



E. C. Stokes

Governor.

STATE OF NEW JERSEY.

Thirty-Fourth Annual Report

OF THE

State Board of Agriculture

1906

Printed by Order of the Legislature.

NEW JERSEY STATE LIBRARY

TRENTON, N. J.
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1907

To the Hon. Edward C. Stokes, Governor of New Jersey:

SIR—In accordance with the act creating the State Board of Agriculture, adopted April 22d, 1884, and with the provisions of the law approved June 15th, 1895, I have the honor to present the report of said Board for the year 1906.

FRANKLIN DYE,

Secretary.

Dated Trenton, November 20th, 1906.

State Board of Agriculture.

OFFICERS AND EXECUTIVE COMMITTEE FOR 1907.

PRESIDENT.

E. B. VOORHEES, New Brunswick.

VICE-PRESIDENT.

JOHN T. COX, Readington.

TREASURER.

WALTER HERITAGE, Swedesboro.

SECRETARY.

FRANKLIN DYE, Trenton.

H. V. M. DENNIS, Freehold.

GEORGE E. DeCAMP, Roseland.

JOHN M. LIPPINCOTT, Moorestown.

STATE CHEMIST.

E. B. VOORHEES, A.M., New Brunswick.

STATE ENTOMOLOGIST.

JOHN B. SMITH, Sc.D., New Brunswick.

MISS JESSIE V. RUE, STENOGRAPHER OF THE BOARD.

BOARD OF DIRECTORS.

BOARD OF DIRECTORS.

NAME.	ADDRESS.	TERM.	COUNTY.
JOSEPH BUTTERHOF,	Egg Harbor City,	2 years,	Atlantic.
L. H. PARKHURST,	Hammonton,	1 year,	"
JOHN F. BOMM,	Westwood,	2 years,	Bergen.
A. G. SMITH,	Wyckoff,	1 year,	"
HOWARD G. TAYLOR,	Riverton,	2 years,	Burlington.
JOHN C. DUDLEY,	Moorestown,	1 year,	"
DANIEL W. HORNER,	Merchantville,	2 years,	Camden.
SAMUEL S. BATTON,	Blackwood,	1 year,	"
RALPH SCHELLENGER,	Green Creek,	2 years,	Cape May.
DR. E. H. PHILLIPS,	Cape May City,	1 year,	"
WINFIELD S. BONHAM,	Shiloh,	2 years,	Cumberland.
ARTHUR SEABROOK,	Bridgeton,	1 year,	"
WM. DEICKS, SR.,	Chatham,	2 years,	Essex.
JOSEPH B. WARD,	Lyons Farms,	1 year,	"
MASON CARTER,	Clarksboro,	2 years,	Gloucester.
JOHN WOLFERTH,	Clarksboro,	1 year,	"
H. E. DEATS,	Flemington,	2 years,	Hunterdon.
W. H. OPIE,	Readington,	1 year,	"
JOHN M. DALRYMPLE,	Hopewell,	2 years,	Mercer.
SAMUEL B. KETCHAM,	Pennington,	1 year,	"
GEORGE W. MOUNT,	Monmouth Junction,	2 years,	Middlesex.
B. DEWITT GILES,	New Market,	1 year,	"
D. HOWARD JONES,	Freehold,	2 years,	Monmouth.
WM. M. MOREAU,	Freehold,	1 year,	"
S. E. YOUNG,	Rockaway,	2 years,	Morris.
GEORGE E. FELCH,	Florham Park,	1 year,	"
ROBERT C. GRAHAM,	Holmeson,	2 years,	Ocean.
C. MILTON RORER,	Cassville,	1 year,	"
LEONARD PIKAART,	Paterson,	2 years,	Passaic.
AARON LAAUWE,	Paterson,	1 year,	"
COOPER COLES,	Woodstown,	2 years,	Salem.
EDWIN L. BORTON,	Woodstown,	1 year,	"
H. S. VANISE, JR.,	Finderne,	2 years,	Somerset
HUBERT T. PHILLIPS,	Plainfield,	1 year,	"
ROBERT O. BALE,	Augusta,	2 years,	Sussex.
ROBERT V. ARMSTRONG,	Papakating,	1 year,	"
J. L. HEADLEY,	Union,	2 years,	Union.
GIDEON E. LUDLOW,	Cranford,	1 year,	"
WILLIAM C. ADDIS,	Delaware,	2 years,	Warren.
CHARLES M. OBERLY,	Shimers,	1 year,	"

OTHER ASSOCIATIONS.

W. HOWARD GULICK,	Kingston,	Princeton Farmers' Club.
W. W. CASE,	Baptisttown,	New Jersey Bee Keepers' Association.
GRANVILLE B. MOORE,	Mount Laurel,	Mount Laurel Farmers' Club.
A. J. RIDER,	Hammonton,	American Cranberry Growers' Asso.

THE THIRTY-FOURTH ANNUAL MEETING

OF THE

NEW JERSEY STATE BOARD OF AGRICULTURE

HELD AT

Trenton, N. J., January 16, 17 and 18,
1907.

REPORT OF PROCEEDINGS.

STATE BOARD OF AGRICULTURE.

Thirty-Fourth Annual Meeting.

FIRST DAY—MORNING SESSION.

WEDNESDAY, January 16th, 1907.

The President, Dr. Edward B. Voorhees, called the meeting to order at 10.45 and prayer was offered by Rev. Dr. George B. Wight.

President Voorhees—The next order of business is the calling of the roll of delegates. The Secretary will call the roll.

Secretary Dye then called the roll, and delegates from nearly all the organizations entitled to representation were present.

President Voorhees—The next item is the order of business.

Secretary Dye—The order of business, friends, is as printed, with the exception that sometime this morning perhaps we will have some remarks by Mr. Sensor, of the Board of Education, on the matter of agricultural education in the country schools; and also by Mr. Rossati, Secretary of Italian Labor Bureau in New York, which seeks to place Italian laborers throughout the country. He may have some report to make, but with these exceptions the program is as printed.

On motion the order of business as prepared by the Secretary was adopted.

ORDER OF BUSINESS.

WEDNESDAY.

First Session.

10:30 A. M.—12:30 P. M.

Prayer.

Calling Roll of Delegates. It is hoped every delegate will be present.

Presenting Order of Business.

Minutes of Last Meeting.

Announcing of Committees appointed:

On Credentials.

On Resolutions.

On Treasurer's Accounts and any other Committees.

11:30 A. M.

Reading of the Executive Committee's Report.

Report of State Grange, George W. F. Gaunt, W. M.

Report of Treasurer, Walter Heritage.

Report of Secretary of State Board.

Discussion of Report.

Introduction of Other Business.

Second Session.

2:00—5:00 P. M.

Report of Committee on Credentials.

Appointment of a Committee, consisting of one member from each county duly represented, to nominate officers for the ensuing year (the members present from each county naming their members of this Committee).

Committee will report when ready.

2:30 P. M.

"The Agricultural College and the Farmers of the State."

By DR. W. H. S. DEMAREST, President State Agricultural College,
New Brunswick, N. J.

3:00 P. M.

"The Importance of Education and Co-operation in Agriculture: Some Lessons from Denmark."

By DR. W. A. HENRY, Dean and Professor of Agriculture, Madison,
Wisconsin.

4:00 P. M.

Annual Address of President of the Board, DR. EDWARD B. VOORHEES.

Third Session.

7:15 P. M.

"Soil Investigation, with Particular Reference to the Soils of New Jersey."

By DR. J. G. LIPMAN, Soil Specialist, New Brunswick, N. J.

8:15 P. M.

"The Insecticides Used in New Jersey and How They are Actually Made and Applied." Stereopticon Lecture.

By DR. JOHN B. SMITH, State Entomologist.

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THURSDAY.

Fourth Session.

9:30 A. M.—12:30 P. M.

Prayer.

Unfinished and New Business.

10:30 A. M.

“Some of the Things Found Out by the Stations on the Feeding of Farm Animals.”

By DR. W. A. HENRY.

11:30 A. M.

“The Present-Day Requirements for the Production and Handling of Market Milk.”

By H. E. COOK, Denmark, New York.

Fifth Session.

2:00—5:00 P. M.

Greetings by the GOVERNOR, HON. EDWARD C. STOKES.

Unfinished and New Business.

2:40 P. M.

“The Farmers’ Relation to the State Agricultural College.”

By DR. G. C. CREELMAN, President Ontario Agricultural College, Guelph, Ontario.

3:40 P. M.

“The Common Diseases of Farm Horses: How Can the Farmer Best Prevent Them and How Treat Them.”

By DR. C. D. SMEAD, Proprietor of Pleasant View Stock Farm, Logan, New York.

“Barn Ventilation.”

By MR. COOK.

Sixth Session.

8:00 P. M.

“The West Indies and Islands of the Old Buccaneers,” introducing over one hundred pictures and twelve moving pictures—a superbly illustrated stereopticon lecture.

By COL. GEORGE NOX McCAIN.

By arrangement with DR. J. M. GREEN, Principal, this lecture will be delivered in the Auditorium of the State Normal School.

FRIDAY.

Seventh Session.

9:30 A. M.—12:30 P. M.

Unfinished Business.

Report of Commission on Tuberculosis in Animals.

10:30 A. M.

“Growing Hay for Market.”

J. G. CURTIS, Rochester, N. Y.

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11:15 A. M.

Address by DR. CREELMAN. Subject to be announced.

12:00 M.

Closing the Business of the Board.

President Voorhees—The next order of business is the reading of the minutes of the last meeting. The Secretary will please read the minutes.

Mr. Bodine moved that the minutes as printed be adopted without reading.

Seconded and carried.

The President then announced the following committees:

Credentials—H. F. Bodine, Albert Repp, Tyler B. Engle.

Resolutions—A. J. Rider, Samuel B. Ketcham, George W. F. Gaunt.

Treasurer's Accounts—J. B. Ward, H. F. Harrison and William Moreau.

Receiving and Entertaining Delegates from Other States—J. M. Lippincott, W. S. Bonham and S. L. Barton.

President Voorhees—The Executive Committee's report will now be presented by Mr. Dennis.

Report of the Executive Committee for the Year 1906.

The Committee has held nine meetings in the interest of the work of this Board during the year. The first meeting, January 19th, immediately following the last Annual Meeting, when George L. Gillingham was appointed to conduct the Farmers' Institutes in the southern part of the State, and John T. Cox those in the northern portion; and Vice-President Cox was chosen temporary secretary during the illness of the Secretary.

The second meeting was held March 5th, at the home of Secretary Dye, when all the members were present. This meeting empowered the Secretary to send communication to our Senators and Members of Congress endorsing the bill for an appropriation to enable the United States Department of Agriculture to aid in subjugating the Gypsy Moth. The Jackson Bill to regulate the

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running of automobiles on the public highways of the State was endorsed by the Committee.

In reference to allowing trolley cars to carry freight, a series of resolutions adopted by the Executive Committee of the State Grange was read by Mr. Cox, and, after due consideration, the resolutions were on motion adopted by this Executive Committee, and a copy certified to be lodged with the Senate Committee on Railroads and Canals, and a committee consisting of Messrs. DeCamp, Dennis, Lippincott and Heritage was, on motion, appointed to co-operate with other similar committees in furthering this legislation.

The Committee took action concerning an exhibit at Jamestown in 1907 by adopting this resolution: "The Executive Committee are in favor of making an agricultural exhibit at Jamestown, providing a suitable appropriation is made for that purpose."

In order to inaugurate short courses in agriculture at the State Agricultural College, the President and Vice-President were appointed a committee to prepare a suitable resolution on this question and furnish each member of the Appropriation Committee with a copy.

The President, Secretary and Mr. DeCamp were appointed a committee on the Agans' resolution to confer with the State Board of Education on the introduction of nature study in rural schools.

Messrs. DeCamp, Dennis and Lippincott were appointed a committee to ascertain to what extent spurious seeds are placed on the market, as per resolution of Camden County Board.

May 22d, met in office of Secretary, who reported action in reference to the Gypsy Moth and that replies had been received from Senators Kean and Dryden.

Committee on Spurious Seeds reported the State Experiment Station had taken up the matter and were prepared to test seeds sent for examination.

The Committee on Automobile Law had done all in their power to secure enactment of a law, and the bill known as the Frelinghuysen Bill was passed.

The President and Secretary were appointed a committee to arrange for a summer meeting of the Board at College Farm, New Brunswick, early in August, and to prepare and send out notices, print program, &c.

The question of holding Farmers' Institutes on railroad trains was referred to the Secretary, with power. January 16th, 17th and 18th, 1907, were selected as the dates for the next (this) annual meeting, and the selection of speakers, arrangement of program, &c., was referred to the President and Secretary.

Secretary reported initial action by the President and himself in arranging for a monthly crop bulletin for general distribution. This action was, on motion, approved.

On August 21st Committee took action relating to the summer meeting held at New Brunswick as follows: "*Resolved*, That in view of the large representative attendance at the summer meeting of the State Board of Agriculture at New Brunswick and the great interest manifested in the work of the State Agricultural College and the Experiment Station, as there expressed, it is the judgment of the Executive Committee that another similar meeting should be arranged for the year 1907." The President and Secretary were requested to prepare report of said meeting to go into next Annual Report. (See close of this report.)

At this meeting appropriation was made to the several County Boards and the State Horticultural Society, as per Treasurer's report. Mr. John M. Lippincott and the Secretary were appointed delegates to the next meeting of Farmers' Institute Workers, November 12th-14th, and Vice-President Cox was appointed to conduct the Institutes occurring during the absence of Secretary.

September 27th, Secretary reported that the Annual Report had not yet been received, and suggested some action calling the attention of the State Printing Board to the delay. President reported he had nothing new to report concerning the Jamestown Exposition.

Secretary expressed his desire to have two concise articles prepared, one on the Cranberry Industry in New Jersey, and one on Asparagus Production. The matter was favorably considered, but action deferred to next meeting.

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October 10th, the Committee took this action concerning the delay in printing the Annual Report: "*Resolved*, We earnestly request the State Printing Board that future reports of the State Board of Agriculture be submitted for printing to a firm that will execute the work within a reasonable time and in a workmanlike manner. We protest against sending any future report to the News Printing Company of Paterson."

President Voorhees read letters from Col. Lewis T. Bryant, Secretary of the New Jersey Commission for the Jamestown Exposition, concerning an appropriation for use of this Board for an exhibit, whereupon it was unanimously "*Resolved*, That the State Board of Agriculture co-operate in the preparation of an exhibit showing the agricultural features and conditions of the State by means of maps, diagrams, photographs and also the preparation of a hand-book, which shall give in detail the agricultural features of the State and opportunities offered in the different counties. Said hand-book to contain also an article on the geological formations and on the manufacturing interests, similar to the hand-book of 1901.

"That the preparation of this exhibit be undertaken, provided the Exposition Commissioners will allow a sum of two thousand dollars for the expenses, not including transportation and maintenance of a booth; and that this amount be placed in the hands of the Treasurer of this Board, in order that bills may be paid promptly when incurred." The President and Secretary were appointed a committee to confer with the Commission in reference to an exhibit.

Attention was called by the President to the Italian settlers in south Jersey: their general character, their methods of bringing into productivity our lighter soils, &c., and it was deemed advisable to make special inquiry along the lines named; whereupon the President was authorized to prepare a general plan or scheme covering such investigation and report later to the Executive Committee.

Committee approved the purpose outlined by the Secretary as to preparation of bulletin on cranberry and asparagus production, and he was authorized to proceed if possible and have the articles

prepared. Dr. Voorhees was, on motion, added to the committee to attend meeting of Farmers' Institute Workers at Baton Rouge.

Meeting of October 26th, Secretary reported he had communicated with Col. Bryant, both by letter and also in person. That Mr. Bryant stated he would let us know within a few days the action of the Commission as to an appropriation for exhibit at Jamestown. Report accepted.

President Voorhees reported a plan (see outline on file) in investigation of the character, condition, methods of work and progress of the Italian immigrants in the southern part of the State. Plan outline was considered and accepted and the President and Secretary appointed to secure a proper person to make such an investigation.

Mr. E. L. Dickerson was appointed assistant to Dr. Smith for the ensuing year, and Miss Augusta E. Meske clerical assistant; both terms to begin with November 1st, 1906. Bills covering the expenses for the fiscal year, closing with October 31st, were then made up, the same to be presented to the Comptroller for payment.

The final meeting of the Committee was held January 15th, 1907, at the State House, when the program of this meeting was presented and accepted, and other business of importance transacted.

REPORT OF THE SUMMER MEETING.

The First Summer Meeting and Field Day of the State Board of Agriculture was held at the College Farm (the Experiment Farm of the New Jersey Experiment Station), Friday, August 17th. The day was all that could be desired, and the attendance was estimated to be 800 persons, representing every county in the State, and many from adjoining States.

The programme included a list of speakers, as well as a general description of the work conducted at the farm, together with a detailed plan of the plots, copy of which is herewith printed.

The addresses were brief but to the point and were much appreciated by the audience. The President of the State Board of Agriculture, who is also the Director of the Experiment Station, welcomed the guests on the part of the Board, and, in order that the visitors might have a more intelligent knowledge of the ex-

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periment work, discussed the question of Experiment Station work from three standpoints, viz.: First, the police work, which has to do with the inspection of fertilizers, feeds, insecticides, seeds, etc., showing, by example, that a great amount of good has been rendered to the farmers of the State; second, the role of the Station in conducting demonstration experiments, in the carrying on of this work, which is largely educational in its character, giving examples of work that has been conducted at the farm, in the field and in the dairy, and then pointed out the much greater importance of the purely investigational work, which was carried out at the farm mainly in the line of plant breeding and soil improvement studies.

He also pointed out the necessity, if farmers were to be benefited by this work, of a knowledge of the principles underlying this work, and called attention to the establishment of the Short Courses in Agriculture for the farmers' sons, which are to be inaugurated in January, 1907. He complimented the farmers of the State very heartily, in reference to their co-operation with the Station and College, and also felicitated them on the harmony of the relations of the various State organizations, and particularly welcomed the ladies, who were there in large numbers.

The new President of the College, Dr. Demarest, was then introduced and in a few, well chosen words, welcomed the farmers on the part of the College, assuring them of the hearty co-operation of the College in the promotion of the education of the farmer, and congratulated them upon their success in the past, and urged strongly that they remember that it was their State College, and that it was now being liberally supported by the State, and that it was prepared not only to fit their sons for the profession of farmer, but, also, for other professions. His words were received with applause, and many expressions of delight were made, and the hope expressed that his administration would be successful in every way.

Secretary Dye was then called upon. He spoke briefly of the impoverished condition of New Jersey farm lands and lack of the essential knowledge to improve agricultural conditions prior to the discovery of the marl deposits of the State and their value in improving the soils so long robbed of plant food. And, later, the

advent of agricultural chemistry and the organization and establishment of Experiment Stations and Agricultural Colleges. These latter had lifted the business of agriculture from one of guess work to a profession of intelligence; showing that a knowledge of foundation principles is necessary to secure highest results.

He referred to the early work done by the late Dr. George H. Cook and now so successfully carried forward by our Professor of Agriculture, Dr. Edward B. Voorhees, and predicted a great advance in the future agriculture of New Jersey under his administration, provided the farmers of the State, individually and through our several agricultural organizations, earnestly co-operate with him in this work.

Brief addresses were also made by Dr. Lipman, the Bacteriologist of the Station, and by Mr. Billings, the Dairy Husbandman, who is in charge of the experiments at the farm.

The remainder of the day, or from 1 to 4 o'clock, was spent in inspecting the experiments, and many expressions of delight were heard, not only concerning the benefits which they had received from the Station in the past, but from the very great satisfaction that they derived from seeing the work actually performed. Altogether, it was a red-letter day for the farmers of the State, for the Station and for the College, and seemed to augur well for the future usefulness of this institution.

The building for the Short Courses in Agriculture was in process of erection on the farm, and much interest was manifested in this matter. There is probably no State in the Union in which the farmers of the State are more closely identified with the Station than in New Jersey, due to the influence of the Farmers' Institutes, the State and County Board meetings.

It was an enthusiastic audience, and one which evidently came to obtain all that was possible from the day.

ORDER OF BUSINESS.

First Summer Meeting and Field Day.

11:00—12:00 A. M.

Address by DR. E. B. VOORHEES.

Address by DR. W. H. S. DEMAREST, President of the College.

Address by FRANKLIN DYE, Secretary.

Addresses by Members of the Experiment Station Staff.

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12:00—1:00 P. M.

Lunch.

1:00—4:00 P. M.

Inspection of Farm, Dairy and Field and Plot Experiments.

GENERAL DESCRIPTION OF EXPERIMENTS CONDUCTED ON PLOTS SHOWN IN PLAN FARM.

The College Farm became a part of the equipment of the Experiment Station on April 1st, 1896, and since that time it has been used for experiments in three main lines, viz: (1) Dairying, (2) Horticulture, (3) Plant Breeding.

(1) For the study of dairy problems, namely, the soiling system, forage and crop rotations, a large part of the farm was divided into acre plots, hence all experiments are on the basis of an acre, or a multiple thereof—over fifty of these plots are used. Plots 16 to 26, inclusive, have been used since 1896 for the study of forage crop rotations, and during the ten years usually two or more crops per acre have been harvested each season, though plots A to F, inclusive, and P and Q, have been used in part for this purpose. The remainder of the farm has been used for fertilizer or crop experiments, as conditions permitted.

The following tabulation shows the crops grown, growing, or to be grown, on the plots this year, and is a fair guide as to the character of the cropping that has preceded:

SCHEME OF CROPPING FOR 1896.

<i>Plots.</i>	<i>First Crop.</i>	<i>Followed by:</i>	<i>Followed by:</i>
1 to 4,	Peas and oats,	Mixed grasses.	
5 to 15,	Timothy and clover,	Second crop.	
16 to 17,	Oats and peas,	Alfalfa.	
18 to 19,	Alfalfa, seeded in 1903.		
20 to 21,	Alfalfa, seeded in 1903.		
22 to 23,	Alfalfa, seeded in 1901.		
24,	Alfalfa, seeded in 1897, re-seeded in 1901.		
25,	Oats and peas,	Cow peas,	Crim. Clover.
26,	Wheat,	Kaffir corn and Cow peas,	Crim. Clover.
27 to 28,	Alfalfa,	Millet,	Rye.
29,	Oats and peas,	Alfalfa.	
A and B,	Wheat,	White flint corn,	Crim. Clover.
C and D,	Rye,	Cow peas,	Rye.
E, F, G,	Crimson clover,	Corn,	Wheat.
H, I,	Rye,	Corn,	Crim. Clover.
J, K, L,	Crimson clover, (turned under),	Corn,	Rye.
M, N,	Rye,	Millet,	Crim. Clover.

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<i>Plots.</i>	<i>First Crop.</i>	<i>Followed by:</i>	<i>Followed by:</i>
O, O',.....	Rye.....	Cow peas.....	Crim. Clover.
P, Q,.....	Crimson clover.....	Corn,	Crim. Clover.
R, S, T, U,			
V, W, X,			
Y, Z,.....	Rye (turned under),.....	Corn,	Rye for cover crop.
14-acre tract,	Corn,		Rye for cover crop.
Triangle			
tract,.....	Grass.	Cow peas.....	Rye for cover crop.

Records have been kept of all operations, as well as the income and outgo of plant-food, which furnish data for the study of soil improvement and of dairy problems from the financial standpoint. The herd, which has averaged about forty-five head, and includes four different pure breeds, is used for feeding and breeding experiments, and for a study of the variations that occur in the yield and quality of milk of different animals, and of the methods of handling and using manure.

(2) The area in horticultural experiments includes five acres, which is divided into small plots, and has been used for the study of the effects of different fertilizers, and of irrigation upon different varieties of asparagus and other vegetables, and of berries and tree fruits. The greenhouses have been used for the study of methods of winter culture of tomatoes and other hot-house vegetables.

The cylinder and pot experiments for the study of the availability of different fertilizers and manures, and methods of soil improvement, are also included in this department.

(3) The large area, Botany, opposite the barn, contains two acres, and is divided into small plots, and has been used, since 1895, for studying plant diseases and for experiments in plant breeding. The vegetable crops, beans, peas, corn, tomatoes and egg-plants, are used in these experiments. The narrow strip, marked botany in the main plan, is also used for experiments in plant-breeding.

In 1905, the area in which plots 30, 31 and 32 are included, was acquired by the College, a part of which has been devoted to experiments in botany and horticulture, as indicated, and the remainder for variety tests of cow peas, soy beans, Kaffir corn, millet, alfalfa, vetches, fodder beets, etc.

President Voorhees—Gentlemen, you have heard the report of the Executive Committee, what is your pleasure in the matter? I may say that heretofore there has been a Committee appointed on Officers' Reports, but it seems that the work assigned to that one committee was so great as to prevent them from giving the reports of the various officers the attention that should be given them; therefore, this year, no Committee on Officers' Reports has been appointed, and if any action is taken upon the report, it will

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be taken upon the floor or we will refer the report to a Special Committee, as the Board may think best. The report is before you for your action.

On motion the report was accepted, to be included in the Annual Report.

President Voorhees—The next order of business is the report of the State Grange, by G. W. F. Gaunt.

Mr. Gaunt then made a verbal report which was much appreciated, and stated that the written report would be sent to the Secretary later.

President Voorhees—We are very glad to have this most admirable report and I hope we shall have it in printed form. What action will you take?

Secretary Dye—I move that the report when submitted be referred to the Executive Committee for printing in the Annual Report. Seconded and carried.

Secretary Dye—I would like to offer the certificate, duly signed by Edward Darnell and Secretary Borton, that Mr. Granville B. Moore was appointed a delegate from the Mount Laurel Farmers' Club to attend this meeting.

On motion Mr. Moore was admitted as a member of the Board.

President Voorhees—Mr. Walter Heritage will now make his report as Treasurer.

Mr. Heritage then read the Treasurer's report, which is as follows :

REPORT OF WALTER HERITAGE, TREASURER, FOR THE FISCAL YEAR ENDING
OCTOBER 31ST, 1906.

TRENTON, N. J., January 16, 1907.

Dr.

Total amount received from Comptroller during the year, \$5,920 75

Cr.

1906.

January 19.	By Delegates' expenses at Annual Meeting..	\$413 38
	Speakers and expenses,	424 41
	Executive Committee and Speakers' bill at	
	Trenton House,	60 00

STATE BOARD OF AGRICULTURE.

Stenographer's bill at Annual Meeting,.....	\$69 00
Janitor and lantern service,	34 00
Appropriations to County Boards of Agriculture,	1,167 50
Appropriation to State Horticultural Society,	300 00
Express company's bills,	66 85
Packing Annual Reports,	10 00
Postage stamps and postal cards,	185 00
Executive Committee's expenses,	292 89
Expenses of Farmers' Institutes,	2,633 95
Printing and Atlas of New Jersey,	39 68
Expenses of Field Meetings, New Brunswick,	224 09
	————— \$5,920 75

President Voorhees—You have heard the report of the Treasurer, what is your pleasure?

It was moved and seconded that the report be received and referred to Committee on Treasurer's Accounts and be incorporated in the Annual Report. Carried.

President Voorhees—The next order of business is the report of the Secretary.

Secretary Dye—First of all, my friends, I want to express to you my personal thanks for my election as your Secretary last winter, when I was lying on my back at the point of death. Part of the time I was sufficiently conscious to know of some of your doings, but later, of course, I had the minutes in my hand. I hope you will accept my sincere thanks. I am glad to be here this year. (The Secretary then read his report.)

Mr. President and members, I thank you for you attention.

President Voorhees—Gentlemen, you have heard the very comprehensive report of the Secretary of the Board, what is your pleasure?

On motion the report was adopted, to be incorporated in the Annual Report.

(See report and discussion following.)

Mr. T. D. Sensor, of the State Board of Education, was then introduced and spoke on the work of the Board of Education referred to in the Secretary's report.

(See report of Secretary.)

Mr. Rossati was then introduced by the President and addressed the Board on the subject of Italian labor, referred to in the Secretary's report.

Mr. Rossati—Mr. President and gentlemen of the Board of Agriculture: I desire to draw your attention to and solicit your interest in the Labor Information Office for Italians, a free Labor Bureau established last spring in New York city by an association of American citizens with the moral and financial support of the Emigration Department of Italy.

The objects of this institution are to promote a better distribution of Italian immigrant labor throughout the States, to secure to the laborers and employers a common ground where the demand and supply of labor can meet with mutual advantage and without interested intermediaries, thus avoiding the evils of the "padrone system," and to encourage Italian immigrants to settle in the agricultural districts of this country.

As you see, its objects are in accord alike with the interests of this country as well as with those of the immigrants themselves.

It is the consensus of opinion among enlightened economists that the much debated problem of immigration is chiefly one of distribution of the immigrants. Efforts must be made to prevent their crowding the already congested tenements of our large eastern cities, and to send them out to those sections of the country where they are mostly needed, and where they will find greater opportunities of endeavor.

To promote the settlement of immigrants in the country districts, beginning from the stage of farm help to become in progress of time farm owners, is a step in the right direction, all the more necessary with the modern tendency of people to centralize in the cities to the detriment of agriculture, and with the consequent and ever increasing scarcity of farm help.

It is along these lines that the Labor Bureau, of which I am in charge, is working. Although scarcely established eight months, it has already supplied the farmers of this country with about 350 hands. This figure may seem small even for a beginning, but it must be considered that the supply of farm help for

a Labor Bureau confined to Italians and drawing its applicants not from Ellis Island but from the city of New York, is in the face of the huge demand of labor of other kind better paid, such as railroad and construction work, much in the nature of missionary work.

This is best illustrated by comparing it with the fact that in the same period 4,360 men were secured employment by this office in other departments of labor, making a total of employed of 4,701 against 10,077 applicants.

In order to understand the difficulty for a labor bureau of supplying the farmers with help, it is necessary to consider on their merits the conditions under which farm employment and its chief competitor in the labor market, railroad employment, are offered.

While most of the Italian immigrants are originally farmers, and would naturally prefer to pursue in this country the occupation in which they have been brought up, still they are induced by the higher wages offered by the contractors to forget the spade for the pick and shovel.

The minimum wages offered by these contractors is of \$1.50 per day for ten hours' work, which means in a month (of about 26 working days) \$39.00, from which we must deduct at the most from \$7 to \$9 for board and lodging, leaving a net income to the laborer of \$30.00 per month. The farmer can only offer him about \$20 a month, besides board and lodging. Furthermore, the farmers charge transportation, while the contractors allow free transportation, provided the laborers remain at work for several months (usually from four to six), and the hours of labor are much longer in the case of farm work, viz.: from sunrise to sunset, compared with the ten hours on the other work. Against which, however, might be stated that the railroad work is more intense and less pleasant than farm work. Another inducement to prefer the railroad work is in the fact that the laborer under such conditions is supplied with food, which, though probably not as wholesome as the farmers' fare, still is prepared according to his taste, and has moreover the social advantage of living in company with his countrymen. On the

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contrary, on the farm the Italian laborer is usually isolated as to language and company.

When a farmer gives employment to a laborer at say \$20 per month, besides board and lodging, he requires an efficient hand. In plain truth the majority of the immigrants, although healthy, strong and willing to work, represent, however, a raw material as to farm knowledge, and this mainly owing to their ignorance of the language and the difference in the character and mode of agriculture here and abroad. Most of them come from the southern provinces of Italy, where agriculture is chiefly arboreal (grape-vines, olives and fruits), with comparatively little cattle, and labor chiefly manual, while here in the East agriculture is mainly in dairy products and truck farming, with the use of improved machinery. For these reasons they are rather unwilling to accept the farmers' offers.

When the farmers accept them at these conditions, they are compelled to break them in before they can obtain the required efficiency, and I need hardly remark that this period of novitiate is rather unpleasant both to the farmer and the help, and does not always end successfully.

The problem for the farmers is to develop some system whereby they could improve this raw material and secure it for themselves, thus turning the tide of immigration to the farms. Since we get these men and must utilize them as they are, some system of educating them to the main points of agriculture as practiced in this country should be devised, established on such lines as to impart them the knowledge required and at the same time remunerate them for their services.

It occurs to me that the State Agricultural Experiment Stations, which have already done much to the benefit of the farm and the farmer, could render valuable service by turning their attention also to the problem of farm help, which, on the face of the present scarcity of efficient labor, is becoming daily more engrossing.

I venture to suggest that by establishing in connection with the Experiment Stations training schools for farm help, organized in such manner as to be self-supporting and to afford a brief period of practical instruction to these immigrants, enabling them to be

paid for the work done while learning, a kind of nursery for useful farm hands would be created, from which the farmers could draw with confidence the help required.

By working intensively a farm of say 1,000 acres, 200 hands could easily receive a two-months' course of instruction, which, in six months of available farm work, would enable the education of about 600 men. Either by shortening the period of instruction or increasing the area, the output of experienced farm help could be materially increased.

Our office would be only too glad to assist such an enterprise by supplying to it the immigrants. I may state that during the last summer we supplied about thirty farm hands to farmers of this State, most of whom have given satisfaction and have been satisfied themselves. We try to reach the farmers and learn their wants by advertising in the agricultural papers, and are willing at all times to do our best for them. We will heartily endorse any plan they might suggest that will benefit the Italian immigrants and the farmers as well.

We are pleased to send our immigrants into this State, where so many farmers of Italian extraction are already thriving and prosperous, for we are sure that a square deal awaits them. In the propaganda we have undertaken for sending the Italians on the farms, we are encouraged by the conviction that the future is for the tiller of the soil, and that by making farmers of them they will develop into better American citizens.

I do not object to the padrone system, but I object when the padrone system is exercised in such a way as to suck the money away from these people. Many of these padrones are nothing less than suckers. They overcharge for the food they give these men, and they do not give them the right kind of food. We see that the enterprises, the contractors or the big companies who carry out the work organize themselves. We want to see their laborers treated more humanely on proper lines, and we want to see a higher standard than there is at this time. We believe as the employers and employes come more in contact it will be better for both. I think the cause of the laborers will be studied more in the future. We are most desirous of sending Italians to the farms of the United States; we see there is a great future for the

farmers. The farmer is the most independent man. There can be no doubt that the future is brilliant for the farmers of this country, so that the desire of the officers to send the Italians on the farms is justified from all points of view. I am ready to answer any questions anyone wishes to put to me.

Mr. Bagley—I would like to ask if there is any method of teaching these Italians, these foreigners, the language of this country. The great trouble with us in getting help is, you have to tell them what to do, and stand right by them and point out, and do things with them all the time. They do not make any effort to learn. Does this organization of yours do anything to encourage them to learn the language of this country, that they may become efficient men for us, that we may be able to offer them the wages they demand. Now, \$20 a month to a man on the farm is much more than he can get, with the education he gets with it, in any other employment in the country. The education he gets with that work is double what he gets on a railroad.

Mr. Rossati—I quite agree with you on that point. It is a great benefit for him in getting that education. We would like to establish a system so they could learn the names of the various agricultural implements. Of course they would have to have an interpreter. We would have to organize a system in such a way that the men would get paid for their work—that is, for the actual work they had to do—so they can live; these people have to live, and receive some money for it. Probably also organize it in such a way as to provide food for them that is suitable. I desire to make known that the address of the Labor Information Bureau is at 59 Lafayette street, New York, just behind the New York Life Building. If anybody wishes help, and will signify to me their wants in the matter of agricultural labor, I will be pleased to make a note of it, and let them know later on what we can do. We take the greatest care in supplying only men that are fit for the business to which they are called and supplied for. We do our best to send out good hands, and the services of the bureau, as I have told you, are intended both for the applicants for help and for the applicants for employment.

A gentleman asked, how is it that there are not many families coming here from Italy, and said that the families are really very

desirable in the line of agricultural employment? The fact is, that the greatest part of the immigration is represented by able-bodied men, who go out into the world to see how they can get along, and so they leave their families and children, and as soon as they find out what a good thing America is for them they send on the money in order to get their wives and children and bring them into this country.

We have in the office several applications for families, and, of course, we should like to be able to fill more. If we do, we will have more applications on the part of families for employment.

There is another point. The families are much sought after in industrial work in factories. There is a great demand upon the part of factories for girls and young men. We think the young men should be left in school, and not put to work in the factories, and so we do not send out young men. What we send out are able-bodied men, adult laborers. We think the young men should be left at school, and get well founded in body and mind before they are put to work.

I shall be pleased to assist the farmers in procuring the labor they want. I thank you for your attention and for the opportunity offered to speak to you.

Mr. Dye—Mr. President, I would move a vote of thanks to Mr. Rossati. He has come here voluntarily and at his own expense to explain the working of the bureau, and I hope the farmers, when they go to New York, will call in and have a talk with him, as in this way something, no doubt, will develop to the advantage of all concerned.

The vote of thanks was seconded and carried.

Then, on motion, Board took recess to 2 o'clock P. M.

AFTERNOON SESSION.

The Board reconvened at 2 o'clock P. M., President Voorhees in the chair, when, for the assistance of the Committee on Credentials, the Secretary called the roll of delegates.

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President Voorhees—The next order of business is the appointment of a committee, one member from each county, to name the officers for the ensuing year. The Secretary will call the roll. The Secretary then called the roll of counties and the delegation named its appointee, as follows:

- Atlantic County—A. J. Rider.
- Bergen County—A. J. Smith.
- Burlington county—Horace Roberts.
- Camden County—Samuel Batten.
- Cape May County—Dr. E. H. Phillips.
- Cumberland County—W. S. Bonham.
- Essex County—Dr. J. B. Ward.
- Gloucester County—John Wolfert.
- Hunterdon County—W. H. Opie.
- Mercer County—Aaron D. Anderson.
- Middlesex County—B. DeWitt Giles.
- Monmouth County—W. M. Moreau.
- Morris County—No response.
- Ocean County—Aaron Laurve.
- Salem County—M. J. Ware.
- Somerset County—Gilbert Phillips.
- Sussex County—Albert B. Armstrong.
- Union County—Gideon E. Ludlow.
- Warren County—Charles M. Oberly.

President Voorhees—The Resolution Committee requests that all resolutions to be presented be handed in before noon tomorrow.

Secretary Dye then read resolutions Nos. 1 and 2, and they were, on motion, referred to the Committee on Resolutions.

The next order of business was an address on "The Agricultural College and the Farmers of the State," by Dr. W. H. S. Demarest, President of the State Agricultural College and President of Rutgers College. (See address.)

President Voorhees—It gives me great pleasure now to introduce to the members one whom many of you know, and you will be glad to hear a word from him—our former Secretary, Mr. Wm. S. Taylor, who twenty years ago left the Board. He comes back to us to-day and will say a few words to us.

Mr. Taylor—Mr. President and members of the Board: I can assure you, it gives me great pleasure to come back and be with you, for I have watched the growth of the Board and the good work you have been doing since I left you, with a great deal of interest. It is nearly twenty years now since I took an active part here, and from year to year I have taken a great deal of interest in receiving your reports and reading what you are doing.

This Board is the first move of the farmers in the right direction, toward looking after their own interests. Before it started, in the early history, I might say—I see many of my old friends here and many I don't know—that for nearly twenty years I was a farmer here, interested in agricultural matters, and I took a very great interest in trying to assist the farmers so that they would be able, as I said before, to look after their own interests.

In the early history, we had farmers' clubs and they were valuable, but at the same time they didn't get together in any way. The State made an appropriation and organized a State Board, I think in 1873. When I first attended I represented the Farmers' Club at Burlington at that meeting, which was up in some little third-story room here, I don't know exactly where the room was now, the State House is so changed. There Dr. Cook was engineering this little Board as it had started. It had run for several years, I think two or three. Thomas Dudley took quite an active interest in agricultural matters, he was there. Old John Halstead was interested in the State Agricultural Society (Waverly Fair), and Professor Atherton, of Rutgers, he was there too, and took quite an active interest in it.

At the time I took the most interest was after the starting of the Grange, which I always felt was the most important step the farmers ever took. I was glad to see that President Roosevelt in his message gave them some credit for the work they have done among the farmers. This Board owes its existence more to the Grange than to any other movement that was made.

At the meeting I refer to our Farmers' Club was dead, but we had organized a Grange, and when they asked me what I represented, I said "I represent the Grange." and I was told they did

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not recognize Granges, that they had nothing to do with that organization and they would not recognize me. I said, "I don't represent anything else." "Very well," they said, "we will put you down as representing the Farmers' Club." I remember an article was read by Dr. Cook, and he was always interesting. There were one or two other matters and then we had dinner and went home. I think we met about 10 o'clock in the morning and got through as soon as we got through dinner. That was the State Board of Agriculture at that time. At the meeting of the State Grange, I think probably in the winter following—I am a little rusty on dates which go back twenty years or more—I remember very distinctly Mr. Cox and a few others were there, somebody got up and offered a resolution that the Legislature be petitioned to dispense with the appropriation they had been making to the State Board of Agriculture, as it was absolutely useless and the farmers didn't care to have it.

Well, I took issue on that. I said, this is the chance now. Finally, that prevailed and at the next meeting began this organization, this Board. Edward Burroughs, whom we all respect very highly, was the first efficient President. Mr. Dye was our Treasurer and I filled the position of Secretary. The work started from that time. We started in, I think, at once, with two days' sessions. The farmers took a great interest in it and among the first things we started was a movement toward good roads, and that is the thing I have looked back to with so much pride, that this Board started the good roads movement in New Jersey, and the other States throughout the United States are following our example.

Another thing you have the first Experimental Station in the United States and that was followed by the other States. I took quite an interest in that. I had the honor of being President of it for a while and was a Visitor to the College, appointed by the Governor, for a number of years.

The farmers began to appreciate, year by year, the value of organization and of meeting together. That is what I always wanted, to have them get together and communicate their ideas to one another.

I can remember the time in Burlington county when we had our first meeting. Many a man could not express an idea who afterwards became one of our best speakers. They had the idea but hadn't the power of communicating it to others. They gradually acquired it, and the steady growth of this Board should be a matter of great encouragement to you. As I say, I am only too glad to have the opportunity to come again to see you and see a number of my old friends who are here and make the acquaintance of others who are carrying on the work to-day. I thank you gentlemen. (Applause.)

The President—We are very glad to have these reminiscences from an old member of the Board. It is a good thing sometimes to go back and see where we came from and follow the lines of development. I think, as our former Secretary has said, it must be a matter of great gratification to all those originally connected with the work to see the development that has been made in all these years, and see how the Board has stood for the good things for the farmers; for education and all those things which make the farmer himself better and make him more efficient as a citizen.

If there are any more who would like to reminisce for a few moments, we would be glad to have them do so. If not, I want to say, that for a number of years it has been the desire of the Executive Committee to have with us a gentleman, not only well known in his own State but who is a teacher in all States along certain lines, one of the leading agricultural workers in the United States. It gives me very great pleasure to introduce to you Dr. W. A. Henry, of Wisconsin.

Dr. Henry—Ladies and Gentlemen and Members of the State Board of Agriculture: It is, indeed, a pleasure for me to be with you. Secretary Dye and myself have been trying to arrange for such a meeting for five years, and at last I have arrived.

I, too, can reminisce here. My mother was Jersey born. She was married in this State, and of that marriage four children were born. Then father and mother moved to Ohio, two were born there, and I was the oldest of those born in Ohio. I went

both East and West for my education, and, I have been connected with the University of Wisconsin in agricultural work for twenty years. One child, my son, I left to come down to attend this meeting, and where do you suppose I left him? On a farm in Connecticut last night. I state these things to show you that I am interested in Eastern agriculture. I expect to be with you during the whole meeting, and there may be some things I will have to say later on the subject which appears on the program, but I would like to treat of another topic that I will announce later.

In running the Agricultural College at Wisconsin, I always study what others are doing, and I am never satisfied with what I am doing. What success I have had is due to that. I am never satisfied with my own work, I have always seen somebody else doing something better than I was, and I could always go somewhere and learn something.

Sitting in front of me is a gentleman who will address you tomorrow and who represents a people who have much push and have made much progress. President Creelman is going to tell you of a wonderful people who have done wonderful work, but I propose to tell you of Denmark, where, under peculiar circumstances, they have overcome almost unsurmountable difficulties, and have become not the largest nation, but, for a little nation, the most agriculture people we can point out. I will now read to you the paper which I have prepared. (See paper.)

Vice-President Cox then took the chair, and the President delivered his annual address, which was received with applause.

Mr. Rider moved that the excellent address be referred to the Executive Committee to be printed in the Annual Report. Carried. (See address.)

Adjourned to 7:15 P. M.

EVENING SESSION.

At 7:15 P. M. the Board was called to order by the President, who introduced Prof. J. G. Lipman, Soil Specialist, New Brunswick, N. J.

Prof. Lipman read a valuable paper on "Soil Investigation with Particular Reference to the Soils of New Jersey," which was, on motion, referred to the Executive Committee to be printed in the Annual Report. (See paper.)

At 8:15 Dr. John B. Smith, State Entomologist, was introduced and gave a very interesting and suggestive stereopticon lecture on "Insecticide Experiments and Spray Practice in 1906." (See paper, also Report of State Entomologist.)

SECOND DAY.

TRENTON, N. J., January 17th, 1907, 9:30 A. M.

President Voorhees—Is there any unfinished or new business? I will appoint a committee to wait upon the Governor. We expect to have him here at 2 o'clock. I shall appoint as that committee Messrs. Charles Collins, W. S. Bonham and John T. Cox.

Mr. Rider—As the Secretary of the Committee on Nominations is not here I will report that the committee nominate the present officers of the Board, including our President, for the ensuing year. (Applause.)

Moved and seconded that the report be accepted and that the action of the committee be concurred in. Motion carried.

The President—Thank you. If there is no objection we will take up the regular programme at once. The first order is the address of Professor Henry, on "Some Things Found Out by the Station on the Feeding of Farm Animals." I have no doubt that Professor Henry has suggestions on some other lines also, and he

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is at liberty to change his title as much as he pleases, so long as he talks as well as he did yesterday.

Professor Henry—Mr. President and Ladies and Gentlemen: I gave to some of the members this morning a little picture-book, and I did it for this reason, I do not care to advertise the Wisconsin Agricultural College here in New Jersey at all. I have no reason to do that. We have more students than we can take care of. If a farmer's boy wishes to take a short course we charge him \$7.00, which includes blacksmithing and carpentering. If a boy comes from New Jersey or from the East, we charge him \$42.00. You say, "Why do you charge so much?" and we say, "We don't want you." The same way with the Dairy School. We have 150 students in our Dairy School, where they are learning to make butter and cheese. We charge a boy from New Jersey \$52.00 for twelve weeks, and then he has to pay all his other expenses besides. You say, "Why do you charge so much?" Because we don't want you. We charge a Wisconsin boy \$7.00. I left 200 students there, and on February 5th I expect 500 farmers under 25 years of age to come and stay ten days, and when they come there I shall have over a thousand people that are in Madison at one time studying agriculture. You can easily see that I don't care to go out and advertise.

Why do I bring the book here? I want to help Dr. Voorhees build up his agricultural school. I have worked 27 years in Wisconsin. My school was the laughing-stock in a way. They were very kind to me, but you know how in a family they will make fun about John or Mary,—not that they don't like them, but they think they are a little foolish about some crochet, and they thought I was a strange fellow and very foolish to give up my professorship in botany to teach agriculture; to live and work with the farmers; and my worst enemies, in one sense of the word, were my friends, the farmers. You know how they did, sneered at me, laughed at me and then they expected results. I have had them come again and again and say, "Professor, when you can make this farm pay then you will demonstrate to us that you are worth the salary. What did that butter cost per pound?" I said, "That butter is costing \$5.00 per pound." "What are you getting

for it?" I said "We are getting about 22 cents for it." "Oh," he said. Then I explained that it was an experiment, and we were not trying to make the farm pay. If I made the farm pay I would be worth the salary of a farm manager, but we were trying to find out some things about farming.

They don't ask such things now. That was 25 years ago. Now, if you want these picture books, write your name on a piece of paper and say "picture," and it will be mailed to your home. I don't want to make comparisons, but I want you to see what we are doing. There is a \$400,000 building for agriculture. My current expenses are over \$750.00 per day for running this school. I have some business on my desk. There are over forty teachers there at work in agriculture. There are seven men teaching animal husbandry; there are nine men teaching dairy, and I want you to get the idea that we out West are working, and my school is not the biggest one; you want to go to Iowa if you want to see big things, and we are doing those things all over the West. The farmers are putting their money in it because they are drawing big percentage on their investment. Take New York; the Legislature last year gave Dr. Bailey \$100,000 more income. He is going to get \$100,000 more each year to run his school. New York is just waking up. Here is Mr. H. E. Cook and Dr. Smead, who know what has been done there. Now, if New York has given \$100,000 for current expenses, and has just given a quarter of a million for one building, what is New Jersey going to do for this man who has stood by you and grown gray in the work? Is he not as good as Dr. Bailey and the others. God bless him; he has got brains and push and you must stand by him. Down in Illinois they spent \$25,000 studying how to feed steers, \$10,000 for horticulture, \$15,000 for dairying—\$85,000 just for research. They have about \$200,000 to run their agricultural college; that is more than we have in Wisconsin.

I tell these things to you, for you are just as smart, but you haven't got the best yet. There are farmers here that sell more than any farmer in Wisconsin. We are a State of small farmers. We are a little like the Danes: we have to do it. Our land is worth about \$100 per acre. There is no trouble with you here,

but you haven't got the best. Now, I tell you it is up to New Jersey. Twenty-seven years ago I went to Canada to study what they are doing, and I go there every few years to study. In Canada they have a most beautiful agricultural college; they have hundreds of acres in farms, and Dr. Creelman, the President of that institution, will talk to you about his school, and I only advertise it a little in advance, so you may get an idea what that man represents. I have this picture-book here, because we often learn more from our eyes than any other way. Look at our flocks. We pay the shepherd \$1,400 that takes care of our sheep. He won \$680.00 in prizes at the live stock show last month in Chicago.

Secretary Dye—That pays half his salary.

Dr. Henry—Yes, sir; and advertises the school. Forty sheep won \$680 in prizes, and those sheep are what the boys work with and study them. What is it worth to have a man that can handle them like that?

We have got three stock-judging rooms, and we have an appropriation for \$25,000 for more rooms. We sit in them, and the sheep, horses and cattle are led in, and the Professor stands there and talks. The room is steam-heated and electric-lighted, and has a skylight so that when the sun shines there are no shadows on the animals. There the Professor works with the boys and the boys study the sheep. We have \$25,000 worth of live stock on the farm. The Legislature gave us \$10,000 at one time to buy stock with. There are farmers there that loan us horses worth two or three thousand dollars, and those horses stay there during the course—stallions imported from Europe—and the citizens say, "We will be glad to loan you all the stock you want."

Now, as to our students; we have a good many married men. We have a millionaire graduate from Harvard College. He is the grandson of Joseph Medill, the founder of the Chicago Tribune. We have two or three farmer students that have come from New Jersey to study with us. Your school at New Brunswick is just started, and I know your needs. I know what we have in New York, and in Ohio: she is just pouring out money, and they brought an architect to our State to study our buildings.

Now, from the last appropriation they are going to build a great barn and other buildings. Illinois and Iowa are going to put up buildings that will cost a quarter of a million. I am putting up two buildings with cement floors and cement columns. One is for instruction in farm machinery; it is about as wide and three times as long as this room. We are going to have threshing machines and reaping machines and binders and mowers. One company donated \$2,000 of electric machinery to run these machines. In the winter time there will be two, three and four instructors in that building, and those boys will study farm machinery. We will take the mower all to pieces, and the corn harvester, and strew the pieces on the floor and tell the boys to put them together again. We will take the corn planter and tell the boys to study that corn planter and see how perfectly it will work. Will it drop three kernels every time, and if not, is it the fault of the machine?

Another building is to study seeds and grains. Our boys are to study seed corn, and at a certain time we study the size of the germ and the size of the grain. You are all right in New Jersey; you are just as smart as we are, but you are just a little behind in regard to your school.

You pay out for the State militia, or something else, hundreds of thousands of dollars, where four thousand or twenty thousand is spent upon some agricultural line. Don't try to economize on your own Board, and let all these other extravagances run along and never try to check them. I daresay New Jersey spends a million dollars on other things where she spend a few thousands on agriculture. If Dr. Voorhees is not spending the money appropriated wisely, get after him; if he is not the man to spend it, get another fellow. But if you don't want him in this State we will take him—we have got lots of places for him; but if you want him here support him, don't starve him; if you have got a good horse, feed him all he needs and work him, don't starve him.

If you want to see what we are doing in Wisconsin, and what our neighbors are doing, write me and give me your address and I will send you this picture-book.

Dr. Henry then read his paper on the "Feeding of Farm Animals."

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(See paper and discussion following.)

Secretary Dye—The time is approaching when the next subject should be taken up. I want to say to the Board, you remember Dr. Henry said that he and I had been corresponding about five years. Yes, I have been after him for five years, and he is with us. After he had consented to come, he wrote me what he would expect in the way of pay, and if it was too much I was at liberty to drop him. I said, "That is all right." He wrote again saying the door was open, and, although he could get here, still he was a slow talker, usually read a manuscript, didn't have any jokes, and didn't know whether he would suit our people, and "If for any reason you don't want me, let me know and I will stay away." But I didn't let him know. He is with us, and he prepared himself to scold us all the way through, evidently with the intention of not being invited again; but he is mistaken. He will be invited again to come to New Jersey. We thank him very much for the pleasant way in which he has addressed us, and I move a vote of thanks for the address of Dr. Henry.

Motion carried by a rising vote.

Dr. Henry—Members of the New Jersey Board of Agriculture: My work in agriculture is pretty nearly over, but I assure you that this vote of thanks from you is appreciated. I have been a worker and a doer, and not a talker; but when I get among practical business pushing men like these, it is a comfort and a solace. Now, don't think I mean that you are behind. You are ahead in some things. I showed you how the Danes were behind in some ways, but in other ways they are ahead. You are behind in some ways, you are ahead in many ways. Now, bring up the weak points. Remember the Agricultural College of New Brunswick, and let it be said—when people are pointing out the progress in agricultural schools—let it be said that the last great move is for another school in New Jersey. (Applause.)

Secretary Dye—One thing more: I earnestly desire that the attendance at our annual meeting shall be a great deal larger than at present. Let us resolve here to-day that we shall not be satisfied with a hundred and fifty people at our annual meeting. Let's try to get more here. They will get something to take home with

them. It will not cost the State of New Jersey any more for these speakers to talk to a thousand people than to talk to a hundred and fifty. We can fill Masonic Temple if we try. Let us increase our number to at least double the attendance of this year. Then as to the Institutes, we begin to-morrow night at Frenchtown. In all the localities where institutes are to be held, friends, come and bring your wives and daughters and the young men, and let's have the attendance increase there also.

Mr. H. E. Cook, of Denmark, N. Y., was then introduced, and spoke on "The Present-Day Requirements for the Production and Handling of Market Milk."

Mr. H. E. Cook—May I be permitted, before I take up my subject, to say a word in reference to your Agricultural School. You may not know that I had something to do with encouraging the work in New York, and I want to say "amen" to what Professor Henry has said concerning our Eastern agricultural buildings and agricultural colleges.

We went at it in New York with a great deal of determination and force, and we succeeded in telling the Governor and the Legislature what we must have, and we got it, against, I am sorry to say, at the time, the wish of the Governor of the State.

He didn't have the right point of view. If you will give a man the right point of view, he will generally be willing to do the right thing. Now, in regard to Wisconsin, as compared with New Jersey, I want to give you a different point of view from the one Professor Henry has given—why New Jersey is behind in her agricultural college work. I don't believe you needed the work as much as Wisconsin needed it.

(Mr. Cook then delivered his address, which see.)

Mr. Cox then introduced a resolution, which was referred to the Committee on Resolutions, when the Board adjourned until 2 P. M.

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AFTERNOON SESSION.

THURSDAY, FIFTH SESSION, 2 o'clock P. M.

The President—We expect Governor Stokes in a few minutes, and if there is any new or unfinished business we can take care of it before he arrives. I believe the Secretary has something to add to the educational feature of his report read yesterday.

After some remarks by the Secretary, Governor Stokes entered the room and was received with applause. He was introduced by the President. (See address.)

Following the address of Governor Stokes, President Voorhees introduced Mr. G. C. Creelman, President of the Ontario Agricultural College at Guelph, Canada, who spoke on "The Farmers' Relation to the State Agricultural College." (See address and discussion following.)

The next subject was presented by Dr. C. D. Smead, of Logan, New York, who spoke concerning "The Common Diseases of the Farm Horse, and How to Treat Them." (See address and discussion following.)

Mr. H. E. Cook then spoke on "Barn Ventilation," using a skeleton barn for illustrating the particular requirements in order to secure perfect results. (See address.)

At the close of Mr. Cook's address the Board took recess to 8 o'clock.

EVENING SESSION.

Eight o'clock, Board met in the Auditorium of the State Normal School, and was called to order by President Voorhees.

He then introduced Col. George Nox McCain, who gave a very interesting and instructive address on "The West Indies and Islands of the Old Buccaneers." The address was beautifully illustrated with stereopticon slides and moving pictures.

FRIDAY, SEVENTH SESSION.

The session was called to order by Dr. Voorhees and opened by prayer by the Rev. Dr. Brooks.

The Secretary then called the roll.

UNFINISHED BUSINESS.

Dr. Ward—The Committee on Treasurer's Accounts report that they have examined the bills and Vouchers of the Treasurer and find them to be correct. The report is signed by Joseph B. Ward, William M. Roe and William H. Harrison.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. Rider—The first resolution referred to your Committee is the one on tuberculosis:

WHEREAS, The prevalence of tuberculosis in cattle has become a serious menace to the general dairy interests of the State; and

WHEREAS, The disease is frequently disseminated to healthy herds by the breaking up and selling by public sale of infected herds, knowingly or unwittingly by their owners; and

WHEREAS, It has become a source of danger to the dairyman to purchase indiscriminately stock so offered at public sale;

Resolved, That we, the Hunterdon County Board of Agriculture, demand such legislation as will compel all cattle owners to have their herds tested for tuberculosis before offering them at such public sale, at the expense of the State.

Be it further Resolved, That all cattle condemned for tuberculosis and destroyed at such examination shall be compensated for in full by the State at the appraised value of any competent auctioneer engaged to conduct such sale.

Be it further Resolved, That we urge upon the State Board of Agriculture the necessity of the passage of such act or acts by the New Jersey Legislature as shall be in accord with these resolutions, and request that they use their best efforts toward securing the same.

Adopted, Flemington, New Jersey, November 17th, 1906.

Attest:

WILLIAM W. CASE,

Secretary Hunterdon County Board of Agriculture.

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Mr. Rider—Your committee is in thorough sympathy with this resolution, and they would go even further, they would say that it is a menace to the dairy interests, and that it is a menace to the health and lives of the people of this State, which is even a more serious matter than the dairy interests. But the question is, whether that is the proper method of reaching the case. It is a matter that the committee did not feel competent or authorized to express an opinion upon, and they thought that the proper thing to do with this resolution was to have it referred to the Tuberculosis Commission for such action as they thought would be the most effective in the case. It has been the practice in some localities, and I think it would be wise, and the committee thought it well to call the attention of this Board to the fact that, in buying cows at sales or anywhere else for the use of the dairy, the farmers should look to themselves, that they should follow the old maxim, "Let the purchaser beware," and that they should require the seller to guarantee that the cow should be free from tuberculosis. I know of some cases where it is required that the cows should be tested after they were sold, and if they had tuberculosis the party should not pay for them, and the man who sold them to pay the expenses of the examination. If they were found not to have it, why, the purchaser should pay for them and also pay for the expense of the examination. I think if the farmers would bear that in mind, and have their eyes open to see that they were not introducing the disease among their herd, it would be a wise precaution. The committee recommend that this be referred to the Tuberculosis Commission.

Moved and seconded that the report of the committee be received and concurred in. Motion carried.

LIMITED FRANCHISE.

WHEREAS, The New Jersey State Legislature has passed a limited franchise act whereunder the franchises of electric railways hereafter incorporated in the State of New Jersey are limited to twenty years, or at the outside to forty years, with the vote of the people in the district through which it is proposed to operate; and

WHEREAS, It is impossible for those proposing to build much needed independent electric railways to raise the necessary funds for the construction

thereof, owing to the fact that the investors who would otherwise purchase the bonds and stock of such a corporation will not do so with the knowledge that after twenty years, or at best forty years, such securities would have no value owing to the termination of all franchise rights at that time; and

WHEREAS, The limited franchise act has prevented the raising of money for additional electric railways to compete with the all-powerful electric railways and railroads heretofore incorporated and holding perpetual franchises; and

WHEREAS, There are many districts of the State of New Jersey in great need of additional transportation facilities for both passengers and property;

Now, therefore, be it Resolved, That the State Board of Agriculture of New Jersey hereby petitions the New Jersey State Legislature to amend the limited franchise act in such manner as to make it apply only to counties of the first class, thereby enabling those desiring to extend electric railways in the rural districts of the State, where they are much needed, to raise the necessary funds for the construction of such railways.

The committee recommends the resolution favorably.

The recommendation was, on motion, concurred in.

APPROPRIATION FOR AGRICULTURAL COLLEGE.

WHEREAS, New Jersey affords greater opportunity for successful agriculture than any other State in the Union, when conducted on scientific lines; and

WHEREAS, The appropriation for the Agricultural College and experimental work is not in keeping with the importance of the industry;

Therefore, be it Resolved, That the State Board of Agriculture, through its Legislative Committee, hereby petitions the Legislature to appropriate the sum of \$100,000 for buildings and equipment, and \$15,000 per year for maintenance.

The committee report favorably upon the resolution.

Moved that the report be received and the recommendation concurred in.

The motion being seconded President Voorhees called Mr. Cox to the chair, and addressed the Board as follows:

I want to make a few remarks on this resolution because it seems to me that while the farmers are in a general way familiar with the work, they are not familiar with the conditions that exist there, and it seems most desirable, in view of this resolution, that we should go on record as knowing the situation at the present time.

It has been your pleasure and your privilege, to hear speakers from other States representing other institutions of the same kind, and I think it has been enlightening to us all, and certainly

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hearing them has given us more courage to ask for the proposed legislation, and I want you to know something of the work done in this institution, and compare the appropriations made in those States with our own State.

In the first place, the institution at Guelph, Ontario, is a purely agricultural institution, that is, it teaches only agriculture. That institution has been founded and is maintained and supported annually by appropriations from the government. In round numbers the institution has received from the government in buildings and equipments, \$1,500,000. In contrast with that, I may say that the State of New Jersey owns but one building at its Agricultural College, and that one just now erected under the law providing for short courses in agriculture, and the total expenditure for the building and equipment was \$24,000. That is the only building that the State owns at its State Agricultural College.

At Ontario they have a farm which has cost the government \$75,000. The State of New Jersey does not own one acre of land at the State Agricultural College at New Brunswick. A great many farmers believe, I think have a right to believe, in a way, that the State does own the Agricultural College farm. It does not own an acre.

The Province of Ontario, which corresponds to the State of New Jersey, owns \$35,000 worth of live stock at its Agricultural College. The State of New Jersey owns but one cow at its State Agricultural College; it doesn't own any equipment of the college farm.

The Province of Ontario appropriates annually \$8,000 for the purchase of stock for the Agriculture College in order that it may have the best breeds and the best animals for instruction purposes. The State of New Jersey owns three cows as a part of the equipment of the State's short courses. That does not belong to the farm, it belongs to the short course, as part of the instructional equipment.

The Province of Ontario provides \$135,000 annually for the maintenance of the State Agricultural College. This is for purely agricultural purposes. The State of New Jersey provides \$6,500 for the maintenance of the short courses, that is, to pro-

vide for instruction and for maintenance and annual equipment.

The Province of Ontario appropriates annually \$25,000 for the erection of new buildings or additions to buildings. The State of New Jersey appropriates nothing.

There is the comparison between the State of New Jersey, which is probably quite as rich in total wealth as the Province of Ontario. I am not familiar with the statistics on that point, but certainly we have the money to do that if we will. The Agricultural College of New Brunswick is associated with Rutgers College, as was pointed out to you by the President the other day, and in that respect it compares in a way with the University of Wisconsin. The University of Wisconsin maintains a school of agriculture in the University. In that school of agriculture there are about 40 instructors that teach agriculture and the branches pertaining thereto. That is, covering all the field of agriculture. The State of New Jersey at its Agricultural College has five instructors, and every one is a member of the Experiment Station staff, and they cannot give but a small portion of their time to instruction. The State of Wisconsin has 40, and many of them are giving their entire time to the work of instruction.

In the way of buildings and equipment for the State Agricultural College, as compared with the University of Wisconsin—so that the instruction may be not only for agriculture but for mechanical arts and other lines—the State of Wisconsin has appropriated in round numbers, Professor Henry thinks, about three million dollars for buildings, equipment and land. The State of New Jersey owns at its Agricultural College for instructions under the Morrell Act not one building. All the work that is done at New Brunswick in the Agricultural College is done because of the buildings that have been provided by Rutgers College through private support—not a dollar has been given by the State for the putting up of buildings or for the buying of land on which to erect the buildings, the buildings having been given by the college.

The only appropriations that have ever been made by the State of New Jersey—and the State made a great big fuss about it, which, perhaps, they had a right to do—was \$80,000 in 1905, to pay for the scholarships which they had established by previous

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acts of the Legislature, and they now give, not for buildings, not for equipment, but for the maintenance and support of students in that institution, a sum not to exceed \$12,000 a year. That is for the entire institution.

The University of Wisconsin has received about \$3,000,000 for buildings, land and equipment, and receives annually for its entire institution about \$400,000, besides buildings. That is the entire university, including agriculture. The College of Agriculture of the university has received about \$500,000 for land, buildings and equipment, and receives annually about \$80,000 for maintenance.

Now we have a combined institution, and I say that the only funds that have ever been received from the treasury of New Jersey was \$81,500. The State doesn't own any building or land, and it doesn't pay anything except to provide for the maintenance of certain students under scholarships provided by the Act of 1905.

The Agricultural College of Wisconsin, that is the college and the university, has received for live stock alone \$25,000. Of course they have that now, and frequent appropriations are made from time to time for the maintenance and support of that live stock, used purely for instructional purposes.

Now it may seem strange that a college of agriculture should require so large an appropriation annually for its maintenance, aside from the instructors that have to be paid; but for instruction in agriculture the equipment is a living equipment, which differs from the equipment of a chemical or physical laboratory, where there is no expense except breakage from year to year, but in the case of an agricultural college you have living animals, you have to have a live equipment in order to instruct in a proper manner; therefore, the maintenance of an agricultural college must be relatively greater than the maintenance of a classical or scientific institution. Your State gives not a dollar for that sort of an institution.

It seems to me that the people of this State, those who are in power, those who are making our laws and who are appropriating money for other purposes—entirely legitimate purposes, I don't question that at all—ought to know this branch of the industrial

work of the State is not supported by the State in no sort or manner as compared with other institutions in other States and in other countries.

It is only fair that the people of the State should know it, and it is only right that every farmer within the hearing of my voice should not only remember that, but should use his influence in every legitimate way to have at New Brunswick such equipment, such maintenance as shall not only provide for the agricultural interests of the State but make it a pride to every farmer and to every other citizen.

We have heard good words here. We have been inspired by the words that we have heard, but such help as has been given by these distinguished men, by these workers for agriculture and agriculture only, will avail us nothing if it ends here in this room. If this resolution is passed, as I hope it may be, we must follow it up, we must pass the legislation, and the law must receive the signature of the Governor.

Now, it is manifestly the duty of every member of every organization relating to agriculture, and of every farmer in this State, to support this thing after it leaves this hall. We can pass resolutions and talk and talk and talk (we have talked for years), and accomplish nothing. It remains for every man not only to talk and to resolute, but to go into his country district and to every farmer whom you represent here and whose delegate you are, and ask him to see to it that the institution at New Brunswick is supported.

I have no personal interest in this aside from the good to the agricultural interests of this State. Every thing that comes to New Brunswick adds to my duties, and I am perfectly willing to do it so long as I have the power and ability and strength. It does not mean anything to me aside from that, as you know. I have been working along those lines for years, and have accepted the responsibilities placed upon me and have tried to carry out the work as I saw it, and if there is one thing more than any other that I have insisted upon since I have been a member of this Board, it is this, that everything must rest upon the foundation of education and co-operation, and we cannot have co-operation among the farmers of this State and other States until we have

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sufficient knowledge to enable us to unite upon a plan of action. Don't do it because someone says so, do it because your conscience tells you it is the right thing and the only thing that is going to make for the uplifting of agriculture in this State, and that it not only affects the farmers of the State in their financial relations, but it affects them in every way, and indirectly helps every citizen of the State. I hope the resolution will pass.

Mr. Gaunt—Mr. President and members of the State Board of Agriculture: I think that further argument on this proposition would be useless on my part, but I want to supplement what the President has so ably said. He said in his remarks, that the State of New Jersey did not own any of the equipment. Now, in my travels throughout the State so often do I hear it said, "Why, anybody can make a success of running that farm with the treasury of the State of New Jersey back of it." That is the impression of so many of our farmers, that Professor Voorhees has the treasury of the State back of him. Now, you have heard him explain that so fully that I don't believe there is an individual here but understands it.

Now, let us do what he asks here: let us go back home, let us see to it that our representatives know the sentiment of the farmers of this State. I pledge to you the support of the State Grange. (Applause.) Every subordinate Grange throughout this State will be notified that they must send a petition, signed by the Master and Secretary of their Grange, and their individual members must do some personal work in order that the representatives from the various rural communities throughout the State may know the position of the organization and of the different agricultural societies. It is up to us to see if we can get this law passed, and by united and concerted action on our part, by getting together—and everyone knows just what it means—by giving a long pull and a strong pull and a pull altogether, there is no doubt in my mind but what we will receive a liberal appropriation this year. But we can't do it by standing here and talking about it in this hall. It means individual effort on the part of the various farming organizations throughout the State.

In my travels through the Western States, I have often been asked, What is New Jersey doing in the way of agricultural education? You know how I have had to answer them. I talk for New Jersey whenever I can, but when they commence to take me along this line, I am like the dog who killed the sheep. I have to get down and say nothing. But now we have made a beginning, we are beginning right, and it will be a great pleasure to me to say to those western farmers that I have to meet, that New Jersey is not behind the times; they may have been behind in some instances, but the location of our State, geographically, makes it one of the most desirable ones for agriculture in the United States. There are no greater advantages than we have, within less than a hundred miles of seven millions of people; soil that will produce almost anything, and as good as any other State. With the research that we can have, and the knowledge that we can obtain by theoretical and practical agricultural education for the young men in the future, we can see the farming interests advancing in New Jersey as they have in the Western States.

These are matters for serious reflection, and I want to urge upon the members to take up this matter, and I want to supplement what Professor Voorhees has said; we pledge him our support, and before many days there will be a circular letter going to the subordinate Granges throughout the State urging them to take immediate action upon this matter, and to assist in promoting and having the law passed. This is a matter for serious consideration; let us take it up with a will and aid our brother who has done so much in the past twenty years for the advancement of the agricultural interests in our State, handicapped as he has been, and assist him in making the name of New Jersey a credit throughout the United States as an agricultural State, instead of having them tell us, as they do, that we raise but two crops: mosquitoes and trusts. (Applause.)

Dr. Henry—Mr. President, I do not feel like returning to Wisconsin without a few words on this subject. I do not know that they are necessary, and yet, perhaps, I can strengthen the argument at a point or two. You have had Dr. Voorhees with you

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a long time; I see every evidence that you have confidence in him; he is your hired man; he is working for you. You are not giving that hired man the machinery that he is entitled to from his ability; he is worth more than you are giving him. If you had a real good hired man, and would not give him a plow and horses and other tools to earn what he is worth to you, that would be short-sighted business. You would say "If I gave him \$30.00 per month, I must give him harrows and plows and get what I should out of him."

Now, you are not giving that man the wherewithal to work with. That is not right; work him to his capacity. I want to say that the East has drawn from the West for a number of her best educators. Dr. Bailey is a Michigan man, and the President of Massachusetts Agricultural College is a Michigan man. The Dean of the Pennsylvania State School of Agriculture, just located, is an Illinois man. If you don't think enough of Dr. Voorhees, we will take him out West and we will use him out there, and give him something to do it with. We won't hire him and then say, "You can't have a horse or a plow to work with." We can use him; we are short of men, and if we do get him out there we will give him enough to work with and get full advantage of his ability. I don't think you want to let him go. You don't know how scarce they are, and there is nothing better to show your confidence in him than by giving him all that he needs to work with to do his best work.

In New Jersey you are behind in your agricultural college and the Master of your Grange has just told you he was ashamed of it when he met the farmers of other States. I am ashamed, when I go to some States, of what we are getting in Wisconsin. Take the Iowa agricultural buildings. They are putting up a building that costs a quarter of a million. Take Illinois. I went there about six years ago—they sent me for me for a purpose. I went down and met with a lot of people. There were about twice as many men as there were women; they represented the best of agriculture in Illinois. They were up against the merchants. We met in the State Capitol and we talked the matter over, and I said, "Gentlemen, I have got more students in agriculture from the State of Illinois staying with me than you

have." That was a fact. The Governor had mentioned it in his message. That was pretty serious. "Do you know what the trouble is? You have got Dean Davenport here, an able man, but he has nothing to work on; what he needs is money." "Well," they said, "how much does he need?" And I said, "Gentlemen, I am running a college with \$50,000 from the State, and then I get \$20,000 and \$30,000 from the Government, beside our experiment station," and I said, "I know I am so short-handed, that I would say for Illinois that you can't do with anything less than \$100,000 a year for current expenses." That set them to thinking. Look at your soil; are you doing anything with that? and your steer feeding—do you know how you are feeding? You are feeding 28 pounds of corn to a steer. Do you know that you could feed 20 pounds and get as good results? So I talked with them that night, and those men went home and they sat up in the hotel until two o'clock. There were about 30 of them, and what did they do? They gave \$85,000 for research, and \$50,000 for teaching—\$135,000 increase grew out of that meeting, and when I meet an Illinois farmer I am reminded of that wonderful meeting that was held in the State Capitol.

Now, when I come back sometime to New Jersey, I hope to be greeted as having worked along with some others to put your agricultural college on its feet.

Now, as to this argument about Professor Voorhees having the State back of him and ought to make it pay. I had to meet that 27 years ago, and we have given that up. The farmers never mention it. When they go into the Madison High School do they ask the principal whether he makes the school pay any dividends? Did you ever hear of a chemical laboratory paying? It pays in the young men it sends out; that is the way your high school pays. Don't bring up that old antiquated argument. An Iowa farmer would hide his face in shame if he should ask such a question as that. That is too old. The question is, has Dr. Voorhees in the matter of fertilizing the soil, in the production of forage crops, &c., has he paid you anything? What per cent. do you get on your investment? If Dr. Voorhees has paid you 100 per cent on the cost, perhaps if you would put more money with him you would still get 100 per cent. If he has

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helped you on food stuffs, if these young men are helping you in agriculture, can't you put some more money in it?

Your Secretary told you about how you came pretty nearly killing your State Board of Agriculture. The farmers are so apt to get that view of things, because the money is spent for agriculture you would like to cut it out. Take your State Militia. There is not a farmer here that thinks of cutting a dollar off of that, but only off their own income. Just as it was in your free rural delivery; lots of farmers fought it, yet it was for them. Now, if you can get some money for yourselves why not fight for it? Suppose you get half a million more it would not hurt, the way money is going elsewhere.

Now, how much are you going to ask for? Don't let them cut you down. If you ask for a hundred thousand dollars, say, "Gentlemen, we won't take a cent less," and you will get it. I recollect four years ago the farmers visited the Wisconsin College. We had \$15,000 in live stock. "Why," they said, "you haven't enough to teach with; the boys want to see the best cows there are." They went to members of the Legislature and they said, "Let's draw up a bill," and we drew up a bill for \$15,000 to buy live stock, and it passed without opposition. They said to me, "Henry, will you work for it?" I said "Yes, but I am working for so many more bills that you farmers will have to carry that yourselves;" and they said, "Don't you go near the committee for our bill, you get what you can can, and this is the farmers' bill and we will carry that through." So I never said a word about that.

At this time we are putting up two fireproof cement buildings for agriculture. We expect within a year to put up a \$60,000 building in which to hold our annual exhibitions. The President says it will cost \$100,000. We are going to have an amphitheatre so that you can sit there and look at this live stock. Those buildings are in sight. If you will go with me to Minnesota, you will see buildings that cost \$225,000, agricultural buildings, and they have already got six or eight buildings up. Things are going all over the West that way. Take it in Massachusetts: they are starting a branch to teach the teachers agriculture, they are asking an increase of \$5,000. Cornell is just

completing a quarter of a million dollar building that our friend Cook fought for. There was opposition and seven college presidents walked into the Governor's office and pleaded with the Governor to veto the bill. The bill was to give a quarter of a million to Cornell and the Governor hesitated, but there was fire from all over the State aimed at him and he had to sign the bill, and last year they gave him \$100,000 income. That is just the beginning of what they are going to do. They gave \$80,000 to another college.

I would say that in Wisconsin we have two county agricultural schools running that cost the State about \$5,000 each, and the counties pay the rest, and we are just building three agricultural schools and we are about to start the fourth, and we are going to have county schools in every county. We have two buildings running beautifully, splendidly, with about 60 students in each, boys and girls, studying agriculture and domestic science. (Applause.)

Mr. H. E. Cook—Mr. President and members of the State Board of Agriculture, I dislike very much to take up your time, yet I believe this is one of the most important events in the history of agriculture in New Jersey, and as a few in this room know, I had a little something to do with the movement in our State, and just briefly I want to tell you what we did. We have probably had more to do than any other State has ever had to do in fighting the battle for industrial training. I believe that is not saying too much, that no State has ever faced the conditions we faced. We not only had the disposition and tendency to destroy the usefulness of our State College, we were compelled to hear it all over the State. Men who ought to have stood together were standing apart, and then we faced what was worse than all, we faced not only seven colleges, but we faced seventeen colleges in the State of New York, which arrayed themselves against this committee and they appointed an executive committee of seven presidents of colleges, and they appointed as their chief a man who is a fighter, Chancellor Day. You know he is a fighter, he is fighting this thing bitterly, and we had all of this tremendous opposition. And then to cap the climax, we had a Governor that was not in sympathy, but we got the ap-

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propriation, and we can say some things now that we could not say before.

What did we do? We began a steady pull all together for agriculture, and it took three years to do it. Slowly and steadily we began to pull and to pull together. The men who opposed agricultural colleges and appropriations were given a new point of view, as I said yesterday. If you give a man the right point of view, he will act right. We formed an association of the agricultural interests of the State, brought these people together, elected a chairman and secretary and treasurer, and had a tangible understanding, one that we could tie to. Then we began to do something. Then we began to approach the members of the Legislature and the members of the Senate—and in turn these men were treated to a dose of agricultural medicine I was going to say, but I won't; but it operated anyway. (Laughter.) And we had to take 44 men after we got to the Legislature, each man representing something in the State, not a man standing for his own personal interest, but representing some agricultural interest in the State—we had to take 44 men down there before the Governor to clinch the thing, and we did. We would never have been able to do a thing if it hadn't been for the Granges; they stood back of us, and when I said to the Governor that I had written to the subordinate Granges, and here are replies from 216 of them and I will read them to you if you want me to, the Governor turned around from looking out of the window, as he had during the greater part of this interview, and he said, "I guess it won't be necessary." That is what we did, and we secured the passage of the bill, and that was not all. We fought out the great principle of industrial training, and I was glad to hear Dean Davenport say, looking at it from a distance, he believed it was the greatest battle of recent times. All you want to do is to get together, and where is the man who will take the lead? It means a lot of work. The intelligence that is in this room to-day will get you your hundred thousand dollars, if you go at it in an intelligent way. (Applause.)

Mr. Creelman—I feel, with Dr. Henry, so strongly upon this subject, believing that you are starting right, the necessity for

immediate action, that I have just one word to say. Dr. Henry says that we have got past, in the West and the Northwest, that argument of making a college farm pay, and we have; but it will be hard for you, gentlemen, as you go about and advocate this increased grant, to convince your farmers that the college farm ought not to be asked to pay. I simply want to say that you have this argument with you to refute that, namely, if you are going to have an agricultural college you have got to have a farm, and if you are going to have a farm and college you must have them both well stocked. There is no use putting in one breed of dairy cattle. You will have to have the Holsteins, the Ayrshires, the Guernseys, and the Jerseys. You will have to have them all, and the very best of those breeds, if you want to give those young men the best knowledge of the dairy business. You will have to have all kinds of cream separators, and you have got to have them all operated. If you go into beef cattle, you want at least four breeds, the Shorthorns, the Herefords, the Polled Angus and the Galloways. You will have to have at least three breed of sheep, and three or more breed of swine, and the very best individuals of those breeds. You have got to have them, the very best in use, and, after you are through with them, you can only sell them as carcasses, for which you were obliged to pay very fancy prices. You will have to have horses, and Ontario this year paid \$1,725 for one Clydesdale mare for the college, because it was the best mare offered in the Dominion of Canada last year, and we wanted our boys to get familiar with that kind of stock.

Can you tell me that any kind of a farm would stand that, knowing that they were going to keep that mare awhile, and then knock her on the head when she is useless, without getting practically any return? All these different kinds of cream separators and these different kinds of farm animals and implements, and all the rest of those things are necessary, and under those circumstances no farm could be made to pay. Hence, if we want the best, as the people of Wisconsin and Canada are getting it, you people will have to pay for it, and there is no argument on the other side. (Applause.)

Secretary Dye—With our County Boards properly manned, we would have 2,000 members. Brother Gaunt has pledged the

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Grange, 12,000 members. We will call together our agricultural associations and take up this thing, and if we don't succeed this year we will take it up next year. (Applause.)

Dr. Ward—It was my privilege last year to be appointed a delegate to go down to Maryland from our State Horticultural Society, and I was proud to be the representative of our State. I was asked, as one of the young boys of the State, to speak for New Jersey. I had just two themes, the roads of New Jersey and our station at New Brunswick. I made some very few short remarks there in reference to our roads, because I had been closely identified with stone roads, and more closely identified with our station work. I was proud of the fact. Our Professor came down and gave us a very practical talk. That night, after I went to my room, they knocked at the door, and some gentleman, a stranger to me, came up and said, "Can't we get Professor Voorhees down here in Delaware?" I said, "I don't think you can; they have been trying to get him all over. They want him in New York. They have been trying to get him West." We talked a little while, and I got into my bed; and another gentleman came and rapped at my door, and he said, "That was an elegant talk Professor Voorhees gave to us. You don't want him any longer in New Jersey; we want him down here." "No," said I, "I am going to bed." Now that is the feeling right through in Delaware, and I was proud to talk there about our station here in New Jersey.

Mr. Whitehead—I have visited many of the different stations of our country, and I have often felt that New Jersey was behind as far as the agricultural buildings and equipments of our station were concerned, but at the same time I have always stood up for New Jersey, and said we were getting a great deal of good from it. I was in New Hampshire, and have been out in Wisconsin, and know the good work that is done. In regard to the farm not paying, I claim it does, and always has paid. We don't draw dividends out of that small portion of land, but we are drawing dividends in hundreds and thousands of dollars every year upon every progressive farm in New Jersey. We are making the other farms pay. (Applause.) Give our honored director and Presi-

dent, the man who has stood by us so nobly and refused the tempting offers from the West and New York, give him the additional money, and we will add a million dollars more to New Jersey. (Applause.)

The resolution was then unanimously passed.

Secretary Dye then read the report of the Tuberculosis Commission, which was accepted and ordered printed in the report of the State Board. (See Report of Commission.)

Secretary Dye—I have a resolution that I want to offer without reference to the committee. It comes from the Mercer County Board of Agriculture:

“Believing that the money (\$242,000) now expended by the United States Department of Agriculture for free seed distribution, as appropriated by Congress for that purpose, is largely of no actual benefit to the agriculturists of this country, although nominally appropriated for their benefit, and believing that a large proportion of the sum might better be expended for the distribution of rare and valuable seeds from all parts of the world, and the surplus, if any, be allotted to the agricultural colleges and experiment stations;

Therefore, Resolved, That the Mercer County Board of Agriculture request the State Board of Agriculture to petition our Senators and members of Congress to use their influence to direct that said sum be appropriated and expended according to the foregoing preamble.”

Moved and seconded that the resolution be adopted.

Mr. Rider—You read a great deal about the seed distribution and the objection to it, but as far as I can learn it comes from the seedmen. I have known good results to come from this seed distribution, and I have known of vegetables that have come to us that we never would have had. I think people are deceived, or the thing is misrepresented, when they make so much kick and opposition to the distribution of seeds.

. Dr. Voorhees—This resolution does not ask for the abolition of seed distribution, but for the distribution of rare and valuable seeds from all parts of the world, instead of ordinary and common garden seeds and the like.

The resolution was then adopted.

Mr. J. G. Curtis, Rochester, New York, then made an address on “Growing Hay for Market” (see address), after which Presi-

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dent Creelman, of Guelph, Ontario, Canada, spoke on "Co-operation." (See address and discussion.)

At the close of Mr. Creelman's address Mr. A. J. Rider said: I think all who are present will agree with me that this has been one of the most profitable meetings of the Board of Agriculture. The Executive Committee and others who had in hand the matter of arranging this meeting have done nobly and I think they deserve a vote of thanks, as well as a vote of thanks to all the speakers who have added so much to the interest of the occasion. I, therefore, move a vote of thanks to the committee and to the speakers.

Motion seconded and unanimously carried.

Dr. Creelman—Insofar as I am included in that vote of thanks, I would say that as it is my pleasure to visit the different States and the different Provinces, and without desiring to flatter anybody present at this meeting, I do want to say that this is the best agricultural meeting lasting three days, where the interests has been kept up until half-past twelve of the third day, of any meeting that I can remember having attended. I think I ought to say that, because it has been well planned and well carried out. The discussions have started on time and always closed at the time you said you were going to. You have shown a business capacity and talent which if properly directed will lead to the encouragement and prosperity of agriculture.

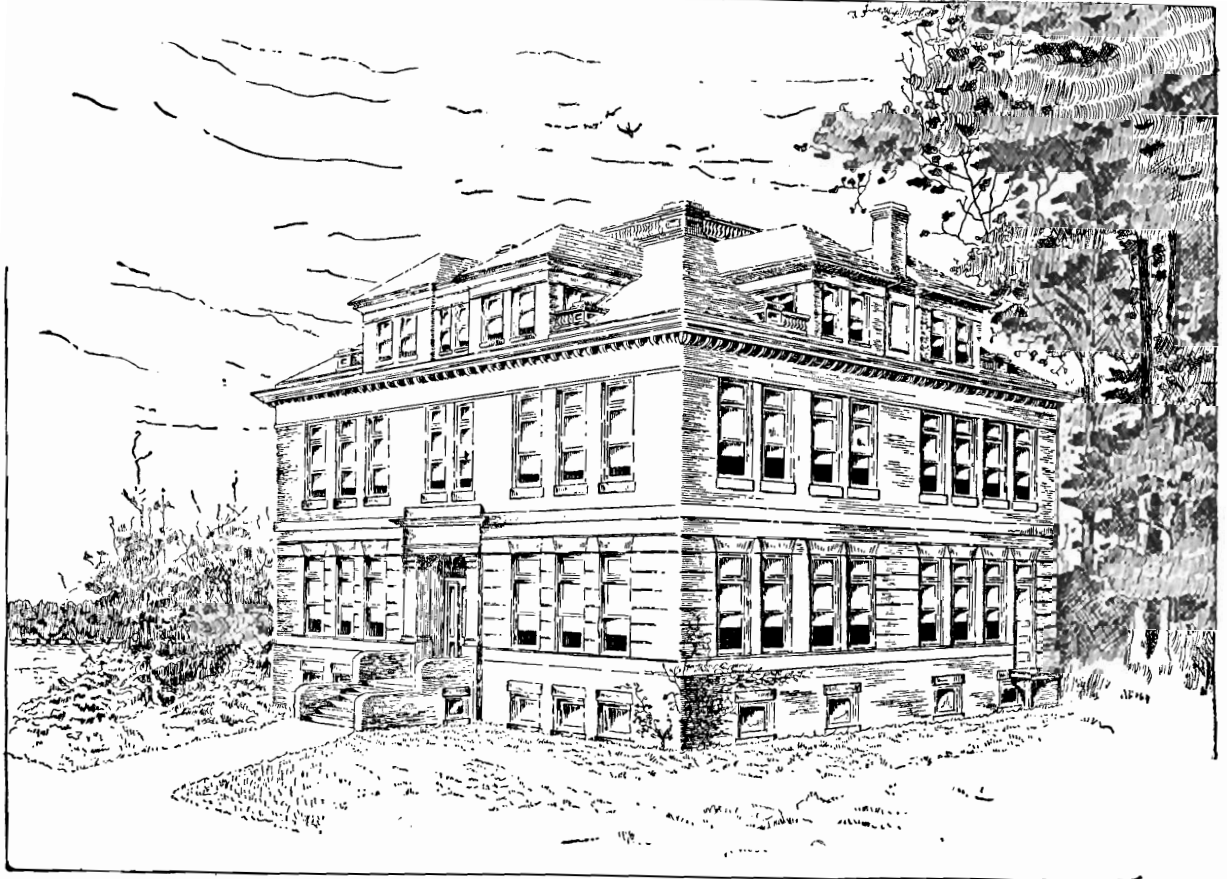
President Voorhees—I should like to make one or two remarks in connection with the meeting we have had. I feel that this has been a most profitable meeting. We have had eminent speakers from other States and countries, and we have had our Governor with us. I am not a prophet nor the son of a prophet, but I venture the prediction here that if the work that has been projected here to-day has proper fruition, the Governor of this State, whatever may be the honors that may come to him in addition to those he has already had, whatever duties he may perform of a high order, as he has in the past, when he shall have reached the later years of his life there will be one thing that he will cherish more than any other—that is, if this has proper fruition—and that will be the act of his in calling attention to the matter of agricultural

education, to the importance of it, and to the necessity for instructions in that subject. I venture that as a prediction because I believe there is no one thing which needs the attention of our people as that which he recommended in his inaugural address of 1904.

The Board then adjourned *sine die*.

FRANKLIN DYE,
Secretary.

Annual Address of the President.



Short Course Building, State Agricultural College.

Annual Address of the President.

DR. EDWARD B. VOORHEES.

We are gathered again in annual conference, to record our successes and failures, to gather new facts, to obtain new ideas, to broaden our views and to receive new stimulus and encouragement for the future. We are still confronted with many obstacles to our progress, that require knowledge, courage and patient persistence to overcome. We still have, among other things, the San José scale to fight; the labor problem to solve; the transportation question to study; the diseases of animals to contend with and the auto fiend to avoid, and yet with it all we can record substantial progress.

As your chief officer I have from year to year called attention to the general work of the Board, and have pointed out lines of progress along which it seemed to me that development was not only possible, but because of our environment probable, and which would, if carried out, result in a greater degree of prosperity for our State. After a series of annual addresses, one finds that new subject matter is not easy to obtain, and yet realizes that unless some forward step is taken, or some thought advanced, which will be helpful to us in our endeavors to promote the interests with which we are connected, there would be reasonable ground for criticism.

The duties with which the Board is specifically charged have been performed in a very capable manner by the various officers; detailed and specific statements concerning these will be found in the Secretary's Report. I desire, however, to briefly point out the lines along which progress is being made, and to show that the influence of the Board is exerted in many lines for the direct and indirect benefit of all the citizens of the State.

66 STATE BOARD OF AGRICULTURE.

You are doubtless all well aware that the duties of the State Board have been increased from time to time in the past, and that it is now not only responsible for the organization and activity of the various county Boards, but that it is charged with the execution of the laws providing for a Tuberculosis Commission; for the insect inspection, and has assumed the conduct and management of the Farmers' Institutes. These are responsible and important lines of work, and require for their proper conduct much time and thought on the part of your Executive Committee.

COUNTY BOARDS.

The work of the various County Boards (twenty in number) is, on the whole, good, though in some counties it should be possible to increase the interest, activity and helpfulness of this work. Comparisons are invidious, and I therefore refrain from calling specific attention to these, or to those which, on the other hand, are showing by their activity how important and powerful a factor is the county organization, both in improving its individual members and in promoting the general work of the county.

TUBERCULOSIS COMMISSION.

The work of the Tuberculosis Commission has been carried on along progressive lines, while at the same time conserving the interests of all concerned. It has been the aim of the Commission to direct its work in such a way as to make it a real educational factor in the construction and sanitation of farm buildings, and thus encouraging preventive measures, as well as to destroy animals which are a menace both to the human and bovine family, and also to reduce the centers from which this disease may be spread. Much interest has, also, been taken in all forward movements along this line, and in the application of new facts of science as means and opportunities warranted. Already active measures have been taken toward a careful study of the proposed immunizing methods, now so promising, and it is hoped that such opportunities will be afforded by the farmers of the State as shall

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enable the Commission to conduct experiments along this line that will be far-reaching and beneficial in their effects.

One feature of the work of the Commission which has not been satisfactory, but which is regarded as of primary importance, has been the effect of such execution as has been found possible, of the importation law. It has been impossible with the means at the command of the Commission to safeguard the interests of the State as fully as is contemplated by the law, and it is the hope of the Commission that this law may be appropriately amended during the present session of the Legislature.

INSPECTION OF NURSERY STOCK.

The inspection of nursery-stock has been faithfully carried out. The nurseries have been inspected annually, as well as a large number of orchards from time to time, and much valuable advice and assistance have been given to growers. The nurserymen have for the most part responded favorably, and have endeavored to adopt such measures as would keep their stock healthy and free from pests. The result is that the nurseries in the State are in a clean condition at the present time, and while some complain of fumigation, there is abundant evidence at hand to show that fumigation, when properly done, does not injure the trees, while it does kill the scale. There are many things laid to fumigation which affected the stock before fumigation was ever inaugurated. This is an important line of work, and in a way vital to the fruit interests of the State.

FARMERS' INSTITUTES.

The number of Farmers' Institutes held have been increased during the past year; a marked interest was manifested, and the results altogether helpful. This line of work has developed from a very few in the beginning until nearly every section of the State is now reached, largely increasing the activity and responsibility of your Board.

68 STATE BOARD OF AGRICULTURE.

A NEW DEPARTURE.

A new feature of the work of the past year has been the holding of a summer meeting of the State Board at the College Farm at New Brunswick, now a part of the equipment of the Experiment Station. The results of this meeting, so far as can be judged from the number of visitors present and the interest manifested by them, were most helpful. The value of a meeting of this sort, aside from the social advantages connected therewith, must come largely from its effect as an educational influence. Previous to this meeting there were probably very few farmers in the State who understood the relations of the farm to the State, or were at all familiar with the aims and purposes of a college experiment farm. Many believed that the State owned the farm, and that the aim of its management was to show how well a farm could be made to appear; in other words, it was maintained by the State to serve as a model. An attempt was there made to point out the object and purpose of an Experiment Station, and the various uses that might be made of a farm in connection therewith, its limitations as a model, and its value, both as a laboratory for instructing students and for carrying out experiments. With the proper understanding of the aims and functions of a College and Experiment Farm, I know of no more inspiring and helpful place for holding farmers' meetings.

DEMONSTRATION FARMS.

Recently much has been written in current journals concerning the value of demonstration farms, by those who have shown good judgment in respect to certain phases of the industrial development in this country, but who have demonstrated their ignorance of the basic principles of agricultural development, and of the advantage of a farm devoted simply and solely to showing modern methods of practice. The influence of a farm of this sort cannot be made lasting or permanently helpful, since it touches but the surface, and its influence upon the visitor is

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in inverse ratio to the distance he lives from the farm—"He is like unto a man beholding his natural face in a glass, for he beholdeth himself, and goeth his way, and straightway forgetting what manner of man he is." A mere visit is not enough—impressions are not lasting, because he observes with the eye only, and not the mind, which often gives rise to a feeling of resentment, and calls forth sentiments frequently expressed, that "anyone could do work of this sort, provided the money was forthcoming from the State or elsewhere, and not from the farmer himself." The educational value of an experiment farm does not lie on the surface, but rather in the principles that are there established or verified, and it is only those who have carefully studied this question and understand it that are capable of making a proper distinction, and thus receive full benefit of such visits.

So, too, a College Farm, to be useful for instruction, must be at the disposal of the instructor, in order to teach principles of farming, already established, in the same manner that a chemical laboratory, for example, is used to teach the principles of chemistry. In such a laboratory, it is not expected that the results obtained by the student will pay for the chemicals used or for the labor involved. Neither should a farm laboratory be expected to support itself; it should be regarded as a part of the equipment for instruction, and be supported by the funds of the college. The same parallel holds true for the experiment farm; it is one of the laboratories for investigation. The experiments should be planned and carried out for the purpose of establishing some fundamental principles, and demonstrating its usefulness, and the crop returns from such experimental work should be regarded as incidental to, and not as a primary object of, the work.

LEGISLATION.

This Board of Agriculture, together with other organizations of farmers in the State, has taken an active part in, and exerts its influences for, the enactment of such measures as directly and indirectly affect the interest of the farmer, as well as those of the people of the State; as, for example, the passage of the

Freight Trolley Bill at the last session of the Legislature, and the modification of the Automobile Law. The Freight Trolley Bill became a law, but the fruits of our victory, or of what we thought to be a victory, are as "ashes in our mouths," because of further enactments which limited franchises, which prevents the securing of capital for building roads in rural districts, because these roads cannot be expected to pay immediate profits even upon undiluted stock issues. Efforts will be renewed this winter to have this law modified, and in such a way as to encourage the building of new trolley roads, a matter of the utmost importance to agricultural progress.

The Automobile Law was also modified, but not according to the desires of the farmer who believes that the "auto" has come to stay, and is therefore willing to grant equal rights on the public roads to the driver and his machine, but not the wanton and deliberate usurpation of them, as is the case in many districts of the State, and which is not prevented under the present law.

PRESENT PROSPERITY OF THE FARMER.

We turn now to the present conditions. This is eminently a period of industrial development, and for a long time it seemed that commercial progress was not affecting so directly the farming as other lines of industry. It is a fact, however, that other industries prosper in proportion as the farmers prosper, and you will find that predictions that are made by business-men, as to the continuance of our present commercial prosperity, are based entirely upon the continuance of the prosperity of the farmer. They feel that so long as there is a large and profitable yield of farm crops, other lines of business will continue to be prosperous. There is evidence everywhere, too, that the farmer is coming into his own, and I desire to call attention to the fact that this is due, in no small degree, to the influence of such organizations as this, that have for their primary purpose the improvement of the farmer, and his methods of practice. Secretary Wilson, of the U. S. Department of Agriculture, in his last report, says: "Economic revolution in the art and science

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of agriculture, which became noticeable in this country half a dozen years ago, has continued during 1906, with tremendous effect upon the Nation's prosperity. Meanwhile, the farmer has been a generous consumer, and has given powerful support to the market of the industrial producer; to the trade of the merchant, and to the wages of the workingman. The farmer has become aware of the importance of the place he occupies in the Republic, and in the pride of his occupation he is ready to offer this yearly account of himself to the people.

The Secretary speaks strong, optimistic words in favor of the farm and its importance, and his report, as a whole, is well worthy the attention, not only of individual farmers, but of representatives of other industries. It is a fact that the supremacy of the United States is dependent, first, upon the wealth of her natural resources as they exist in her soil, combined with the power that is exerted by the individual farmer in utilizing them to the best advantage. From the financial standpoint, the value of farm products for the past year was stupendous, namely, \$6,794,000,000. This is a gain over the census of 1899 of \$4,717,000,000, or a gain since 1899 of 44 per cent. in the total farm value. Inasmuch as the areas that are occupied by the farmer are not largely in excess of those of six years ago, and with the exception of cotton, not a large increase in the prices received; this shows a remarkable increase in the efficiency of the farmers of the United States. The American farmer feeds the world, and words are inadequate to fully express this fact. As stated by Burke, in 1775, when speaking of England's commerce with the colonies, "Fiction lags after truth; invention is unfruitful, and imagination cold and barren." And it is true now, as stated by him then, though in a greater degree, "The Old World has been fed from the New; the scarcity which you have felt would have been a desolating famine, if this child of your old age, with a true filial piety, with a Roman charity, had not put the full breast of its youthful exuberance to the mouth of its exhausted parent." The American farmer is, therefore, an unselfish benefactor.

That the farmers in New Jersey have participated, both in this beneficent work and in this commercial progress which fol-

lows, is abundantly shown by statistics taken from the same source, namely, census reports, which show the value of our agricultural products in 1899 to be \$43,000,000 in round numbers, and in 1906, to be \$76,000,000, an increase of \$32,000,000, or over 75 per cent., or, in other words, the New Jersey farmer to-day is receiving \$1.75 where he received \$1.00 in 1899. This is, indeed, a very gratifying gain, and I think it is probably not exceeded by any other State, though I have not at hand the data to confirm the statement in this regard. With this increase in total value of product, there has been, of course, a large increase in the actual expense involved, though not sufficient to reduce the net income to that of 1900. This is abundantly evident by the advance that farmers have made in their standard of living, and in the things that they now regard as necessities, but which a few years ago were regarded as luxuries by the rich.

As stated by the Secretary, in the report referred to: "The farmer's standard of living is rising higher and higher. The common things of his farm go to the city to become luxuries. He is becoming a traveler; and he has his telephone and his daily mail and newspaper. His life is healthful to body and sane to mind, and the noise and fever of the city have not become the craving of his nerves, nor his ideal of the everyday pleasures of life. A new dignity has come to agriculture, along with its economic strength, and the farmer has a new horizon far back of that of his prairie and his mountains, which is more promising than the sky-line of the city."

In view of these facts, which speak eloquently for the condition of New Jersey farming, it is difficult and perhaps not becoming to call attention to points of weakness in our present development, and the opportunities which are still open for improvement.

NEW JERSEY AS A FRUIT STATE.

In previous years I have pointed out what were, in my judgment, the lines along which development must come. In 1904, your attention was directed to the opportunity afforded for the development of our fruit industry, particularly along the line of

apple and peach growing. It was shown that there were no better natural conditions for apple growing anywhere in the country than in the northern counties of our State. They are naturally well drained, and a sufficient distance from the sea to prevent injury from the warm, muggy conditions and high winds which are often disastrous on the coast. The soil in these sections consists in large part of decomposed original rocks, and possesses the physical character and chemical qualities that will permit the roots of the trees to readily penetrate the soil, and to great depths, and to permit the absorption of an abundance of moisture and of plant-food, and thus not be seriously affected by short drouths; besides, the location is not so far from markets as to make the cost of shipping excessive, particularly if sufficient quantities are grown to make it possible to ship in large lots. It was shown, too, from a study of the conditions, that the judicious planting of apples in those northern counties would not interfere materially with the dairy business, now well established in many districts in that section, as the orchards might occupy the high hillsides, while the valleys and lowlands could still be devoted to forage crops for the dairy. This combination could be successfully managed, and would accomplish in large part the proposition originally pointed out to grow that which is profitable, and well adapted for the locality, and at the same time to intensify the productions.

These same considerations apply in a way to peach growing, as well. There is a future for peach growing in the State, and the culture can be successfully prosecuted to-day in those sections of Somerset, Hunterdon and Sussex counties where they were formerly grown, and even in other parts of the State, if proper care were given in all directions, as understood at the present time. We can better afford to supplement the exhausted food conditions of soils naturally well adapted for this crop than to attempt to grow general farm crops in competition with those areas whose natural conditions are more favorable for them than ours. It is only necessary that the farmer shall study his conditions, and adapt himself to them, and then to provide the necessary food and care not provided by Nature.

Investigations recently made by our Station fully confirm these views, and the results that have been secured during the past year is evidence that the farmers are awakening to this fact.

The two factors which have probably more than any other been the cause of a decline, particularly in our peach industry, have been the San José scale and exhausted soils. It has been clearly shown, by the experiments that have been conducted and verified by farmers in the field, that the San José scale can be controlled on peaches. We have numerous orchards testifying to this fact. It is mainly a question of recognizing that it is necessary to prepare for the repression of the scale quite as carefully as it is to prepare for any other of the untoward conditions entering into their successful production. When thus carefully prepared, it does not add so largely to the expense of growing as would seem to be the case from imperfect observation or wilful ignorance of the facts. It has also been clearly shown that the depleted soils upon which peaches were formerly profitably grown can be cheaply reinforced with the mineral fertilizers, and at a profit. Experiments that have been conducted at the Experiment Station have shown, too, that trees properly fertilized not only produce better fruit and are fruitful for a longer period than those which depend upon the natural resources of the soil. The rapid increase in our population makes this line of development one well worthy the attention of our farmers. Prices for good fruit do not fluctuate as in the past, owing both to the increase in the home demand and the greater facilities for distribution now available.

In the case of apples, our investigations have also shown that the conditions here are as favorable, in certain sections, for the production of high-class fruit as anywhere in the country, and while their arch-enemy, the San José scale, cannot be so easily controlled as on peaches, it is possible to keep it in check.

DAIRYING IN SOUTH JERSEY.

Another line of progress to which your attention has been called from time to time is the development of our dairy industry. I recently pointed out to you the fact that it would require 250,-

000 cows to supply one-half pint milk daily to the population within the limits of this State or on its immediate borders. It would require an addition of 600,000 cows if but one pound of butter were used daily by every ten persons in the same area, and 60,000 more if one hundred persons consumed only one quart of cream per day, or a total of 910,000 cows, five times as many as are now owned in the State. There are two causes which militate against the milk dairy industry at the present time. The first is that consumers have not yet been fully educated in respect to the value of milk as a food, and are, therefore, not willing to pay the higher price that must be obtained for products of a high quality. This higher cost is due to the fact that not only do the common operations in connection with the dairy require a greater expenditure than ten years ago, but expensive expert supervision is demanded. The cost of labor, feeds and animals have increased at least 50 per cent. in the last ten years; besides labor is more difficult to obtain even at any price, whereas the price received for milk has remained practically the same, hence milk of the same grade should bring at least 50 per cent. more now than then. In addition to these normal increases in cost, the various city, town and borough governments demand that sanitary measures shall be adopted both in respect to the care of the cow and her product, which means additional labor. The added expense naturally increases the cost of production, and except in instances where special markets are provided, the profits in the dairy are not so encouraging as to warrant a large increase in the general business.

Another factor which has appeared to limit the development along this line is the feeling that dairy farming is only possible in certain well-defined areas, where strong soils are available and natural grasses abound, and that the more sandy soils of South Jersey are not capable of profitably maintaining dairy herds. Experiments along this line, which have recently been conducted by the Experiment Station in Atlantic county, show that large areas of these lands which are now devoted so largely to fruit and berry growing, and not sufficient hay and other roughage for farm teams are produced, are capable, with proper fertilization and by careful management, of producing cattle foods at a reasonable cost. I am satisfied that if the farmers on these light soils

would combinè the dairy business with fruit-growing, their total business would not only be much more profitable, but would enable them to supply, at a profit, a part of the demands of the nearby sea-coast cities with milk, cream and butter. That this is possible is due to our increased knowledge concerning soils and their treatment, as well as to the facts we have acquired in respect to the forage crops that are suitable for these soils. The experiments were conducted to determine whether it was possible on these light, sandy soils to grow forage crops in succession by the use of a commercial fertilizer alone. The added fertility was derived exclusively from fertilizers, mainly because in the beginning of the work, and before the farms were well stocked, it would be the only practicable source of manures. Later, when the herds are established, there will be, in addition, a large supply of vegetable manures, which will naturally decrease the necessity for fertilizers, and consequently the cost of the crops. The crops tested in this experiment were crimson clover, rye and vetch, spring vetch, red clover, wheat, soy beans, corn, millet, cow peas, oats and peas, oats and vetch and alfalfa, and it was demonstrated through three years of experiment that all of these crops, when suitably fertilized, mainly with minerals only, would produce satisfactory yields of green forage, that practical rotations could be arranged, so as to provide a continuous supply throughout the entire growing season; the grasses and hays, particularly of the legumes, to be held for winter feeding. The average yields of three years show that one acre will provide a sufficient amount of roughage for one cow, for one year, and at an annual expense for fertilizer after the first year of \$6 or less per acre, besides a very material improvement in the condition of the soil. All of the lands in these areas are not capable of such rapid and profitable improvement, though sufficient are available now to warrant the adoption of this line of work.

The great advantage here lies in the fact that the lands are cheap, are easily worked, are near the best markets in the world, and are provided with abundant facilities for transportation, and are located in sections where the climate is most admirable. The only drawback to the handling of stock in some of these areas is the mosquito pest, and notwithstanding the resolutions adopted

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by certain educational boards recently, demanding that the State transfer the State appropriation now made for the eradication of this pest to the State School fund, I believe that the results of the work along this line will be both directly and indirectly beneficial to the farming interests of these and other areas of the State, and to such an extent as to make the appropriation seem infinitesimal in comparison, though naturally the greatest immediate benefit will be obtained by other interests. That the work of mosquito extermination is practicable has been abundantly demonstrated, not only in our own State thus far, but in other States and in other countries.

It is, perhaps, not advisable, or perhaps wise, to attempt to provide for all the demands of our cities and towns that are within easy reach, but I do feel that two cows may be kept where none is now kept, and with the proper knowledge of handling dairy animals, can be kept at the same cost that one is kept now; but the farmer must concentrate his energies upon small areas, prevent the waste of soil and manure constituents by the growth of clover crops, adopt better methods of handling manures, introduce protein catch crops, which increase the total production per acre, as well as improve the soil, and exercise wisdom in the selection of fine feeds. Progress has been made along all of these lines, and it only remains for the progressive man to take advantage of the conditions as they now exist.

AN INCREASED NUMBER OF IMPROVED ANIMALS.

In the next place, I am satisfied that great improvements can be made in the line of animal husbandry other than dairying. Our poultry interests are increasing in a satisfactory manner, and are profitable, but too little attention is being given to the general live stock of the farm. We have in New Jersey live stock, other than dairy cattle, 81,191, or less than $2\frac{1}{2}$ per farm, and the chances are that a large number of these are heifers and young bulls, and not high-grade animals of other types. In fact, I know of but one herd of pure-bred beef cattle in the State, and that is a recent introduction. I do not believe that the State should change from

dairying to beef-growing, yet I do believe that the conditions warrant a larger interest in cattle of the beef type, particularly in those sections distant from market. This may not pay as well as in other States, where larger areas are available, still it seems to me that with the saving of the labor that is now involved in the dairy business, many farmers now well situated for growing grass, and not so well situated for disposing of dairy products, could maintain a few high-grade animals that would find a ready market at good prices. It is more largely a question of good animals than a question of the kind of business. As an illustration of this fact, take the business of raising veals now followed in many sections of the State. The calves are obtained from dairies, largely bred Jerseys, Guernseys or grade-bulls, rather than from herds which have at their head either Holsteins, Shorthorns or Angus breeds, and the calves are, therefore, small to begin with, are not so readily fattened, and thus, while bringing a fair profit, do not give the same profit as would be obtained if better stock were used. There seems to me to be a very promising outlook at the present time for the development of this line of work, and it would be one which would not interfere with the progress that may be made in dairying.

In the case of sheep, too, I find that the census reports show that there are 44,644 sheep in the State, less than $1\frac{1}{2}$ animals for each farm, and while these statistics may be correct, from such observation as I have made, I rather question whether there is as large a number as this. In many counties in the State it would be possible to raise sheep, and with the increased prices of wool, mutton and lambs, I regard it as a most promising line along which we should develop our farming business. At the present time there are very few breeders offering pure-bred sheep of the Horned Dorset, Shropshires, Hampshires or Southdowns, lamb and mutton breeds of the best types. One of these breeders informed me that he had offered adjoining farmers the use of his pure-bred Horned Dorset rams, and would pay them \$10. for every grade ewe lamb dropped, and there were no takers. I cannot conceive of any other line of business which promises so much for limited labor as the growing of lambs under these conditions. Of course, in the more thickly settled portions of the State, the

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menace of dogs is a serious one, but probably can be overcome by a slight increase in the care of the flock. There are, however, large areas of rough lands in our more northern counties that are peculiarly adapted for sheep husbandry, and are located near enough to our markets to obtain the highest net prices for lambs and good mutton. I commend this line of improvement to your thoughtful consideration.

In the matter of swine, the State has always taken front rank in proportion to its area, though we have but 158,537 hogs reported as the number in the State. There is no other farm animal that is so easily raised, or that can utilize so large an amount of refuse material to advantage as the hog. The raising of pigs is a desirable adjunct to a dairy farm, to a fruit farm, and for general farming, and it is possible through proper breeding and care to make this line much more profitable than at the present time.

While this is not a horse-breeding State, many are raised, particularly in our central and northern counties, and I believe greater profits would be secured if stallions of the draft type were used instead of trotting or coach types. Good grade draft horses, weighing from 1,200 to 1,500 pounds, are always saleable and at good prices, and the likelihood of obtaining saleable animals is proportionately greater than for the others. Besides, the colts can be worked at an earlier age, thus reducing their cost. It is only occasionally that a very valuable animal is secured of the light horse type, the remainder are too light even for good farm teams, and are seldom saleable at profitable prices.

It may seem from what I have said that I am advocating a line of development which is not well suited to the agriculture of the East, and in order that the conditions here may be compared with other States, I have looked up the statistics of New York State on this point: New Jersey has an area of 7,454 square miles, and New York an area of 47,637 square miles. New York is, therefore, 6.4 times larger than New Jersey. New York State, according to her area, to have the same relative number of cattle, other than the dairy, as New Jersey, should have 6.4 times as many—she has 12 times as many; she should have 6.4 times as many sheep—she has 23 times as many; she should have 6.4 times as many hogs—she has but 4 time as many. New Jersey, there-

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fore, stands ahead of New York in the number of hogs, but far short in the proportionate number of sheep and cattle, other than dairy cows, and it may be inferred that because she has so many sheep in excess of New Jersey, proportionately, that she does not have as many dairy cows, but the fact is that she has nine times as many dairy cows as New Jersey. New York State as a whole does not possess any greater natural advantages of soil or climate, nor as convenient markets as New Jersey.

What has been stated in reference to the lines of progress which, in my judgment, may be made a part of the future work of our farmers, has been based upon the correct assumption that the farmer of to-day is alert, intelligent and familiar with the results of the investigations of the past and present, and conducted for his benefit, and the advantage to him directly and indirectly of such work, for all true progress must rest upon knowledge. This, of course, does not apply exclusively nor primarily to financial progress, but including this, relates to that of the farmer himself. I think there are but few who truly realize how much of the opportunity and success intellectually, socially and financially, is based upon the scientific investigations that have been made of the principles which underlie. Our success and our progress and our development in many lines, is very largely due to the indirect effect of the work of others. They have rendered the conditions favorable. We take as a matter of course those things that come to us and seldom realize how dependent we are upon the principles that have been established for us, and which in their application make it possible to make true advancement, and enjoy the benefits of what we are pleased to term the "higher civilization."

AGRICULTURE WITHOUT KNOWLEDGE.

It is only necessary, in order that we may realize this to its fullest extent, to visit a country which possesses magnificent resources in its soils, climate and location, but which, because it has not received either the direct or indirect teachings of science, is following the primitive lines of practice which were in vogue in the earliest times. It has been my privilege during the past year to

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visit Mexico and make some study of her agricultural resources, and no other experience that I have ever had has impressed me so forcibly with the indirect benefits of science as applied to agriculture. During the whole trip there was a constant query as to why this great country was allowed to remain in a practically mediæval condition in respect to this one great industry. From Laredo, on the Rio Grande river, through to Mexico City, there is evidence everywhere of great agricultural possibilities. The variety and character of the flora indicated that even in this semi-arid region modern methods of agricultural practice would result in securing profitable crops.

The soil is unquestionably abundantly supplied with the mineral elements, phosphoric acid and potash, is not strongly alkaline, and only needs proper cultivation and a supply of nitrogen to ensure adequate returns. Because, also, of the varying altitudes and climatic conditions, it permits of the growing of a wide series of crops, including all of the cereals, the legumes, and many of the grasses and fruits. In many sections, and on areas now quite limited, irrigation is practiced, and while the results are apparently good on such crops as alfalfa, the methods of culture used do not result in securing maximum yields of this or of corn, barley or wheat. In this respect, the methods are really mediæval in their character—the land is imperfectly tilled by the use of Egyptian wooden plows, which scarcely scarify the surface, not permitting the conservation of the natural rainfall, or the irrigation waters applied, and hence most crops suffer more or less from a lack of moisture.

The yields are pitifully small; corn, in many instances, is not worth harvesting; wheat and barley universally an uneven stand, short and not a profitable crop under ordinary conditions, and even under the best cultivation that was observable, the yields were much smaller than was warranted by the character of the soil and the climate. The total yield of wheat for the whole country is, for example, less than is produced by the State of Maryland, in the United States, and the yield of corn is but little more than is produced by the State of New Jersey, containing an area of less than 7,500 square miles, and one not specially devoted to the growth of this cereal; while the total production of rice, cotton

and tobacco is a mere fraction of what one Southern State produces annually, and yet Mexico has a territory of 767,000 square miles, a large portion of which is suited to these crops.

In the tropical regions about Orizaba and Jalapa and eastward toward Vera Cruz a hundred miles or more, which it was possible to visit, the vegetation is rich and varied, and yet the impression made even here is that the citizens are not living up to their opportunities in any greater degree than in the more hardy regions; bananas, oranges, coffee and other tropical fruits are grown, but the plantations are small, and the management without system or definite plan. The opportunities for development here are unlimited, and the need for knowledge and practical business ability nowhere more apparent. It is a country of boundless resources, which needs but the hand of intelligence to direct and develop. It is really pitiful that in a great country like this, that the vast majority of its citizens should have no knowledge whatever of the principles which are involved in the successful exploitation and use of these resources, or that the government should in the past have been so dead to the importance and value of the proper development and use of their soils. These men know not the work of Jethro Tull, Sir Humphrey Davy, Boussingault, Baron von Liebig, Lawes and Gilbert, Ville, Helriegel, Deherain, Warrington and Monroe, familiar to all in this country as the organizers and founders of agricultural science, nor they are not familiar with the names of Johnson, Cook, Goessman, Atwater, White, Stubbs, Armsby, Henry, Jordan, Bailey and a host of others in this country, who as investigators and teachers have rendered the term "farmer" honorable, and the business profitable and helpful to all mankind, and who have, besides, made it possible for them to apply those principles in practice, and which enable them to lift themselves from the class of those who, without knowledge, are following the primitive methods of old, and whose outlook for the future is barren of incentive.

We are living in a time when science is contributing untold benefits upon mankind through the investigations and resources and personal influence of men whose names I have mentioned. It is not only a privilege, but a duty that every father owes his son, to give him an opportunity in these times to become acquainted with

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these pioneers, seers and teachers, that have made possible the splendid opportunities that we now enjoy.

THE SHORT COURSE.

In closing, I cannot but express the great satisfaction I have in reporting that, after many, many days, those who "went forth weeping, bearing precious seed, have come back with rejoicing, bring their sheaves with them," in the establishment of our Short Courses in Agriculture at our College. This, in my judgment, marks the beginning of better things for New Jersey agriculture; those who take advantage of the opportunities there afforded must exercise a helpful influence, because their work will be based upon principles and facts that have been acquired through careful, painstaking research, and are now so arranged as to make it possible for others to acquire them, and to use them in their practice. Much is due to this Board and to the other farmers' organizations for their loyal support of this movement, and the successful establishment of the school, but the support must not stop here. Every member of this Board, every member of a helpful farmers' organization in the State, should constitute himself a committee of one to be added to that committee of thirty-five earnest students, representing thirteen counties of this State, now taking these courses, and who shall go forward in April, each better equipped for his work; each an advocate of agricultural education, because he has tasted it and found it good.

Annual Report of the Secretary.

Report of Franklin Dye, Secretary,

For the Year 1906.

To the Governor and the State Board of Agriculture:

The old maxim, "When agriculture is prosperous, every other business is prosperous," seems never to have been more fully realized than at the present time. So evident is this condition throughout the entire United States that no argument is needed to prove it to the well-informed, unprejudiced observer.

In common with other States, New Jersey has shared in this prosperity and her agricultural interests have prospered with others. For the past seven years there has been a steady increase in the output and value of agricultural products. This increase in production is not due to a larger acreage under cultivation, nor in dairy matters altogether to increase in number of milch cows, but to more intelligent management of the soils, crops and stock. The researches and investigations of our Agricultural Experiment Stations, as expressed in their numerous bulletins; the teachings of our Agricultural Colleges and the work of our agricultural organizations in disseminating and discussing agricultural matters have each and all contributed to a better understanding of crop production.

Farmers are studying their business and they are applying business principles to its management, so that one acre produces from two to five times more now than it did years ago. One dairy cow, properly bred, fed and cared for, now produces more than three of years ago. In confirmation of these statements, the value of the farm live stock and the gross earnings of the past seven years in New Jersey agriculture are given: in 1900—\$43,005,732; in 1901—\$56,157,717; in 1902—\$62,231,964; in

1903—*\$59,998,525; in 1904—\$68,767,980; in 1905—\$73,023,962; in 1906—\$76,851,509.

The steadily increasing value of farm products is due to increased production per acre, increased demand and better prices.

The increased demand is due to the large increase in our non-agricultural consuming populations and to increased foreign demand. § Then too the working people, so called, are living better, because they are able to do so. Never have wages been so high, the working day so short and the amount of money per capita in circulation so large as now.

The statements quoted below from my report of 1900, although not intended to be prophetic, seem to be in process of fulfillment. Population is chasing hard after production, and the meat packers, filled-cheese makers and canned-goods manipulators are slowly learning—per force—“To guard the purity and healthfulness of their products if they expect to capture and hold the foreign market.”

The farmers' interest in the prosperity of our manufacturing and other non-agricultural industries is apparent. His products are for human consumption, and to increase the eaters is to increase the demand for what he produces. The fact, too, that peo-

*The year 1903 will be long remembered as the year of the fall flood. The destruction of the farmers' crops was heavy. Then there was an early summer drought that cut down the yield of hay and some other crops. But for those abnormal adverse conditions that year would, no doubt, have registered \$65,000,000.

§ The time will come when, at the present rate of increase of population and the rapid reduction of new agricultural lands in the United States, our population will more nearly equal our rate of annual production. Then, and not before, always excepting widespread adverse natural calamities, will the home market suffice for the consumption of the products of the farmers of the United States. At present (1900) we are producing enough annually to supply 130,000,000 of people, nearly twice as much as is needed at home.

If the agriculturists of this land are to prosper by farming, they can only do so in the larger sense for some years to come by the enlargement of their markets, and every encouragement should be given to the United States Department of Agriculture in its endeavor to extend the markets for the products of American farms. Meanwhile, *guarding the purity and healthfulness of the products* so exported in order that a market once captured may be held.”

ple are living better is a challenge to the farmer to produce and market high grade goods.

In some lines there is not enough produced to satisfy the demands of consumers at prevailing prices, prices that have for a long time been considered as fixed. Such products must advance. This is the case with milk and cream. There is room for many more dairymen in proximity to New York and Philadelphia. But, even though they should increase, the price of milk must advance and remain higher; for the requirements in the production and marketing of these articles of food are more exacting and more expensive than ever before.

In some sections of the State, quite near market, many who were in the dairy business, as was supposed permanently, have abandoned it because of the scarcity of reliable help. It is a business that requires the best of care every day in the year and, without good help at reasonable wages, it is impossible to make the business pay at prevailing prices. So these one-time dairymen are growing crops that do not require unceasing attention and which will not perish in a day.

A possible outcome of the dearth of farm laborers, which is referred to by a number of our correspondents as an injury to the farming business, may be the reduction of the hours of labor per day on the farm; a higher and more uniform rate of wages for similar work and, of necessity, an advance in the price of farm produce all along the line.

By the improvements in and knowledge of production already made whereby a better article of food is placed on the market and, with a better system of marketing, consumers will be able to secure for their money better goods. Accordingly there will be less waste from poorly grown and inferior stuff found in the hands of the purchaser.

The solution of the farm labor question is still in abeyance. It may be settled in the natural course of industrial events by the adjustment of the proper quota of laborers to each industry. In the light of past experience one thing is certain: if manufacturing and other non-agricultural industries should be even partially suspended, although it might throw on the farm labor mar-

ket a large number of unskilled workers, agriculture would suffer also, for the demand for farm produce would be reduced and the price lowered.

The wages of farm laborers in common with those in other industries have quite doubled within the past few years, and in the majority of cases the increase in wage has, unfortunately, been in the inverse ratio to the ability to do farm work.

The great need of agriculture to-day is men who will take up the business of farming as their life work. Only in this way can skilled farm laborers be secured. Such men, and women too, would command high wages on the farm.

It has been suggested that farmers should arrange to provide for help the year through; a period of a few months a year on the farm will not secure the best men, nor raise up a supply of skilled laborers for agricultural work. Day laborers are, as a rule, migratory, and comparatively inefficient laborers are in demand now as never before.

At the last Annual Meeting of the State Board of Agriculture a resolution was adopted, the spirit of which I have endeavored to fulfill, and the following correspondence and letter was sent to all our farmers' organizations in the State. I would be pleased to know whether any attempt was made by any farmer or farmers to hire these, and with what success. (Thirty were sent to New Jersey.)

STATE OF NEW JERSEY.
STATE BOARD OF AGRICULTURE.
OFFICE OF SECRETARY.

TRENTON, N. J., May 15th, 1906.

To the Farmers of New Jersey:

GENTLEMEN—At the last Annual Meeting of the State Board of Agriculture, held in Trenton, January 17th-19th, 1906, the following resolution was adopted:

“Resolved, That we recommend that the Secretary of this State Board of Agriculture be requested to establish such relations between our farmers and those interested in the welfare of immigrants as will facilitate their distribution among the agricultural communities of our State.”

Complying with that resolution, I now inform you that a Labor Information Office for Italians has been established in New York City by an association composed of prominent American citizens, incorporated under the laws of the

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State of New York, for the purpose of better distributing Italian immigrant labor and preventing the abuses of the padrone system.

In sending you notice of this institution, which aims solely to act as a disinterested intermediary between applicants for employment and applicants for help, without making any charge to either the one or the other, they invite you to let them know the number of men you may require and the conditions relating to the work for which the men are required. They will send you blanks with all the requisite particulars.

In answer to my letter, April 24th, 1906, to the Manager, Mr. G. Rossati, he says, under date of April 26th :

"Mr. Franklin Dye, Secretary State Board of Agriculture, Trenton, N. J.:

"DEAR SIR—Replying to your favor, dated April 24th, beg to state that while we thank you for the favorable reception accorded to our communication, we shall be only too pleased to co-operate with you in helping the farmers of your State to obtain good farm hands.

'More than 80 per cent. of the Italian immigrant laborers arriving at this port come from the country, and they make splendid workers for the farm, especially for fruit culture, or for any work concerning intensive cultivation.

"We are preparing a statement explaining our work and aims, but as it will take some time for us to do so, at the present time we will be glad to receive from farmers a list of application of the number of men they want, of the wages they are ready to pay, and whether they would advance or not transportation from New York, which we think to be an essential condition in order to secure such help.

"Yours truly,

"G. ROSSATI, *Manager.*"

I would suggest that our farmers who desire to secure this class of help co-operate either as neighborhoods or through the Grange or other organization, and employ enough of these men and provide such conditions of living as to social intercourse as will make them contented, if possible, as it is scarcely probable that they would continue long, even if engaged, unless there were several employed in the same locality.

I would suggest, further, that if you think of employing this class of help, you open correspondence immediately with this agency, when "Employers' Application for Laborers" and other needed information will be sent you. If you employ any of these laborers, I would be pleased to be informed at the close of the season's work as to the outcome of the experiment, whether they have been satisfactory or otherwise.

The name of this agency and the location are "Labor Information Office for Italians, 59 Lafayette (formerly Elm) street, New York."

FRANKLIN DYE, *Secretary.*

Dismissing for the moment the farm labor question, the trend of agriculture is forward and upward. The steady and almost uniform increase from year to year for six years past, in the value

of our farm products and stock, as previously stated, suggests a healthy business. With this increase in the earnings, there has come an advance in the land itself.

The United States Department of Agriculture places this increase in value since 1900 for the whole country at thirty-eight per cent.; the North Atlantic States being the lowest, or thirteen per cent. New Jersey is sharing in the rise. Other things being equal, these conditions may reasonably be expected to continue. These facts suggest to those owning farms, who are now in the farming business, the advisability of holding on to the farm and continuing in the agricultural profession.

FIELD MEETING.

We are making progress in New Jersey, both in more intelligent and, therefore, more profitable farming; and by act of the Legislature last winter, we have taken a long-delayed step forward in enlarging the scope and power of the State Agricultural College. The Faculty are doing all in their power to so utilize the funds appropriated to make them secure the greatest benefit to the farmers and the agricultural interests of New Jersey. This they can accomplish only in connection with the full, earnest, co-operation of the farmers of the State.

A movement to familiarize the farmers with what is now being done at the State Agricultural College Farm at New Brunswick and to popularize the prospective enlargement of the work there, was inaugurated when, on August 17th last, a field meeting of the State Board of Agriculture was held there. That was the first meeting of that character held by this Board. And to say it was popular, only, would not describe the good spirit and enthusiasm shown by the crowds that attended. And we were much pleased that the farmers brought their wives (thanks to the teachings of the Grange), their sons and daughters with them.

The day was fine; they all seemed to enjoy the occasion. It promoted a wide acquaintance and fellowship between the farmers throughout the entire State, for every county seemed to be represented—and it will strengthen the estimation of the work of

our several agricultural organizations in the minds of the farmers, and in particular, the experimental work being done at the College Farm under the supervision of our able President, Dr. Edward B. Voorhees. The Farm, with its experimental and field crops, the stock and the methods pursued all presented a tangible object lesson in experimental work, and they were all inspected by the visitors.

NEW SOURCES OF PLANT FOOD.

New sources of plant food are in process of development, according to Mr. David Fairchild—(July number "World's Work"):

"Dr. Allerton Cushman, of the Department of Agriculture, in grappling with the problem of what constitutes a good binding rock for roadways has discovered, and is just making public, a curious condition of affairs relating to the supply of one of the greatest of our plant foods—potash, the plant food without which no plant can manufacture starch. The granites of the hills contain it, and the disintegration of the potash feldspars which compose the granite sets it free, but, in nature with a geologic slowness. The great rock crushing and grinding machines which make the cement for our bridges and buildings can grind granite boulders to powder as fine as flour for from \$2.00 to \$5.00 a ton, and the laboratory and green-house tests of Dr. Cushman have shown that when so ground the rock gives up its potash rapidly to plants in well-watered soils. Yet we are importing from abroad more than \$5,000,000 worth of soluble potash fertilizers because there does not exist in this country a single visible supply of this soluble form of potash, the market value of which has nearly doubled since 1904.

"Carbonate of potash, which is the great tobacco fertilizer, brings to-day at its port of entry \$98 per ton, which puts the price of potash at 7 cents per pound, while an unlimited quantity of granite containing more than five per cent. of potash lies not fifty miles away from the Connecticut tobacco fields. It is estimated by Dr. Cushman that this can be ground to powder for \$2.00 a

ton, which will make the potash cost only one and one-half cents a pound.

"The great spar grinders in Trenton and a company in Henryton, Maryland, are getting ready for the demand that is sure to be created when the Connecticut tests confirm Dr. Cushman's green-house trials, and the availability for plant uses of the potash in rock powders has been established. It is no small thing that we have probably reached the point when we shall be able to make available for our crops in a single season the stores of potash which it would take Dame Nature centuries to dole out to us in driblets."

That potash exists in some rocks is not a new discovery. Whether the grinding will bring it into such general and satisfactory use as the writer seems to suggest is to be proved. There is no doubt truth in the statement; the trouble will be that many will accept it as applying to their conditions, which require not only the element potash but demand that it shall be in a form readily distributed and immediately available, as, for example, when the object is to obtain early maturity of crops on soils deficient in all of the mineral elements.

THE STATE BOARD WORK.

County Boards of Agriculture.

Of these there are now twenty, one having been organized in Passaic county on the seventh day of June, 1906, and, for the first time, that county is represented in the State Board along with her sister counties.

Of the several County Boards, it may be said, some of them are doing grand work for their counties. A large, active membership, meeting regularly, monthly or quarterly, discussing the questions connected with the branches of farming pursued in their county, each one contributing from his experience or study to the general fund of knowledge is of great value to the industry.

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And that was what was contemplated by the law, Section 13 of which reads: "And be it enacted, That it shall be the duty of each county board of agriculture, on or before the fifteenth day of December in each year, to make a full report of transactions of such board during the year next preceding, with as complete a statement as practicable, of the condition, progress and results of agricultural and horticultural industries in such counties respectively, together with reports of such special subjects of inquiry as may from time to time present themselves to such county boards, or be submitted by the state board of agriculture, or the executive committee thereof, and forward the same to the secretary of the state board of agriculture, and it shall be the duty of the several representatives of county boards in the said state board to make a full report to their respective county boards of the proceedings of such meetings of the state board as they may from time to time attend."

By the system of County Boards of Agriculture, each one sending two delegates each year to the State Board, and one delegate from each Pomona Grange, the Board assumes a representative character peculiar to the New Jersey plan. It could not be more comprehensive, and County Boards that are scarcely able to maintain an organization, because of lack of interest on the part of the farmers, should be revived in some way.

If the influence of our farmers is to be made known in legislation and in other ways so as to make an effective impression, it must be through and by organization, and the same is true in the matter of purchases and sales. Let every intelligent progressive farmer, therefore, affiliate with his county organizations.

Farmers' Institutes.

The Institutes held during November and December, 1905, it was my privilege to attend and conduct—of these there were twenty-seven in number. The attendance was better in most cases than formerly, and the interest in the subjects presented greater.

The sixteen Institutes held during January and February, as also the Annual Meeting of 1906, I was not able to attend, owing

to a dangerous illness. The latter Institutes, however, were conducted by Messrs. John T. Cox and George L. Gillingham, and good reports were received from each meeting, both as to the attendance, the addresses and the efficiency of the gentlemen presiding. The total number of sessions held was 126, and the total attendance, counting all who attended and at every session, was 10,791.

For the season of 1906-7, arrangements have been made for forty-four meetings, twenty-seven prior to the Annual Meeting of the Board, the others to follow immediately after. Do these meetings pay the State for the expenditure made? When we see our agricultural crops and farm stock values increasing year after year from \$28,997,349 in 1890 to \$76,851,509 in 1906, we may well inquire what were the causes that produced such results.

As stated in the forepart of this report, "This increase is not due to a larger acreage under cultivation, nor to increase in number of milch cows altogether, but to more intelligent management of soils, crops and stock."

In conjunction with other sources of information, as the Experiment Station and Agricultural College teachings, improved agricultural papers, etc., helping the farmer to better understand his business, the Institute has been a valuable agent. It has correlated information not always available to all farmers alike, brought the different parts together, and presented them at the Institutes in such a way that even the ordinary farmer could grasp the ideas presented, and make them avail to his purpose and profit. The focusing of needed information, at a given place and time, for a community engaged in the same general occupation should be to their advantage, if they apply it in practice. This is just what they have done, and are doing, hence the splendid results named.

AGRICULTURAL EDUCATION.

Education is appreciated and sought as never before. Farmers are beginning to realize the fact that agricultural education is needful with agricultural training for intelligent agricultural practice and profit. Mother Earth has never yet been able to

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bring forth her plenitude of harvests because of the excusable ignorance (excusable now no longer) of essential principles on the part of those who tilled the soil. The millennium of agriculture awaits the coming of the educated, and agriculturally educated, farmer.

This Board has been discussing this matter for many years, and addresses on the subject have been given. At the Annual Meeting January, 1889, Prof. Austin C. Apgar addressed the Board on "The Study of Plant Life in our Schools." (See page 259 of that year.) Again, at the Annual Meeting January, 1891, following an address on "What Shall be Taught in Country Schools to Educate Farmers," by Prof. Apgar (see page 139 of that year), this resolution was adopted:

"WHEREAS, It is the opinion of the State Board of Agriculture that the lack of facilities for the proper education of the farmers' children is the chief difficulty in the solution of the problem of profitable agriculture; and

"WHEREAS, The curriculum now established in our public schools does not demand a knowledge of the principles of agriculture on the part of the teacher, thereby making it impossible for the pupil to secure training in those branches of knowledge so essential to his lifework; therefore, be it

Resolved, That this Board, through the Executive Committee, does hereby request the Board of Education and the Superintendent of Public Schools in this State to introduce into the curriculum of the Normal School such studies of science as shall enable the teachers to give instruction in the elementary principles of agriculture; and that certificates to teachers in the rural districts be granted only upon their passing careful examinations upon the above subjects, and that the teaching of the same be enforced by the trustees of said district schools."

At the next Annual Meeting (1892) the sub-committee of the Executive Committee, consisting of President Edward Burroughs, Prof. E. B. Voorhees and Secretary Franklin Dye made report that they had "presented the resolutions to the State Board of Education, through the State Superintendent of Public Schools, on June 25th, and it was referred to the Committee on Education, with the understanding that said committee would give a hearing upon the matter to representatives of the State Board. Accordingly, on September 16th the committee was invited and met with the Committee on Education at the Normal School building, and were granted a hearing.

After some opening remarks by President Burroughs, reciting the position and demand of the State Board of Agriculture, Professor Voorhees addressed the Board of Education Committee, presenting the following statements as a basis of arguments in favor and in justification of the demand made, to wit:

1. That successful farming under the conditions now existing in New Jersey, and which are likely to continue, requires a broader knowledge of the principles that underlie reasonable practice.

2. That the means of education, now generally accessible to the farmer, are inadequate to his needs, and that proper means are inaccessible.

3. That the introduction of the study of agriculture in the country public schools is legitimate, since its pursuit fulfills in an eminent degree the true aim of education.

4. That in those countries where instruction in agriculture is a feature of public school work, it has been amply proven that it can be successfully taught, resulting in a higher intelligence and more permanent prosperity among the farming classes.

5. That the introduction of the study of agriculture in the public schools of the State will not materially increase the present cost of public school work.

The Secretary of the State Board of Agriculture, Franklin Dye, presented for the consideration of the Committee the following reasons, viz.:

1. Agriculture lies at the basis of all other industries; and general, continuous prosperity is dependent largely upon a prosperous agriculture.

2. Agriculture can only be made to reach its largest possibilities when it is directed by minds educated to understand the laws of nature that control germination and growth in fruit, vegetable, plant and animal life.

3. The want of such knowledge is widespread, and education in this particular will become general only as it is generally taught, *i. e.*, in the common schools.

4. The recognition of this defect in our educational system has given rise to agricultural colleges, which, however, begin their work too far from the starting point of education.

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5. Our agricultural colleges and scientific schools, coupled with the close competition and depression of agriculture, have emphasized the necessity of beginning the study of natural things in the formative or educational period of child life, thus preparing the youth for the higher education at the agricultural college and on the farm.

6. This demand is not for sectional, denominational or class education.

Furthermore, at the request of this Board, the State Grange and the State Horticultural Society, Dr. Voorhees prepared a work—"First Principles of Agriculture"—intended for use in our public schools. This book, published in 1895, has had a much wider circulation in some other States than it has in New Jersey, although it has been introduced in some schools in this State.

At the Thirty-third Annual Meeting of this Board, January, 1906, this action was taken: "*Resolved*, That the President of this Board be requested to appoint a committee from the Executive Committee to confer with the State Board of Education in reference to the introduction of nature studies in the rural schools of our State."

Complying with that resolution, the President, Secretary and Mr. DeCamp, of the Board, were selected by the Executive Committee to confer with the State Board of Education on the subject, which we have done, and we are pleased to state that, although so many years have passed away since the above-named actions of this Board (Prof. Apgar says it takes a full generation to complete any change made in schools), we now have a Superintendent of Public Instruction, Mr. C. J. Baxter, who seems to have taken up this general question with a view to making it a practical realization as far as that may be possible, in the public schools.

Superintendent Baxter issued a special bulletin in 1905 on School Yards and School Gardens, from which I venture to quote two paragraphs:

"The oft-quoted aphorism, 'As is the teacher, so is the school,' though true in a measure, does not carry us back to first principles. Local educational sentiment, to which school boards, as

far as practicable, are accustomed to defer, determine the varying standards of culture, scholarship and efficiency, to which those employed in teaching must conform. If the superintendent, principal or teacher fall below, or, as is frequently the case, shall rise above such standard, he is usually given an opportunity to seek a more congenial field.

“Local educational sentiment also prompts the interest that is taken in school work, the nature of the appreciation accorded, the value of the co-operation given, and is the chief factor in determining the character of the school. As is the community so is the school, expresses a more precise and general truth. So, in the promotion of this most desirable reform, the condition of each school yard will be an index of the community’s appreciation of the importance of attractive school environment.”

“This discussion is offered with the expectation that it will direct the attention of many to a matter of most unfortunate neglect, and that a general improvement in the surroundings of our public school buildings will result. If this shall be the case, it will prove a valuable addition to the refining influences already exerted upon our youth, serve to strengthen personal as well as local pride, increase the efficiency of our schools, and improve our school property.

“The popular notion that those who are not qualified to succeed in other vocations will do to till the soil is erroneous. Judgment, foresight, industry, resourcefulness and large diversified knowledge are the prerequisites of success in this pursuit. Because of the exceptional personal equipment required to avoid misdirected effort and secure the most satisfactory results, it is the one occupation that is entitled to rank among the ‘learned professions.’ The honorable and lucrative profession of farming will undoubtedly be one of the interesting and fortunate developments of the future. We are upon the threshold of conditions in which intensive and scientific cultivation of our soil will pay, and the New Jersey farmer should now keep his brightest boy at home.”

Again, on September 11th, 1906, Mr. Baxter sent out a circular to county superintendents, from which I quote the opening and the closing paragraphs :

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"In every section of the State there is a growing appreciation of the possibilities of agriculture, and a corresponding demand for a better and more general knowledge of its elements. The tendency of the instruction given our rural youth in the past has been to wean them from rural life. The time has come to make this instruction of such a character that it will put them in closer, broader and more intelligent touch with their environment and cause the rural school to become a more practical force."

"Many of us have been wont to deplore the lack of educational interest manifested in many of our country districts. It now occurs to me that we may have been culpably slow in discovering the surest means of stimulating it. A course of training that will increase their children's productive capacity, better fit them for earning a livelihood, open up to them the esthetic and material possibilities of farm life, and suggest to them the graces and utilities of rural home-making, will certainly appeal to our rural patrons."

In the circular Mr. Baxter requests County School Superintendents to suggest "an outline of a course that will embody the elements of agriculture as related to the conditions of soil and climate and of supply and demand in your county." The purpose being, as stated, "to prepare a suggestive course in elementary agriculture that will prove sufficiently comprehensive for general use."

We farmers believe we have a book, referred to above, sufficiently elementary and comprehensive for general use, but, perhaps this new work will be a valuable addition to what we have. At all events, we are pleased at the awakening of the Board of Education to the importance of this general question, and we shall hope that good success may crown the movement. All farmers interested in our school work should read the circular of the Board of Education referred to, as no doubt they will desire to co-operate in this movement.

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THE FEEDING STUFFS LAW.

The law of 1900, Chapter 29, has been found to be of great value in protecting all purchasers of the various feeds placed on the market from imposition. It is an easy matter for a manufacturer or dealer, destitute of strict honesty, to adulterate his goods with that which has no feeding value, not only, but also with ingredients injurious to the animal.

The law named places its administration in charge of Dr. Edward B. Voorhees, Director of the State Experiment Station. Dr. Voorhees furnishes the following statement for the year 1905:

“Three hundred and eighty-four samples were collected, of which 276 required guarantees, and 108 did not. Of these, 348 were selected for analysis, 245 of which belonged to the class that required guarantee.

“The samples received represent 125 different brands, four of which were devoid of all information as to their composition. This is 3.2 per cent. of the total number, and is the best showing of any of the Station's inspections. This shows an increasing compliance with the requirements of the law on the part of the manufacturers.

“Two hundred and forty-five samples requiring a guarantee were analyzed. The guarantees, when given, were fulfilled in 151 samples, or 63 per cent., a marked improvement over the last two years, but still below the ratio maintained in 1902 and 1903, when 68 per cent. of the samples reached their guarantees. Of the ninety deficient samples, fifty-two were low in protein, nineteen in fat, and nineteen in both protein and fat.

“To summarize, a careful study of the results of the six feed inspections in this State shows that the manufacturers are guaranteeing their feeds, and that where the guarantees have been shown to be too high a large proportion of the brands have had their guarantee reduced; furthermore, twenty-five overguaranteed brands have been withdrawn from the State's markets, indicating the difficulty of selling in this State feeds which are flagrantly below their guarantee. The fact remains, however, that

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certain feeds—eleven in the last inspection—still carry too high a guarantee; five of these have been reduced in guarantee, but insufficiently, while in the other six the manufacturers have as yet shown no recognition of the fact that their brands are guaranteed too high. It should be said in justice to these feeds, that, with one exception, they are all high grade feeds; they simply bear guarantees which analysis fails to confirm. Several manufacturers this year, after receiving the Station's report of the analysis of their feeds, reduced their guarantee to conform with the analysis, but inasmuch as these changes were made after the collection of the samples for this inspection, the guarantees have not been changed in the tables, and the percentages given represent the guarantees supplied by the dealers or filed by the manufacturers at the time of sale.

While no direct evidence of adulteration was found in any of the feeds examined in this inspection, there were a number of feeds of marked inferior quality. It is believed that this inferiority was due in the majority of cases to methods of manufacture, although in a few cases foreign material was also present, which may have been introduced accidentally during the manufacture or shipping of the feed."

WORK OF THE STATE ENTOMOLOGIST.

The interesting work of the State Entomologist also claims our attention. There are those who seem to think the State should destroy the insects on the farmers' orchards. The State Entomologist does not so understand the provisions of the law. We believe he has earnestly tried to point the way in a comparatively unknown and difficult field. With the co-operation of the owners, better results will no doubt be reached each succeeding year.

Dr. Smith sums up the year's work under the act of 1903 as follows:

"The State Entomologist has continued the work of inspecting orchards as well as the nurseries of the State, and the effort has been to reach personally as many of the fruit growers as was pos-

sible, so that direct attention could be drawn to existing conditions and specific directions given for treatments. In this work of inspection seven thousand miles of Pennsylvania mileage have been used within the State by the Entomologist and his Assistant, and many hundred have been covered on other lines on which Pennsylvania mileage is not accepted. Every county in the State has been reached and a very large number of orchards have been visited. Orchardists have been encouraged to use any insecticide in which they had confidence, and the results of experience were given to each individually.

“During the summer and late fall, the inspections were chiefly directed to determining the effect of the applications that had been made. The results of these inspections will be extremely valuable, because the strength of the different preparations has been demonstrated as well as their weakness: and the conditions under which each can be used to the best advantage are now much better understood than ever before. The effort has been made to provide for the benefit of the fruit grower the cheapest effective insecticide among the manufactured products and the best method of preparing the home-made mixtures.

“There is now scarcely an orchard of any size in the State whose owner does not recognize that it is necessary to spray with either fungicides or insecticides or both, in order to obtain fruit in satisfactory quantity, quality and condition. In many districts in which the pernicious scale had heretofore almost unrestricted sway, it has been very materially lessened, and on the whole it can be said that the insect has been very much reduced in the State, while fruit growers are much more confident in their ability to control it than they ever were before. There have been many failures as well as successes, and the causes of these failures have been as patiently investigated as have been the successes.

“That the calls made by farmers and fruit growers upon the office are almost more than can be satisfactorily attended to, indicates the extent of the general awakening; and the quantity of insecticides sold during the past year within the State indicates even more clearly the practical effect of the teachings of the Experiment Stations. We are informed by one of the manufacturers of soluble oil that in 1905 he sold one hundred barrels

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of oil for each single barrel sold during the year before, and that up to the date of the communication, in early fall of 1906, he had sold ten barrels for every one sold at the same period in 1905.

“Attention has been also directed, so far as possible, to crops other than those growing in orchards, and a great deal of information has been given to the Shade Tree Commissions and Improvement Societies in the various municipalities. Altogether the work of the office has been greater than ever before and the demands are continuing to increase.”

FARM ANIMALS.

In general our domestic animals are in good condition. Bovine tuberculosis is being guarded against and diseased animals removed from our dairy stock. For details of this work see report of the Commission on Tuberculosis in Animals.

Dr. Henry Mitchell reports four cases of rabies, seventy-six cases of anthrax and one hundred and forty-seven of glanders. These did not become epidemic, as strict and prompt measures were adopted to hold them in check.

Referring to the records of the Commission, it appears there were at least seven thousand cows brought into the State of New Jersey during the fiscal year ending October 31st, 1906.

The question arises: “Would it not pay our farmers to raise more of this stock than they now do?” In answer to my question, “What are average good cows selling for per head?” the replies from Atlantic, Bergen, Burlington, Camden, Cumberland, Essex, Monmouth, Ocean, Salem, Somerset, Sussex and Warren are such that the average price per head for State is \$51.83. The number of cows named would at this price cost those who bought them \$362,810 for the year past. Perhaps they did not pay quite so much per head. This question, as it seems to your Secretary, is worthy of serious consideration, for some other crop must be laid under tribute to furnish the capital named.

CROP REPORTING.

It is a satisfaction not only to know the condition of crops during the growing season, but also to have a statement as to the actual yields at the close of the year. For reports during the growing season: As the former Climate and Crop Service of the United States Weather Bureau, in co-operation with the New Jersey Weather Service, had abandoned that part of their former service which had to do with crop conditions, the Executive Committee of the State Board of Agriculture deemed it advisable to inaugurate measures for collecting information as to condition of crops and stock and anything of special interest in connection therewith in New Jersey for the months of May, June, July, September, October and November, 1906, and to issue a monthly bulletin for the months named which would also contain other information of interest from time to time. Copies of such bulletin to be sent to all who reported for it, to rural papers, to secretaries of granges and county boards to be read in their meetings, and to others who might request it. Accordingly a bulletin was issued for the months named. It was well received. If it is considered of sufficient interest and value it may be improved and issued during 1907, beginning perhaps with April.

For approximate reports covering the yields of the farm crops grown in the State, your Secretary depends chiefly upon the directors of the Board for his preliminary report to the Governor, and for the final, more comprehensive report upon the secretaries of county boards of agriculture. I desire here to bespeak the co-operation of all the officials named for our future requirements, and to thank each voluntary correspondent for his assistance in the past.

THE ANNUAL REPORT.

The Report of this Board for 1905-06 was assigned to a printing firm in Paterson. Either from inability or indifference, the report was not printed, bound and returned to the Custodian of the State House until during the months of October and Novem-

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ber, when they were received from time to time in small shipments; whereas heretofore they have been received during the month of June. I mention this to the Board in order that the members may know the reason for the delay in sending the report to them. For the forthcoming report I have requested the State Printing Board to allow us six thousand copies, instead of five thousand five hundred as at present. The Annual Reports of this Board seem to be appreciated; the demand for them increases from year to year both in New Jersey and elsewhere.

DIRECTORS' REPLIES TO QUESTIONS.

As heretofore, a series of questions soliciting information concerning the general condition of agricultural crops and farm stock was sent to the directors of the Board early in October, 1906. A summary of the replies is given herewith:

“Causes that have injured any crop”:

Atlantic—Twig blight almost totally destroyed the apple crop. Excessive rains damaged hay, peaches and potatoes.

Bergen—A cold, late spring. San José Scale.

Burlington—Wet weather.

Camden—Extreme wet weather in August rotted potatoes, peaches and tomatoes.

Cumberland—Dry for hay. Dry in September for potatoes.

Gloucester—Tomatoes, white potatoes and cantaloupes injured by excessive rains in western part of county. Some damage from hail.

Monmouth—Excessive rain latter part of season.

Morris—Potato vines injured by white worm borer.

Ocean—Late frost injured fruit while in bloom.

Salem—Wet weather injured tomatoes.

Somerset—Too wet for corn on low land.

Sussex—Oats injured first by cold weather, then by drought and rust. Scale on fruit.

Warren—San José Scale.

As to whether the year has been a prosperous one for farmers, twelve answer emphatically “It has”; four reply “Fair,” “Fairly so” and “Moderately so.”

To the question, "Are the average good farms being run at a profit?" fourteen say "Yes," and the per cent. of profit approximated averages nine per cent.

To the question, "What causes, if any, are injuring the popularity and prosperity of agriculture in New Jersey?"

Atlantic says: Excessive freight rates, proximity of large cities, which annually absorb a large number of our boys and girls. Abnormal weather conditions, etc. Insects. High taxes on farms.

Bergen—Trying to farm too many acres. Too many farmers farm as their fathers did, slow to understand that they live in a different age.

Burlington—Scarcity of farm labor.

Camden—I think the popularity of farming is growing rapidly. Another says—There are no causes injuring it.

Cumberland—The labor question. Another—Sending the boys away to school, nine out of ten never come back on the farm, but I say educate them just the same.

Essex—Inattention to business.

Monmouth—Scarcity of competent workmen.

Morris—Scarcity of help.

Ocean—The want of better roads in this section, also for higher grade of school teachers, which causes many to take their families to the cities to educate their children. Expense of hauling over poor roads takes most of the profit.

Salem—The labor question is a serious problem. Wheat has been damaged, since harvested, by the moth-miller to a greater extent than ever before, where it has been stored in the barn.

Somerset—Scarcity of farm labor. The San José scale has ruined the apple orchards. It will be only a short time when apples will be a luxury. Spraying does not seem to be effectual.

Sussex—Scarcity of help.

Warren—The scarcity of labor—high price and poor quality. Another—Farm help, they prefer the ten-hour system, not thinking that the farm crops must be put out and gathered in eight months, but are willing to live with the farmer the other four months; in spring go on public works.

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The answers given to the foregoing question are suggestive. It will be observed the labor problem (elsewhere referred to), is still a perplexing one. The usual eccentricities of the weather are also cited as having interfered with reasonable hopes. The San José scale has reduced the apple crop, and the grain moth has seriously injured the wheat. Although this latter complaint is mentioned by Salem County only, the trouble prevails in most wheat-growing sections. Wheat has not only been reduced in quantity by its ravages, but the quality of that not wholly destroyed has been reduced in value. So our table places wheat in New Jersey at only seventy cents per bushel. It seems the presence of the moth injures both the milling quality of the wheat and imparts a disagreeable odor to the flour. The remedies suggested by Dr. Smith years ago will need to be used in the future, should the moth continue with us.

Following are some of the remedies suggested for the improvement of the agricultural situation:

Atlantic—Co-operative shipments of farm produce. Getting the young people interested in farming, by giving a percentage, or, better yet, by taking them in the business as partners. Attending Institutes, etc., to attain a better knowledge of farming and fruit growing.

Bergen—Some other way of educating the farmer than with printer's ink.

Cumberland and Warren say—The only remedy is to employ foreign labor.

Monmouth—Smaller farms.

Ocean—If trolley roads should run through some parts of our county, it would be an inducement to develop more land. There are too many laws against the farmer and fruit grower. The game law protecting the rabbit has become a nuisance, as the woods are getting overrun with them, destroying cabbage, sweet potatoes, cantaloupe vines. Persons living in localities where there is brush land have a large portion of their crops destroyed. Minks and weasels are getting more plentiful, destroying poultry, making it unprofitable to raise to any extent. Some of the game wardens are so arbitrary they don't want shepherd or terrier dogs to be at large.

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Somerset—Try to keep the boys at home, and give them something to encourage them for their work. Our New Jersey farms seem to be drifting into the hands of foreigners in a great many places.

On the above replies I make no comment, except on the answer from Bergen county. I do not know what was in the writer's mind. There is or should be an additional way of educating the farmer in *connection with*, and not separate from, "printer's ink."

Every farm should be so managed as to be in itself an object lesson to every other farmer, and especially to the boys and young men of each neighborhood. And he will fall very short of possible results who holds himself aloof from the great discoveries of science as related to agriculture, although it may be printed.

ACREAGE AND VALUE OF FARMS.

Number of farms of all areas in New Jersey, Twelfth Census, . . .	34,650
Average acreage in each farm,	82
Average value per acre, Twelfth Census,	\$57 23
Average value each farm,	4,692 00
*Average value per acre, 13 per cent. increase in 1906,	64 66
Average value each farm, 13 per cent. increase, buildings and machinery,	5,311 92
Total value farms and improvements, except buildings, Twelfth Census,	
	\$93,360,930
Thirteen per cent. increase,	12,136,920
Buildings—Census value,	69,230,080
Implements and machinery,	9,330,030
	<hr/>
Total for State,	\$184,057,960

The following tables show yields of the crops named with the value for 1906.

Table II is same as for 1905. Table III is given for reference.

* U. S. Department of Agriculture, Bureau of Statistics, Bulletin No. 43, on Changes in Farm Values 1900-1905, gives the value per acre of New Jersey farms \$65.44.

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NUMBER, AVERAGE PRICE AND TOTAL VALUE OF FARM ANIMALS IN NEW JERSEY, JANUARY 1ST, 1907.

	<i>Number.</i>	<i>Average Price Per Head.</i>	<i>Total Value.</i>
Horses,	101,886	\$115 00	\$11,763,722
Mules,	5,223	127 00	661,862
Milch Cows,	190,193	44 00	8,368,492
Other Cattle,	82,003	20 00	1,658,107
Sheep,	44,198	4 81	212,592
Swine,	156,952	11 00	1,726,472
			\$24,391,247

From Crop Reporter, Bureau Statistics, U. S. Department of Agriculture, February, 1907.

TABLE I.

<i>Crop.</i>	<i>Acreage.</i>	<i>Yield Per Acre.</i>	<i>Total Yield.</i>	<i>Price Per Bushel.</i>	<i>Total Value.</i>
Corn,	277,749	38	10,554,652	\$0.54	\$5,699,409
Wheat,	111,093	18	2,033,002	.80	1,626,402
Rye,	78,363	18	1,420,534	.56	866,525
Oats,	62,512	28	1,750,336	.38	655,127
Buckwheat,	11,598	18	208,764	.60	125,258
Hay,	424,525	1½ tn.	636,787	15.00	9,551,805
White Potatoes,	67,353	120 bu.	8,082,360	.66	5,334,357
Sweet Potatoes,	20,588	170	3,499,960	.65	2,274,974
					\$26,133,857

* TABLE II.

Miscellaneous Vegetables and Fruits,	\$11,069,805
Milk,	13,052,480
Live Stock,	24,391,247
Poultry and Eggs,	2,204,120
	50,717,652
Total for 1906,	\$76,851,509
Total for 1905,	73,023,962
	3,827,547

* From Report of 1905.

TABLE III.

A comparative statement of crop yields and farm stock in New Jersey for seven consecutive years, not including beef sold on the hoof nor young stock, as calves, lambs and pigs.

1900,	\$43,005,732
1901,	56,157,717
1902,	62,231,964
§1903,	59,998,525
1904,	68,767,980
1905,	73,023,962
1906,	76,851,509

President Voorhees—The next order of business is a discussion of the report of the Secretary. I shall be very much pleased to have Mr. Sensor, of the Department of Public Instruction, come before us and give us some idea as to the work of the State Board of Education, referred to in the Secretary's report.

Mr. Sensor—Mr. President and members of the State Board of Agriculture: You have listened, no doubt, with a great deal of interest, to the report of the Secretary as to the work that has been done by the Department of Public Instruction, along the lines for which you are here to-day. I do not know of any part of the work that devolves upon the State Board of Education that is so interesting to the Department of Public Instruction, and in which they are taking more interest than that of the rural schools. That the rural schools all over the United States have been sadly neglected in the past goes without saying: but, generally, that such is the case is not the fault of the Department of Public Instruction. I am satisfied that the rural communities have had just as good schools as they have asked for. If they have not, the fault rests with the rural communities themselves in a measure.

Your Secretary, in his very comprehensive report, has shown you the attitude of the Department of Public Instruction of New Jersey toward the work of education in the rural districts. There are many things we are trying to do in detail, that are not men-

§ Hay, wheat and corn reduced by severe early drought and fall flood.

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tioned in his report, which will be of interest to you, but the lateness of the hour will not permit me to attempt to go into the details of this work, I desire merely to add to some of the things the Secretary has told you. The Secretary has stated in his report that the 'Teachers' Institutes, held throughout the State during the last few months, have taken up the subject of agriculture, practical agriculture, and it was given a prominent place upon every program. There is possibly to-day, in the State of New Jersey, no man more able to discuss the practical side of agriculture than Prof. Apgar of the State Normal School, and the topics upon which he has addressed the teachers relating to this subject has enabled them to know far more about these things to-day than they did six months ago.

The County Superintendent, the executive officer of the school department in each county, has had the responsibility placed upon him to see that the subject of agriculture is given due consideration. Therefore, if you are not satisfied with the conditions in your community, it is your duty to apply to the County Superintendent, in your several counties, and see that he gives you what you want, and I assure you that the State Department will sustain you in every reasonable request you may make.

I want to mention a subject which the State Department has discussed, the subject of school gardens and school yards. Then I want you, as you sit in your seats here, to think of your own school yard to-day. Now, having thought of it, what is there in that school yard to make your boy or your girl, or any boy or any girl, if attending that particular school, want to live the life of a farmer?

Now, it is in the power of every rural school board in this State to place an object lesson around the school-house door, that will make every child in that school want to know more of the life of a farmer. When I say every child, I don't mean that strictly, for every child is not in the future going to be a farmer, but many more children will be farmers as the result of such training.

As the Department of Public Instruction would recommend, there should be two lines in which industrial education should be developed. Through the existing public school system, the work

in cities and towns should be so modified in the elementary schools as to include for boys and girls instruction and practice in elements of productive industry, including elementary agriculture and the mechanic and domestic arts, and that this instruction be of such a character as to secure from it the highest cultural as well as the highest value in gaining a livelihood, and that the work in the high schools should be modified so that the instruction in mathematics and sciences and drawing shall show the application and use of these subjects in industrial life, so that the students may see that these subjects are not designed primarily and solely for academic purposes, but that they may be utilized for the purposes of practical life. That is, algebra and geometry should be so taught in the public schools as to show their relations to construction. It may be done under the name of manual training, or any other name. Botany to show its relation to agriculture, chemistry to agriculture, manufactures and domestic sciences, and drawing to every form of industry. Why not? Is not the work of the public schools to fit for life?

The policy of the rural schools and of all the schools in the past has been to say to the boy or girl, "If you want to make anything of yourself, study hard and pass your examination that you may become a doctor, a lawyer, a merchant or a minister"; but did you ever have a school teacher tell you to work hard and get your lessons that you may become a farmer? That teachers have not given this instruction in the past is not the fault of the teacher, because those for whom they have worked did not demand it. Ask for it in the future, and see if you don't get it. Should you fail, the fault will be your own.

Every day communications come to us from almost every State in the Union asking, What are you doing in New Jersey along the lines of practical instruction in agriculture? I assure you the State is doing everything in its power. We are glad to be represented at this meeting of the State Board of Agriculture and work in hearty co-operation with you and we will hope for some grand results in the future. (Applause.)

President Voorhees—We are very glad to have Mr. Sensor here to-day to present this matter in such a very clear way. If you desire to discuss this subject we have a few minutes.

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Mr. Bazley—Mr. Chairman, with all respect to the gentleman who has just spoken, and all due respect to all the energies they have put forth in order to educate the child of the rural district, I may be wrong—or I may be a crank, I don't know—but I don't think they go far enough with this business. Suppose they do educate these children, give them a smattering of an agricultural education, in the district school, what are we going to do to further that idea? The educational facilities as they are to-day are not correct, not to my way of thinking. I may be wrong, or this may not be the proper place to discuss this question, but I think it is. I don't expect or propose to put my humble thought against the gentleman who has just spoken, but these rural communities are not properly used in the way of education. There is an unjust discrimination, and I think that injustice should be lifted. When we apply to our County Superintendent for what we want, and then what we are going to get, is two different things. Now, my idea is simply this, if you are going to put this small smattering of agriculture in our rural schools, how are you going to follow it up? The little bit they learn there they could not go to any college and complete, simply because they don't know enough, and in order to obtain that much more we have to put our hands in our pockets and pay for it individually. If they tell us there is a unit in the system of education, why don't they make it a unit. Those things they most certainly have in their power. I don't see why rural communities should be discriminated against, and every chance and every opportunity I get to speak on this subject I am going to speak. I think it is just, and I think it is due to the rural communities to see that such laws are enacted that a child coming from our rural community has just as much and just the same opportunity for educational advancement as children of the town or city. I don't know what the condition is that exists all over, but in Hackensack there are three hundred and one children at their high school and one hundred and eighty come from outside municipalities, and they charge from forty to fifty dollars a year and get the city money with it, and I would like to know who is supporting the school, the people there or on the outside.

Those conditions exist, and if they are going to follow up this good work they must go further than at present.

Mr. Fort—I was very much interested in the remarks of the gentleman from the State Department of Education. He speaks the truth, every word, when he says these rural districts are responsible for the condition of their public schools, when the people are so indifferent that they will not come out to the school meetings and elect a proper man to the Board of Education. They let any person go into the board; they take no interest in the children; they do not visit the schools during the whole school year, they have no interest. When you people go home from this meeting, go and attend the school meetings, go and see that they have got good school teachers, go and visit the schools and see what they are doing. Our rural school districts throughout New Jersey are just as good as many of the town schools, when we have the right men in the Board of Education. I know what it is, I have been on the board fifteen years, and have put a good deal of time and labor to it. They put personal friends in who have had no experience in teaching, and it should be the aim of every board of education to carry out the theory of the gentleman who has spoken, that they secure the services of the best teachers that can be secured for the money in hand.

We have a rural school where I live, in the county of Burlington, as good as any of the schools in the cities of the State, and the children that come out of that school are just as bright as any in the town schools.

Mr. Pickard—I would like to ask the gentleman from the State Department of Public Instruction to what extent and how far these courses will be carried, that is, to what grades?

Mr. Sensor—The lateness of the hour makes it impossible for us to go into this matter fully, but we feel that we will arrive at some practical basis upon which to work. As has been said, these changes that are about to be made, and are now well on the way, cannot be accomplished in one year or possibly in five, but it is the purpose of the State Board of Education to give to the rural districts teachers who know something about the interests and wants of the rural community. Now, gentlemen, you employ

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an eighteen- or twenty-year-old girl to go into your school and train your boy at the time of his life when he must be so trained as to fix in his mind what he proposes to do when he becomes a man. With a teacher in charge of that boy who knows absolutely nothing about the practical side of farm life, how is your child going to get any training that will induce him to want to stay on the farm?

Again, you ask where we propose to begin this work? We would say begin in the cradle or in the kindergarten. If you don't shape or train a child's life at the very earliest beginning of it, along certain lines, he will shape it for himself. You want in your rural districts an interest aroused in farm work. That is what you want. Go from here to-day, as the gentleman said, and see to it, that you have instruction given to the child from the very earliest time in his school life, not necessarily in scientific agriculture and chemistry of soils, but make of your school yard an object lesson. Begin right there and the child will become interested in the school garden and the work therein and obtain a different outlook upon life.

Mr. Pickard—That does not seem to be an answer; the question was, At what grade would that end? Does the child begin at the cradle and carry it through to the high school course and get the science of it?

Mr. Sensor—In my opinion the instruction ought to continue through the course to the college. It ought to be a reasonable system going from the first beginning right through. I was a country school teacher myself, and I am almost ashamed to say so. I look back over the things I told those country boys and girls, and I tell you I didn't teach them anything they ought to have known at that time. I taught them certain things that were found in the text books, but not in the way it should have been taught. I was seventeen years old. What did I know? I had no business there as a teacher; I was very glad to get the work for I wanted to earn money to go away to college, but I had no right to ask that community for that money. There are hundreds and thousands of teachers who are doing the same thing to-day. Men who are making use of the public schools to get into some other profession,

and we tolerate it because we tolerate it, and that is the only reason we do it. Such men as your President are giving thoughts to the public that will make them get busy and know something about the things the people need. In answering the question, I can only say the work in the schools should be a regular ladder and Dr. Voorhees stands on the top rung.

Mr. Pickard—The laws are so framed that the money is distributed or divided among the school districts of the State. I am now speaking on the question Mr. Bazley spoke about. In some communities sufficient money is not raised to carry the instruction further than some particular grade, may be to the fifth, sixth, seventh or eighth grade, and there it ends. There the education of that child ends at that point unless they go to the Board of Education of their particular district and say to them, "I wish to have a high school education or education in higher grades." Then it is up to that Board to take some action, to make application to the Board of Education in some other district in the State where probably they will be very negligent about this agricultural course and ask them if they have room for a pupil from their district. The district may say "No, we haven't; we are full." Then probably the Board of Education will go to some other district and ask for admission and finally be admitted; then the Board of Education of that district says it will cost you from fifty to seventy-five dollars for that child. Now if the Board sees fit, from the district where that child comes, to make that appropriation to pay these expenses and transportation, it does so; but if they refuse to do so, then in order for that child to receive that advanced education the parent goes down into his pocket and pays it. But the parent of that child may be too poor to pay that cost, and what we need is something to give us better facilities in the rural districts to give our children this advanced education. We want it and have not got it. Some of the communities if they had to pay for this advanced course could not raise the money, there isn't sufficient property for taxation to get it. That is the subject that Brother Bazley was speaking upon, that a great many of our children would have to stop if the Board of Education saw fit not to take any action in that matter, and the parent would be obliged to pay it, and in some cases the parent would be too poor to pay the ad-

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ditional fee. Our constitution says that our Legislature must enact laws to provide for the free education of all the children of the State between the ages of five and eighteen, but they do not do it.

Mr. Sensor—Every School Board of this State is morally and legally obliged to educate that child, they cannot say they will not do it.

Mr. Bazley—It is with a referendum. It is to be put to the people to vote for. They have got to vote on the appropriation.

Mr. Sensor—It doesn't make any difference in the end. The child must receive his education.

Mr. Bazley—This question has been discussed so often, why didn't they carry that up. We had a very able lawyer down there to tell us that.

Mr. Sensor—The State Board can withhold all State moneys from the district until it does its duty.

A Delegate—We had a case down in Camden county where it was finally decided that the local authorities of the township were responsible and had to pay the bill.

Dr. Ward—This question about the beautifying of the school grounds seems to me one of the most important things to do for the young mind. Travel from one end of the State to the other, and a majority of the yards are in a most deplorable condition. There is nothing there at all to beautify, nothing to elevate the child. Now I think, from my experience of years as a school trustee, if you beautify the grounds surrounding the district school you can inculcate principles in those children that are in the kindergarten, you can teach them to love the beautiful and leave something in the young mind that will go through life. I am very glad that matter was brought up, and if the majority of our members that are here to-day will carry that one thought home with them, and beautify their school grounds they will start something in the young mind that will never be forgotten.

**Address by Hon. Edward C. Stokes,
Governor.**

Address by Hon. Edward C. Stokes, Governor.

President Voorhees—Ladies and Gentlemen, it gives me great pleasure to introduce to you again to-day, as last year, the Governor of our beloved Commonwealth, the Honorable Edward C. Stokes. (Applause.)

Mr. President, members of the State Board of Agriculture: I am here this afternoon just for a word of greeting and goodwill and not to pose in any respect as an expert on agriculture. I always feel happy and rich in the presence of farmers. I have always contended that the farmer's lot was the happiest of all of the varied forms of activity. He manages as a rule to keep out of office. (Laughter.) He is his own political boss over his own acres, and I believe I never heard of him being dethroned at the primaries, and I understand that he is just about finding a remedy for that agricultural blight known as the mortgage, and that he has commenced to pay it off. At any rate, since the passage of the act providing for the formation of national banks with a capital of \$25,000 over 1,700 of these banks have been formed in agricultural communities. Needless to say, these institutions would not have been organized had there not been in those communities money for safe keeping and deposit.

I learned from your Secretary, Mr. Dye, that during the last seven years in this State, farm products have increased in value from forty-three to seventy-six and one-half million dollars, an evidence of increased production per acre and an evidence that there is at least a demand for the increased products.

I took my first lesson in agriculture at the feet of the Roman poet Virgil, who taught me the way to farm was to allow the field to be fallow in alternating years to gain strength and fertility

for alternating crops. We have departed from that method of agriculture; we have commenced to farm now with the brain as well as with the plow, and we have learned that Mother Earth responds as readily to the pleadings of intelligence as to the force and will of ignorance.

In my inaugural I recommended the establishment at State expense of a short course in agriculture, where, during the winter season subjects of interest to farmers might be taught theoretically and as far as possible practically, and I understand, if I have the figures right which I received from your President, that there are to-day 39 enthusiastic students pursuing that course.

I trust that this policy will be still further adopted, and I know that the Educational Department of this State is moving along that line. The public schools should be brought into close touch with the farmers' needs, for after all the earth is the source of life and nourishment, and it is well that we know how to produce and derive the best from the earth for our comfort and happiness.

I think the farmers of this State are to be especially congratulated upon their location. You have, I presume, as good a market as exists in the world. You lie midway between those great centers of population, Philadelphia and New York, and you have during the summer a seaside population who spend most of the time in eating the farmers' product, and part of the time in paying for his harvest. You have a market of from five to six millions of people ready to take your crops as fast as they are raised. With this market easy of access, with proper encouragement on the part of our State, with the development of agricultural schools, with the further development of a school curriculum designed to meet the farmers' needs, the prospects of agriculture in this State are cheering and encouraging.

You have my best wishes for your success, and I trust that in the near future the farmers of this State, like the landed proprietors of England, will be publicly recognized for what they now really are, the bone and sinew and safety of our civilization. (Applause.)

The President—We are all very glad to have a cheering word from our Governor and to know that he is in sympathy with our

work. I think I made an error in reporting the students at our short course, in that I did not recognize by the words that I expressed the fact that we have two ladies attending the courses as well as young men. My attention was called to that omission, and I make the correction now and make full apology for not calling attention to that fact. The short courses are open both to the boys and to the girls, and the young ladies that are there are evincing great enthusiasm for the work and are showing a very great adaptability for taking the kind of work that we are offering. They are taking a course in horticulture and are following along quite as well as the young men. My only explanation of the omission is that the proportion of the young men was so much greater that I didn't think the young ladies should be mentioned in the same class on account of the number, and I didn't think it was unusual for young women to study agriculture at a college. I hope in the future that the farmers here will remember that the courses are open for young women as well as young men. There is no limit as to sex. Neither is there a limit to age over 16. That is, anyone over 16 could be admitted to the course. Furthermore, it is hoped that in the near future the equipments that we have there may be made effective in assisting the teachers now in the State, in the rural districts, in getting such information as will enable them to do better work in the country schools. We have the equipment and the teachers ought to be given the opportunity to get such further information as they might need in preparation for the teaching of agricultural subjects in public schools.

I add these words believing they ought to be added to make you fully realize the character of the work that is being done.

**The Agricultural College and the
Farmers of the State.**

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First Short Course Class in Practical and Scientific Agriculture at the State Agricultural College, New Brunswick, N. J., January and February, 1907.

The Agricultural College and the Farmers of the State.

BY DR. W. H. S. DEMAREST, PRESIDENT OF RUTGERS COLLEGE AND
OF THE STATE AGRICULTURAL COLLEGE, NEW
BRUNSWICK, N. J.

President Voorhees—It gives me great pleasure to introduce President Demarest to the farmers of this State and their representatives in this Board.

Dr. Demarest—Gentlemen of the State Board of Agriculture, I want to express my appreciation of the courtesy shown me in inviting me to speak to you, and my appreciation of the opportunity of speaking to you on this matter, the relation of the college to the farmers of the State.

We certainly have a community of interest, and there ought to be, of course, a community of action, a community of effort. We surely have a duty resting upon us, and a privilege of assisting one another in the work for which all of us in a way are responsible; and I am sure that we shall be in a position to serve one another better and be served better, the more familiar we become with one another. I hope you will pardon me if I seem, in the few words I speak, to depart a little from the specific point of agriculture as uniting your interest and the college interest, if I do not confine myself to just that one point.

The State College of New Jersey is in a little different position, perhaps, from the State colleges of most of our States, because the scientific school, declared to be the State College for the Benefit of Agriculture and the Mechanic Arts, is connected with a college which existed long before, and is carrying on specifically

a work relating to agriculture and mechanic arts, founded upon a prior function of the general college work in existence for years.

Let me speak of that for a moment, because I do want to emphasize the relation between the college and the farmers of the State as more than an industrial relation. It is a general relation. It is an original sort of relation. It is a historic relation.

Mark it, that when that college—Queens, now Rutgers—was founded in 1766, it was founded in a way by the State, because the charter was granted through Governor William Franklin, of the Province of New Jersey, in the name of George III., and from that time to this by the charter which was granted, certain State officers have been members of the Board of Trustees. More than that, it was founded for the benefit of the State—that is, of all classes and conditions of men in the State, and the farmers are of that general body of the Commonwealth which entered into relationship with the college founded in their midst—to serve the general body politic. And more than that, the college was founded more or less by the desire of the farmers. Largely the population, of course, of those early days was an agricultural population, and the zeal of the farmers for education, education for their sons and education for all young men, did much to bring about the creating of such a college as this. So through a hundred years the course of things went on. The college was constantly serving the general body of the Commonwealth, and the general body of the Commonwealth, including the farmers, was constantly behind the college. We might trace that, and indicate how important the relationship has been, the sons from the farms coming up to the college at New Brunswick through all these years from 1766, long before the college was thought of as bearing any special relation to agriculture or to the farmers. Through all the years largely the atmosphere and the resources sustaining the college have been the atmosphere and resources of the agricultural life of the State.

More than that, we might trace how the college, through all those years, was serving the body politic by sending forth those men who represented you, and still represent you, the farmers, as all classes of men in the State. The relationship between the college and you, the farmers, has been its work of training men

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in no small measure to well represent you in all the fields of public life, to represent you, by your own choice, in the assemblies of the State and of the nation. I could mention names that would bring that very forcibly to your mind, such names as those of Vice-President Hobart, Governors Newell, Ludlow and Voorhees, Secretary of State Frelinghuysen, and Supreme Court Justice Bradley, and of many men in the National Legislature and in the State Legislature, more or less trained at Rutgers, that they might represent you. It is a relation that I do not want to have forgotten when we speak of the Agricultural College or the College for the Benefit of Agriculture and the Mechanic Arts, a new specific title telling of a new specific work added to the general work to which you and your ancestors have been distinctly related through all these years, and of which the service has been by no means small. Further, I am reminded, as I speak of all that, how this later development is really in uniformity with, is agreeable to, the charter granted so many years ago, for that charter provides for the founding of a college for classical training, not only, but also for education in the liberal and useful arts and sciences. The men of the early day had far vision. They seemed to see what might come in the years later on, and upon their broad phrasing there has been built a magnificent specific work of this later time. Yet I am reminded once again how time has developed the idea of people with regard to this matter. Let me quote a word that is found in an early address of the first President of the College, showing what the idea was in those days. He says something like this: "Education is not to create ability, but ability is necessary for study and education. Study is to develop ability." Much of it, he says, may be afforded a dunce, with little profit to himself or society. Such might better give himself to mechanics or agriculture. Think of the change wrought in the years since then. Men now realize that agriculture is a science, realize that the very best of ability may be properly given to the searching of the things that have to do with cultivating of the soil. It was about a hundred years after the founding of the college, you know, that the nation began to wake up to this thing, that the farmers themselves and the general body of our people woke up to the fact that agriculture is a science, and men can be

educated to it. It was an awakening of the nation to the fact that agriculture lies at the very basis of national prosperity, and that largely the development of the nation's welfare must be the developed, scientific grasp of the laws of agriculture and the outworking of them. So in 1864 there came the national movement, the national law creating in the various States of our Union colleges for the benefit of agriculture and the mechanic arts. So the scientific school at New Brunswick was in 1864 made such college, as provided by the land grant act, and since that time has entered into still closer relation with the State through the State's own provision of scholarships and other sustaining acts.

Let me just emphasize that last point, how, following upon the national legislative act which I have named, the State of New Jersey recognized its relationship and made it more vital, more active, and more important to the farmer population of the State by opening more wide the privileges of the College, especially by creating scholarships upon which the sons of farmers and the sons of New Jersey in general, may enter the college from the schools of the State.

Now, in reference to the more specific relation of the college to the farmers of the State, let me speak of these two or three things.

In the first place, it is in special relationship with you, this college, because it is in and of your own State, and you are in a way proprietors of it. It stands in very close connection with you. There are the two colleges in New Jersey, of course, from colonial times, Princeton and Rutgers. New Jersey, so small a State, so small an early province, is the only one to have two colonial colleges, in both of which the State rejoices, and a special relation has been created between the State and Rutgers, its scientific school.

The second thing is with regard to the quality of the college. I am not here exactly for the purpose of advertising it, but at least to inform you what privileges are there offered to you, your sons and your friends. I have been surprised sometimes to find a certain ignorance with regard to the opportunity there afforded young men of our State, and because it is a State college I feel I am right in telling you of the privileges afforded. There are thirty professors with their assistants, masters in their depart-

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ments of work. More than one of them, many of them, are known far and wide throughout our land and in the old world for their attainments, their efficiency in their fields of teaching. In the agricultural department, in the department of science relating to agriculture we have men that, I believe, are looked to as authorities by those in the same fields of work throughout our country. The names of some of them you know. Here is Professor Voorhees, I can speak of him as he could not speak of himself. Here is Professor Smith, also with us to-day; and there are others whose names you know, men you have met, men you have listened to. Besides, it is not simply a college of full courses leading to a degree, but opportunity is offered also in the line of what are called the short courses in agriculture. This is to be spoken of fully before the session of this Board is closed.

The sessions of the school began, ten days ago, short courses established by act of the Legislature of New Jersey. They give the opportunity for twelve or thirteen weeks of earnest, direct study on the very field of action to young men who are not able to take the full college course. And that work began with no less than forty students. As I faced them the morning when they gathered, I was impressed with the intelligence in their faces, impressed with the earnestness of purpose that was apparent; and as I have heard of the week's work, the ten days' work, my impression has been confirmed. They came up from the various parts of the State, and they are gaining there day by day instruction and experience, the value of which can not be measured, bearing upon their ability and skill in agriculture and their influence on the agricultural interests of their neighborhood and the State. These short courses have started successfully and they are sure to be a great success, increasing with the years. That is the last provision by the State relating the State College to you, the farmers of the State, and the farmer's sons.

Now, before I close, I want to further emphasize what the college affords in a general way; and then what it affords in a specific way to the farmers of the State. I want to say to you first, that Rutgers College is not simply an agricultural college; it is a college that affords to the farmer's son, under the scholarships of the State, broad privileges running in the various lines of edu-

cation. All farmers' sons do not want to be farmers. All farmers' sons ought not to be farmers; some want to be engineers, some want to be chemists. There are various occupations open to-day, inviting college men. The scholarships of the State at Rutgers College open the privileges of various courses to the sons of the farmers of the State. Does a young man want to be a civil engineer; if so, he gets there a broad culture which expands out toward his chosen profession, showing him the way into the field which he wishes to enter. So of the chemist, so of the electrician. The young men coming up from the farms of the State receive general culture and receive special training, and at their graduation from the college they go to their chosen vocations; and we could send many more than we have, for the demand is greater than the supply. Only yesterday, I think it was, one of our professors told me of a letter from a great industrial concern asking for men, saying, we want your men. Our men seem to be so successful that back comes the constant call for more. Among the lawyers, doctors, electricians, engineers are sons from the farm, perhaps. If the young man is able financially to take the full college course do not let him turn his back on such an opportunity. If he has not that possibility, then let him come to the short courses out on the college farm. There is a new building erected especially and adapted for this purpose. There are competent instructors dealing with the work through the morning and afternoon hours, making the students intelligent and interested in the work that is to be their life vocation. That is the second opportunity. If a farmer's boy can not have the first, let him have the second. It all means, of course, that agriculture has come to a new dignity not only in the minds of the farmers, but in the minds of all men. It is a dignified calling, and it is dignified because it is not only useful, but scientific. A tremendous opportunity lies before the agriculturists of our country. Frequently there comes the evidence, how the productive power of the soil may be increased, how the returns may be made so much richer and the work so much more satisfactory. It is clear to us that for the purpose of seizing that opportunity, for the development of the agricultural interests of our land, a school is a necessity. The man who is to be most successful in this calling is to

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have not simply the education on his father's farm, but on the college farm as well.

I see that some one is to speak a little later in your programme on the Relation of the Farmers to the State Agricultural College, so I will not intrude unduly upon that sphere of the subject. But let me say these few words as to it: For one thing, send your son to the college—if it is possible. For another thing, go to the college, your college, and look on it with pride. I tell you you have reason to be proud of it, and it is a good thing when there is a thing to be proud of to be proud of it, if it is yours; again, it is for you to speak a good word, as the chance offers, for the old college at New Brunswick. As the State stands in no small measure behind its work, and as the development of its work must come in no small measure from the sympathy and perhaps resources of the State, I suggest that, in no partisan way, but simply in the broad way of the body politic, the State sentiment be made vigorous and enthusiastic for its largest development.

The President—You have heard the very interesting address of Dr. Demarest. Has the Board any questions to ask or remarks to make in connection with the address?

Secretary Dye—For one, I am most deeply interested in the address of Dr. Demarest and in the historic statement in connection with the old college; I believe the good words he has spoken and the suggestions he has made will be carried out by the farmers of the State, I have no doubt they will be.

Mr. Roberts—Forty years or more ago I was at Rutgers College (it does not seem possible), and I happened to be sitting by Governor Newell. When the college bell rang he remarked how many years it had been since he had heard that college bell when he was in the college. He went on to say, "our class was small then; in it were Frank Frelinghuysen, Courtlandt Parker and Joseph P. Bradley, they were all classmates of mine." I said, "Your class was small, but it seemed to be made of excellent material." "Well," he said, "I think the material was good, but we were grandly taught. Our opportunities were, I think, unusual." I have felt pride in Rutgers College ever since.

Delegate Thompson—I have been familiar, as some here know, with the college from my youth up, and it has never been in any

better condition and had more hopeful prospects before it than it has to-day. I have watched its development from time to time.

I remember coming down here once to see about the first appropriation by the National Government, and I had a talk with Mr. Hotten, of Paterson, and a number of others. I was glad to converse with him and the others here and interest them in getting the appropriation for the College at New Brunswick, and the future of the College from that time to this warranted what was done then; and the prospects have never been so hopeful with the corps of instructors, the President and other officers in charge there as it is to-day. I am very glad to be able to bear this testimony.

**The Farmer's Relation to the State
Agricultural College.**

The Farmer's Relation to the State Agricultural College.

BY DR. G. C. CREELMAN, PRESIDENT ONTARIO AGRICULTURAL COLLEGE, GUELPH, ONTARIO.

President Voorhees—I take great pleasure in introducing, as the President of the best agricultural college on this continent, Mr. George C. Creelman. I would say that I have sent my oldest son to his college, not because we didn't have a good school here, but I desired that he should get in the beginning that direction which would make him a better student when he returned. I take great pleasure in introducing Mr. Creelman.

Mr. President, ladies and gentlemen: It gives me the greatest possible pleasure, for two or three reasons, to have been invited by your Executive Committee, and through your President and Secretary, to come here as a young man to say something to you along the line of my subject that may assist you or help you in some direction to appreciate the advantages of the Agricultural College of your State.

I appreciate this invitation from two or three standpoints. In the first place, it is the second compliment which your Board has paid to the Ontario Agricultural College, because three years ago you invited my predecessor, Dr. Mills, to come here and speak to you, and now you have invited the President of the same college to come back on this occasion. And I also appreciate the fact that you have provided weather just to my liking; that you bring me here from Canada not under conditions that we hear prevail at Atlantic City all the year round, not that which usually prevails

here, and which is closely associated with the weather of the tropical parts of your country, but you are giving me good Canadian weather, and I am feeling right good. Everything is good, just to my liking, and I think we are going to have a good time. (Applause.) I also appreciate a feature that has attracted me all through this meeting: that is, if my eyes were closed as I sat here and listened to your discussions, I would have thought that I was in a Canadian audience of farmers; and as I heard Professor Henry say in his most excellent paper yesterday, and again this morning, and Mr. Cook, who spoke to you about his conditions (and threw a little mud at Wisconsin), I was impressed with the fact that the people of New Jersey, and the people of New York, and the people of Wisconsin, and the people of the Dominion of Canada on their farms, are, if we go far enough back (and that not very far), all derived from the same stock, and, therefore, we can't afford to throw mud at any of those States or Provinces for fear we hit some of our own kinsfolk. So that we are one people, speaking one language, thinking one line of thoughts, and practicing one line of agriculture, and for that reason I felt particularly at home when I opened my eyes and saw faces before me which might be the faces of our own people as they come from our farms.

When I learned that Rutgers College was established in 1766 in your midst, and that Princeton University was situated only a few miles from this historic town of Trenton, I began to see that you had educational advantages far beyond many of the States and many of the Provinces of Canada. When your former Secretary, Mr. Taylor, told about the struggles in the early years of this Agricultural Society, and that for all these years you have been doing big things for your people, I began to appreciate that I was getting among people who were doing things, and it was not until Professor Henry arose and threw a wet blanket over us, and showed us that other people were doing greater things than we were, it was not until then that I could contain myself from getting up and cheering for New Jersey. And, as Professor Henry put it, in giving the reason why he came here to tell us the truths that we ought to know, he afterwards was able to say in his kindly way, as he always does, that you have good things in

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New Jersey, but you know it; they are things which you are familiar with, and it is sometimes necessary for a man to come from the outside and tell you of lines along which you can make improvements. But your Chairman came to the rescue nobly, and in his most admirable paper sated that New Jersey this year had in one particular decided to throw off any criticisms which might have been made of the State up to this time, by saying that they had established at Rutgers a short agricultural course, and it was being appreciated to the extent of 39 or 40 pupils at the opening. And hence, I forgot that Professor Henry said that you were behind in many things, and I try to look at your beginning in an optimistic way, your beginning toward scientific agriculture. I come from a country which was just where you are in agricultural education a few years ago, and by reason of circumstances which I will state to you, we were enabled to appreciate the fact some years ago that we had to change our ways of farming; that we had to change our method of doing things; that we had to employ men who knew what they were doing, and pay them a large salary to do it and give us the benefit of it, before our farmers were going to rise and occupy the position which all farmers ought to occupy in every State of the Union and in every Province of Canada.

That brings me directly to my subject, the relation of the farmers of the State to its Agricultural College.

May I be permitted to say in the beginning, that farming is not a money-making business, not a money-making proposition.

From \$5,000 to \$10,000 invested in farm property, farm buildings, farm machinery, and farm live stock, must not be expected to give in return a sum of money each year which will start a man along the road to become a millionaire. A good farm, well tilled, will give a man a good living, enable him to bring up his family in good physical condition, to educate them well, and so start them out in the world able to look after themselves.

The trouble with many farmers is that they expect to make a success without having been specially trained for the business, by working without any method, living from hand to mouth, and operating by rule of thumb. Such men find themselves growing old with no money laid by for their declining years.

Under these circumstances, farming is not a money-making business, and men on Canadian farms, realizing this, with the help of the Agricultural College and Experiment Station, decided to change their ways as soon as they realized that farming was not a money-making business, and they began to make money.

Our farmers to-day are prosperous, as your Governor has just told us that your farmers are prosperous. Banks are springing up, and farmers are supporting them. The farmers of Ontario have doubled the output of the ordinary farm in twelve years without any appreciable increase in population or acreage. Our output from the farms of Ontario was about 125 millions of dollars when the McKinley bill was passed, and this last year it was 300 millions of stuff from the same farms, and due to a large extent to what we thought then was an obnoxious measure, the McKinley bill, as it referred to us.

At that time we were able to send our wheat over here, and our barley and our eggs, and sell our cereals, which we took pleasure in raising in large quantities, and ship them to the United States, and we were gradually—yes, faster than that; Dr. Voorhees would say we were rapidly depreciating our land, and selling off that which was not a finished product, and year after year sending it over to feed the people of the United States. And my father said to me, when the McKinley act, the first one, became a law; he said: "George, our farm has got to go, and our farmers are ruined. There is that great consuming population to the south of us, and we cannot longer enter that market. We know how to grow wheat and barley, we know how to sow and reap it, and how to thresh it; we know how to store and haul it, and we have the machinery for all these processes, and we don't know anything else; and if we are obliged to change our methods—if I am at my age obliged to change my method, I will have to go out of the business."

Yet it is very strange that adversity is often the making of a man or a woman, and so adversity may be the making of a people. We turned around immediately, thanks to the splendid Irish, English, Scotch and German blood that courses through our veins, that peculiar germ in that blood which enables them to

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change quickly for the benefit of themselves and the people at large—we were enabled to turn right around and meet the new conditions when forced to, taking little satisfaction then, but we have the satisfaction now of knowing that we have won out in what looked like a blind game at the time. But, by being forced by political conditions to feed our grain at home and sell our cheese, our butter, our bacon, our beef and our other animal products, and retain all the fertilizer on our own farm, we have built up and doubled our output without any appreciable increase in acreage, and that has been done very largely through the influence of the Ontario Agricultural College.

Now, you say, how can one college or one institution in a big Province, or in the State of New Jersey, mould the opinion and so influence a whole State, where they have been set in their ways? How can it influence them so that they will quit what they are doing and start something new on a more progressive line?

I will tell you. Our college struggled just as yours has been doing and as many colleges in the United States have been doing, because—may I say it, and will not develop the question if you will allow me to keep that for my talk to-morrow morning—we organized. Our professors said, "The boys are not coming to the Agricultural College." They said, "We are drawing \$2,000 apiece and are not earning our salaries; we are experimenting, we are filling our minds with a lot of knowledge that will be useful to a great many people, but yet these people are not coming to us to secure that information;" and Dr. Mills, who was then a professor of the college, said in faculty meeting one night, "If the people will not come to us we will have to go to the people," and hence, those people who were not known at that time except to those who lived in the town of Guelph, adjourned the classes for one month and changed their curriculum to suit it, and went out to the township halls and to the farms, and said to the farmers, "We have a message to deliver to you, if you will listen to it," and from that grew up a series of agricultural societies, farmers institutes, dairymen's associations, bee-keepers' associations, horticultural societies, and fruit growers' associations, that to-day number 30,000 paid members, who pay their fees over again every year in order to belong to these associations, and it

commenced at the college. And these men, almost to a man—listen; those men, almost to a man, leave their work at least one day in the year, some of them 300 miles away, and come and visit the Agricultural College and the Experiment Farm every year.

I gave lunch during the month of June, 1906, to 40,000 farmers who visited the Agricultural College and the Experiment Farm, without any adverse criticism, but with kindly offerings and suggestions and asking questions, bringing a note-book and taking home thoughts and ideas which they thought would be useful to them on their own farms, and incidentally patted us on the back and said, "If there is anything you want, say so, and if any member of the Legislature, be he a Liberal or Conservative, dare rise and say that you shall not get the grant you desire, he shall answer to us in his constituency and in every constituency of this Province." (Applause.)

Now that, in a nutshell, is what has been accomplished by taking the good word to the farmer and leaving him to thresh it out himself, and sending to the college for suggestions when he gets stuck, and when *we* got stuck we asked such men as Professor Henry, or your own Professor Voorhees, or Professor Smith, and those men who, perhaps, like the prophets, are not so well known in their own country—men to whom we write when we get stuck, and they give us their information, and then our men believe them.

I realize that I am talking this afternoon to a superior class of farmers of the State of New Jersey, just as I say to my own farmers when I find them at meetings of this kind; I say that because you have made some sacrifice to come here; you have come here without a cent of pay (some of your delegates get expenses, but none get a cent of pay to come here), that you may get some ideas or instructions, or exchange your ideas for new ones to take back home with you. I haven't very much trouble with men such as you are, but it is the chap who will not come, it is the fellow who is pursuing the old methods, and who goes to meetings for the purpose of asking knotty questions and tying up the professors asking them questions they cannot answer, and then sneering at what was done, and saying, "I don't expect to get any knowledge from books, I have to work those things out, we can't get any-

thing from professors who never were in our township or county before."

I will tell you what we had to find out, and what every one of you will have to do when you go back home, and that is to remember that all you can do with a man of that kind—and there are thousands of that class of men in all States—is to try to get them interested in the principle of the thing. We have gone to the other extreme and then had to quit it.

In my address this year as President of the American Association of Farmers' Institute Workers, I stated that the Farmers' Institute movement in the United States and Canada had come to the point where I believed we should quit talking money; how much money was I going to get for a flock of hens, etc., etc., etc., while we are neglecting—as the man from Denmark, New York, said this morning—the place in which the hens and the cattle are living?

So we have to remember that we have got to this place in Farmers' Institutes where I believe we can drop talking money and talk principles. Congress has recently given \$15,000 as an additional grant to that given under the Hatch act some few years ago, because they believe that the experiments and principles underlying the science of agriculture, as proven by experiment, are sound, and must be taken in larger measure to the people.

So I say you can begin to teach the principle of the thing and not start in and tell a man that he must make more money if he would succeed. Not that that is not important, but, if he will study for example the principles of ventilation so that he will take better care of his cattle, more money will come just as sure.

The time has passed when a man can allow things to be slovenly; when a man can allow himself to be called a hayseed; the time has passed when a farmer in the United States and Canada can allow that to be said. So I want to impress this upon you above all other things that may be said at this meeting, don't forget they are ripe now, ripe and ready—having had all these agricultural papers and bulletins in hand, they are ripe and ready to start the A, B, C of agriculture, and to learn the principle of things; to instruct your Secretary, Mr. Dye, when he sends out his

Institute instructors to start at the simple A, B, C of ventilation, and the simple A, B, C of cement, and the simple A, B, C of constructing buildings different from what they have been constructed all these years.

Now then the farmer has not progressed in a constructive way to the same extent as the manufacturers have in industrial businesses for this reason, which is sometimes overlooked; agriculture presents so many problems over which the farmer has no control. Let me illustrate it by comparing it to an industrial business; the wagon-maker knows the price of hickory and steel when he buys it, and knows the price of labor; knows just what he has got to charge for that wagon when complete that he may make the business pay and leave a profit for himself and give him value for his own labor in that transaction. When the farmer sows a crop of wheat upon his land that farmer does not know, nor can anybody tell him just exactly what fertilizing constituents were removed, nor just how the mechanical condition of that soil was improved or injured, nor just what he can expect to get out of the cent by the next crop, because there are so many conditions, atmospheric, bacteriological and chemical, entering into that matter, that makes it almost unsolvable.

Yet it would not do for us to throw up our hands and say we must give it up. By no means, the harder the problem the harder we must tackle it, and I think it is good advice and sound judgment on the part of him who says, that if under those conditions that you cannot control, you go along working from hand to mouth and by the rule of the thumb, you are not giving a chance for that ordinary intelligence which the ordinary farmer ought to give to his business, and you are allowing the blame to rest on Providence or the air or the weather or something else, all the time.

But I make the point largely for this purpose: You realize there are discouragements in our business. At the same time there are laid down certain hard and fast rules, principles of cultivation, principles of seed selection, principles of animal selection, principles upon which you can stake your future prosperity that will guide you, notwithstanding the fact that there are so many things you cannot control. Now we are slower than any other class of

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men that I know of in adopting these methods, even if we have had them rubbed into us—slower than any other class of men doing business on the continent of America.

What I mean is this: In every State in the Union, and particularly so in New Jersey, you have men at your Experiment Station in whom you have perfect confidence. When Dr. Voorhees or Dr. Smith, for instance, say to you that certain things are true and that if certain principles are carried out certain results will follow, you believe them implicitly, don't you? And yet, you do not go home and put them into practice. These men will stake their reputation upon the results of the experimental work, and yet weeds will creep in and cover the State, plant diseases and insect depredations will spread from county to county, diseases will affect the great majority of your live stock before you wake up to the fact that this could all have been prevented had you taken the advice of your own men in the very beginning. Farmers are proverbially slow in adopting new methods.

Now, compare that with some other professions. I was struck last week with a young doctor who came into my office to tell me about a condition of influenza that was attacking people way up in Northern Ontario, and while that had only been one week in the country, that young medical man by telegraphic communication through the ordinary press had been able to read up on that subject, and was prepared to treat that disease if it broke out at Guelph, 400 miles away. And yet the farmers will allow weeds and disease to creep in and nearly ruin them before they wake to their responsibility as citizens and take measures to stop it.

We were in just that condition, and it was not until these men went out, men like yourselves, and took the gospel of agriculture to every person that we began to get ahead. I might say that these college men who went out first were only allowed to stay out two or three years, because the farmer said, "I want my son to live with that fellow awhile, he can only give *us* the arousements of this business; we want our boys to know something more of the subjects like chemistry, botany, entomology." That sounded as foreign as telegraph and telephone and some other words did a few years ago, and yet are common words now on the college grounds and at farmers' institutes, by reason of the fact

that we must have an intimate knowledge of them if we want to get the best out of our business. They said, "You, Professor, go back and we will send our boys up there." They sent them long enough to leaven the lump until the Government sent a man to look after the institute work, and another to look after the dairy work, and other men to look after other parts of it. They multiplied the men like Dr. Voorhees, and just in proportion as they had farms and farming interests did they demand that the money be expended out of the treasury to supply these wants of the farmers.

And the thought comes to me, suggested by a remark which Professor Henry made to me at lunch (and I would not have you think that the Province of Ontario is superior to you or that we are further advanced), but I would say that our horse business is receiving no special attention because the horsemen have not come as a body to demand anything. The other day our horsemen went to the Minister of Agriculture, who corresponds to your Secretary of Agriculture, and said, "Mr. Monteith, we want some more money for the horse breeders' association." Mr. Monteith said, "What for?" "We want to develop the horse business." Said Mr. Monteith, "What have you accomplished—you have been getting a good grant for years; how many Clydesdale stallions are there in the Province?" "I don't know." "How many Hackneys are there in the Province?" "I don't know." "How many scrubs?" "Thousands of them, but we don't know." Mr. Monteith said, "As Executive officer of this department it is my duty to see that the money expended is spent to the greatest advantage of the greatest number of people, and while you are in the horse business, every farmer also uses horses, and in the aggregate represents a big business, while you are only representing the narrow side of breeding a few animals on your own farms. What has been done for the farmer, and what opportunity has he had to improve the quality of his stock?" "I don't know." Then he said, "You go back home, please, and don't bother me any more just now; I have something which I am working out which I think will get this information I am asking, and then you can have anything you want, if you work along the line you suggest." And he went to his office and sat down and wrote out on

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a piece of paper and said, "I want a grant of \$6,000 for investigation in the Province of Ontario of the status of the horse industry." And he selected 30 men from among these horse breeders who had been to see him, and he turned those 30 men loose and gave each 2 men, a county or part of a county, just as the horse breeding industry was important in those counties, and sent them into every county, going on every farm where a horse was kept, and looked at that horse, finding its name, taking note of its conformation and breed. Now he is prepared to get intelligent legislation to keep out these scrubs and prevent them being used in the country, and he is prepared to give any amount of money within reason to improve and encourage the breeding of horses that the farmers of Ontario ought to raise on their own farms. That is the situation of the horse industry.

Suppose I went in here and asked the Governor or the Chairman of the Agricultural Committee to put down \$6,000 for the horse industry, the chances are I would not get it. You will never get it, and you will never get a million dollars as you ought to have for the Agricultural College of New Brunswick, until the farmers of the State of New Jersey by co-operation, and by getting together, will pass the sort of resolutions that I saw here to-day, and in larger numbers—then they will get this great benefit which will improve their agricultural condition. Ask for it just as Denmark has done, just as we are trying to do in Ontario.

At the college we do two things; we take the boys and the girls. I was glad to hear that some of the girls are taking your short course. In the days of which I speak of, twenty years ago, when I was a student, we had some 60 students in agriculture. There were a number from the cities and towns and a number from the old country, and they were a mixed lot, I may say to you. Some were interested, some were not. All recognized that it was a cheap education, and many of the parents, who had left the farms and moved to the cities, thought that the boy was not in the best surroundings, and he sent him up to the agricultural college to be made a man of and a farmer. Those were hard kind of boys to handle, and it was not until we got the college pretty well filled up and had the respect and the annual visits of the farmers of the Province of Ontario themselves, that we were able

to put on the curriculum and publish in the rules governing it, that no boy would be allowed to enter the doors of the college until he had spent at least one year as hired man on the farm. (Applause.)

Every State in the Union and every Province of the Dominion is an agricultural province. You have no State in the whole Union as I have been in it, serving ten years as professor in one of your agricultural colleges—I don't know of any State in the whole Union that the principal industry is not agricultural—no State but what can at least grow all the food that is required for its own people, and in most cases can send food out to other people. Therefore, you are an agricultural people just as we are, and, therefore, I am able to tell you after ten years' experience with that rule in force, that we are getting a splendid lot of boys, and have gotten to-day such a crowd of boys that last winter I had a petition that the agricultural library might be left open until 11 o'clock, and that the laboratory in physics and bacteriology and chemistry might be available for them to work until the same hour in the evening, after the studies were all over. So great had their interest become in the studies they wanted an opportunity to get down to these things. No fraternities, no social organizations, no time for that. These things have been cut out by the boys in order to devote all the time to scientific agriculture.

That is the way we handle the boys in the long course, but we have found that an agricultural college will not attract more than one or two per cent. of the eligible farmers' sons to its doors, and then there is the ninety-eight per cent., and all the older brothers and the father, left without the agricultural college, and to some extent these must be helped. So we established short courses. When we started that first we had very few students. You have forty, and are starting off under more auspicious circumstances than we did. Yesterday, when I left home, there were 300 grown men, who had left their homes and paid their own expenses to come up there for two weeks to study the practical handling and judging of cattle, sheep and swine. We had forty young men taking a dairy course of three months. We had thirty-two young men and women taking a course in poultry for thirty days, and we have now in all courses at the present time in the Ontario

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Agricultural College nearly a thousand students, all farmers' sons and daughters, taking a direct interest, and coming there at their own expense or the expense of their parents to study the practice and principles which underlie the subject of agriculture.

I say that not in a boasting way, but to tell you of the growth of such an institution, and ask, not your assistance by resolutions—that is all right as far as it goes—but that every man of you will be a practical politician, independent of politics, to see that your local assemblyman is instructed to work and vote for a generous appropriation for the Farmers' College.

It is suggested that there are more of our graduates of agricultural colleges going into the Legislature. I think that is a good move. I often find, theoretically and on paper, that whenever there comes a lawyer or a doctor of my acquaintance, or a brother of one of the boys up to the college, and I get him to speak to the students, he invariably rises and says: "All of the success which has come to me by virtue of any small intellectuality which I possess, or anything that has come to me in after life, is because I was raised on a farm." Does that man talk that way on the agricultural committee in the Legislature? Does he do that? Does he get together the brainiest men in that house, and say to them: "If we give a hundred thousand dollars to the agricultural college, if we give all the money which the hard-headed farmers in session in Trenton in 1907 ask for, will that lawyer, because he was raised on a farm, see that the money is forthcoming, and use the argument which Professor Henry used yesterday, and which I am trying to use, that it will be returned a hundred, and two hundred, and two thousand fold? Does he do that? (Applause.) He is buried in law, and while he does owe a great deal to the farm, what he got from his father and mother and from the cows and other animal products of the farm, where he got the brain and brawn to endure those hard days of work that the average lawyer has to endure in the court-room, while he got all that, it does not as a rule impel him to go to the Legislature and present your interests as they should be presented. Until you get a thousand agricultural students down at New Brunswick, and appreciate the fact that a hard-headed farmer can go into the Legislature, and go on the Law Committee, or on the Agricul-

tural Committee, and represent the largest constituencies, and vote on things that come up, matters that must be carried out in the College and the Experiment Station, until that time comes you will not have attained the greatest success in agriculture in New Jersey.

For that reason we have a strong department at the college in public speaking. Sometimes the people open their eyes when they see our boys visit our universities and enter into competition with those young men in debate, pitch in and hold their own, because they have been trained to think. I do not care whether he goes to the State Legislature—after all, that is not the highest ambition of most of us—but that boy can stand upon his feet and in a general way, and in good language, express himself as to how he feeds his pigs or how he builds his stable or ventilates it, or how he grows his clover, or how he has sense enough to get some fertilizer to put upon that clover, and proves what he did have to say by the fact that he was thinking along the lines of his own business—that man is going to be a greater power in the community than if he sat in the back seat. We want more in the back benches who can rise as you have risen, and who can tell when they go home all that has been said here, and say it better, too, in many instances, than the speakers themselves can.

Two things must be done in an agricultural college. First, teaching the boys and girls, and, secondly, the experimental work. Large sums of money have been wasted—you know, Mr. Chairman, whether that is true or not—wasted in experimental station work in the United States of America and in the Province of Ontario, by virtue of the fact that the experimenters were not prepared. When the Hatch Act was passed in 1888, creating our Experiment Station in every State, men were not available at once in such large numbers to do that work, and men in the United States and Canada are looking for quick results. You won't wait a year and a half now to get a building built in the city of Trenton; you want that building in six weeks or two months, and the man who cannot do it has got to go out of the business. They do it in New York and Chicago. Old buildings are torn away and a new building put up in six months, and the man that builds it is willing to pay for that in order to get the use of the build-

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ing. In plant and animal life growth cannot be forced that way. Scientists are made, not born.

So the Experiment Stations were established, and in time the men were found. Think of the agricultural colleges, think of the departments in Washington, think of the thinking men whom you have sent to the Legislature and colleges. Enough has been done so that we have those men. But you are not getting the benefit of these experiment stations on your own farm as you ought to? Would I be going too far to say that every man in this room who is interested in scientific agriculture ought to visit the Experiment Station once a year and talk with the officers there, and find out what they are doing for the State and what they are doing for him.

I have been told often by our farmers who come to us in the month of June—I should have stated from day to day—to get lunch and then go over the farm, and they are given a little short circular of directions of where to go, and every professor is in his place to answer questions when the men and women come around to them. I say during that month we feel we are doing our very best work for the farmers, because during the eleven months we are working to get something ready for them. They are taking advantage of the full work that we are doing. If you have not gone to the Experiment Station, I appeal to you to go down there and get Dr. Voorhees to show you over the place. I know what he has been working for. It is just that, to conduct experiments and prove things for you to put into actual practice. Otherwise, his work is wasted, and his salary has not been earned.

And we have classes for women. I was so glad Dr. Voorhees informed us as he did, that there were some girls taking the new short course, but there has not been much done anywhere yet in the world for the emancipation of the women and girls of the farm home. Nobody works so hard, nobody's life is so monotonous, nobody has to do so many things over and over again, cooking the meals and washing the dishes every day twice and three times, and then do it over again the next morning.

Now, if you knew that your little girl, whether you will it or not, or whether she wills it or not, is going to grow up to womanhood and have to do cooking and washing and laundry work, or

all three, all the rest of her life, in some capacity, no matter what profession she goes into—nine-tenths remain at home or at somebody else's home—if you know that, is it not time for you to make provision for them to learn the best way to do those three things?

That does not seem to me reasonable, and much to our surprise when we were given \$200,000 three years ago to build two buildings, one beautiful residence for the girls, in which the farmer girls can live, and the other in which they can do their work and learn those three things and those only—we were very much surprised to find that the day school opened, and we were only able to issue our circulars six weeks previous, that every place was occupied by a girl with a desire to learn more about the arts of homemaking.

So don't wait for some member of the Legislature to start this thing, and don't wait for somebody to get up in some city and say we ought to come to these things, but start and agitate now for the teaching of domestic sciences in your public schools. If you find your little girl or boy—the little girl taking domestic science and the little boy taking elemental agriculture—you will find it worth while. Some of our schools are adopting the school agriculture. They use the playground, which has been enlarged and made into a school garden for the little boys and girls, and they allow them to plant them and spray them, and allow the little chaps to sow barley and oats and watch them grow up. I say the time is coming when the school teacher must be taught all these things, and the time is coming when the trustees must insist that they shall be put in, and the time is coming when the parents must insist upon it if you are going to keep the boys and girls on the farm. (Applause.)

I feel that I have taken up all of the time which I ought to occupy in an address of this kind. I just want to start the work going, to-morrow I shall have something to say along co-operative lines, and yet I must take time to enforce one argument which I have made in reference to the value of experiment station work to the farmer. We must get it out of our heads, that the Experiment Station is at New Brunswick and we live in another county. It does not matter where it is if you get the benefits, and it is your right to get all the information which they can give you, and they

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have placed themselves in an attitude to give you all of that information for the asking. You can get the instruction just as fast as you want it. In the Province of Ontario the director of our Experiment Station in his annual report made this statement:

“The results show that the Manchuria barley gave decidedly the greatest yield per acre of the four varieties for the whole period of fifteen years, and also for the last five years. The Manchuria gave an average of 9.3 bushels per acre per annum over the common six-rowed barley in the average results for 15 years. The average area devoted to barley in Ontario from 1882 to 1904, is given as 633,290 acres per annum. An increase of nine bushels of barley per acre throughout the Province would, therefore, amount to an increase of over five million bushels of barley in Ontario annually. This increase at 50 cents per bushel, would amount to about two and one-half million dollars. Two and a half million dollars annually would pay the running expenses of about thirty agricultural colleges like the one located at Guelph.” (Applause.)

Dr. Henry—I wish Mr. Creelman would enlarge a little upon what the McKinley Bill did for them, first, in the staggering blow that it dealt Canada; and it was the people of New Jersey, New York and other States that were so insistent for the McKinley Bill to protect our farms against the inundation of Canadian butter and cheese and hay and eggs. I wish he would tell us a little more of the McKinley Bill, and how it finally proved a blessing to Canada. It shows how the people can turn adversity into prosperity by will-power and intelligence.

Mr. Creelman—The McKinley Bill pretty nearly ruined us for a short time; it gave us a slap in the face which pretty nearly turned a lot of our people into Yankee haters. They had said that probably “we could get into closer commercial union with these people, but it appears now that politics have entered very largely into their commercial life, and they have set up a barrier which we cannot overcome.” And that sort of feeling went on for a year, while the farms were depleted to some extent. But not many men can move off of a farm and get away and sell it, especially during times of depreciation. So they talked and did

very little else, and it went on until the next year and the second and third season, when they began to find that 50 and 60 cent wheat would not pay the interest on the mortgage, much less pay anything on the principal, and they were getting further behind. Then an inspiration came to us pretty generally through the country, and the Agricultural Department and the people at the college insisted more than ever upon scientific methods, and experimented immediately upon some of the lines that some of us had laid out, and they said, "there is a great population in Great Britain who are getting their bacon from Denmark and Ireland and their cheese from France and Germany and Holland and their butter from the same sources." And they said, "Why can't we supply that market? We will send over some experimental shipments and, as a result, from a wheat-growing province to the extent of 30 to 32 millions of bushels we have fallen to 12½ millions of bushels during the last year. Some of it is fed to live stock; and we have increased in other lines in order to try to catch up with this great trade which we established in a small way at first. We have increased our barley production from the time when the McKinley tariff passed from about 10 millions to over 24 millions of bushels, practically all of which is fed to our live stock. Oats have gone up from 50 million of bushels to 102 millions, and our farmers now know that when oats are at a certain price and wheat at a certain price, he can afford to sell his wheat and buy oats for his feed. So when the McKinley tariff forced us by changing our methods, we adopted new ones, and those methods have gone on until this last year our dairy products alone shipped to Great Britain amounted to about \$40,000,000. There are cities and towns in Great Britain, between London and Liverpool, that Dr. Henry has passed through, that you never heard of before, of thirty, forty fifty and a hundred thousand people, all manufacturing things, but not to eat, and they must be fed—and we found when we went in that if we gave them a better article—they have no fads—they won't take our butter unless it is as they like it, they won't eat fat meat, they won't eat your skimmed milk cheese—we could and we did, secure their trade, and we don't make one pound of skimmed milk cheese any longer. We had to put in exactly the same amount of salt and the same

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amount of color and send always the same quality to the same commission merchant, and we had to pack our apples just so and had to crate them and mark them, and had to force our people when we found it was right by legislation to do that, or their apples would not be put aboard of any ship. We had to cater to that market, but when we found what they wanted we kept the market. We have good grass and good water and good farmers, and in combination with those things we feed our stock and we can compete with the markets of the world. We supplied then only ten per cent. of cheese to the British market. To-day eighty per cent. of the entire import of cheese into Great Britain comes from Canada, all due to necessary change of conditions. (Applause.)

Mr. Charles Howell Cook—I want to say that our good friends there don't stop with the agriculture, but they are after the manufacturers as well. I have on my desk three applications coming from different Provinces of Canada asking me to locate a factory there. They are doing that everywhere; and I want to say to the people of the United States and to our good friends here, that they are coming out in agriculture and in manufactures, and when you think of the great Westinghouse Company, the General Electric and other factories that have gone across the border to locate by the efforts of the Canadian Government and the great offers they make them, that we, as an agricultural and a manufacturing country, must look to our laurels.

A Delegate—If it does not pay to raise wheat in Canada at the present time, why is it that American farmers are leaving our Western farms and emigrating to Canada to raise wheat?

Mr. Creelman—That is a very pertinent inquiry, and brings out the distinction between Ontario, the constituency which I represent, and the northwest territory and the western part of Canada, which is our great wheat-growing country. Wheat growing there is the principal industry. They can grow Manitoba hard, such as the miller wants, while our wheats are all soft in Ontario. Hence, I am not talking about the western condition, but about the conditions in Ontario, and when our farmers want to grow wheat, we provide them with the information about wheat growing conditions in the western country.

Dr. Henry—The wheat area of Canada that he refers to is situated to the west and northwest of Winnipeg. To give you some idea of the wheat area, if you will let your mind stretch from where you sit to New Orleans, you will get some idea of the distance you can practically plow a furrow without lifting your plow, from Winnipeg to the northwest, and that is the wheat growing country.

Mr. Creelman—In the northern part of our country beyond the wheat area our surveyors have just returned from surveying hard-wood land, and a surveyor said to me that when he left the most northern limit of the northern survey, where no white man had stood before, that he climbed one of the highest trees in that section and that he could yet see woodland and bush to the north of it as far as visible.

Dr. Henry—Where was that?

Mr. Creelman—In northern Ontario, looking towards James Bay, we have a railroad now in course of construction.

Dr. Henry—How far above Toronto?

Mr. Creelman—That is not more than 300 miles directly north of the American Soo. That land, much of it, up to this time has been practically unexplored.

The Importance of Education and Co-operation in Agriculture; Some Lessons from Denmark.

W. A. HENRY, DEAN COLLEGE OF AGRICULTURE, AND DIRECTOR
OF AGRICULTURAL EXPERIMENT STATION,
MADISON, WISCONSIN.

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In directing your attention to the importance of co-operation among farmers, I wish to compare two nations agriculturally, one of which has retrograded and the other advanced, under almost similar conditions.

With the abolition of the Corn Laws, more than half a century ago, the British farmer found himself in competition with the agriculture of the whole world. Under the stimulus of free trade, the manufacturing interests of Britain advanced mightily, and there were at first good home markets for the products of the farm. Then came the enormous development of ocean steamship transportation, and the development of railways through the fertile districts of India, Australia, North and South America. In addition came refrigeration, by which meats were congealed while passing through the tropics, or kept cold when brought from distant points to market centres. About 1870, the combination of these forces was felt for the first time by the British farmer. Then he was dealt a staggering blow, from which he has not recovered, for the same forces are still in action, and he has not seemed to learn what has struck him and how to escape from his unfortunate conditions.

After remaining in a dazed condition for some ten years, about 1880, British students—thoughtful men of all classes—began to study the causes of Britain's agricultural troubles, and all sorts of

explanations were made, and all sorts of remedies proposed. No matter what conclusion was reached, no one gave remedies of much value, or at least no remedies were adopted that were really helpful. Landlords and tenant farmers were both affected. No one seemed to see that in union there is strength, and that through education there is always some way for improvement and for betterment of present conditions. The education of the agricultural people of Britain was left unprovided for by the government. The transportation companies took no interest in the miserable condition of the agricultural people. The agricultural people themselves, who are the most intelligent of all farming peoples on earth, did not seem to know what had hurt them. There is no man, generally speaking, more intelligent than an Englishman. Of all Englishmen, the tenant farmers have been the highest strung and the most independent. A splendid class of able, self-reliant, and proud of their splendid reputation, these tenant farmers clung to the traditions and customs of the past, as though they were all-sufficient, under the new conditions. Go over England to-day, and you will be heart-sick in studying her agricultural condition, as compared with that of fifty years ago. British agriculture has retrograded from 1870 in many ways, and a change for the better has not yet occurred.

Now I ask your attention for a moment to consider what Denmark has accomplished.

Remember, first of all, that little Denmark covers an area only twice as large as the State of New Jersey—about fifteen thousand square miles of territory. The Napoleonic wars left Denmark a wreck. The wars with Prussia and Austria bereft her of two of her fairest provinces. She was reduced to the narrow limits of Jutland and the islands. Part of these lands is miserably poor—sand dunes, on which even brush will not grow. The same causes which produced agricultural depression in Old England, in New England, and in New Jersey, also affected Denmark. Denmark had as much right to complain of changed agricultural conditions as did New Jersey or Old England. What Denmark suffered seems to have been a fire of purification, out of which has come one of the finest agricultural peoples the world has in sight. We all listen, wonder-eyed, to the stories of the marvelous

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energy of our Japanese friends. Let me bring to your attention a people still more wonderful in the lines of peace and agriculture. When depression rested like a pall over Danish agriculture, instead of languishing, instead of sulking and letting matters get worse, the people of Denmark roused to action and set about improvement, through government assistance, in many directions, through education in many lines, and through co-operation in the broadest, most unselfish ways. While the British farmer was wondering what struck him, the Danish farmer was sending envoys to Britain, to study the markets that the British farmers could not supply; was sending envoys to Ireland to study how pork was produced there; was establishing agricultural schools of all kinds, and girding up itself for one of the most wonderful developments ever witnessed in any nation.

Denmark's first studied effort was in butter production. Up to 1860 Danish butter was about the most offensive of any produced in Europe. It was then that Professor Segelcke began his efforts to place the butter business of Denmark on a rational basis. The government sent envoys to Britain to study the requirements of the British market. The aim of Denmark was to produce just such butter as the Britons loved best, in order to get the most money from them for such butter. These agents travelled from city to city and reported conditions of the markets directly to the home government, which indicated in turn to the creameries. This system yet prevails. The result is that the Danes make the kind of butter Britain wants, and Danish butter stands highest in the English market.

The Danish Government appropriates to the Agricultural College at Copenhagen \$10,000 annually, to be expended in the single item of scoring butter sent to the college from the different creameries of the country. There are travelling instructors, paid for by the government, who visit the creameries and held them over their difficulties.

And now for the results. In 1901 Denmark, which, remember, is twice the size of New Jersey, exported, mostly to England, \$35,000,000 worth of butter. But she buys some cheap butter, and uses some oleo. Taking out the cost of these imported dairy

articles, there is still left a balance of \$27,000,000, which the Danish farmer receives annually from the sales of his butter.

We talk of American agriculture, and boast of our attainment. In 1905 we exported \$1,645,000 worth of butter. That is, Denmark exports, net, nearly twenty times as much butter as the whole United States.

The next great agricultural advance of Denmark was in pork production. Here, too, troubles have confronted them, but all obstacles have been overcome. Previous to 1887, Denmark was selling most of its pork to Germany. Then Germany shut out Danish pork, and Danish farmers were without a market for their hogs and hog products. Did they give up, like the English farmer? Did they have a set-back, the same as eastern agriculture, in these United States? Not at all. Envoys were sent to England to study the English pork markets. They went to Ireland to study how Irish bacon, the best and highest-priced in the world, was produced. Returning, they made their report, and the Danish Government took up a careful study of how hogs should be fed to produce the highest quality of bacon and other pork products. A series of experiments were begun, under the direction of the government, which cost at least \$50,000. These experiments showed that barley is the best single grain for producing pork of the highest quality. They showed that some corn can be fed with barley to advantage, but all corn for producing pork is not advantageous. They showed that the highest grade of pigs should not weigh over 160 pounds, and that the fat should not exceed 1.7 inches over the shoulder.

In 1887, when Germany shut out Danish pork, Denmark was producing 54,000,000 pounds of pork products annually. Ten years later, having found a new market, she was exporting pork products to the total of 138,000,000 pounds. In 1901, Danish pork products sent out of the country brought to the people \$22,000,000, and Denmark is twice the size of the State of New Jersey. The total exports of pork products of all kinds from the United States for 1903 were \$116,000,000. Thus, little Denmark, only twice the size of New Jersey, exports annually nearly one-fifth as much pork products as does the whole United States.

We might well think that when the Danish farmer had accom-

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plished all this, that he would be satisfied with his attainments and rest for a time, looking about him to see what his neighbors were doing, in a sort of satisfied way. But not so. There were other fields of enterprise, and the Danish farmer pushed in to occupy them.

In 1878 Denmark awakened to the opportunities of improving her egg export trade. In that year she shipped \$321,000 worth of eggs. Then improvement began. In the year 1878 Hendrik Pontoppidan, a broad-minded statesman, gathered a number of citizens on his estate near Aarhus, to discuss the improvement of the poultry industry. Out of this effort was organized "The Society for the Promotion of Poultry Breeding, especially of Chicken Breeding and Egg Trade." Here was the beginning of a union or combination of people that was to prove of the highest benefit to Denmark. In 1903 this poultry Association had a membership of over 3,000, and there were other poultry societies, with an aggregate membership of 8700.

In 1895 the Co-operative Egg Export Society was formed. Even down to that time the Danish export trade in eggs was comparatively small. With the organization of these co-operative societies, the advancement has been nothing short of marvelous.

Up to this time the Danish farmers were doing many of the same things in the poultry line that some of us are still doing. They were always glad to sell their smallest eggs to other people, and the dirty ones went to market, and sometimes the stale ones got into the basket, or package, along with better ones. The first great betterment was brought about when they adopted the method of selling eggs by weight. The improvement societies have aided egg producers in many ways. They have furnished them with eggs of the better breeds and strains. They have held meetings of all kinds. The Danish Egg Export Society, which is a co-operative organization, is now a most powerful one, having, in 1903, over 33,000 members, distributed among 475 local societies. The society is managed by five directors, who act as counsellors, fixing the price of eggs each week. Membership is divided up into circuits, each circuit paying a small membership fee. Egg collectors gather up the eggs and forward them to the export points. No farmer can deliver eggs over seven days old.

The eggs must be clean and each stamped with the number of the member in the Association, who furnishes the eggs. The collector stamps all dirty or unsatisfactory eggs, returning them to the members. Eggs are bought by weight, as already stated, regardless of size. The farmers are paid cash, at the price fixed by the director of the circuit, such price being somewhat under that which will finally be decided on, the difference being made good at settlement time. The collector gets about 1.2 cents per dozen for collecting, and cost of transportation to the point of export is about .4 cents per dozen. The total cost for placing the eggs on the steamer is about 1.5 cents for a dozen. There are nine points in Denmark from which eggs are shipped to other countries, principally to Britain.

And now for the result: In 1878 Denmark exported \$321,000 worth of eggs. In 1903 she exported \$8,092,000 worth, an increase of over 2,300 per cent. in the value of her egg exports in twenty-five years. According to the last census, the State of New Jersey, half as big as Denmark, produced all together \$1,938,000 worth of eggs in 1889.

The United States is a great agricultural country. In 1903 it shipped \$3,152,000 worth of horses to other countries. Denmark, twice as big as New Jersey, did almost as well, for she sold to other countries \$3,082,000 worth of horses. But you say, after all we have left out America's greatest exports in this comparison, and this is true.

Our greatest agricultural export is cotton. Then come the cereal grains—wheat, corn, oats, rye and barley. Add all of our agricultural exports together, and then compare them with Denmark. When this is done we find that we export about \$11 worth of farm products to other countries, for each man, woman and child in the country. Denmark exports \$33 worth of agricultural products for every man, woman, and child in the country.

In studying these figures, let me remind you that Denmark is a kingdom; the people support royalty, as well as an army and a navy. This is nothing to their credit, but such is the fact. Think of royalty, a navy and an army of 50,000 men in a little country, twice the size of New Jersey. Think of a people that have gone

through the struggles, that have suffered the national disgrace that Denmark has done, rising to their present high standard in agriculture.

Let me tell you some of the things she has at this time. Denmark has :

Twenty-seven co-operative bacon factories, having a membership of 65,800.

Numerous poultry and egg societies, having a membership of two or three thousand each.

A bee keepers' federation, made up of sixty local associations, with 5,000 members.

Co-operative insurance companies for insuring the live stock, single societies having as many as 7,000 members, with aggregate insurance of \$6,500,000.

It is not uncommon for the Danish farmer to belong to as many as ten different local co-operative societies.

There are a hundred societies for the improvement of live stock, with a membership of 65,000. The Government turns over to these societies \$50,000 per year to forward their interests.

The agricultural laborers of Denmark are organized into 270 societies for improvement of home life, encouragement of thrift, etc. These have a membership of over 12,000.

Four years ago there were 250 co-operative societies, each of which employed one traveling counsellor who spent his whole time visiting the farm of each member, posting his books, testing his cows, and helping him in the purchase and use of feeds and fertilizers.

There are 1,050 co-operative creamery and cheese factory associations in Denmark, numbering 148,000 members, who own 750,000 cows.

I think you will join me when I say that we should take off our hats to little Denmark, a country that has no mines and no forests, a country where much of the land has been farmed for thousands of years, a country that must sell its agricultural products at distant points.

Now, in view of all this, let me call your attention to the fact that Denmark has advanced to her present exalted position agri-

culturally, through two great factors—agricultural education and agricultural co-operation. Let me call your attention most particularly to the further fact that in both the education and the co-operation, there has always been government leadership, government aid and government sympathy. I wish the Governor of New Jersey were in attendance at this time at this meeting. I wish that our State Legislature were here to listen to this recital of Denmark's wonderful progress. I wish that the men who are legislating for the advancement of the interests of this Commonwealth could be induced to stop for a little time and learn of what some of the other nations are doing. Maybe if we looked oftener about us, studied more carefully what others are doing, we would be less boastful and more earnest in advancing ourselves and making the most of our splendid opportunities.

New Jersey was one of the leaders in starting her Agricultural Experiment Station. She has now taken an advance step in starting an agricultural school that is doing business, and going to do business, and more and more of it from this time on. What is needed is state aid for all legitimate agricultural effort. Your State can well afford to help this Board, and every other organization trying to advance the cause of agriculture. It can afford to help in the formation of co-operative societies, just as Denmark is helping such societies. Your Agricultural College should receive ten times what you are now giving it. It must receive it if it is to furnish and do the work you require of it.

Then, there are many ways in which your farmers should at once embark in co-operative efforts. Milk men are receiving too small payment for their arduous, never-ending labors, in producing good milk for local consumption. Who shall say that the man that is now getting up at four o'clock each morning throughout the year to care for his cows, carry the milk to his customers, and wait on them properly, is sufficiently paid. We all know that he is not. If your farmers will combine in the purchase of feeding stuffs, in the elimination of tuberculosis from their herds, in the purchase of commercial fertilizers to grow their crops with, and especially in dealing with those who distribute the milk, they will get better returns for what they produce, they will receive some-

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thing near what their services are worth. The State Board of Agriculture, the State Horticultural Society, your Agricultural Experiment Station, and your Agricultural School, just started, are, in conjunction with the Grange, almost the sum total of your agricultural organizations at present. All of these should be strengthened and many others should be formed. Will New Jersey rise to her opportunity?

NEW JERSEY STATE LIBRARY

Co-operation.

BY PRESIDENT G. C. CREELMAN.

Mr. President, ladies and gentlemen: The difference between the average crop of wheat in the United States, and the best crop of wheat grown by Mr. Roberts in New Jersey, is more than 300 per cent. In the Dominion of Canada, and particularly in the Province of Ontario, when we learned that to be true—while our land being newer land than yours, because more recently cut off and burned and cultivated—we decided that some steps should be taken by our people to prevent the difference between the average and the possible crop reaching 300 per cent.

One of the first movements made in that direction was by the Ontario Experimental Union, a co-operative association formed twenty years ago at Guelph in connection with the college and experiment station, and which has spread throughout the length and breadth of our Province. To cut the story short, I would say, in the beginning, we wrote letters to the practical farmers, such as were indicated to us by general meetings, such as the one we are now attending; and asked them if they would on their own places stake out a piece of land one rod square, and on that would plant, as they planted their other crops, the kind of seed, for instance, which we would send them, in a field where they were growing some other variety of the same cereal, and let us know at the end of the year what they thought about it.

From that grew systematic work, until this last year we have 4,050 farmers, 4,050 individual farmers conducting experiments in connection with our work and reporting every fall the results of their work, and meeting together at the close of the season when these reports are in, in the month of December, and dis-

cussing what is best for their particular section and for the Province at large.

That is the work of the Agricultural Experimental Union. I stated yesterday that in 1889, Mr. Zavitz, our experimenter, had gotten one handful of barley from Manchuria. Last year we had half a million acres grown in that Province, all the product of this handful. This had produced nine bushels per acre over the common barley, and would mean, at 50 cents per bushel, two and a quarter million dollars.

Had you gotten that barley, or had your Dr. Voorhees gotten that barley down here in New Jersey, and had planted that at the New Jersey Experiment Station farm, and had he made up his mind, as he has in a thousand things, that the best thing for the barley growers of the State of New Jersey—and this will apply to sweet potatoes or anything else—had he made up his mind that the barley growers of the State of New Jersey would be better to the extent of two and a half millions if they grew this variety of barley rather than the variety they were growing, your President could not, nor could we at Guelph, have gotten the people of the State to adopt that thing by simply publishing it in bulletin form, or state it to the State Board at the annual meeting; but by virtue of the fact that we had a liberal appropriation from the State to enable our department of experiment work to engage enough help to correspond directly, and to print sufficient material that was practical and simple, and send it directly into the homes of the farmers with the sample of grain and get answers back; and by the public press making use of the agricultural journals, the weekly papers in the different counties advertising that under certain conditions the farmers would be supplied, we were enabled by the co-operation of the farmers to bring about an increase in the production of barley to the extent of two and a quarter million dollars per year.

We have done the same thing with oats, the same thing with wheat, the same thing with potatoes and turnips, and the same thing with mangle wurtzel, and good forage crops. By a simple twist of the wrist, as it were, the farmers were put in the way of helping themselves, directly by correspondence, and by attending these meetings once a year to talk about it.

THE FARMERS INSTITUTE.

I do not think I need say anything further about that to show the advantage of co-operation, and that is without political or other signification, and that body of farmers comes together and nobody knows what political party they belong to, and yet they work in unison, and it does not interfere to any extent with their business on the farm. We found if we were going to bring the work of the college and the experiment station—and those things are so interwoven that I can't help but bring the college and the station into it; they are to us the fountain-head of information as the result of the work of men who are working 365 days—or thinking it—along lines of scientific agriculture, and, therefore, they are the men to do that, while the other men are working in the fields with their individual problems. From them must necessarily emanate most of the suggestions in reference to the upbuilding of agriculture in the Province of Ontario.

So that we found out that if we were going to embrace a large number of people in this co-operative work, that they must have some sort of permanent organization among themselves and outside of the college for educational purposes. You have the Grange, Michigan has the Farmer Clubs, other States have Farmers' Unions, and many States have Farmers' Institutes, call it as you will, organization is necessary if you are going to do anything in a short time; if you are going in a given time to accomplish anything for the whole county or State, it must be done in a co-operative way, and we found it necessary to have a permanent organization, and we called it the Farmers' Institute. We hold each year some 800 meetings in the Province. Each Legislative district, sometimes only a part of a county, holds from six to twelve meetings of its own, presided over by a President the same as your President does here, the Secretary being present at the meeting and if possible the Vice-President, and that Board moves about in that county and has six to twelve meetings, just the same as you are holding the meeting here to-day, to discuss problems just the same as we have been discussing them. We have permanent officers elected once a year, and we have them hold office

from year to year if they are good officers, and that does another thing in a co-operative way that enables us to accomplish something which I will tell you about.

In the first place, it enables us to get a representative set of men permanently interested in agriculture in every district who can be corresponded with in reference to matters of agriculture. For instance, when I write to these men, as I have done in the past year, and again this year, and say that we shall be very glad if they, through the permanent organization this winter and through handbills in the spring, will inform their members that we will be very glad to entertain them in the month of June at the College, I ask their secretary to correspond with me, and I give them a date that will not conflict with other dates. We have in this way been enabled to bring out there, at their own expense 40,000 people each year to visit the college and Experiment Station.

Again, because of the permanency of this organization (they having a nominal membership fee of 25 cents, which is retained for the payment of rent of hall and other expenses, same as your Grange)—I say by virtue of the fact that they have a permanent organization, we are enabled, in a word, just as I tried to explain the manner in which medical men are enabled to stop a disease, by virtue of their organizations and the medical papers, we are enabled to change our methods, if necessary and profitable, within a few years, as we were obliged to do after the passing of the McKinley Bill. That, however, was forced upon us, and we must take no credit upon ourselves, except that credit which belongs to the Anglo-Saxon people, who scorn defeat under all circumstances; but there was one thing there, the permanent organizations and the farmers' institutes, enabled us to change our ways in the business of pork production. Ten years ago, ninety per cent. of the pork raised in the Province of Ontario was fatted pork, just as you know it, and as it is in the corn belt of the United States and the other parts of the Union. But all at once we were confronted with the fact that the price of pork at 4, 4½ and five cents was not bringing us a profit on the business in the Province of Ontario, where we had to buy our corn, because we raised very little of it ourselves. And a few men in the Province

of Ontario put their heads together and said: "We will interview the packers of pork who are endeavoring to build up a market for lean meat or bacon, and see if these people who were putting hundreds of thousands of dollars into packing houses, and who were sending this product abroad, will give us their assurance that if, instead of ninety per cent. of fatted hogs going into the market and using them for lard rather than for the production of bacon, we change that and give them ninety per cent. of lean bacon hogs, whether they will assure us of an increased price. At any rate, we will interview them."

Before going into a further discussion of that, I would like to say that the reason we were forced into making a change in reference to the business of pork production was the McKinley Bill. This was largely because and by reason of the fact that we had no great mining and negro population, as you have, to consume fat pork in large quantities, and we found our population even in the lumber district, where fat pork was formerly used in great quantities, was demanding a lean pork, just as soon as the transportation facilities were sufficient to bring them in lean meat.

The packers said: "There is no doubt about the difference in the price. Great Britain is controlling the price now, and we are paying you for ninety per cent. of stock that the English people don't like, and we are obliged to manufacture that into products that we can't sell at a profit, but we certainly will be enabled to pay you more if you give us ninety per cent. of lean."

We realized we had the grass and the grain and the water and the climatic conditions, and we went into the business; but what I want to point out to you this morning is this: that we were enabled in four years, through the organization of the Farmers' Institute, by going down, as I did personally myself, and getting these men to say what is a bacon hog. We said: "Pick out some of those ninety-per-cent. fellows; show us just exactly the type you want, and then we will figure how we can breed and raise that hog to the best advantage, and if we can prove at the college or Experiment Station that that hog can be raised just as cheaply, and which weighs from 160 to 220 pounds, instead of a hog which weighs two or three or six hundred pounds, then we will

put our farmers in the way of breeding and feeding such an animal."

Then we took up this proposition and put it before our farmers and every farmer saw that hog, or a picture of it, and was told how to feed and breed him within a short time afterwards.

We conducted these investigations. We got all the experiments of Dr. Henry and all the people in the West. We convinced ourselves that we could produce the barley and the clover and the oats and feed this hog and retain the fertilizer on our own place, and do it just as cheaply as a fat hog.

By virtue of that change the President of perhaps the largest pork packing establishment in Canada said to me this fall, "that between 75 and 80 per cent. of all the hogs, of all the thousands of hogs marketed in the three largest factories in the Province of Ontario, are of the bacon type, and the price we are paying is 7 cents, live weight."

So you see there are two things necessary, one is that you have good men to do the experimenting. Such men you have in New Jersey, and notwithstanding the temptation that they have had to remove to Delaware and elsewhere, they have remained with you, and although their researches are perhaps not appreciated as much here as they are in other States, they have remained here. But you have not begun the organizations which are possible by the people themselves. Nothing has been done to adopt organization methods. It will be too late when Professor Voorhees has gone, and he cannot last forever in New Jersey, when he is removed to some other State, either here or hereafter, and you will then talk about what a great man he was and what he foresaw. He did not foresee anything. He simply knows by actual experiments that certain laws of nature when put into operation by certain men will produce certain results. Just as Mr. Roberts knows when he manures and cultivates his land so and so that there is never a year when the land has gone back on him.

These facts are true, and I appeal to you first to get some sort of co-operation among yourselves. In addition to attending this meeting once a year and saying that there is good enough agricultural education in New Jersey; in addition to coming here and agreeing by resolution that the methods are right, you must dur-

ing the other weeks of the year have some sort of non-political organization at home.

THE CHEESE BUSINESS.

In our cheese factory business, in which we have made some reputation, our success was brought about by co-operation. If you have ten or fifty men selling milk to one factory and one man's milk is bad, and it is used with the rest, that is going to spoil the cheese. Or, if that cheesemaker cannot make the best cheese by virtue of the fact that the factory is not paying enough to get a first class man, one who has not been to a dairy school to learn how, then you do not get the best results. So we require that every cheesemaker shall have a cheese course, just as your dentists and lawyers and doctors are required to have their courses. Every man is required to go to college and learn to make the best kind of cheese and pass an examination on it, so that we know that we haven't a man who is a faddist, and thereby spoil any output of that factory, but that he will make it uniform with the next factory and other factories, so that this cheese which we ship to the markets of the world, shall be uniform in quality and color.

So we have established a series of syndicates of 25 factories each, in which the Government co-operates, and pays the salary of one man who is engaged to drive from factory to factory every day and help each cheesemaker, instruct that cheesemaker, inspect that cheese factory, go to individual farms, where the cheesemaker tells him he has got bad milk, inspect the herd and stables and assist in every way to make better butter and cheese, and so enable us to keep up our reputation as a whole in a co-operative way in the markets of the world. We think that is a step in advance.

But I ask you what your State Legislature would say if you should ask them to give you an appropriation for that. You can figure out how many cheese inspectors we require—80 of them doing nothing else and paid \$100 a month by the State, only to insure one fact to the Province of Ontario, and that is, that this twenty-five million dollar cheese business, that cheese that is be-

ing exported from Ontario to Great Britain shall not depreciate in quality. And it pays over and over again.

THE APPLE BUSINESS.

Now, in the apple business we found out that when we had a big crop we didn't get any price for it, the orchards had been cultivated all summer and fall, and then after gathering the crop and looking after it as we look after a sucking colt, we brought it along to get a splendid product and then the market falls away. Yet we realize there was never a year in the history of this country or Canada, when apples were not worth from 75 cents to \$2 a barrel more in the spring than in the fall. We found out that by clubbing together and with a little help from the Government, by the farmers going to the Government and asking for a little aid in the way of cold storage business, we found that we could actually build under the conditions of high prices for labor and lumber, a cold storage plant, keep this building in first class condition for five months for five cents a month per barrel. To do this, of course, the farmers must co-operate, enough men must be gotten together who will stand by one another in a community and say, "we will not sell our apples until we can get a certain price," but you can't do it without co-operation. We have had to fight prejudice, but so long as a few men stick to it and know it is a good thing and carry it out and argue it out from that standpoint, and then put their money in it, the thing will win out.

So all over the country the idea is spreading of these co-operative packing and cold storage plants. What has the packing to do with it? Simply this, if that cold storage house is going to attract buyers to it, those buyers have got to be sure that the people have given a reasonable amount of attention to the sorting and crating and packing of that fruit; and just as soon as they do that, then they are enabled to attract these buyers. We found out that by co-operation we could have men packing apples ten hours a day, and they could pack a great many apples; whereas if it depended upon the farmer himself, who is a Jersey cow man or a wheat man, the apples never come in packed as they would be packed by a man who knew his business.

We found out, as a matter of fact, in one year that the men who graded their apples into firsts, seconds and thirds, got a better price for their third-class apples that were sound but of a small size, than they used to get for their mixed firsts seconds and thirds, where the man had to come to the orchard and buy them or take them off the railroad platform, and for his seconds always, and for his firsts always 100 per cent. more.

That is why I cannot help preaching this agricultural business, when I see the difference between the average and the possible; when I see that the men who work from early morning till late at night, just as an intelligent business man, putting brain into his business, using the best horses, keeping the best dairy cows, and yet when he puts it upon the market it falls down for lack of a few business methods, that his own son, twenty years of age, if he is working in a factory, is putting in practice in that factory. Yet we fall down for lack of co-operation in getting rid of the bulk of the business.

It is not a matter of trusts. It is not a matter of those things that your Federal Government is legislating against. I want to keep those things out of politics. I want you to feel that it is business, business on the farm, and a business that will pay you for your labor if it is properly conducted.

Just one word more, in the matter of *management*. I would keep away from that. This matter of co-operation can go too far when a few men in the community get the idea that they can do without the moneyed men in this operation. You can't do that. And while I am opposed to trusts in agriculture or anything else, I do realize that when a man in a pork-packing establishment is willing to send men over to the old country at the expense of his business, and start that trade and conduct it by cable, we can afford to let that man do that and make a legitimate profit in his business. A farmer may have only \$10,000 invested, but from that \$10,000 he wants to make gross 10, 15, 25 per cent., and that is his legitimate business; but we found where farmers took hold of the factories and said: "If we can make money by raising hogs and selling them at 7 cents, and find pork on the market retailing to the consumer as bacon at 16 and 18 cents, we are not getting what we should for our pigs." That farmer does

not know and has not the time to study that whole question as a farmer, and the difference between 7 cents and sixteen is not for him. It is giving him a good profit to raise it at 7 cents, and the man with the money can step in and do that business to a better advantage than the dozen or fifteen farmers, as directed by their organization. You can do your own business and other business, provided you have sufficient capital and have the time to give to the business; but we have found, even in the best localities, where the factory is surrounded by a hog-raising country, that farmers have failed as bacon manufacturers. I remember very well one instance. They appointed twelve men as directors, and brought them in once a week to a meeting, and they paid those men as directors, as all companies pay them, two or three dollars a day. And they came and sat there, those twelve, and listened to reports of their manager, and they spent \$36.00 and expenses coming to town, sitting as directors, looking wise and listening to reports from a man whom they paid because he knew his business, and they passed the financial statement every week, and it went on until they were broken up by virtue of the fact that other companies, with their capital running at smaller expense, crowded them out of business, first because they had a lot of unnecessary expenses, and second, because they didn't know they were putting their foot in it every once in a while by adopting something which was not practical, and in the third place, because there were other bigger men who were using their brain all the time while these men were back on the farm. So I want to give that word of caution, that there is so much money against you, that the management of that business ought to be outside of your own hands, or otherwise it is going to cost you for the expense of some man whom you don't know anything about.

With these few words, quickly spoken, and a little more hurriedly than I would like to, because of the lateness of the hour, I leave the subject with you.

Dr. Henry—Does the Government give any money toward the construction of these cold storage houses?

Mr. Creelman—Yes, it gives thirty per cent. of the original cost, and will give them three years in which to build them.

Dr. Henry—And let them build any kind of a building?

Mr. Creelman—No, the Government sends a man who must approve the plans, and they must build them under those conditions, but as large as they like.

Secretary Dye—Is there any provision whereby the farmers can take them off the Government's hands?

Mr. Creelman—They become the property of the farmers as soon as they build them.

Dr. Henry—How many cheese inspectors does the Government pay \$100 per month to?

Mr. Creelman—I would not like to go into print on that, whether it is seventy or eighty, but I believe it is between the two.

Mr. Braddock—I got the figures that you export forty million dollars of cheese.

Mr. Creelman—I should have said forty million cheese and butter.

Dr. Henry—Can the individual farmer send his apples out of Canada?

Mr. Creelman—No, sir; the Government has paid inspectors at the ports of Montreal, Halifax and Toronto, and no package is allowed to be shipped unless it is marked on the top of the barrel whether it is first, second or third grade, and the Government has a right to confiscate any of this fruit if they find it is below standard. There is a lot of kicking among the farmers and shippers. They say that it is a paternal form of government, but the majority of the people stand by the Government that passed that measure, and the rest of the people have to take the consequences.

On motion, it was directed to print the address in the Annual Report.

Some of the Station's Feedings of Interest to Farmers.

W. A. HENRY, DEAN COLLEGE OF AGRICULTURE AND DIRECTOR
AGRICULTURAL EXPERIMENT STATION, MADISON, WISCONSIN.

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GRINDING CORN FOR HOGS.

At the Wisconsin Station each winter for ten years past we have fattened one lot of hogs with shelled corn and middlings, while another equal lot received corn meal from the same corn, and middlings. In all, 280 hogs have been fed in this way. The result shows that we save six per cent. of the feed by grinding. A little calculation will show that it usually does not pay to grind corn for fattening swine. The corn used was year-old yellow dent. Flint corn, which is often grown in the East, is harder than dent corn, but usually the farmers do not keep it long before feeding, and the grains are not particularly hard.

It should be understood that such hard small grains, as wheat, rye and barley, should always be ground before being fed to hogs. Sheep will eat these grains whole, but the hog does not masticate them satisfactorily.

COOKING FEED FOR STOCK.

In the days of Horace Greeley and long before, there was much said concerning the advantages of cooking feed for stock. Arthur Young prepared a book on the subject, telling of the wonderful savings that came from cooking. Professor Mapes, in the Transactions of the American Institute in 1854, wrote: "Raw food is not in a condition to be approximated to the tissues of animal life.

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The experiment, often tried, has proved that 18 or 19 pounds of cooked corn, equal 50 pounds of raw corn for hog feeding." Professor Mapes tells us, in the above sentence, that it takes over two and one-half times as much raw corn as cooked corn to produce a given gain with hogs. This is very important, if true.

First as to coarse feed, such as straw, hay corn, etc. From 1850 on to about 1870, there were many establishments in this country where coarse feed was steamed or cooked for stock. It is significant that none of these establishments long maintained the practice. Cooking feed for swine has been thoroughly tested by many stations. Averaging the results, we find that with such grains as corn, corn meal, peas, barley, rye, middlings, there is an actual loss of 6 per cent. in feeding value by cooking the feed.

Experience has shown that potatoes must be cooked, if fed in quantity, to give satisfactory results.

VALUE OF SKIM MILK.

Nineteen trails with separator skim milk, fed in conjunction with corn meal at the Wisconsin Experiment Station, show that where not over three pounds of skim milk are fed, with each pound of corn meal, that 327 pounds of skim milk are equal in feeding value to 100 pounds of corn meal.

When feeding one pound of corn meal, with from three to five pounds of separator skim milk, 446 pounds of skim milk saved 100 pounds of corn meal. When feeding as much as from 7 to 9 pounds of skim milk, with each pound of corn meal, it required 552 pounds of skim milk to equal 100 pounds of corn meal. The average of all the experiments was that 475 pounds of skim milk, or say 500, in round numbers, is equal to 100 pounds of corn meal. Still further simplified, we may remember that 5 pounds of skim milk is as good as a pound of corn meal for feeding pigs.

Ford's methods in Denmark showed that 6 pounds of skim milk were equal to one pound of grain.

If the farmer will not feed any over 3 pounds of skim milk for every pound of corn meal, then, when corn is worth 50 cents a bushel, 100 pounds of skim milk is worth 28 cents. Where corn

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is worth a cent a pound, 100 pounds of skim milk is worth 31 cents. If more milk is fed in proportion to grain, its value decreases after giving as much as three of milk to one of meal.

SWEET VERSUS SOUR MILK.

The Vermont Experiment Station found that sour skim milk was as valuable in pig feeding as sweet skim milk.

BUTTER MILK VERSUS SKIM MILK.

The Massachusetts Station found that butter milk was equal in feeding value to skim milk.

POTATOES FOR SWINE.

At the Wisconsin Experiment Station the writer found that 441 pounds of potatoes, when cooked, were equal to 100 pounds of corn meal.

RAPE FORAGE.

English farmers have for generations made extensive use of Dwarf Essex Forage Rape, as a stock food. This plant may be described as a rutabaga run to head. The seed is sown broadcast from April to July, or sown in drills, like rutabaga turnips and cultivated, without thinning. The large, numerous, succulent leaves, are greatly appreciated, by sheep most of all, then by swine and cattle. Rape is fed off by turning stock directly into the field so that there is no expense for harvesting. As indicated above, it may be sown any time from early spring until mid-summer, and furnishes food from about eight weeks after sowing, until it is consumed. At the Wisconsin Station we found that an acre of rape when grazed off by pigs, gave returns which indicated a food value equal to 2,600 pounds of grain. Jersey farmers, keeping swine, are urged to experiment with rape. Be sure to

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call for Dwarf Essex Forage rape. Do not accept Bird Seed rape. The seed is inexpensive and the crop one of the easiest to raise. Sow two or three pounds in drills, of four or five pounds broad-cast, on good, rich soil. Seed any time from early spring until July.

CONDIMENTAL STOCK AND POULTRY FOODS.

The farmers of the United States are wasting more money on condimental stock and poultry foods than the entire cost of their agricultural colleges. Pick up any agricultural paper and read the advertisements. Often they cover a whole page, costing a hundred or more dollars for a single issue in some instances. These advertisements make the most extravagant claims for condimental stock foods, condition powders, etc. Who pays for all this? The farmer. Can he afford it? No.

Bulletin 106 of the Massachusetts Agricultural College, Amherst, and Bulletin 184 of your own Experiment Station, New Brunswick, can be had for an inquiry written on a postal card. If you are itching to spend some of your hard earned money on some of these foods, waste a cent on a postal card, use a little ink and time and when these bulletins come read them over carefully. You will find that the best of these condimental stock foods, which cost from six to twenty-five cents a pound, are made up, for the most part, of such materials as corn meal, linseed meal, wheat bran, etc. You will find that there is usually present in addition a little charcoal, pepper, salt, saltpeter, sulphur, fenugreek, annis, etc. Often the medicinal part of the compound is added without any reference to the contrary or opposite effect of the several drugs placed therein.

The American public love to be humbugged. Witness the tens of millions of dollars paid out annually for patent medicines, a large part of which sum goes to pay for the advertisements in the magazines and newspapers. Shrewd persons, seeing how dearly the people love to be humbugged, and knowing that the farmer is no exception, have turned their effort over to providing nostrums for the stock of the farmer.

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You cannot get an agricultural paper to say one word about these patent stock foods, condimental foods, etc. They are all as mum as an oyster. Why? Do you have to think long to know? Here is where your experiment station comes in and gives you valuable help. Read the bulletins and you will let these high priced things alone.

But, you say, you would like to have some sort of a condimental food for your stock. Very well, here is one which is as good as any and better than most of them. You can buy all of the materials yourself and save at least three-fourths of the cost of the compound by doing so. Your money will all go for the materials and get, instead of being divided between the shrewd advertiser of these nostrums and the publisher of the agricultural paper, who must live, of course, by some means.

CONDIMENTAL POWDER FOR FARM ANIMALS.

100 lbs. linseed meal,	\$1.75
10 " Epsom salts, .....	.50
5 " saltpeter, .....	.50
5 " salt, .....	.05
5 " powdered charcoal, .....	.75
2 " Fenugreek, .....	.40
2 " allspice, .....	.40
4 " gentian, .....	.80
<hr/>	
133 " .03 $\frac{7}{8}$ a lb.,	\$5.15

Never forget, farmer, that a poor stockman will never have fine stock, no matter what quality of these condition powders he may buy and feed. A good stockman will have good stock without the use of condition powders.

THE IMPORTANCE OF CROP ROTATION.

At the Illinois Experiment Station they have been conducting an experiment, which has now extended over a period of twenty-

nine years, in determining the value of rotation of crops, in comparison with continuous cropping.

Where corn has been grown continuously year after year on the same land, the yield has now fallen to 19 bushels per acre.

Where corn has been grown every other year, in rotation with oats, the yield is now 44 bushels per acre, or more than twice as much as where grown continuously.

Where corn has been grown in rotation with oats and clover, making a three year rotation, the yield is 59 bushels per acre, or more than three times as much as where grown continuously.

In all these cases no manure or fertilizer of any kind has been applied.

Could there be any stronger testimony bearing on the importance of crop rotation than this.

THE USE OF FLOATS OR GROUND PHOSPHATE ROCK IN PLACE OF ACID PHOSPHATE.

In South Carolina, Florida and Tennessee there are large beds of phosphate rock. This rock carries about the same amount of phosphorous as ground bone. When ground to a powder the material is known to the trade as "floats." Manufacturers treat the floats with about an equal rate of sulphuric acid, to make acid phosphoate. By this means a half a ton of rock and a half a ton of acid make a ton of so-called acid phosphate. In consequence of this treatment we get only one-half as much phosphorous in a ton as the original rock material contained. On the other hand if we apply the powdered rock to our fields we get very small returns, sometimes none, in the crops following the application.

For several years past at the Ohio Station they have been sprinkling the powdered rock phosphate or floats over stable manure and applying the mixture to the fields. The theory is that the liquids of the manure will, in some way act upon the ground phosphate rock and render some of the phosphorous available to plants. This important matter has also been taken up by the Illinois Experiment Station and is under test. To date the results are favorable to using ground phosphate rock in this manner

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under certain conditions. It is thought that the floats may be rendered available by scattering over a clover field and plowing the clover under. The decaying matter is supposed to effect the same result as the stable manure does. The advantages are that some of the phosphorus is made available by being put on the manure. Twice as much, or more than twice as much phosphorous can be purchased for a given sum in this form, for there is no expense for sulphuric acid, etc. A secondary advantage of relatively small importance is that the powdered rock, sprinkled in the stables behind the animals, help soak up and save liquids which might otherwise be wasted. Many farmers use land plaster for this purpose. A ton of the ground phosphate rock, which closely resembles land plaster in appearance and physical effects, can be purchased for not much more than the cost of land plaster. Ground phosphate rock can be had from the New York & St. Louis Mining and Manufacturing Co., St. Louis, Missouri, whose mines are in Tennessee. Most of the phosphate rock is controlled by corporations that will not sell it at a reasonable price to users. This company is glad to do so, though it has hardly been able to keep up with its orders to the present time.

The ground phosphate rock of this company contains about $12\frac{1}{2}$ per cent. of actual phosphorous, which is about the same as is found in ground bone.

John N. Lippincott—I would like to know the firm's name that puts out the acid phosphate.

Dr. Henry—The New York and St. Louis Mining Company, St. Louis, Missouri.

Mr. Roberts—I would like to say that a year ago I bought a carload of that material. It was very satisfactory to me. This year I have bought another carload, and my son, a larger farmer than I am, bought, I think, four or five carloads for his own use. We are pretty well satisfied with it. You have to learn to use it. If you try it on your potatoes or your green crops you will be very likely to get very little result. It don't act as quick as the dissolved kind, but you put it on the land and the land gets it. A year ago I very unexpectedly met a gentleman I used to buy fer-

tilizers of years before. He said, "What are you doing, still farming?" I said, "yes, I don't know anything else, that is my business." "Do you use fertilizers?" "Yes." "Whom do you buy of?" "We commonly mix our own fertilizers." "What are you using now?" "Well, I have got to using the Tennessee rock a good deal, that analyzes as high as 70%." "Yes, better than that oftentimes, but," he said, "it is not soluble." "That is true, but we used to use marl very extensively, that was not soluble, but we got results, and this is more soluble than that was." I said, "My aim is to duplicate our own New Jersey marl at less expense and less labor." We had a pleasant talk, and he said, "I have a farm over in Pennsylvania and I am going to try that rock on my farm." I haven't heard the result, but I thought it was a great compliment to get his endorsement, because he knew more about fertilizing material than I did.

Dr. Henry—Mr. Roberts has just clinched and rounded out this subject, and I want to impress upon you not to buy that rock phosphate and think that you can get the immediate effect of the acid phosphate. Put it with some vegetable matter. Manure is the best, but you must have vegetable matter to go with it to make soluble, and don't try to get quick action.

Mr. Gillingham—How about throwing that on where the cow peas are growing?

Dr. Henry—And then turn them under, that will be all right. You might get your soil acid from turning under a large amount of vegetable matter. Dr. Voorhees can talk to you about that.

A Delegate—How would it act under a hen roost with chicken droppings?

Dr. Henry—I think that is all right.

Dr. Phillips—How would phosphate act in the orchard.

Dr. Henry—With crimson clover or cow peas?

Dr. Phillips—There is clover in the orchard now and I want to put on the phosphate rock and then plow it under.

Dr. Henry—Remember you must have some vegetable matter to go with it.

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Dr. Phillips—The only thought I had about that was we may put too much vegetable matter among the trees, they would grow too much.

Dr. Henry—I would try it cautiously.

Mr. C. H. Cook—Do I understand this will take up the free ammonia in the stable?

Dr. Henry—I don't think so.

Mr. C. H. Cook—would you not use plaster in conjunction with the use of phosphate rock in order to conserve the ammonia?

Dr. Henry—I would do away with the plaster.

Mr. C. H. Cook—How do you get the ammonia, the nitrogen?

Dr. Henry—Let Dr. Voorhees answer that. When you put the land plaster in the cow stable you get a chemical union?

Dr. Voorhees—Yes, provided you have moisture enough to cause a reaction. If you have that then there will be reaction in the matter of the ammonia and the carbonates and sulphates which will form the sulphate of ammonia which is soluble and the carbonate of lime.

Dr. Henry—In an ordinary stable where a man cleans it out every day is there much ammonia?

Dr. Voorhees—Not a great deal. It is more effective from the sanitary standpoint than from the saving or fixing of ammonia. That is, the losses are not very great, at the same time it would be well if we could hold it. In many instances they are using the super-phosphates. There you get the reaction, but the difficulty is, if you don't take care of the manure, the last condition of that manure is worse than the first. They will lose both.

A Delegate—What do you think of the use of floats in the stable?

Dr. Voorhees—I think it is very much better from a standpoint of security, and adds much more phosphate acid, but it will not absorb in the same sense. It is a physical absorbent, and not a chemical absorbent. One point in reference to this matter of the ground rock—we have had a great many inquiries lately in reference to forms of phosphates, and our advice has always been

to buy the raw material wherever the purpose is to build up, but not where the purpose is to get immediate returns. So we divide our farmers into different classes. Farmers who desire quick returns, and whose profits depend on the growth and sale of high class products cannot afford to wait. They must get it in the most available form to convert it quickly into something they can sell. If a man desires to use it to build up the land, then we recommend a cheaper form of phosphate. But when a man goes to raising musk melons, or early tomatoes, or early potatoes, he cannot depend on any insoluble form. To fortify his soil he can use the cheaper supplies. We conducted experiments along that line way back in 1887 and 1888 with the various forms of phosphates; for example, those which are insoluble in water, those which are soluble in citrate of ammonia at 65 per cent., and the results showed that on land not rich in vegetable matter and used for grain crops, the insoluble phosphates were practically of no immediate value, and those soluble at 65 per cent. were but little better; but that the soluble forms caused a large increase in crops.

Mr. Case—As to wheat-growing, is a mixture of 600 raw bone, 600 raw rock, 600 acid phosphate and 200 muriate of potash sufficient for the immediate needs of the crop and also for soil improvement?

Dr. Voorhees—I think I would use a little more of the superphosphates than that. Suppose you add two or three hundred pounds of that mixture, you get very little soluble matter. I would increase the proportion of acid phosphate.

Mr. J. H. Denise—In regard to rock phosphate pulverized. I don't want to say anything against what has been said about it in localities where it has proved advantageous, but in our section I tried it quite thoroughly as long as twenty-five years ago, and received no benefit from it. I tried it with almost every crop. On the wheat we could not see any benefit in comparison to where there was none, and where we used the rock fertilizer we got a great deal better crop. The clover was just a trace better where the undissolved rock phosphate was used, and I attributed it to the fact that the wheat was not as good, and the clover had a chance to thrive. But I never saw any benefit from the appli-

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cation of that rock phosphate. I say this word because some of our farmers may indulge in it too freely.

Mr. Roberts—I want to add; in reference to the Tennessee rock. We have used it quite largely on grass land. My aim was to counterfeit the old marl. On pasture land we were using half a ton of Tennessee rock, and the result has been exceedingly satisfactory on the old home farm. There was a large pasture field, and it is astonishing the crop of pasturage that that field has yielded. We put it on on the same principle that we put on the marl. It has a great deal more potash and phosphoric acid, and the result has been a great deal better than I have ever seen from marl. But on another field on which the cattle run every day, the pasture has been rich and high all the time. That had Tennessee rock and kainit, about half a ton of each, and it had nothing else, and there is not a better pasture in this State.

Dr. Henry—Now remember, if you use this ground rock you must have organic matter with it, either stable manure or cow peas, or something like that. You must not expect immediate results such as you would get from it in another form.

Dr. Voorhees—I think also the Tennessee rock would be more desirable than the South Carolina rock. That is, the Tennessee rocks have been deposited in a different manner, and are not so hard and dense. It is easier to grind them fine, there is more lime in them, and the results are likely to be better. There was a point that was brought out very clearly by Mr. Roberts—he used a half a ton. Now, there is a great deal of difference between using a half a ton of ground rock and 200 pounds. So many farmers use a small quantity. One thousand pounds would be apt to give you results where 200 would not give you any results. Now, I have a question or two I wish to ask Professor Henry. You said yesterday that the Danish farmer was a poor farmer; does he use a poorer cow than we do here? Is his milk poorer? Why is that? Our skimmed milk is better.

Dr. Henry—The Danish farmer is not perfect, and in developing toward the good, he left the quality out of the cow. For some time he was an elegant butter-maker; he is now turning his attention to the improvement of his cow. His herds are im-

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proving rapidly. He is coming ahead in the quality of his butter. Then he went into the pork business, and then into the egg business, and now his cow is coming to her own.

Dr. Voorhees—You said in feeding skimmed milk and corn, three parts skimmed milk and one part of corn. Would a substitution in that ration of any other material containing the same amount of nutrients as skimmed milk answer the same purpose? That is, you get a better result in feeding skimmed milk with corn than corn alone?

Dr. Henry—Yes.

Dr. Voorhees—Then it is a question not only of giving the proper proportion of the soluble nutrient in the skimmed milk, but to add to it a nutrient which the milk does not contain?

Dr. Henry—Yes.

Dr. Voorhees—If you are not in a position to have skimmed milk to improve the ration of your hogs, could we add something which the skimmed milk had, some easily digestible nutrient in the form of wheat middlings?

A Delegate—At the present price of wheat, why not feed the whole wheat? Wheat is bringing 65 cents.

Dr. Henry—In 1892 and 1893 wheat was very cheap. That was the time our friend Mr. Bryan was telling us about it. At that time I got hundreds of letters from farmers asking whether they could feed wheat. I advocated it very strongly, and forty millions of bushels were fed to hogs. Now wheat is worth about ten per cent., from six to ten per cent. more than corn, if you will grind it and feed it alone.

Mr. Roberts—I would like to say the past summer I had a lot of hogs, weighing probably 350 pounds. I had a granary of old wheat, and the market was dull for it. I told my foreman I wanted him to put a bushel of wheat in the barrel and fill it with water, and in the morning give it to the hogs. They ran out in the fields like cattle. Of course there would be some waste, but the chickens go there, and they appreciated it. I don't think we ever fed grain with more satisfaction. The hogs came right up. They looked pretty well, and the price of hogs was high in the autumn, and I thought I had better sell them; probably I

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would get as much for them as I would in the spring. I had them killed. I was not present when they were killed, and my man telephoned up in the evening what they weighed. I said, "You did not weigh them right." I would not believe it. I took them down to the butcher's in the morning. They were weighed there, and the returns showed he weighed them all right. I was astonished at the increase in the hogs. It was a great deal more than I had any idea of, and it was a very good disposition of that wheat. I would have fed the whole granary, only somebody in the pigeon trade wanted the wheat, and he offered me 90 cents per bushel, and it went.

Mr. Rider—The hog seems to be receiving considerable attention in New Jersey, and I guess it deserves more. I have a little information that I gathered on a trip abroad a few years ago, and it might be valuable. I believe we think too much about quantity and not enough of the quality. That was probably one of the causes of the success of the Danes. They looked after the quality. I became acquainted with a man who had charge of the packing business of a large Liverpool concern, and they raised their pork in Illinois. I don't know how many hundred tons they sent over every year. They raised their own pork, and from him I received an invitation to visit their establishment in London, where there were acres of ground, with as fine pork as I ever saw. He gave me the reason why they came over here to raise their pork, and told me how they fed their pork to satisfy the English people. He said the ordinary American pork didn't satisfy the English people, but they raised them there according to their ideas, and the process was to raise them up to a certain stage, and then within a few weeks of killing they fed them on milk and oatmeal, and that gave a peculiar flavor and quality to the pork, which the English people wanted; they had a ready market for all they could supply, and they were increasing the quantity they were producing every year for the English market. I thought there might be some suggestion in that for our Jersey hog producers. Dr. Voorhees has told us what will take the place of skimmed milk, and the statement Mr. Roberts and others have verified. While oats may be too expensive, there are other things which will give the flavor to the pork and create that demand.

The Present-Day Requirements for the Production and Handling of Market Milk.

BY H. E. COOK, DENMARK, N. Y.

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The Present-Day Requirements for the Production and Handling of Market Milk.

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Mr. President, ladies and gentlemen—A word before we begin, in regard to stock foods. I have stopped talking about them. I don't want to criticise Professor Henry, because I have never heard that question put as nicely as he put it this morning. I was attending a Farmers' Institute in our celebrated Delaware county, famed for its Jersey cows and rich milk, etc., and bright farmers. I had been thinking very seriously about stock foods, and I talked very wisely, I thought, against them, and after the session was over, and we took a train, the agent of one of the companies came in and slapped me on the back, and said, "Cook, you're a good one; the more you talk the more I sell," and I believe he was right. We just help advertise the whole scheme, and, do you know, I have stopped talking about them.

Of course, a body like this understands it. In some country places, however, a man says enough to excite them a little, while the other fellow boards with them a month or so, and he has the best of it. So I have stopped talking about them. Feed them if you want them, you can't get rid of your money any quicker, I know that. Now to our subject.

I did not prepare a paper, because, while there is no use making any excuses to Mr. Dye, I have been pretty busy, and I didn't know just how much time I would have; and, in fact, I do not like to read a paper. I promised the Secretary, if he wanted it for the report, I would write it out on a page or so. I don't want the stenographic notes. I once had some notes sent to me from

the State of Connecticut, and I went down to a notary public and made an oath that I never said it. (Laughter.)

I think we are getting acquainted. I don't want to talk to you. I want to talk with you—it is a great deal different. People as a rule don't like to be talked to. They don't like to be lectured to, and don't like the lecturer. So on this milk business this morning, I want to talk *with* you about that. I was glad indeed to hear Professor Henry make a remark this morning on the way to the assembly hall, that the character of all this work was changing in some places, and we must make greater changes in others; that we must get down more nearly to the school system of doing work. In other words, if you want to talk dairy and the conformation of the cow, the feeding of the cow and stable management, let's hold the meetings in cow stables, and not in capital buildings. That is what I mean. I don't know whether you understand that or not. (Laughter and applause.)

Our good friend Creelman is here. They are doing some of that work in Canada. We are trying to do some of it in New York, but we ought to do more. Less of the abstract and more of the concrete. That is what we want, and to do things you must go where it is being done. That is the trouble with these meetings. Too much formality. They are too nice; and then we go back into the stable, and it is not so nice.

Now, about this milk business. As a rule both the people in the country and the people in the city fail to appreciate the value of milk as a food. I believe there is an underlying difficulty to-day. We don't realize that milk at 6 cents per quart furnishes food for the human body at about the same price as bread at 6 cents per pound and potatoes at 90 cents per bushel, even cheaper than potatoes at 90 cents per bushel. We don't appreciate those things, and we feel that milk is rather to be tolerated because the housewife finds it in the recipe, and that is why she uses it. But she realizes that it has a value as a food comparable to the other foods. It is not fair to compare it as a food with wheat and corn, because milk is a perishable product, and it costs more to handle a perishable product than a non-perishable one. It should be compared to meat, and when you do that you find that milk at 6 cents per quart, and beefsteak at 20 cents per pound, that

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milk is about 20 per cent cheaper than beefsteak—saying nothing about the loss of energy in chewing a lot of the stuff we get? (Laughter.)

I think that is the fundamental reason, and I am glad that in the city of New York there is an effort being carried out to discuss questions of this kind with the consumers of milk. He is the fellow we want to get after. The Board of Health is now sending an inspector into every field furnishing milk to the city of New York. The inspector is all right, and I have talked with the State Department in our State about undertaking a system of inspection of the State, but we never will be able, I believe, to live up to it either in New York or New Jersey—and you are interested in the New York milk business almost as much as we are—we never will be able to live up to the ideals of the Board of Health until the fellow that consumes the milk is willing to pay for those things. (Applause.)

There are some things we ought to do. When you go into an old stable, with the cobwebs which have not been swept down in two weeks, and you find side walls nasty, and the whole thing dirty and foul-smelling, I don't think there is any question that the price of milk should be considered in such a case. General health laws should oblige the cleaning up of such premises.

It is a question of health for the human family, and if that man cannot produce milk for prevailing prices he ought to go out of the business. We want to eliminate him, and he is a tremendous load too, that class of dairymen, we want them to do better. He is a tremendous load to carry because he is actually producing milk so-called, while it is a sort of an emulsion from that kind of a stable, and he is producing that cheaper. But that man does not regard the cost of production. He usually puts his whole family, himself included, into the production of the milk, without any regard to the value of their labor, and that man is a most dangerous competitor and ought to be eliminated.

Right in connection with this has come the production of "certified milk." I don't know whether I had better spend much time on this question or not. I don't believe the producers of certified milk are getting any more for their product than they ought. I built a building with the intention of producing "certified milk"—

not sanitary milk, but "certified milk—but have not commenced the business because I do not think the price corresponds to the requirements, it has a legal status in our State that makes it possible for the Board of Health of any city to outline certain rules and regulations governing the production, and that milk shall not contain over 30,000 coli per cubic centimeter, and if they live up to that condition and the milk does not exceed 30,000 it is certified milk. I don't know whether you have such a law.

In the State of Ohio, or in the city of Cleveland, rather, they have reduced the bacteriological contents for certified milk down to 10,000, and our own Mr. Stewart is producing sterile milk or nearly so. It shows the possibility, but I question whether the price of that milk paid to the producer is netting any more money than the production of the milk at market prices, on account of the extreme care required in the management of the dairy and the handling of the milk from beginning to end.

Now in regard to the Board of Health work. I don't want to criticise the Board of Health of the city of New York or any other city because I know their purpose is right. I had the pleasure a year ago of spending a day with Dr. Parks and Dr. Freeman, respectively Chairman and Secretary of the Board of New York, and I found out these men were fair. Their purpose was right and they were candid and were disposed to do only the right thing. But here is the tremendous weakness as I see it, and I have been studying it over our State; the men who are doing this are city men. The men who come to our cow stables are city men. In one case a fellow went to Mr. Stewart's stable at Newburg not knowing what the gutter was in the cow stable, and he spent a day studying the barn—as fine a barn as there is in the United States, and the milk goes out every day and is sold in New York at 20 cents, and that fellow was equipped after spending one day in that stable to inspect stables in New York. They go into these sections very quietly and later, without knowing what their recommendations are, we get the report from the Board of Health of the State saying we must do this and that and many of them we ought to do. At the same time when he was there the farmer didn't know anything about the recommendation; he didn't say a word to him, and when he got this report he found some

things that he ought to do and some things that he could not, and it made him warm under the collar. We want these inspections all over the dairy section by men that are in sympathy with our work who have the farmer's point of view.

Now the can question. You know it is market milk we are talking about, milk shipped in cans. What is the real condition? Well, the expense attending upon furnishing cans is a big one. I know one concern in New York, not one of the largest in handling milk, whose can investment is over a hundred thousand dollars, and a year ago they had 53,000 cans in use. The expense is a big one and the depreciation is such that they use these cans just as long as they can solder them and hold them together.

Now, how are they treated? Have you ever seen a can when it came back? Is it not pretty hard work to take one of those old cans and hand it out to the farmer to take back to put his milk in and then tell him he must be very careful about handling his milk? The only reason it is clean at all is because the fellow has washed it or tried to wash it with water so strong with sal soda that it is too strong to put his hands in. That is the only reason it is usable. I am not offering any relief, but that is the situation.

The modern can washer is a very good one. I have seen many a man wash a can and I don't think he spent three seconds in washing it. Then he put it over the steam jet not over five seconds. That won't kill many germs. The only salvation is that milk goes into ice water and it is kept at a temperature below fifty until the consumer gets it. The can question is a hard one, but we must deal with it.

Now a point or two in regard to the methods at home and some of the things we ought to do. Every man ought to have his cows clipped, every cow that produces milk should be clipped around the flanks and thighs and the belly and the udder. No matter how clean the man is unless the cow's udder is washed it will not be possible to milk her without getting a great deal of foreign matter into the milk. I don't think it ought to be necessary for the Board of Health or for any inspecting body to say that the cow should be clipped. Every man should do that. She will be so much cleaner and nicer. It takes but little time. You can buy a clipper for nine dollars and two men will clip a cow in twenty

minutes. The general cleanliness of the cow ought to be provided for. And before you begin milking wipe the udder over. Professor Voorhees give us some data on the wiping of the udder, and so it may be a common practice down here. If I am telling you about things that you people have already done hold up your hands and I will stop.

Now the care of milk at the farm. We have had a whole lot of misunderstanding and talk about care of milk that has been misleading. I don't want to get into water that is too hot this morning, because discretion is always the better part of valor, and I am sure it is when a fellow talks to a body of intelligent farmers. I believe the thing to do with milk is to get it from the inside of the cow's udder into a clean receptacle as quickly as you can and give it as little air contact as possible. Can you stand for that, or is that pretty rank?

A Delegate—What are you going to do with the Star cooler?

Mr. Cook—The Star cooler people have done good service for the dairymen. They have done much in this country in the manufacture of material for the handling of milk, and great credit is due them. You can put the Star cooler into a clean room and run the milk over it and you won't harm the milk and it is effectual, but just get my point of view for a moment. We will take the Star cooler or any of the tin coolers that are about two feet in diameter and two feet high and let's see how many square feet we have—between ten and twelve square feet of area on the average cooler. Now we will turn a pail of milk on that cooler out in the atmosphere that has not been sterilized, and what have you? Why your milk will be alive with germs. But some men say there is animal odor in the milk that must come out. We have found out what that odor is, it is diluted cow manure.

A story is told of a distinguished lecturer who was talking to his class on milk, and he gave them milk direct from the udder taken in a sterilized vessel, and they said, "There is something the matter with it, it don't have the milk taste." And the next day—I don't know but what it happened in Wisconsin—he put in a little of the material from the stable and they said, "Yes, that is all right." (Laughter.)

I took occasion to answer a question in the "Rural New Yorker" a year ago, and I said that men were coming more and more to understand that animal odors in milk were nothing more or less than cow manure, and the editor of a paper in Maine took the matter up and the way he did flay me; I wish I had it here, I think you would like to listen to it. He said, "What bosh! and yet," he said, "that man is abroad in the land as an institute worker." I did have the privilege after that of writing this thought for a bulletin in Maine and got the Board of Agriculture of Maine to indorse it.

Now is it not most unreasonable that the more we expose milk in the air the better it will be? Yet I have been so far in our factories as to advise and buy areators for the care of milk. There was some good for it over no cooling at all because many of our people did cool their milk in this way and we got better milk. We were using large cans, and if there was one germ at night there would be millions of them in the morning, and when we reduced the temperature by air contact the milk kept better, but it is a great deal better to put milk into a receptacle and then put that receptacle into ice water—stirring if necessary in order to cool quickly.

A Delegate—Why ice water, would not cold water do it?

Mr. Cook—Yes, if you have cold running water.

A Delegate—If you will serve it right out of the ice water it will go back on you a good bit quicker than if it is not so cold.

Mr. Cook—If you get milk at 50 or 52°, unless that milk may be going to the consumer in so short a time so that it won't change or sour, it is bound to change faster than milk at 40°, and if it is to be held any length of time, your 40 degrees will serve you better than your 50°; or, for the manufacture of butter it may be 60°. I think the creamery men in this State would be glad to get their milk at 60°, because they get a good deal of it now at a very much higher temperature.

A Delegate—Does not the character of the milk before it goes into that temperature have something to do with its keeping qualities?

Mr. Cook—Most certainly. Milk that had been contaminated would not keep as long as milk that had not been contaminated at

50°, but I don't think we want to get crazy and wild because our milk contains 30,000 or 40,000 or maybe a hundred thousand germs per cubic centimeter. We won't die, because the greater number of those germs are not harmful to the human family, but when we get them loaded down so that you can smell them then they are too thick and it is time to call a halt.

Now about this stable; let us go back again to the inspector—and here he is right. He takes it for granted that the character and condition of the stable will largely measure the quality of milk produced from that farm. A man can have a stable as clean as this room and in other ways ideal and still have dirty milk, but I think the facts are that the man who will go so far as to provide a clean nice place for his cows, light, well ventilated, cement floor, tight ceiling and all those things we know so well about—that man won't shovel dirt in his milk. We are not built that way. That man will look to it pretty carefully from first to last that those things are done which mean for good clean milk. So I believe the stable does largely measure the character of milk produced from a farm.

Don't understand that I mean an expensive stable; oh, this thing has been a most serious drawback in our milk business, at least it has been in New York. Our people have had held up to them fancy stables, the stables of the wealthy, the stable of the man that was getting his money from some other source than the production of milk, and the farmer said, "I can't build a stable like that, there is \$20,000 or maybe \$10,000 in that stable, and if it is necessary to build a stable like that I can't do it." He was glad to build one costing two or three thousand dollars. Now we know that we can have as good a stable and as clean a stable along hygienic and sanitary lines and costing but little money—just as nice as the man who had so much money and didn't know what to do with it. I want to submit this proposition to you; I don't ask you to agree with it unless you think it is right, I want to see what you think about it. I want Professor Henry and those other doctors to listen and I want their judgment.

We pretty generally agree for the production of milk there must be a definite and specific form of animal. We must have a dairy conformation. Now we won't all agree on the same cow. If

we were going out to buy a cow we would not all buy the same cow. At the same time in counter-distinction to the shorthorns and the beef type. We do agree. We have gone a little further, we have come to agree fairly well on the feed necessary for that form. You will find if you take a hundred successful dairymen in this State and their rations are analyzed that the nutritive ratio will not vary much. The men are interested in keeping the cows vigorous and strong to reproduce themselves, and you will find the rations ranging from one to five to one to six and one-half.

If that is true, if it is necessary to have a special form, and for that form a definite feed, why is it not as necessary, and why can't we tie to specific forms for their environment? I want to know if that is not good reasoning. I think it is, and if that is so we will stop this building of long stables and of short stables and of high stables and low stables and dark stables and all kind of stables, and we will have a form of stable that will fit our cows whether it is in New Jersey, or Wisconsin, or in New York.

We haven't done that in the past; every man has built his stable largely after his own fashion and his own judgment, and pretty near responsible for the whole thing has been the fact that we haven't had any system for ventilating that stable. Here is the secret, and we had to go to Wisconsin to get a system which we are to talk about this afternoon.

I think when we build our cow stables we want to tie pretty closely to 500 cubic feet air space to a cow. If it is thoroughly insulated she will warm a little more, but 500 cubic feet of air space will give all the working space necessary.

Let us put in plenty of windows and give her at least four or five square feet of window space per cow. That will give as much light as we have in this room. I wish I might show you a method of window construction if I could from here that I believe to be the best, and this will hinge on our work this afternoon a little. We will provide means of ventilation, but in latitudes like yours which are not as cold as further north, and where you need more air than you get through the ventilating methods, we want some means of furnishing that air. Now I don't know any better way than by adjusting the window as shown in fig. 1. If we raise the window and open the doors we create a draft, and

there is nothing that will raise the mischief with a milking cow like a current of air passing over her. There is a certain time when we need more air than will come in through the ventilators. I don't know any better way than to have the upper sash swinging and let the air that comes in come in over the top of the sash.

Now about the side wall construction. I think Professor Henry made this statement once in my presence that only about half of the stables that were inspected by the representative of the station at Madison that were using the King system of ventilation found it as successful as it ought to be.

Now I meet men every day who want to know what is the matter with the inside of their barn making it so wet. Why a man said to me yesterday, "My barn is tight and warm, it is double boarded and paper between and then I battened the cracks outside." Well, it was tight, but it was not insulated. No system of ventilation will keep that kind of a wall dry in cold weather. You can't do it, because the currents of air pass so slowly that they won't take off the water, the cow is throwing off about eight pounds of water per day from her lungs and skin, and if we have a cold surface moisture will form—this pitcher of water is wet on the outside, and it is wet because this room is full of moisture. Now if I had a cloth around that or put warm water in it it would be dry. The same principle is involved in the construction of a barn.

What shall we do? Take those two boards that this man used—and use paper if you want to, but I would not give much for tar paper or any other kind unless it is between two boards—and put one board on the outside and one on the inside and then fill the space with shavings. I have houses for cows and pigs and hens and horses and people and a creamery building, all built in that way with that kind of a wall. I don't know any building built so cheap, but some one will say that the rats and mice will be troublesome. There certainly will be some trouble with plank floors, but you can keep them out if you will put cement down at the sill, but with cement floors there will be no trouble. You have a cheap wall; it don't cost any more than the other because the expense of the batting and paper will pay for the cost of filling it with straw or shavings.

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A Delegate—What would be the difference in using charcoal instead of shavings?

Dr. Henry—It would be all right if a man could afford it. It is a good insulator. They use it in refrigerators.

Mr. Cook—I never thought of it. If you could get this same insulation in that way it is all right. A single air chamber is difficult to make tight, it will be effectual if it is a dead air chamber, but it won't be with the ordinary building material that you use. When the air currents begin to form it is no more a dead air space and that is why I advise this method.

I have not very much plastered wall myself, but I like it, just ceiled up with the cheapest kind of timber and then plastered and you have an ideal wall and inexpensive, and then furthermore I would have the whole inside of this building whitewashed.

Dr. Henry—With what?

Mr. Cook—With Portland cement or hard wall plaster. I would have a place as good for the cows to stay and to stay myself when I care for them as I could get, as long as I can get it without too great expense. Why not? Either use metal lath or board laths; metal lath is preferable because when it is on with concrete plaster over it it is really reinforced concrete. And in applying this concrete if you will just work it for about four or five hours, handling it and adding water and getting it well settled, you will find that you will quite largely do away with that difficulty of cracking which is always present in the use of concrete plaster. It is almost impossible to keep it from cracking, but by prolonging the handling of it, making it up in the morning and then using it before night, you would largely do away with that trouble.

One word concerning the floor. Concrete is cold. It is cold because it is a good conductor. Many men object to cows or any animal lying directly on concrete because it is so cold, and again there is some moisture that will come up. It is a small amount, but there is moisture coming up and unless there is some bedding on that floor it is objectionable. Now if you will use plenty of bedding there is no trouble, but here is a method of getting rid of the trouble when you lay the floor, and I don't think it is necessary to put it under the whole of the floor, but just where the cow lies

—put a foundation work of two or three inches, and then tar paper and then a coat of tar paint, then some more tar paper and another coat of paint and some more tar paper until you put down three thicknesses of tar paper. Now put your surface coat of cement up on that. You have stopped any moisture coming up from below and you have reduced the material to be warmed. It is a good thing to do to put it under the whole stable if you want to. When you put down the finishing coat put it on thick, you want about three to three and a half inches of this surface coat because you loose the union between the upper and lower coat of cement.

Dr. Henry—How wide an area under where the cow stands, how wide and how long?

Mr. Cook—That will depend upon the cow, four and one-half to five feet is the ordinary cow platform. If you get a Channel Island cow she will stand on four feet six inches.

Dr. Henry—How wide is this strip that the paper is under?

Mr. Cook—Under that width of the cow platform. It is not necessary to go under the manger. Personally, I haven't used tar paper under stable floors because when I put down the last concrete I didn't know about it. I know where it is in use. My experience with it is under granaries. It was troublesome, the grain being stored upon it for pretty nearly a year, about two or inches of it next to the floor would become damp and musty. I put down the paper and then about an inch and a half of cement and sand on top and the grain is as dry and perfect next to the floor as it is on top of the pile. So I know what it will do in this respect. I was talking with a concrete engineer only a few days ago. He came to the meeting and listened, and said, "I am glad you talked about the use of tar paper, we use it largely in erecting banks and those things in which we want to insure tightness.

A Delegate—Standard certified milk in New York, what is that?

Mr. Cook—The Milk Commission calls for 4%, but the fact is the dealers who were handling the milk can get 5% and they insist upon it and do get it. Now, Mr. Chairman, I feel that these people are getting weary and I will stop.

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Mr. Fort—I would like to know what they get for the general run of milk over Northwest New York?

Mr. Cook—They have been paying \$1.60 and \$1.70 and some places \$1.75 per hundred pounds this winter.

Mr. Fort—What do they get in May and June?

Mr. Cook—The low water mark last year, if I remember correctly, was 92 cents.

Mr. Fort—That is a lipuid quart?

Mr. Cook—No, that is a hundred pounds, that would be just a little under two cents a quart; 94 and a fraction would be two cents a quart.

A Delegate—What are they getting now?

Mr. Cook—From \$1.60 to \$1.75. We have a few creameries manufacturing rich milk that are returning their patrons as high as \$1.98 per 100 pounds.

Barn Ventilation.

BY H. E. COOK, DENMARK, N. Y.

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Animal housing is rapidly approaching a science, particularly as it concerns the dairy cow. Milk producers have quite generally come to agree that a definite and specific form is required for milk production. While we may not agree in every particular, we do, in contradistinction to the beef type, have a common conception. We are also gradually approaching a common understanding of the feed requirements for this milk-producing machine. Careful students substantially agree upon rations. That is, for the greatest efficiency the nutritive ratio must range from 1.5 to 1.65 in order to meet varying individuality. If, therefore, a given feed is necessary for a given form for a desired result, why, then, is it not good reasoning to insist upon an environment equally as specific and as clearly defined?

That condition of air—volume of air per unit of live weight—sunlight and general sanitation should be as thoroughly understood as the conformation and feed. When we have arrived at this complete common understanding, our dairy business will have such a firm foundation that we can go forward, whether in New Jersey, Wisconsin, or New York, upon a sane and profitable basis.

The subject of stable ventilation upon which we are to speak and the present understanding thereof makes possible this standard uniform environment.

We may safely compare animal housing to the protection given the human, accepting the fact, however, that it is more difficult and complicated. In the first instance, we have artificial heat

from wood or coal, and no animal excreta, and an exceeding small amount of live weight per unit of air space, a comparatively easy proposition. If the temperature goes down by reason of low outside temperatures we shovel more coal.

The proportion of foul matter and gas is comparatively insignificant when compared to the dairy stable. The same general principles, however, are involved of conserving the greatest possible amount of heat consistent with the least impurity in which health can be maintained.

It is not to be supposed that stable air can be maintained chemically pure. While carbon dioxide is not the only poisonous gas arising as a product of animal life, it is, however, a fairly safe guide in judging of air impurity. Outside air varies greatly in its percentage of CO_2 , as also would stable air; but it should not, for health, contain more than .56 per 1,000 volumes at the top, .50 in the centre, and .37 at the floor, as determined at the New York State Experiment Station.

Theoretically, for perfect ventilation, whether for stables or dwellings, loss of heat by induction should be nil. This is, however, a physical impossibility. More or less imperfect wall and ceiling construction, openings around windows and doors, and directly through them when put in singly, make specific rules impossible.

Some recent experiments have shown that in an ordinary, well-built school building, in moderately cold and quiet weather, the air was changed every ninety minutes through air-leakage, and in severe weather the change was much more rapid.

One can, therefore, understand that in the usual stable construction the problem of accurate determination is very much more uncertain. We might be permitted to say here, in parenthesis, that this air-leakage has been the only safeguard against loss of life, and it must not be entirely or even an attempt made to cut it off without flue construction.

Man rarely improves upon natural conditions, but the index of a civilization is found in man's ability to control natural laws so that the results may be uniform and constant. No civilized agricultural country has a famine in this day because of a know-

BARN VENTILATION.

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ledge of methods of soil fertilization, an understanding of soil physics, and control of soil moisture.

No one can improve upon a June day, when sunshine and moisture are well balanced, but when dry August comes our skill is in demand. No dairyman would undertake to improve upon a rich June vegetation and even, balmy temperatures, but the dairyman who depends upon natural feed and environment for the twelve months will find the sheriff in possession. It is, therefore, to stable construction and ventilation that we must turn if we would provide and maintain June conditions for the entire year.

MOISTURE.

It is a well-known fact that a moist, humid atmosphere, if sufficiently protracted, sooner or later brings disease.

Animals will withstand very low temperatures in a dry atmosphere. In fact one of the fundamental reasons for animal housing is to keep them dry. We must, then, guard against any form of construction which shall make for damp walls or a saturated atmosphere. It is, indeed, difficult to realize that eight pounds of water is daily thrown off from lungs and skins of a 1,000-pound cow, and proportionate amounts from other animals having a greater or less weight.

Two methods are employed to remove this moisture, one through open construction with constant passage of air into and out of the stable, constituting not more or less than a windbreak and subject to sudden temperature changes. The other a close house construction having in mind the same insulation necessary for a warm home.

There will be demanded even more complete protection in the stable because of the large amount of moisture present and the danger of condensation on the side walls through cold by induction. I am, therefore, practicing and advising the following methods: The use of capping or matched lumber as an outside covering and a smooth lumber ceiling upon the inside of girts or studs unless the inside is to be plastered then one may use the very cheapest rough lumber against which metal or common lath may be secured, using either some of the prepared hard wall morters

or a home made mixture of Portland cement and sand, one to two. Some trouble has been experienced with Portland mortar in the small checks found later in the wall. I am advised by concrete engineers that frequent working of this mortar over a period of several hours will remove this trouble. In a New Jersey climate I am of the opinion that this side wall construction will be sufficient to prevent condensation. In the more northern latitudes, however, we must either make for a double air space or to insure against times of extreme continued cold to fill this air space with cut straw or dry planer shavings. I prefer the shavings. In this way we have a most perfect insulation, one that will not wear out

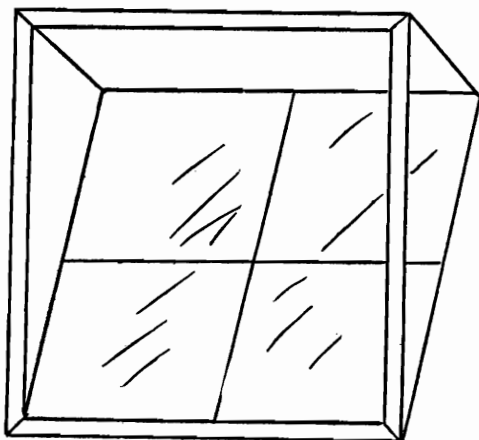


Fig. I. WINDOW.

or even get out of commission and inexpensive. The loss of heat through such a side wall will be very small. Double or storm windows must be provided for northern latitudes. Not less than four square feet of window space per cow should be provided and the upper sash, if a double sash window is used, and the whole sash if but one is constructed which shall open in from the top as shown in Fig. I. In the early fall and late winter months the open windows may serve as extra inlets for fresh air when outside and inside temperatures are nearly balanced and wind pressure is light. The ceiling above should also be perfectly tight. Personally I would ceil under the joists and timbers, obviating the constant an-

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noyance of cleaning between and around the joists and timbers and should have no fear of rats and mice, providing a cement floor is built. Every dust catching device must be removed and the walls be smooth and the floor perfectly water tight. Under these conditions the King system of ventilation will be, if properly constructed, most effective. None of that familiar odor found in stables will be present.

The system alone, without control of air currents by wall construction as above mentioned and a non-absorbing cement floor will be disappointing.

OUT-TAKE FLUES.

This system has been called the fire-place system and nothing can more properly describe it.

The flue must be free from openings large or small. If a chimney was loosely built danger would arise from fire, but with the heated air current passing there would still be a strong draft and all would go well. Through the ventilating flue, however, are passing air currents of a comparatively low temperature not above the temperature of the room to be ventilated, and what is of even greater hindrance is the burden of moisture in the form of vapor, together with the gases and organic matter from the breath, skin and excreta.

The builder must therefore understand that complete insulation against the cold outside air must be as perfect as the side wall of the stable. In mild temperatures galvanized iron is the most satisfactory; rivets and solder make for an air-tight flue. In localities where low temperatures even occasionally prevail, I should advise a double wall, above the stable, filled with dry shavings. It is not expensive when built of wood, and leaves no chance for condensation. The flue should always find its way to the highest point of the building, projecting not less than five feet above.

If the building is low and any other obstruction is near, thereby interfering with free wind pressure directly across the top of the flue, then the flue should be carried to a height above these obstructions. No contrivance is necessary at the outlet except

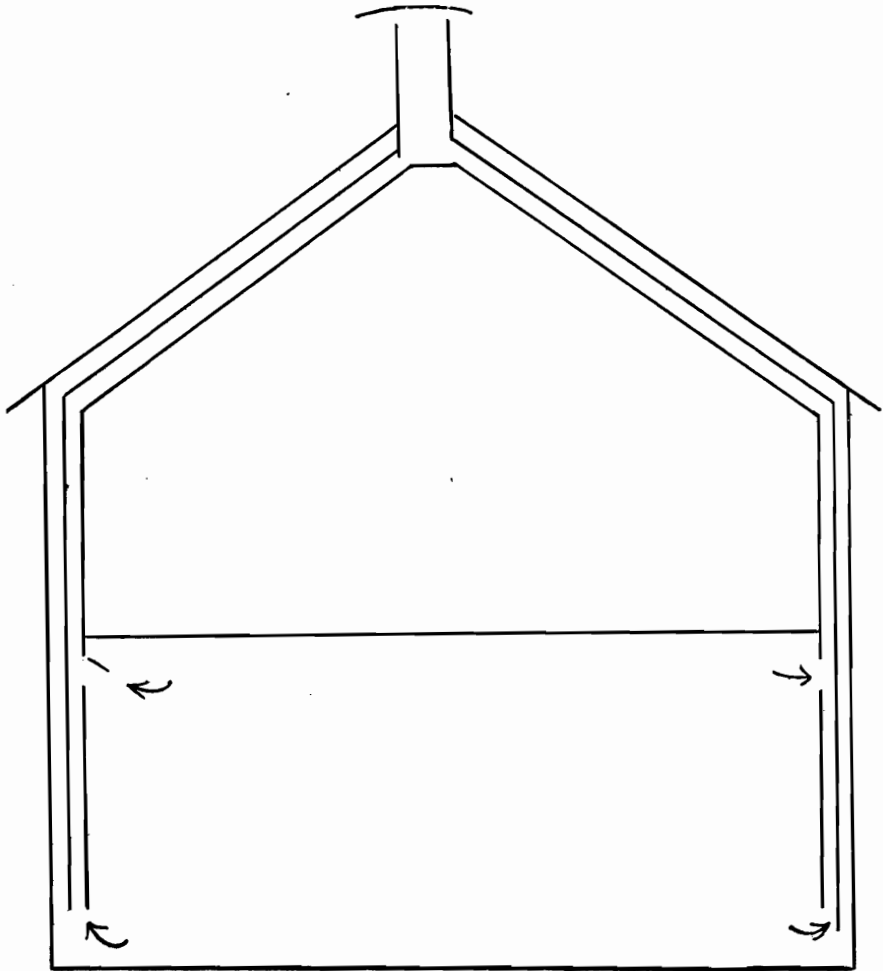


Fig. II. OUT-TAKE FLUES.

a cap, to prevent rain and snow entering the flue, set about one foot above the top.

It is not necessary to carry the flue inside the building, if the proper height is reached and insulation is perfect. Seldom will there be any excuse for outside construction. The flues should always be free from the side walls and roof.

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The area of these flues should be equal to a foot square to every five or six cows, and the location may vary in barns to suit their form of construction.

In new buildings which will be rectangular in form these flues should be located upon each side, passing up in pairs and making their exit through the roof as one. Openings in each flue equal to their area should be provided at the floor or near it, and near the ceiling of the stable. The lower opening for cold and the upper for warmer weather. (See Fig. II.) The operator will soon learn to adjust these openings to meet the changes outside, and so quite nearly equalize the temperature of the stable, and in extreme cold weather the lower openings may be partly shut off. The location of building and force of wind pressure will influence the inflow and outflow of air, which must be controlled, and for which no exact rules are possible.

The intake flues must be so distributed that air movement will take place uniformly throughout the building. Theoretically speaking, they should be evenly distributed upon the four sides of the room, and this may be generally practiced in new construction.

No so-called dead air can be allowed. Frequently a corner or retreating box stall is a source of annoyance, always dripping with moisture in cold weather.

Under no circumstances should out-take flues be placed in this corner. We must here set air in motion toward the out-take flue by introducing through proper intakes dry air from outside. When these currents are formed, the side walls if properly insulated will dry off and a normal atmosphere prevail.

These intake flues may have an area in thoroughly insulated stables equal to the out-take flues, but of course much smaller by reason of the greater number. They should be built only as shown in Fig. III., directly over the top of the flue.

Now the question of insulation. These flues must be insulated for all low temperature latitudes. You get good results from galvanized iron. I would have to build a system to get water that would condense. We have to insulate. Why? Against the cold outside air. Still, I find in southern Ohio they were getting good results from galvanized iron alone, but that

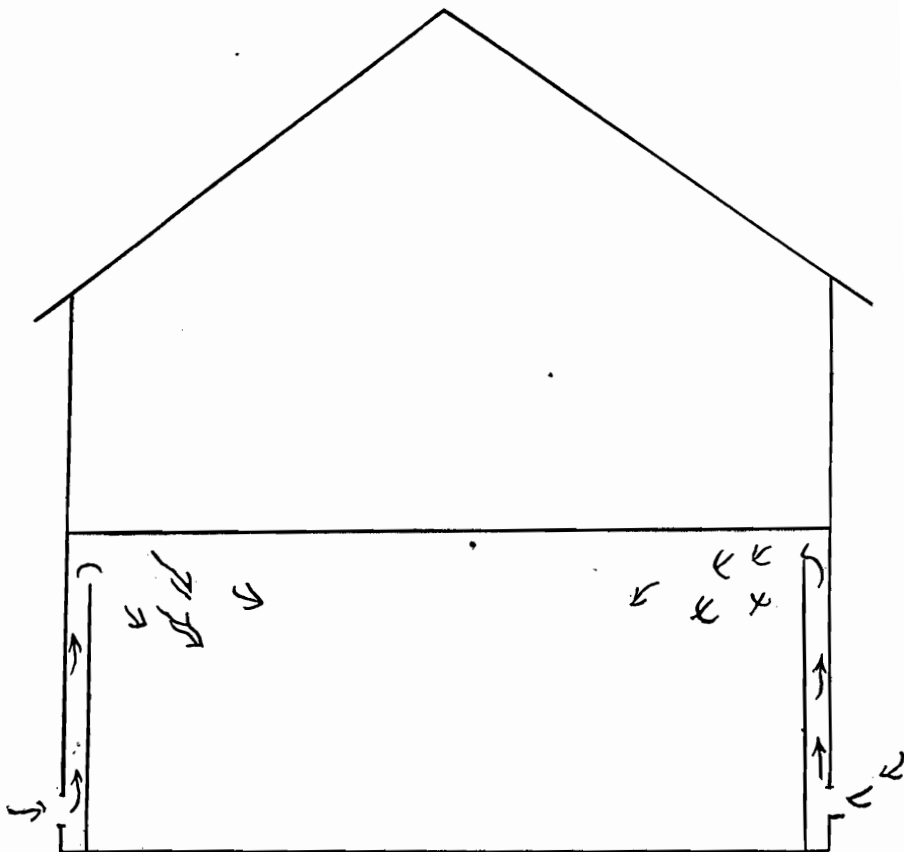


Fig. III. IN-TAKE FLUES.

current of air must be kept warm till it gets out of doors. That air must be kept warm. Don't fail to put something in the opening of the flue in the upper part so that it can be used in the warmer weather.

Mr. Gillingham—Suppose you had a barn 100 feet long, how many would you have?

Mr. Cook—Two on each side of the barn, and I would make them flat instead of square, give a foot square to every five or six cows; if it is two feet square, it would be big enough for 20 cows.

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Mr. Gillingham—Then for 70 cows how many?

Mr. Cook—That would be 14 feet square. You can reduce that. A square foot for six would be enough, as you increase the size of the flue you can somewhat diminish the amount of air for the cow, because there is a little less friction in the larger flues than in the small ones. A flue 3 by 4, divided into four parts.

Mr. Gillingham—You don't need any more ventilators, just make them larger.

Mr. Cook—Yes, but for 70 cows I think you would need for the best results about three of those openings on the sides. That has been most difficult to determine. That is just depending upon how far the flue would do the best work, how far we might be expected to draw this carbon dioxide and moisture and some ammonia. Some experiments have been made with the air; it has been boiled down, and it had so much organic matter that it was a jelly-like matter when they got through. Those things can hardly be worked out so as to give a definite rule, but in a stable 70 feet long it is perfectly safe one on each side, and if it was 30 feet longer, I would put in two.

A Delegate—If you run the flue under the roof would you not interfere with the hay fork?

Mr. Cook—In a new building it is an easy matter, because you can drop your hanger that much lower and get around it. In an old building it is not easily done, and I have advised this—I think I can show you here (illustrating). Just cut a little space out of the roof and let your flue run over your hay fork. Of course, if you can get around it by putting the flue around the end of the building or in some other place in the building, then it would not be necessary to run it out of the top of the barn, but where you have to do that I think that is the best way.

A Delegate—Do you put this ventilator in front of the hanger or by the gutter?

Mr. Cook—It don't make any difference.

A Delegate—How low from the floor would you put the ventilator?

Mr. Cook—Within a foot or two; sometimes the wall comes up three feet, and the owner says I don't want to come over that

wall because it interferes with my feed, then I would come to the wall.

A Delegate—The ventilation would be the same.

Mr. Cook—Whether it is near the wall or within three feet?

A Delegate—Yes.

Mr. Cook—Your circulation would be stronger if it was three feet above than if it was nearer the floor, but in extreme cold weather the nearer it is to the floor the more nearly we control the temperature, because we are bringing that warm air down to the floor before we let go of it. In warm weather you get heat enough.

A Delegate—What are the dimensions of the flue?

Mr. Cook—A foot square to five or six cows.

A Delegate—I understood you to say that flue had to be three or four feet.

Mr. Cook—No, I said you must have that amount of area, then divide that area up. This man wanted to know the area for 70 cows.

A Delegate—In a barn where steam heat is furnished is it advisable to place that in there to create a circulation?

Mr. Cook—Not if you've got sufficient length of pipe and the flues are properly built.

A Delegate—You say the temperature must be higher in the flue than what it should be in the barn?

Mr. Cook—No, I didn't say so. I said that the temperature of the air in the flue must be kept warm until it reached the outer air, to prevent condensation or moisture in the flue.

A Delegate—Would it not have a tendency to make the air cool in the ventilators by bringing it in that intake from the floor? The air naturally is cooler at the floor.

Mr. Cook—Yes; the air passing out of the floor will be at a lower temperature when taken from nearer the floor than nearer the ceiling, but when you take it from the floor you get the circulation in those cold days when the temperature gets down very low. It is in the warmer weather that the circulation bothers us.

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A Delegate—Do we understand that the ventilator is open at the bottom and the top, too?

Mr. Cook—Yes; and under control so that we can open and close it as well. Now, if you want to do the thing real nice, put one about the middle; then you have it about right, providing the building is thoroughly insulated.

A Delegate—Do I understand that you leave the opening open all the time?

Mr. Cook—You never want to close them, not all of them; if you close them all you shut off the air.

A Delegate—But are they to be left open, all in proportion?

Mr. Cook—No; you shut these upper ones entirely in the cold weather—shut them off entirely. You will be surprised how little an opening there will stop the circulation from the lower end. The draft is rather forced out of the upper part, while in the lower part we have to lift it, really.

A Delegate—Are these pine boards sufficient?

Mr. Cook—No; did you ever cut a hole in the stove pipe and find that your wife or somebody else complained about the draft in the stove—well, it interferes and it will interfere with this. In a single board flue you will have cracks that will interfere with the circulation. The flue ought to be and must be perfectly tight, and the flue insulated to prevent condensation.

A Delegate—You want your boards running up and down or crossways?

Mr. Cook—It don't make any difference, whichever way is the most convenient. I think you will see the force of that.

A Delegate—How did you say you make it tight?

Mr. Cook—Set up the 4-by-4 or 3-by-3, if you can get them; board inside and outside, and stuff the air space with straw or shavings. It is a simple proposition.

A Delegate—What about above the roof?

Mr. Cook—Above the roof we want usually a sightly thing, so I would make that of galvanized iron. Then make an air chamber, build it double, with the top of the space between the inner

and outer flues just covered, so that it will prevent the air passing between the inner and outer flues; then you won't be troubled with condensation.

A Delegate—Suppose your outlet is below the eaves, won't that interfere?

Mr. Cook—That will work sometimes, but when you want it to work most it won't work. When the wind is blowing from one side the flue on the other side may work, and vice versa, but you can't depend upon it. You would not put a stove pipe that way.

A Delegate—Do you cover the top?

Mr. Cook—Yes; put a cap on it, one foot above top.

Now, the intake, this is the important part of it. In each case we would build our intake flues in the corner. In this barn I am going across here and take in what fresh air I think is necessary for that barn. That is, I will make an opening in this side equal to this one. Now in this barn I am going to put it in this shape (illustrating on the blackboard). I am putting in eight intakes in that barn, two on each side. What will happen? There will be a volume of air coming in and going across to find its outlet, and if the animals are standing in that passage possibly there will be trouble, you would have such a volume of air passing over these animals that they would catch cold. In this part of the building what would happen? They would die of foul air. Now, we will go in here and put this in all around the building, and this is what will happen: In the one case we are taking air in, so that every atom of air is in motion from the beginning of winter to the end, and in the other case it is not in motion at all.

A Delegate—How large do you make your inlets?

Mr. Cook—They ought to be equal to the outlets—fully equal to that.

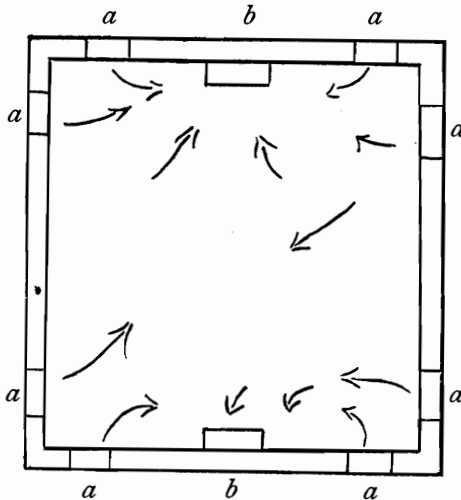
A Delegate—The total?

Mr. Cook—The total. Suppose we do it on the basis of two feet square. Let this represent two feet square. That is twenty-four times twenty-four—576 square inches—and we want eight of these intake flues. Now, eight goes into that seventy times—seventy-two. Now we get eight flues with seventy-two square inches of area, 6x12, 8x9, suiting the pleasure of the builder. I

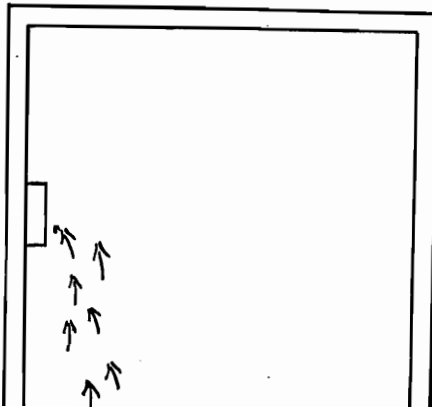
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find a very nice way in new buildings to have them make the flue the height of the stable, with an opening on one side near the bottom in the flue. Make it out of roofing tin, and an opening on the inside on the other end of the flue. Like this (illustrating); let that represent the side wall of the barn. Have your tinner make a flue that will fit right in there, the size you want, with an opening there, and a flange turning on it and operating there, and just fasten that to the edge of the ceiling or the coping or boards on the outside. That is the nicest way I know of making an intake flue. You can build those of anything you are a mind to. They will work better with a strong wind pressure against them, but they will always work.



CORRECT LOCATION OF FLUES.
a.a. In-takes. *b.b.* Out-takes.



Cloth Ventilation.

Since the foregoing address was delivered at the Annual Board Meeting in Trenton some interesting results have been obtained by the writer, as well as some very interesting observations from the experience of others concerning the use of cloth windows as a means of ventilation for dairy stables.

My own experience has been gained in northern New York, where temperatures are very low. Two small rooms, not previously used for stock purposes, were first selected. Young stock were housed there at the beginning of winter, and the rooms being very closely ceiled and not provided with any system of ventilation, they were soon damp.

The King system not being easily put in, we took out the windows and covered the space with .06 unbleached cotton cloth. The effect was very satisfactory, the air at once seemed quite pure, and the walls began to dry. This led me to partially equip the main stable in the same building. Although the King system was working, more stock was housed than intended when the flues were built, and so this addition was really needed not to prevent condensation, but to carry away the gases arising from exhalation and excreta.

The effect was noticeable, and, much to my surprise, the temperatures were not materially lowered.

One large stable, equipped completely with the King system, was used as a check. We did not in any way improve upon the King system in that stable, but the results were exceedingly satisfactory. The effect in stables without special ventilation has, according to my observation, been most marked, drying off the side walls in a few days and making for a new atmosphere.

Some results carried on by Dr. E. M. Santee, of the United States Department of Agriculture, at his farm near Cortland, New York, show the necessity of about two square feet of cloth window space per cow, in order to maintain a minimum humidity. My experience would warrant the use of some means of reducing the area during high winds and extreme low temperatures, and especially when these are combined. One may place the windows

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in the east and south sides and lessen the effect of wind pressure. In fact, I would say that at least one side of the barn should be solid, and thus, to some extent, prevent air currents forming.

Slide doors could easily be arranged to close or partly close the cloth windows when necessary, and so guard against sudden changes.

My advice to New Jersey dairymen is to try the cloth window. You will be, no doubt, like others, very much surprised at the results and find it difficult, indeed, to explain the workings of a scheme so simple and cheap.

No excuse can be offered on account of expense or lack of time, because one yard of .06 cloth is enough for a single opening, and a half hour will put it on.

If you have the King system installed, and all is satisfactory, let well enough alone, but, if you have no ventilation, try the cloth window.

Report of Commission on Tuberculosis in Animals.

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Report of Commission on Tuberculosis in Animals.

Although not the first State to introduce examination of dairy animals for tuberculosis, New Jersey was first to so inaugurate the work as to make it popular, progressive, permanent and effective. Located, as we are, so near the large cities, where much of our milk is sold, the fact that the State is making regular and constant examination of dairy animals for the purpose of preventing as well as eradicating bovine tuberculosis has, no doubt, had its influence in popularizing our milk product, and increasing the demand to such an extent that there is a shortage.

There is at the present time a general movement for pure, clean, healthful milk. City Boards of Health, in increasing numbers, are looking after their milk supply; extending their inspections to the dairies and the animals from which the milk comes, and unhealthy animals must be removed, and filthy, unsanitary stables and surroundings must be abolished, if the producer would continue in business.

In the light of these facts, it behooves all milk producers to keep in the front rank of progress and improvement. The health of dairy animals should be guarded, and diseased ones promptly removed. Stables should be so constructed or remodeled as to be dry, light and properly ventilated. For ventilation, the so-called King system seems to be the best in operation. The stables, the cows, the milkers, the milking and the utensils should be clean, and the surroundings such as to bear official inspection.

These statements may be like an oft-repeated story, but they must be reiterated and driven home until every producer of milk for other people to consume shall conform to such necessary essentials.

On the subject of bovine tuberculosis and its possible transmission to the human, much has and is being written—some of it worthy of serious consideration, some of it erratic and over

radical. Extreme radical ideas and measures governed largely in the early investigations in Massachusetts and New York. So much so, indeed, that the work of inspection has not become popular among the farmers of those States. This is unfortunate. A conservative inspection covering the entire State and carried forward year by year, would be a sure benefit to all concerned.

Few people will, knowingly, eat the meat of diseased animals, and milk from such a source is not relished by adults, even though to them, it might not be dangerous; and the State does well to institute and maintain a careful supervision of the dairy animals, of milk, and of all meat offered for sale. The consumer may depend upon the intelligence and honesty of the producer as a guarantee that the product he offers is right, but when this is lacking, the State is his only and his rightful protector.

The fact that inspection in New Jersey is conducted only where and when the individual cow owner requests it, makes the work of the Commission just that much less comprehensive. Mr. A. requests an examination. His herd is tested. Diseased animals, if any are found, are removed. His milk product goes to the market free from any suspicion of tuberculous taint. Mr. B. does not believe (?) in the tuberculin test. He does not make request to have his herd examined, although he may have, and probably has, several diseased animals. He sells his milk in the same market with A, and at the same price. And, unless the Board of Health of the town or city where he sells his milk makes an investigation, and prohibits its sale until conditions are improved, he will continue to market his product there in competition with A. This does not seem to be fair, neither to A nor to the consumer.

The State makes provision for examination of dairy cows, and even some compensation for condemned animals as an encouragement to milk producers to aid it in controlling this disease. The law has been in process of enforcement for several years. Knowledge of it and its provisions is quite general. While the number who have applied for examination has increased from year to year, many have not done so. This is a mistake if for no other reason than personal profit. That this disease is very insidious in its workings is the experience of all who have had to deal with it.

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It is an enemy working in the dark, and although, at first, there may be but one animal in a herd infected, it is liable to spread to others and even to all. The test applied will spot out and remove the initial animal, and save the herd. Regular annual or semi-annual testing is the only present means of checkmating this enemy.

Dr. Leonard Pearson, in a recent address, said: "The economic importance of tuberculosis of cattle is becoming greater each year. This is partly due to the greater prevalence of this disease in most States, and, therefore, to greater actual destruction from it, and is partly due to more complete recognition by breeders to the necessity for controlling it. There can be no profit or satisfaction in breeding and propagating tuberculosis. Yet this is what many breeders are doing."

In the appraisalment of cows condemned, the Commission endeavor to act clearly within the meaning of the law, not allowing the owner less or more than the law seems to permit. The appraisements generally have been satisfactory. Occasionally we find an applicant who thinks he should have what the animal was worth before it became diseased, but such cases are exceptional. We have a number of testimonials to the fairness of this work as it is done.

It is the opinion of very many New Jersey dairymen that our law should be so amended as to require all persons offering cattle at public sale within this State, to make application to the State long enough before such intended sale as to have the animals tested, and only such as pass the test approved for sale.

In the light of our present knowledge of tuberculosis, of the fact that it exists in the domestic animals used for human consumption and is liable to affect, not only the flesh, but also the milk of dairy cows, no one can reasonably question the course pursued by the State in its efforts to eradicate tubercular animals from herds within the State, and to prevent the introduction of new sources of contagion by the importation of infected animals.

The methods pursued and the means used are the only generally workable ones now in sight. But scientific men, both in Europe and in this country, are studying this scourge of tuberculosis, and, so far as bovine animals are concerned, it may soon be possible,

under proper conditions and with systematic care, to vaccinate young stock against contracting this disease from natural exposure to it.

The Commission is arranging to test this method, experimentally, for the purpose of determining its value and whether it can be introduced in general practice throughout the State in the near future. If that should be possible, it will be a great step forward. Meanwhile we must continue to work with the means at our command until something better is found.

The work done by the Commission up to this time has been of permanent benefit to those dairymen who have observed the care and watchfulness over their animals suggested. In neighborhoods where inspections have been general, cases of infection are of rare occurrence, proving the value of inspection by the State, with the co-operation of dairymen. In some cases, owing to peculiar conditions and the extent of infection, more than one examination has been made. But such cases are the exceptions and not the rule.

Where inspection has been of but temporary benefit is owing to the carelessness or indifference of the owner. New sources of infection are introduced by the purchase of suspicious animals, or stables and premises are not properly cleaned and disinfected. Our records show but a very small per cent. of herds to have been visited and inspected more than once.

During the year ending with October 31st, the Commission has inspected two hundred and ten dairies. Most of these were by request of the owner, a few by the State Board of Health. The number of animals examined is three thousand one hundred and seventy-six; the number condemned and destroyed four hundred and seventy-nine.

The table herewith gives the counties, number of animals examined, number condemned and sum paid. Neither the total number condemned, nor the number condemned in any county, should be taken as a basis by which to determine the per cent. of infection throughout the State.

It must be borne in mind that the herds visited are believed to be affected to some extent. There are thousands of animals hav-

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ing no suspicious symptoms. The general condition and health of our dairy stock is much better than it was a few years ago.

THE IMPORTATION LAW.

So far as in their power to do so, the Commission has examined, tested and inspected the dairy animals brought into New Jersey from surrounding States. The fact that some so-called testing is done by unreliable men in other States before the cattle are shipped into New Jersey makes the work of the Commission seem to some to be unreliable, especially if any of such animals soon thereafter show signs of tuberculosis.

The Commission has no control over outside veterinarians, except in that they can reject their work when both it and they are found to be unworthy of confidence. This they have done in some cases. There are a few dealers who seem to delight in sneaking cattle across the border whenever they can do so without detection. Some such have been held up in their nefarious work, and compelled to comply with the law.

A concensus of opinion as to the value of the inspection work done under the importation law is that the cattle now brought into the State are a great improvement over those brought in by cattle dealers prior to its enactment. The trend of the law is in the right direction, and its enforcement has materially improved the dairy herds of the State. The records of this office show there have been imported during the year ending October 31st, 1906, 9,160, of these 2,258 were brought in under permit and tested after their arrival, and 6,902 were tested before they were shipped.

FRANKLIN DYE,
Secretary.

The table herewith shows the counties visited, with other details, and also the report of the Treasurer, Mr. Charles Howell Cook:

STATE BOARD OF AGRICULTURE.

<i>County.</i>	<i>Total No. Examined.</i>	<i>Total No. Condemned.</i>	<i>Total Sum Paid.</i>
Atlantic,	6	3	\$75 00
Burlington,	391	62	1,391 25
Camden,	116	38	998 25
Cape May,	147	22	572 25
Cumberland,	48	9	192 00
Essex,	20	12	358 50
Gloucester,	79	12	209 25
Hunterdon,	124	39	900 00
Mercer,	189	29	506 25
Middlesex,	83	15	372 75
Monmouth,	119	24	652 50
Morris,	261	28	636 75
Salem,	228	28	499 50
Somerset,	406	43	1,034 25
Sussex,	600	54	1,185 75
Warren,	359	61	1,543 50
Total appropriation,			\$15,500 00
Total sum paid for cows,			\$11,127 75
Expenses of inspection,			1,204 40
Expenses of commission,			293 83
Secretary, assistant and stenographer,			2,549 28
Stationery and blanks,			80 99
Tuberculin,			218 75
Ear tags,			25 00
			<hr/> \$15,500 00

CHARLES HOWELL COOK,
Treasurer.

Contagious Diseases of Animals.

REPORTED BY THE STATE BOARD OF HEALTH.

To the State Board of Agriculture:

GENTLEMEN—Two outbreaks of anthrax occurred during the year ending October 31, 1906. On March 7 a report was received from Whitefield Gray, D. V. S., of Newton, stating that there were cases of a suspicious nature upon a farm located near Newton, Sussex county. Bacteriological examinations of specimens from these animals proved that they were suffering from anthrax. Seven of the animals which were affected with the disease died, and one animal recovered. As a preventative measure, twenty-five animals were injected with anthrax vaccine, and no further cases were reported. During May, June and July cases of anthrax occurred in Cumberland and Salem counties, and during this outbreak sixty-eight cases of the disease were reported. For the prevention of the spread of the disease nearly two thousand animals were vaccinated. The history of the repeated outbreaks of anthrax occurring in Cumberland and Salem counties indicates that the owners of animals in this section should each year, prior to turning the animals out upon the meadows, have protective inoculations applied to each animal. If this is not done it may be expected that from year to year recurring outbreaks of the disease will appear.

The number of cases of glanders which have been reported during the year is 147, as compared with sixty-nine reported during the previous year. The most serious outbreak which occurred was in Middlesex county. During the month of July, twenty-four animals having glanders were destroyed in Perth Amboy and vicinity. The investigation of the outbreak showed that the dis-

ease had been introduced by animals which were purchased in sale stables.

Six cases of rabies were reported to the State Board of Health during the year, and four cases of tuberculosis in cattle were referred by the Board to the State Tuberculosis Commission.

A list of the cases of glanders which occurred during the year, together with a summary of all cases of infectious diseases among animals with which the State Board of Health was called upon to deal, is on file in the office of the Board.

The total number of cases of glanders reported was 147. Of this number thirty-eight cases occurred in Newark, twenty-four in Perth Amboy, fourteen in South River, and ten in Jersey City.

SUMMARY.

Losses of animals from anthrax,	76
Vaccinations to prevent the spread of anthrax,	2,000
Animals destroyed on account of glanders,	147
Cases of rabies reported,	6
Cases of tuberculosis reported,	4

The Common Diseases of Farm Horses: How Can the Farmer Best Prevent Them and How Treat Them?

BY DR. C. D. SMEAD, PROPRIETOR OF PLEASANT VIEW STOCK FARM,
LOGAN, NEW YORK.

(241)

The Common Diseases of Farm Horses: How Can the Farmer Best Prevent Them and How Treat Them?

BY DR. C. D. SMEAD, PROPRIETOR OF PLEASANT VIEW STOCK FARM,
LOGAN, NEW YORK.

Mr. President, Ladies and Gentlemen—The programme says I must talk to you upon the common diseases of the farm horse, and I was especially interested in the address of Professor Henry on feeding. Feeding is a sort of hobby with me, and when he spoke of the feeding of stock foods, I was more than ever interested. I have hung up a picture of a sort of family or national horse. Yes, we will call him an international horse, from the fact that a great number of American farmers, and Canadian farmers, too, have an interest in him. They have helped buy him. They have paid three dollars for a twenty-five-pound pail of condiments worth thirty-one cents. I don't care to call it food. So Mr. Savage was enabled, by having about \$2.75 left on each pound, to buy this horse. He is the owner of the horse really, although the farmers of these great United States and Canada helped to pay for him. He took \$52,000 to pay for this animal out of the farmers, that was all.

So I say we have a common ownership in this the most phenomenal horse the world has ever produced. This is an exact picture of him, as near as the artist could make it on canvas. Less than three years ago that picture was taken to Mr. Savage, the present owner, and he said to the artist, "I can't suggest any change at all." I say phenomenal again. Why? Because he is the only horse that for the past six years has year after year kept increasing his record. He is really a horse of speed, and it is not

known yet how quickly Dan Patch can go a mile, and I desire to have you see the picture of that perfect machine. I desire you to notice the head, for it is the business end of that horse. With all his nervous energy, unless he had a head on him and a controllable disposition, he never would have gone in 1.55, and I don't know what the end is yet.

I am here to talk to you upon diseases, but I am also interested in the feeding, from the fact that as we study the diseases of animals, the horse especially, we find that about sixty per cent. of the diseases that exist to-day upon the farms of the whole country can be traced back to the improper feeding of the animal.

As we follow out general lines, we find that fully fifteen per cent. of the diseases is due to lack of knowledge upon the part of the breeder of the animal in the matter of proper mating. The horse is a creature, like all our other animals of man's development. Nature never developed the horse to his present form. We have produced all these breeds through environment and proper feeding and mating. Seventy-five per cent. of the diseases to-day that animals have, barring the influenza, might be prevented if the breeders and the feeders of the horse had properly studied breeding and feeding.

Take spasmodic colic. There are but very few colts that are well bred, of good constitution, bred from good parentage—there is practically not one to-day that would ever be subject to that disease if that horse had been properly reared from the day of his birth and properly fed.

We have to qualify that. Do you realize that milk is the most important food? Scientists tell us that milk is a perfect food. We know it is for the babe and for the colt. Dan Patch had to have milk in a very little while after he came into the world, or he would not be here to-day. He would not be the international stock food horse if he hadn't had milk.

Now, man, ignorant of the scientific composition of food, of protein, etc., knows that feeding certain foods to a cow will cause her to produce a certain class of milk. So we will say that a milk-producing food is a health-preserving food, and man cannot go very far outside of that limit without producing disease. If he takes to fattening foods, he will sooner or later have a diseased

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animal. If he gives starvation food, he will so debilitate the animal that disease will take place.

You are not breeding horses very much in New Jersey, but you will be breeding more, because the price of horses is destined to be such that you will be compelled to. You can raise horses cheaper in New Jersey, because your land is not as high as where some of the best horses are being raised west of the Mississippi. Right here, near Philadelphia, New York and Trenton, the land is capable of producing just as good horses as I find in some other States. Hence, I say you can raise horses cheaper in New Jersey than in Iowa.

Now let us start with the little colt. Milk was all that colt had for the first two or three weeks after it was born. We see it at about four months old, eating the same class of food that the mother is eating, food she was converting into milk, and he looks like a little horse. You have seen those cases. Horsemen will frequently buy a colt at about weaning time, and bargain with the farmer to keep him until he is two or three years old. He buys him then because among horsemen it is a known fact that as the horse looks at the age of four or five months that is how he will look when he is matured if he is properly fed. Hence the buyer always requires that you shall feed his colt as he directs you. What does he do? He directs you to feed him right along on what we call milk-producing food, something that may approximate that.

Now let us see where the colic comes in. It is a general habit of the animal-raisers over the United States to feed what they have the most of, and not what the animal needs, and if there is a surplus of corn and corn fodder, that has to be the food. If it is straw, why, then, it is straw, and at weaning time there is too much of this going on. The little colt, when he is about four months old, is a little horse. He has the action and the fire of a horse; the eyes are bright, the body trim, he is elastic in his movements; his hair is smooth; he is ready to run and kick up his heels, and he looks as well as he ever will.

Now, so many feed whatever they happen to have the most of, and the result is the same in every case. How does that little fellow look when he is about one year old, when he has gone through

the winter months? Does he look much like he did when he was weaned in August or September, as far as your own observation has been? No. Is it not a fact that about the first of the next April that he has, instead of that bright, sparkling eye, a lusterless eye, and instead of that nice arched neck, his neck is apt to be curved the other way, and a head on him like a beetle. Does he walk with an elastic step? No, it is more like knocking his knees together. I have heard men say, "I believe in giving a colt a good digestion. He has to have a certain amount of stomach distension," and he has it with a vengeance, and then I want his teeth cut nicely, so I throw in an ear or two of corn. Is there any sense in that? Those days are past. What would the mothers say, if the doctor was to say to them, "You must give your child a hard, dry crust of bread to chew upon?" Many a well-bred colt is spoiled, and we are seeing it right in the very horse-growing regions of the West, right in Ohio, where corn is raised, and where I have many inquiries coming to me, asking for remedies for colic. Corn is good, but it needs to be balanced with something else. To make corn and wheat middlings take the place of the milk is not the best we can do. The little colt, the first winter of his life, may have stomach distension, a weakening, and become five times out of six a dyspeptic. He grows up to be a horse, and you water him a little or change the feed and he has spasmodic colic.

Now you may ask me to give you a cure. People are always anxious to get a cure, but are quite reluctant about seeking a preventative. There is a preventative that we could give.

We have to take the horse as we find him, and have to treat him according to the condition that he is in when we get him. I find by experience that of the eastern-bred horses, and I might say the Canadian horse, too, there is about one in thirty that cannot eat corn or corn meal, because they have not been accustomed to it for one thing, and because it is not acceptable to their dyspeptic stomachs. When a man says—he has perhaps five horses, and we frequently run up against these propositions—he is in the habit of feeding quite largely with corn, I always suggest to him a change in the feed. I say, "It is your feeding." He says, "I have owned horses all my life, and that has been my habit, and why don't it make all the rest sick?" The time was in the State of New York

when they were raising more barley. There is about one horse in twenty-seven or twenty-eight that can't eat barley or rye, even in a mixture with oats, because it does not agree with them. Our horses are like ourselves. We can't all eat the same class of food. We realize that we are a mixed nationality. You can take the Italian. He eats a certain class of food right along. Take myself. I can't eat pumpkin pie, and five out of every six can eat it with a relish.

So we must reason that one of your animals is sick, made so by eating a certain thing, we must change the food. If you have a horse that has the colic, stop the food and make a change. If it is corn—you raise a good deal of it; Iowa don't beat you much—and if you have an animal, instead of going to the veterinary to give you a remedy, the important thing you should understand is the necessity of your making a change in your feeds. I cannot tell you what that change is. If you are reading what I write in the "Tribune Farmer," you will note that I insist every time upon knowing what these men are feeding. It is not the remedy that makes the success, it is the advice that I give that a man for the time being should give this horse so and so, and make a change. It is a disease that the owner of the horse must take into consideration and study out for himself, and eliminate some of the classes of food that he is feeding to the animal, then he won't have that colic.

Professor Henry was speaking of the condimental class of foods. I might say they are an imposition and they are not. They are really a fraud as far as the food in them is concerned; but I will say there is an importance and value in those foods. What is it?

Just the same value that there is in the food that we eat. If there hadn't been a particle of salt or pepper in those potatoes or in that chicken, it would not have been palatable. The horse needs something besides food. He needs a little seasoning, and as a matter of fact and practice you can prove it. Take your horse out to-day and tie him up to an apple tree, and he will gnaw the bark off. Why? Just for the same reason that you like a little tea or coffee and seasoning in your food. These men, taking advantage of that fact, put up into a package those ingredients as stock foods.

I am advising to furnish plenty of salt and charcoal to the animal. Salt is a necessary thing in the proper digestion of food for ourselves and for the animals in greater or lesser quantities, but some people are afraid they will drink too much water if they salt them. I have bottles full and jugs full of those preparations from these very feed men. A few days ago I got from your own State, I don't remember the point, but I had a package of six pounds put up in the finest way, splendid pictures, asking me to test it, and asking me if I knew of anyone with an animal, horse that was run down, to let them have it, and give them a teaspoonful in every feed. I made an examination, and what did I find? Nice fine crystals of salt and charcoal. What did it retail at? Ten cents a pound.

If I gave that to a man who is feeding his horse too much corn, he would ride off, and in a day or two would come back and say, "Well, sir, I have tested that, and it is a grand, good thing," and he would pay ten cents per pound for a little salt.

I don't want to run down any man's business, but when I hear a man advertise and say that he has a remedy in the line of an absorbent or something of that kind, that will cure ringbone and spasms and all things of that kind, why I can say that is a fraud. Why do they sell them? Simply because the man himself don't know what ringbone is, and if he did he would not spend his money for the medicine. It is an imposition upon the man. I don't want to call the man ignorant, but he is ignorant in this one thing. Many horses have inherent tendencies, lack of conformation, proper construction, and can not stand the class of work he is doing. I brought a picture of ringbone here, and I will show you the natural bone of a horse below the joint. (Illustrating with some bones.)

They are natural and all right, nothing the matter with them at all, but they are the same bones that are affected by the ringbone. It does not take a man with very much intelligence, when he sees that the effect of the ringbone is simply to unite those two bones, to know that it cannot be cured by medicine. There is the ringbone, and there is the bone in the state of nature. A man can see from his knowledge of the case that to cure it you would have to take off that enlargement. He can see that joint is not right, but

when he once sees that ringbone is practically a union of two of the bones, he would simply call a man a fool who would say that he had a medicine that would restore that. You know it is beyond the power of any drug or any operation to do that.

Here is another thing. We are living to-day right along the line of operations, and I would suggest an operation if I wanted to transfer ten dollars from some man's pocket into my own. What would I do? I would not need a great number of surgical instruments. I would want a large knife to make it look big. That joint is already destroyed. The blood vessels are on the back side, and the tendons are there; nothing near the front except some skin; and I would make an incision; then with my chisel and mallet I would chisel it off and hold it up for him to see, pocket the ten dollars and go home. I have got the ten dollars and he has the experiment, and the horse has got an ankylosis joint. (Laughter.)

There is much of that going on all over this whole land, and you know it. As to the stock foods, you are practically fooling away your money without getting what you think you are getting. If a horse manifests a desire to be gnawing on the apple tree, throw him in something that is a little bitter. They really get what the animals need when they are right out in the pasture field. They will pick it out of their hay and eat it when they need something a little bitter. They are not classed as remedies. They should not be. They are simply what we call seasonings for animals. There is no need for a farmer to pay 12, 25 or 50 cents per pound for a little salt and pepper of that kind.

Here is another disease that we call asthenia. How many men know what I mean? This disease is causing, directly and indirectly, more serious loss to the farmers than any other one disease, and yet it is a disease that is most readily prevented, and, I might say, a disease that can be under the farmer's control and most readily cured when he has a knowledge of the true nature of it.

It is a disease of over-feeding and idleness. It occurs always with an animal that is well fed, and after a period of idleness, as a rule. It might be called a Monday morning disease, because the animal has been idle over Sunday. After a man has begun his spring work, perhaps has a field ready to sow, and then there

comes a period of rain of three or four days, and the horse stands in the stable, and the man feeds it right along. Men will come to me and say: "Doctor, I hitched up my horse; he never felt better in his life; he felt so well he could hardly stand in his traces, and I started off, and hadn't gone more than a half a mile before he began to stumble, and a little further on the horse broke out in a sweat, and then I discovered my horse was sick." What was the cause of it? Simply when the animal was full fed, upon a full balanced, nitrogenous ration, his stomach was digesting this food, and it was being carried into the blood. All food nutriment goes into the blood, and when he was working every day there was a breaking down of tissues, and the food was building them up. A change like that is going on in our bodies and in the animal's body, but when he comes to the days of idleness the food or nutriment was carried into the blood, and there was not a breaking down of the tissues to make way for the building up, and the consequence was when this man hitched up his horse his blood was really what we might call in a slightly coagulated condition; it was overloaded to the point of clotting. When the exercise was given to him he started off as well as ever. When that heart had to pump that thickening blood through the smaller blood vessels there was a clogging, hence the horse began to lose control of his limbs, sometimes in the fore limbs, more likely in the hind limbs. There was a cramping that was going on in the muscles, and when he stumbled, he stumbled because he hadn't full control of his limbs.

There is no doctor ever cures anything with medicine until he has studied what nature is endeavoring to do, and lends a helping hand. Hence, we must study what is the nature of the disease. This is brought on by the heart's inability to pump the coagulated blood into the smaller blood vessels. Now, what did nature do? The horse began to sweat. He had been driven but a short distance, and this was a natural effort to relieve the cramping muscles, that was all, and he broke right out in a sweat. Now, what should common sense do under those circumstances? Here is where lack of knowledge results in very improper management. Men get excited under such circumstances, and as a rule they say, "Oh, dear, I am going to have a sick horse; what will I do? I

must get this horse home, or I must drive to Trenton, or somewhere else where I can get a doctor. Hence, he hurries him along, and at last down goes the horse on the road, and when he goes down it is a rare thing if he gets up again. The chances are five out of six that he will die in spite of all good treatment that any veterinary can give. Yet the farmer can control all that the moment he knows what it is. Exercise brought it on; sweating was nature's effort to throw off the disease. Now, what will common sense say under these circumstances? If nature says sweat, help nature sweat, and put a blanket on. The horse will be in a quiver. He will be breathing quickly, almost panting, because the muscles of the stomach are overworked. If the man will see that and stop and put on the blanket, and will stand about five, ten or fifteen minutes, when the horse begins to take longer breaths it will relieve the horse. If you are far from home, don't try to get home; let him walk slowly and get him to the nearest barn. He does not need a drug shop. If he needs anything he needs hot water. Get some hot water, and get an old piece of rag carpet; that is an ideal thing. It is always a yard wide, and thick, and it will hold a whole lot of moisture, but get a piece that will go the whole length of the spinal column, and, being a yard wide, it will come well down the side, and wring it out of the hot water so that it will not drip, and then lay it over him..

Then what will you do next?

Well, what do people do under those circumstances? I have seen and known of one horse being ridden to death by a boy to hurry it to the drug store or after the veterinary, hurrying after myself to go there, or to the drug store to get that great remedy that is so very common, spirits of nitre, the very worst thing that can be given. Men imagine that he has inflammation of the kidneys. They imagine that because of the discharge (it is high in color) the kidneys are overworked. This poisoned condition of the blood has to be relieved through the kidneys, and consequently it is highly colored, but that simply indicates a condition in the animal that the kidneys are trying to throw off. I say spirits of nitre should not be given. Why? I know there are men here who will say they have given spirits of nitre and it has done a lot of good.

I will explain that. Spirits of nitre is what we call diuretic. If the kidneys are overworked, to give spirits of nitre would be like trying to put kerosene in the heater under this building to put out the fire. Why did you give spirits of nitre, and why did it help? Well, the spirits of nitre in the average country store is no good, and it will have but very little effect. Well, would you not give him anything? Not necessarily. Perhaps in one case out of ten give him a mild physic.

Here is another mistake. As quick as the horse is better, you say, "I wonder if he will eat a mess of oats," thinking that as long as he will eat he won't die. I have known horses that were actually fed twelve quarts of oats inside of an hour.

Now, what shall we give him to eat? Don't give him a thing to eat for two hours' and I don't care if you don't in twenty-four. But give him all the water he wants. A horse fed and treated in that way will reduce the veterinary's bills; and the next day feed him about half rations. He will be sore in his muscles, but in two or three days he will be all right.

Now, how are you going to prevent the whole thing? When those idle days come, cut that grain ration right in two in the middle. It is not needed at all. Now, I have seen men shake their heads and say, "I don't know about that. I like to eat whether I work or not." If there is a doubting Thomas in the audience, I am going to use him as my witness. I am going to prove it right by personal experience. We are farmers here to-day, and work all through the week, and when Saturday night has come, and we say we have worked hard, and to-morrow we are going to rest, not even going to church—a thing we would all be the better for, and the horse would be a better horse if he went to church—but no, we are going to rest, and the Lord will forgive us if we don't go to church.

You never rested all day Sunday in your life, after you had spent a week working—never did, did you? Now, be honest; see if it has not been this way. You got up Sunday morning and did the chores. You read the newspapers or the Good Book. Then, when dinner time came, you ate the meal, and then you laid down to take a nap, but you didn't sleep, and you didn't take any interest in anything. You yawned and stretched and said, "What is the

matter? My limbs ache." By instinct alone you got up and went out to the barn and took a walk over the farm to get some exercise. What was it? Nothing more than that full meal and the effect it had upon the digestion and the blood. It has the same effect in the horse. He stands first on one foot and then on the other, and then leans up against the stall. If he is spirited, he kicks some little for exercise, and then you go to the barn and lick him. Being tied up there, he is unable to do what he would if he were loose.

I think I have talked long enough. At any rate, I have tried to say something on those two very common diseases, and if you get any good out of it, I shall be glad of it, thanking you for your attention.

Mr. Roberts—I would like to ask a question on the matter of spasmodic colic. A man that handles a great many horses attributes spasmodic colic in many cases to the teeth, that they are not as they should be. He is a man that deals in horses, raises them, and he says in many cases it is owing to the formation of the teeth, and he recommends dentistry by some blacksmith, to get the teeth so that they will grind together right. He says it is because the food is not properly masticated. Is there anything in that?

Dr. Smead—There is occasionally a case of that kind, and the teeth need attention the same as a child's teeth. There is in the aged horse a constant wearing of the outer edge of the lower teeth and of the inner edge of the upper teeth. There are sometimes sharp teeth which prevent mastication. As to the second part of the proposition, the man going to the blacksmith, who had really no knowledge of the structure of the teeth, nor what he was going to accomplish, would be like putting a hammer and a looking glass into a child's hands. He could do irreparable damage, if he did not understand his business. A horse's teeth never need a very large amount of care, but if you put them into the hands of an ignorant man he can do more harm in about three minutes' time than another man can repair. I will say just one more word—the traveling horse dentist, give him the go-by.

If you want the teeth examined take the horse to a competent man, a veterinary, that understands his business; not to a blacksmith, nor the traveling fellow that goes over the country and at-

tributes everything to the teeth, give him the go-by, the same as the fellow who was going to operate on the ringbone.

A Delegate—The heaves, can you tell what that is caused by?

Dr. Smead—It may have several causes, it may come from physical defects, it may come from a diseased heart, it may come from nervous troubles, it may come from over stomach distension by eating a large amount of innutritious food. Sometimes we have the heaves from emphysema of the lungs. That comes from the horse being driven at the top of its speed on a full stomach, and in order to get up the speed they will rupture the cells of the lungs. It is not really remediable, you can accomplish more in feeding, cutting the hay, and in those cases we would say give a partially cooked food, a partially pre-digested food. The tendency of many people is to feed cooked foods to the working animal. But if carried to excess, it weakens the organs, gives them nothing to do, and they grow weak, and I desire to emphasize what the Professor said in relation to the raw foods. As a matter of fact, when we come to the cooked foods the pre-digested foods, many of the bi-products that have been cooked, we are feeding them frequently at the expense of weakening the digestion of our animals. It is all right for fattening animals.

A Delegate—What is the usual cause of spinal meningitis?

Dr. Smead—The usual cause is change in climate, and yet bacteriologists claim that it is something of a bacteriological disease, but it has not been fully demonstrated. It is usually caused by exposure to cold. It becomes spinal meningitis in this case of asthenia because the muscular force comes from the nerve force at the base of the brain of the spinal column, and when the animal falls, he goes down with congestion of the spine.

A Delegate—Is there always fever with spinal meningitis?

Dr. Smead—Usually supposed to be, it may be localized, that is, a small section of the spinal nerve may be diseased without any general fever, but in this case it is usually manifested by more or less paralysis.

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A Delegate—It is a germ disease?

Dr. Smead—Not wholly, I am not ready to say that spinal meningitis is a germ disease, although we know that there is a certain condition of ensilage which can be fed to horses and produce a condition very similar to spinal meningitis, that is carried by a germ, it is a ptomaine poison.

A Delegate—Is not the disease more prevalent in damp countries?

Dr. Smead—Yes, a change of temperature will do it. It will prevail as a zymotic disease.

Mr. Case—Is there any danger in giving water at too low a temperature?

Dr. Smead—It might be possible if the water should be too cold, and the animal was very thirsty, it might do some damage, but if I was giving him water, I would give him practically good drinking water. I do not say hot water.

Soil Investigations, with Particular Reference to the Soils of New Jersey.

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Soil Investigations, with Particular Reference to the Soils of New Jersey.

Thomas Rudyard, Deputy Governor of East Jersey, wrote from Elizabeth (or Elizabeth-Town, as it was then called), in May, 1683: "There's extraordinary land, fresh meadows, overflowed in the winter time, that produces multitudes of winter corn; and it's believed will endure twenty, thirty or fifty years' ploughing, without intermission, and not decay. Such land there is at Esopus, on Hudson river, which hath borne winter corn about twenty years, without help, and is as good as at first, and better. William Penn took a view of the land this last month, when here, and said he never seen such before in his life."

This early reference to the soils of central New Jersey may serve as an illustration of the views held at that time concerning the ability of arable lands to produce crops of grain. The first arrivals from old Europe brought with them the traditions that their fathers accumulated slowly through a long experience, and these traditions included specific directions for the judging of land values. Generations of European farmers have been taught that in the growth of forests, and especially in the growth of virgin forests, there may be found important evidence as to the crop-producing power of different soils. Certain forest trees and other native vegetation indicated by their occurrence and mode of growth whether a soil was strong and durable, or whether it was poor and liable to rapid exhaustion. This experience, transplanted to the newer soils of America, was enriched by many additional facts, and standards of soil values were in time developed. "Such estimates on the part of experienced men," says Hilgard, "based on previous cultural experience, are generally very accurate; so much so that in many of the newer States they have been adopted in determining not only

the market value, but also the tax rate upon such lands, their productiveness and durability being a matter of common note."

"Thus in the long-leaf pine uplands of the cotton States, the scattered settlements have fully demonstrated that after two or three years' cropping with corn, ranging from as much as twenty-five bushels per acre the first years, to ten and less the third, fertilization is absolutely necessary to farther paying cultivation. Should the short-leaved pine mingle with the long-leaved, production may hold out for from five to seven years. If oaks and hickory are super-added, as many as twelve years of good production without fertilization may be looked for by the farmer; and should the long-leaved pine disappear altogether, the mingled growth of oaks and short-leaved pine will encourage him to hope for from twelve to fifteen years of fair production without fertilization."

With the native growth before him, the new settler was thus possessed of a more or less certain guide in the purchase of land. But the disappearance of the native forests and the change in the character of the soil through continued cultivation deprived this method of most of its value. So changed, in fact, had the soils become in the course of time that Liebig was led to say in 1859 that: "The deplorable effects of the spoliation system of farming are nowhere more strikingly evident than in America, where the early colonists in Canada, in the State of New York, in Pennsylvania, Maryland, etc., found tracts of land which, for many years, by simply plowing and sowing, yielded a succession of abundant wheat and tobacco harvests; no falling off in the weight or quality of the crops reminded the farmer of the necessity of restoring to the land the constituents of the soil carried away in the produce.

"We all know what has become of these fields. In less than two generations, though originally so teeming with fertility, they were turned into deserts, and in many districts brought to a state of such absolute exhaustion that even now, after having lain fallow more than a hundred years, they will not yield a remunerative crop of a cereal plant." So much, then, for the classification of soils as based on the character of the native vegetation.

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Attempts have not been wanting, likewise, of classifying soils according to their geographical origin. It was but natural to suppose that, because of the great variation in the composition of rocks, the soils derived from them would also show definite differences. Indeed, chemical analysis soon demonstrated that rocks rich in potash gave rise to soils rich in potash, and that certain limestone soils were rich in phosphoric acid. "It is obvious," says Merrill, "that soils derived by purely mechanical agencies will, if unmixed with other materials, show a composition closely resembling the mother rock. * * * Obviously a rock mass containing in itself none of the elements of plant food cannot, merely through its decay, furnish soil of appreciable fertility. * * * That, however, a rock contains all the desired materials is no certain indication as to the character of its decomposition product, since in this process of decomposition much desirable matter may have become lost. Nevertheless, most soils retain what we may call inherited characteristics, and a direct comparison, whenever possible, is by no means uninteresting." The geological surveys in our own State have taken cognizance of the possible relation of soil to parent rock. Rogers, in a final report on the geology of New Jersey, published in 1840, refers, in passing, to this relation. George H. Cook, in his *Geology of New Jersey*, published in 1868, also assumes this relation. "In the prosecution of the survey," he says, "it has been assumed that the soils on the different geological formations were derived from rocks underneath them, and, of course, were of nearly the same composition with them." In referring to the analysis of gneiss, limestone, slate, shale, trap-rock, clay, green sand, marl, etc., he says further that: "The rocks are mostly derived from these; sometimes from one, and sometimes from a mixture of two or more of them. And this geological classification of soils is probably the best that can be made. A more common classification is into sandy, loamy and clayey soils. The latter, however, is not capable of general use. The meaning of the three terms always depends on the experience of the person who uses them. What in one part of the State is called a clayey soil, in another part is called a loamy soil, and in still other places it would be

called sandy." Cook was evidently conscious of the fact that the geological classification of soils was not entirely satisfactory. He knew that many soils of the State were mixtures of various materials, representing no one definite form of rock, and that in the glaciated area of New Jersey the mixtures were frequently very complex. Furthermore, it is quite apparent that the chemical changes produced in the course of weathering may at times be far-reaching. Merrill admits that because of the destructive changes involved in the weathering of rock soils, and especially those of considerable antiquity, may bear but a slight resemblance to such parent rocks.

We may readily see, therefore, that the character of the native vegetation and the geological derivation of any particular soil may at times be of considerable value as a guide in the judging of new lands. We may readily see, also, what limitations there may be to such standards of measurement. Fortunately, however, we have in our possession still other standards of valuation, no one of them perfect in itself, yet gaining in value when taken in conjunction with the others. These other standards of valuation may be classified as physical, chemical and bacteriological.

PHYSICAL METHODS.

It is a well-known fact that the fertility of a soil is intimately associated with its behavior towards the rain that falls upon it. A soil which is too compact and fine-grained to allow the rain-water to percolate downward is not satisfactory for crop production, neither is a soil that is too coarse-grained and porous to hold sufficient amounts of moisture. This fact was recognized early in the last century, and led to the development of methods for the so-called *mechanical analysis* of soils. These methods consist in the separation of the soil particles by means of sieves and in other ways into portions of varying degrees of fineness, and of determining the relative weights of these several portions. It need scarcely be pointed out here that such analysis may be of great help in enabling us to judge of the capillary power of soils—that is, their ability to pull up moisture from the subsoil—of their

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specific heat—that is, their power to warm up more or less rapidly in the spring—and of the total surface exposed to the action of soil moisture. The last named is particularly important, since all plant-food is taken up in solution, and where the soil is coarse-grained but a small surface is exposed and acted upon by the percolating rain-water, the inside of the grains not being accessible to the dissolving action. On the other hand, where the soil is fine-grained, as is the case in very fine sands and silts, and particularly in clayey soils, the surface exposed is so very large that the soil moisture is enabled to render soluble very considerable quantities of plant-food. According to King, the total surface area of the particles in one cubic foot of a sandy soil is 11,000 square feet; in a sandy loam soil 36,900 square feet; in a loam soil 46,500 square feet; in a clay loam soil 70,500 square feet; in a fine clay soil 110,500 square feet, and in the finest clay 173,700 square feet. For the sake of convenience, we may take the total surface area of the particles in one cubic foot of ordinary light loam soil as equal to about one acre. More recently a German soil physicist, Mitscherlich, elaborated two new methods for determining the surface area of the soil particles in a given quantity of any soil. One of these is based on the amount of heat developed when a dry soil is moistened, the other on the amount of water which dry soils are capable of absorbing from the air when kept under certain conditions.

An attempt is being made by the Bureau of Soils in Washington to classify the soils of the United States on the basis of their mechanical composition. For this purpose the Bureau of Soils is making soil surveys in the different parts of the country, and has already surveyed, among others, two areas in New Jersey. The first of these areas designated as the Salem Area, includes portions of Cumberland, Salem, and Gloucester counties, and the cities and towns of Woodbury, Bridgeton, Salem, Woodstown, Swedesboro and Elmer. The other area designated as the Trenton Area, includes parts of Hunterdon, Somerset, Middlesex, Mercer, Monmouth, Burlington and Ocean counties. Such surveys, all of them based on the mechanical composition, and to some extent also on the geological origin

of the soils are of value as a basis for other studies. In themselves, they are not sufficient for supplying all needed information as to the crop-productive power of different soils. For one thing, they do not tell us much of the chemical composition of the particles which they attempt to grade according to their size; nor do they tell us of the modifications which many seasons of cultivation had introduced in our arable lands. Notwithstanding these very serious difficulties, some soil physicists are inclined to regard mechanical soil analysis as quite sufficient in measuring the crop productive power of soils. Indeed the Bureau of Soils has gone so far as to maintain that all soils, even the poorest, contain enough plant-food for an indefinite number of crops, and that profitable harvests can be secured for a long series of years by keeping the soil in the proper physical condition. The well known fact that manures and fertilizers increase the yield, is explained by them on the ground that it is the function of these to neutralize the poisonous substances secreted by the roots of plants, and thus restore the soil to a health condition. The theory of the Bureau of Soils is contrary to all practical experience, contrary to hundreds or thousands of carefully planned field trials, and contrary to the almost endless number of still more exact pot experiments. There is strong probability that certain substances may pass from the plants into the soil, and may even prove injurious if accumulated in large amounts. Yet we have no direct evidence that under actual field conditions the reduction of crop yields may be due to the mere presence of such poisonous substances. The injurious effects observed could be accounted for in other ways, and largely by the reduction of available plant-food in the soil, and the prominent development of certain groups of undesirable bacteria, and the suppression of other groups of soil organisms beneficial to the growth of crops. The farmer in the East, who would work on the theory that his soils contains enough plant-food for any number of crops, and need no application of fertilizers would come to grief sooner or later, and would leave but a poor inheritance to his children.

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CHEMICAL METHODS.

As chemists began to study the composition of plants and soils they discover that certain substances are always taken by the former from the latter. They realized that plants, like animals, need food for the building of their tissues, and that the food is derived partly from the air and partly from the soil. They found that the amounts of plant food removed from the soil were more or less extensive, that the soil was left poorer because of this removal, and that some soils sooner than others showed the effects of these losses. It seemed then that chemical analysis would furnish a certain means of gauging the fertility of any given soil, since soils shown to contain large quantities of plant-food could be expected to yield large and numerous harvests, while soils shown to contain small amounts of plant food could not be expected to yield large crops. And thus it was that about the middle of the last century many chemists in Europe were engaged in analyzing soils. In the course of a few years, when the numerous analyses had been tabulated, it was found difficult to establish a direct relation between the laboratory and field results. Some soils which contained smaller quantities of plant-food than others, produced, none the less, larger harvests; some soils shown to be rich in potash, or in phosphoric acid, failed to yield satisfactory crops without the application of these materials. For this reason, chemical analyses of soils fell into disrepute and in our own States the views of the time were voiced by George H. Cook, when he wrote in 1868 that "the character and capabilities of a soil depend so much more upon its mechanical condition than on its chemical composition that the leading agricultural chemists of the day are of the opinion that, at our present state of advancement in agriculture, soil analyses are of but little benefit to farmers."

The discrepancies observed between the analyses in the laboratory and the actual crop returns in the field brought out the fact that the plant food in the soil is not all in the same condition, that portions of it may be readily accessible to the grow-

ing crop, while other portions may not be accessible at all. We thus came to distinguish between available plant-food, and plant-food that is not available. We recognized the limitations of soil analyses because they gave us the total plant-food in the soil, but did not tell us how much of it would be placed at the disposal of the crop within the growing season. With this recognition came renewed attempts to develop methods that would enable us to determine the actual fertility conditions in the soil. The methods thus developed may be divided into two classes, namely, those dealing with vegetation experiments on the one hand, and with various solvents.

The vegetation experiments, first resorted to more than fifty years ago, aimed to determine the fertility requirements of soils by their behavior towards different fertilizers. The experimental field is divided into measured areas designated as plats or plots, and these are treated according to a prearranged plan. Some receive no fertilizer at all; others only phosphoric acid, potash or nitrogen; others still combinations of two or three of these. The crop from each plot is harvested separately, weighed, and analyzed, if necessary; and the increase over the nothing plot is credited to one or more of the constituents used. By proceeding in this manner, it becomes possible to determine whether the soil is in need of plant-food. However, this method is open to serious objection. In the first place, it is practically impossible to secure a field whose composition is quite uniform. Natural variations occur even in level fields apparently uniform in their make up. Such differences may exist in the mechanical or chemical composition of the soil, or of the subsoil, in capillary power, in color, in proportion of organic matter, etc. The differences thus observed may be so great as to obliterate differences due to the fertilizers applied. Furthermore, differences brought out by one crop may not be duplicated by another, nor can the supply of water be controlled properly. The difficulties just referred to led to the introduction of the pot culture methods, where comparatively small quantities of soil of absolutely uniform composition are taken. The moisture can be readily controlled here and injuries from insect enemies and birds guarded against. Furthermore, the changes in the soil itself

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as due to certain methods of cropping or manuring, can be more readily detected in small quantities of soil; whereas, in the field it is practically impossible to ascertain such changes, the difficulties in drawing representative samples and in reducing the analytical errors to limits sufficiently narrow, are almost insurmountable. The latter difficulty should be especially emphasized, for it will be seen readily that the least error made in the analysis of the very small quantity of soil taken will be multiplied many thousand times in calculating the results on the acre basis. It becomes next to impossible, therefore, to detect in the field losses or gains of a hundred or two hundred pounds of phosphoric acid or of potash. On the other hand, the uniform composition of the soils in pot experiments, as well as the small quantity taken allow the detection of such changes. We thus find that pot experiments have been used with great success, not alone in the study of the plant-food requirements of different soils, but also in the study of a great variety of soil and fertilizer problems, such as the availability of various compounds of nitrogen, phosphoric acid and potash; the influence of tillage, of animal manures, of green manures, of lime and marl, etc. It should not be supposed, at the same time, that the pot culture methods are free from objections as a test of the fertilizer requirements of soils. For one thing, they are not calculated to give an immediate answer to the questions asked. It takes a season of growth, and sometimes two or more seasons of growth to determine the full influence of certain fertilizers. Moreover, because of the comparatively small quantities of soil employed in such experiments, the circulation of air and moisture are more rapid than they would be in the field, the mineral constituents become available more rapidly, the humus decays more readily, and the general bacterial changes in the soil are more or less different than they would be in the field. This objection is met in part at least by the use of large quantities of soil, not too large to make the analytical work difficult, as is done in our cylinder experiments at the New Jersey Experiment Station. Speaking generally, therefore, it may be stated safely that the pot culture methods when carefully planned and executed are a very important aid in the study of various soil problems,

among them that of the fertilizer requirements of different soils. There are still other methods at our disposal for the study of the fertilizer requirements of soils. Chief among these are the chemical methods involving the use of various solvents as was already indicated. For general purposes, a solvent may be defined as a liquid in which a soluble substance can be distributed leaving the liquid itself quite clear. Thus water is a universal solvent and a solution of sugar, or of salt, prepared with its aid, could not be distinguished by its mere appearance from pure water. Now, since all food is taken up by plants from solution in soil water it follows that the value of such plant-food will depend largely on its solubility. When chemists recognized the difference between available and non-available plant-food they began to search for solvents that would remove from the soil quantities of plant-food nearly corresponding to the amounts actually taken up by a growing crop, within one or two seasons. A large number of such solvents have been studied in this connection, particularly pure water, water charged with carbon dioxide (carbonic acid gas), citric acid, acetic acid, dilute solutions of ammonia, caustic soda, etc. These studies were usually checked by vegetation experiments, since there is no other way of determining the practical value of various solvents. Pure water has been used extensively, notably in the study of the formation and movement of nitrates in the soil. It has also been used in the study of phosphoric acid, potash, and of other mineral food; much work in this direction has been done in the United States by the Bureau of Soils. While it is quite true that under actual conditions of growth it is the soil water that serves as the medium in which soluble plant-food is carried, yet it should not be forgotten that the work of solution in the soil is quite gradual. In day-time and at night, in the months of spring, summer, fall and even winter, this work is carried on unceasingly. The days, weeks and months that follow one another, each contribute something to the nourishment of plants, even though the contributions are quite variable, and are affected directly by temperature, rainfall, and season; by tillage, manuring and cropping. It is evident, therefore, that the treatment of a soil sample in the laboratory with pure

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water for a few minutes or hours can not imitate the actual process in the field extending over weeks or months.

Due attention has also been given to the fact that considerable quantities of carbon dioxide, thus formed, hastens to a marked extent the weathering of the mineral particles in the soil. Hence, attempts have been made to employ carbonated water instead of pure water as a solvent for plant-food in the soil. These attempts have not, on the whole, met with great success. The search for suitable solvents has been influenced by the belief that plant-roots secrete acid substances which help them to attack and dissolve the rock fragments in the soil. As a result of this belief a number of organic acids including citric, acetic, oxalic and tartaric, have been tested extensively for their ability to the root-action. Attention should be called in this place to the use, for this purpose, of dilute solutions of citric acid as advocated by Dyer in connection with his studies of the Rothamsted soils in England. He secured very gratifying results in the study of the available phosphoric acid, and potash in these soils. When tried on other soil areas this method failed to yield results as uniformly in accord in the vegetation trials, as were secured on the Rothamstead fields. On the whole, however, Dyer's citric acid method has proved quite serviceable in the study of certain soil problems, and has helped us to gain an insight into certain soil reactions that might have remained untelligible to us for some time to come.

Aside from the organic acids just mentioned, use has been made also, of mineral acids, especially hydrochloric and nitric acids. Weak solutions of the former are recommended by the Association of Official Agricultural Chemists in the United States, while weak solutions of the latter have been employed with varying success both in this country and abroad. This is particularly true of a method recently devised for the study of available phosphoric acid in the soil; nitric acid being used as the solvent. To sum it up, therefore, the various solvents enumerated, as well as others of which no mention was made here, have been employed as a means for the differentiation of the available and non-available plant-food in the soil. Theoretically, they should be of great value in enabling us to determine in a

few days, or even hours, the fertility condition of any soil that could not otherwise be determined without the aid of long and costly vegetation experiments. Practically, these methods are far more perfect, and while answering splendidly for one set of soils or conditions, they may fail entirely with other soils or under other conditions. There is no reason to suppose, however, that further study may not teach us how to improve these methods so as to increase their significance as an aid in the study of soil. Certain it is, that we are in need of such methods for the study of the crop-producing power of various soils, and likewise for the study of many problems in plant nutrition, whose solution is of utmost moment to practical agriculture. Whatever we shall achieve through them in the future, we have every reason to feel thankful for some of the knowledge that they have already given us.

Still another method for the study of available plant-food in the soil, is based on the ability of plants to take up larger or smaller amounts of the different constituents. It is a fact well known to every agricultural chemist, that plants growing in soils rich in available nitrogen, or in available phosphoric acid will take up larger proportions of these constituents than they would in soils not well provided with available plant-food. Since, however, the crop yield is usually determined by the constituents present in the least amount, it follows that this constituent will bear a certain ratio to the others. With this fact in mind, a number of investigators have tried to trace a definite relation between the available plant-food in the soil, and the composition of the crop grown upon it. Analyses have been made for this purpose, of the entire plant, of the roots, or even of the plant and of the seed, and it has been established that such relations do not exist at times. It was found, however, that the composition of plants is frequently affected more intimately by several conditions, particularly by the amount and distribution of rainfall, than by conditions of availability of the different substances in the soil. Hence, it has been proposed that standards be established for certain soils, and certain climatic conditions. This is rather difficult because of the wide temperature and rainfall variations in most localities, and the soil analysis by means of plants,

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as this method has been designated, promises to be more limited in its usefulness than that involving the employment of solvents, already discussed above.

Attention should also be called here, in passing, to other methods, or attempts at other methods for the study of soil fertility conditions. It was recognized about the middle of the last century that the soil possesses a more or less pronounced power to retain phosphoric acid or potash, and likewise other substances applied to it in soluble form. We designate this property of soils as the fixation of, or *the power to fix*, certain compounds. Thus, soluble phosphates are fixed in the soil, being changed there to insoluble phosphates, not liable to be leached out by rain. Some agricultural chemists were inclined to seek a relation between the fixing power of soils and their fertility conditions, but were not successful in establishing this relation. More recently, it was found that soils possess a characteristic behavior towards certain coloring matters. Definite differences in this regard are shown by soils of different origin, and are undoubtedly due to difference in the composition of soil particles. Attempts have been made to show that there may be a direct relation between the absorptive power of soils for coloring matters and their producing power. This work is mostly of recent origin, and further investigation is necessary to demonstrate its possible value. Much further investigation will likewise be necessary in as far as the other chemical methods are concerned, before we are in a position to judge clearly of their general application. As König expresses it: "There is therefore a whole series of conditions which affect the utilization of the plant food constituents in the soil, and increase the difficulty likewise of determining the available portion." Hardly more than a beginning has been made in establishing a basis for the measure of all these influences. This must not deter us, however, from tracing these influences, or the relations of plants to soil in all their ramifications, however numerous and difficult to follow, provided we are persuaded that this alone would place us in a position to give the farmer definite and reliable advice for the fertilization of his soil. For we must not content ourselves with merely determining whether the soil is lacking in nitrogen, potash, lime,

phosphoric acid, etc., but should also strive for the knowledge that would enable us to say how *much* of the single constituents should be applied to a given soil, with proper regard to its physical characteristics, climatic conditions, etc., in order to attain a medium or maximum harvest of a more or less definite composition.

BACTERIOLOGICAL METHODS.

The chemical and physical methods of soil investigation have been amplified of late years by bacteriological methods. The latter are based on the knowledge that the soil is inhabited by enormous numbers of microscopic plants, which we call bacteria. The soil bacteria play a very direct and very important part in the formation of available plant food in the soil. It is largely through the activities of soil bacteria that the unavailable nitrogen of the soil humus is changed into soluble nitrates, and made accessible to the crops. It is largely through their activities that the weathering of rock particles in the soil is hastened and a better supply of mineral plant-food provided. It is through their activities that we are enabled to maintain a proper supply of combined nitrogen in the soil. Lands in a high state of cultivation not only contain larger numbers of bacteria than similar lands more or less neglected, but they contain also more vigorous forms of the same organisms capable of doing a greater amount of work in a given time. By determining the numbers, kinds, and vigor of the bacteria in the different soils, we also gain some knowledge of the fertility conditions of the latter. But more than that, since bacteria are merely microscopic plants, the requirements for their development are in many respects similar to those of higher plants. They can not develop in the absence of nitrogen, of phosphoric acid, of lime, of magnesia of sulphur, and of other constituents of plant food. Hence, it has been attempted to grow bacteria in the laboratory under experimental conditions, so arranged as to allow a comparison of different soils as a source of nitrogen, phosphoric acid or lime. The principle is the same as that employed in vegetation experiments, where the addition of different plant food constituents in

varying amounts allows the determination of the plant food requirements of any given soil. Such then, in brief, is the essence of the systematic examination of soils from the bacteriological standpoint. These bacteriological methods are of very recent origin, and while they are of considerable promise as an aid in soil fertility investigation, some time must pass before we are enabled to assign to them their proper value in this connection.

This above sketch of the methods employed in soil investigation and particularly as to their fertilizer requirements, is of necessity quite brief. And yet, before we leave the subject, it would be worth our while to consider for a few moments the tendency manifested in this country and Europe, to go back to the complete analysis of soils. As was already pointed out here, the analysis of many soils made about the middle of the last century and subsequently, did not give the information that was expected of them; they failed to give a definite answer as to the fertility requirements of soils. The recognized difference between available and non-available plant-food led to the search rather of suitable solvents for the determination of the available plant-food in soils. Yet we are going back to soil analyses from a changed point of view. We are recognizing the obligations of scientific agriculture to those who shall till the soil many years after we had departed from this earth. We are beginning to regard our soils from the standpoint of *permanent* fertility. Obviously, a soil that is poor in plant-food has less promise of future usefulness than a soil rich in plant-food. If the crop yields are to be maintained the former will need artificial fertilization at an earlier date. Just as the mine owner attempts to estimate the riches still buried in the ground, so must we try to learn more of our plant-food resources. We must learn to know what we may still expect from one soil or another, what utilization of plant-food there may be in one soil or another, what the cost would be of producing one pound of grain in one soil or another. All these questions are insistent and calling for analytical work that is still regarded as more than useless by many agricultural chemists.

Having reviewed the methods of soil investigations in general, it would be but fitting to consider their application past, present

and future to the study of the soils of New Jersey. European experience transplanted to our own lands taught the enduring value of meadows. "I have been at Burlington," wrote Rudyard in the letter already cited, "and at Pennsylvania as far as Philadelphia, which lies about twenty miles below Burlington. That journey by land, gave me some view of all the provinces; and made me considerably to estimate favorably this of East Jersey, having some conveniences esteemed by me, which the others are not so plentifully furnished withal, viz.: fresh and salt meadows which now are very valuable, and no man here will take up a tract of land without them, being the support of their stock in winter, which other parts must supply by store, and taking more care for English grass." Thus we note that the early settlers already regarded meadows and meadow land as a valuable asset in the economy of farming, where the waning fertility of the uplands became in time more and more insistent. The rich alluvial deposits of the meadows, accumulated through long stretches of time at the expense of the higher lands more or less distant contained in them vast stores of plant-food. They possessed an enduring quality. And moreover, they furnished the food for cattle whose wastes could be used for the enrichment of the uplands, just as the fertility of the far away mountains has been carried by the waters of the Nile to enrich the lands of Egypt since the early dawn of human history. And thus it came about that also in New Jersey, as in Europe, the fertility of the meadows was used to replenish the fertility of the higher fields. An admirable practice it was then, as it is to-day, yet somehow the land became more and more hungry for food, the clover failed more and more frequently, and the crop grew less. New Jersey, like the New England States, deserved the rebuke of the American editor of Liebig's Letters on Agriculture. "In the early history of our country," he wrote, "our fathers found an immense expanse and their urgent necessities calling for immediate action they selected the most prolific spots and began to grow crops. Here were the washings of the highlands gathered, and localities like the Miami Valley, the receptacles of vegetable decaying matter for centuries, were interspersed through the whole Atlantic slope. As men began to till the soil,

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and as fast as they exhausted one locality of such elements of God's bounty as were in a condition from their solubility, to act as food for plants, they moved to new places rather than to properly work or fertilize the old ones. There were not the servitors of their grandchildren, but with a vast country before them they chose to "skim" it, and as they drove the Red Man westward, they found new fields for planting, and they "skimmed" the land. Here the great mistake was made, that of overrunning the soil to reap a few good crops that ended in impoverishing it, and this bad example has followed to the present day. Thus the Atlantic slope became a depleted expanse and unprofitable with the modes of culture in practice."

The farmers of New Jersey, like those of the other Eastern States, sinned against their soils, and the time came for them, as it did for the others, to forsake their old homes and to turn their faces towards the setting sun. Hundreds, or perhaps thousands, of families in our State took up the cry "Westward, ho!" and they went. It is recorded in the history of Cape May county that sixty or seventy families moved thence to a single county in Illinois. They went West to make good citizens there, to help build a great nation. But they left behind them many deserted acres, where good crops would not grow. And for all that, we in New Jersey have not everywhere depleted our soil and undermined its fertility. The New Jersey farmers have destroyed, but they have also built up; indeed, on many an acre they built better than they knew. He who would study the history of agriculture in New Jersey will do well to consider carefully the great constructive work done in the last century throughout the marl area and through a strip of land several miles wide on each side of it. "The marl," wrote George H. Cook, in 1868, "has been of incalculable value to the country in which it is found. It has raised it from the lowest stage of agricultural exhaustion to a high state of improvement. Found in places where no capital and but little labor were needed to get it, the poorest have been able to avail themselves of its benefits. Lands which, in the old style of cultivation, had to lie fallow, by the use of marl produce heavy crops of clover, and grow rich while resting. Thousands of acres of land which had been worn out and

left in commons are now, by the use of this fertilizer, yielding crops of the finest quality." Thomas Gordon wrote in 1830: "It would be difficult to calculate the advantages which the State has gained, and will yet derive, from the use of marl. It has already saved some districts from depopulation, and increased the inhabitants of others, and may one day contribute to convert the sandy and pine deserts into regions of agricultural wealth."

The marl has had its day, and has been crowded out by the more concentrated commercial fertilizers. And yet while it was used it gave substance to the soil. In the many years of its application, it added to some soils as much as ten thousands pounds of phosphoric acid. Truly a magnificent inheritance left by the fathers to their children, and to their children's children. The marl has had its day, and has done its work, yet it seems to me its work is not all done. Some day, perhaps, we may hear of it again. Meanwhile, we have other and more convenient forms of plant-food for our soils, and in the great field of soil investigation there is much work still to be done in seeking more definite knowledge concerning soil treatment and crop production.

Insecticide Experiments and Spray Practice in 1906.

BY JOHN B. SMITH, ENTOMOLOGIST.

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It is the task of the Entomologist to investigate all complaints of insect injury, to determine the species at fault, and the manner and extent of the mischief done. Having accomplished this, the first part of his task is done; the enemy and its position are known, and the matter of dealing with it arises. To this end we must first of all make out as completely as possible the life cycle of the species for one entire year, to ascertain whether there is any point or period peculiarly subject to our attack, and whether there is any natural check; or whether there is any variation in agricultural methods that would lessen or altogether prevent injury.

When all these facts have been ascertained, the question of what insecticide can be used must be settled. When the Entomologist can say that a specific material or practice applied or pursued at a specified period and in a specified manner will destroy the insect or prevent injury, his task is, theoretically, completed. The question of actual application, nozzles, pumps and preparation outfit is not, strictly speaking, a part of his business at all; yet in the practical operation of his office it is necessary to look after such details as well, and to instruct and direct concerning the actual mechanical details as fully as in the life cycle of the insects themselves.

During the season of 1906, therefore, a very large portion of time was devoted to insecticides and their applications, and part of these applications were made by or under the direction of the

office, and more were made by agriculturists and horticulturists at our suggestion. Besides this, we examined the results of many applications made in ordinary course by farmers and fruit growers throughout the State, and we learnt much concerning the causes of failure on the one hand and of the conditions under which success was obtained on the other.

The most commonly used and best understood of all insecticides are the arsenites, and the Station has from time to time published formulas for about all the home-made mixtures that have been suggested. Some farmers and more fruit-growers have used, and some do still use, these home-made combinations, which have the advantage of uniformity of composition when care is exercised in the making, and of cheapness when the item of labor is not highly reckoned.

The majority of the New Jersey people prefer to use purchased mixtures, however, and at the suggestion of this Board a law was passed at the last session of the Legislature providing for inspection and analyses of the Paris green sold in the State.

Bulletin No. 195 contains the results of these analyses, and shows that on the whole a very satisfactory grade of Paris green is offered in New Jersey. With few exceptions, the products contained over 50 per cent. of arsenious oxide, less than 3 per cent. of it soluble, and 29 per cent. of copper oxide in combination. What is not shown is the mechanical condition of the poison and the relative size of the crystals, a matter of great importance in practical work. It will be easily understood that where crystals are large and comparatively few to the pound, they will sink readily to the bottom in any spray mixture, and will need constant agitation to keep them in suspension. So, also, when they are sprayed, they do not cover so well as when the particles are smaller, and they wash off more readily in a pelting rain. It is quite conceivable, then, that we may have two brands of Paris green precisely identical in chemical composition, which may vary widely in their effectiveness.

Of late arsenate of lead has been growing in favor, and there are now several brands on the market varying in price from 10 to 20 cents per pound. Several brands of this were analyzed and also used in practical work in gardens and in cities for shade-

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trees. Three different brands were used at New Brunswick on elm trees and with identical effect, although we paid respectively 12, 17 and 20 cents per pound. Analysis showed that the first contained 14.74 per cent. of arsenic oxid, the second 12.14 per cent., and the third 15.34 per cent. The middle sample besides being the poorest was also decidedly under weight in the 1 pound packages in which it was bought. Nevertheless, used as it was at the rate of 4 pounds to 100 gallons of water the effect was equal. It should be noted in this connection that it requires just about 4 pounds of ordinary arsenate of lead to do the work of 1 pound of Paris green. A new process product containing 20 per cent. of arsenic oxid at a cost of 12 cents per pound is now ready for the market and this will make 3 pounds equal one pound of the highest grade Paris green at a cost equal to that now paid for the better brands.

The advantages of arsenate of lead are—first, its extremely fine condition, keeping it easily in suspension, making it spread and cover well, and giving great adhesive qualities; the particles settle so closely into the leaf tissue that they do not wash off even in the heaviest rains and may be demonstrated by chemical analysis months after the application. Second its absolute harmlessness to foliage of any kind, no matter what strength is used. Even conifers and evergreens of all kinds may be safely treated and in the nursery and garden it is simply unequaled. It does not so readily combine with the bordeaux mixture as does Paris green, which, being a copper compound makes a ready combination with the fungicide. For that reason I prefer to recommend Paris green for use with the bordeaux mixture in the orchard where a double effect is aimed at.

Among the most difficult of all insects to deal with are those that feed underground, on or in the roots of plants, and series of experiments were carried on at various points in the State against maggots on cabbages and onions.

Besides the standard tobacco, hellebore and carbolic acid emulsions we attempted to use the foreign "antidin," said to be effective against the grape phylloxera in Germany and "kill-larvae," a patented preparation based on an ammonia producing compound. Neither of these got a fair test; but we did find

that the soluble oils as against such insects were useless and killed more plants than maggots. We found also that hellebore, tobacco and carbolic acid emulsion might all be used to good advantage provided the applications were seasonably made and furthermore a preparation of carbolic acid and lime was very satisfactory in preventing attack. Our experiments seem to indicate that it is quite possible to control both cabbage and onion maggots, provided the work is begun in time.

The longest series of experiments was with contact insecticides against the San José scale and we have records of work done from Cape May to Warren county on all sorts of trees, by all sorts of men under all sorts of conditions. Systematic inspections were made by my assistant, Mr. Dickerson, throughout the summer and fall and entire days were spent in orchards to determine the results of work done.

Caustic soda is no longer used anywhere and no case of material benefit was observed. My own observations in this and previous years showed that there was a very misleading brightening of bark due to the removal of surface scurf and lichens that gave the impression of clean trees, until in late summer the swarms of larvæ setting on this clean bark effectually dispelled all illusions.

Crude carbolic acid applied to the surface of the trunk in a band or as a wash from base to the branching was exploited in Hunterdon and adjacent counties during midsummer; and, fortunately, Mr. Dickerson was able to see and examine not only the original acid treated trees but quite a number of others—peach, plum, and apple, under sufficiently varying conditions to determine the results. The acid treatment is not really new, for it was tested by me ten years ago and discarded; but Mr. Dickerson had no record of this and judged the material entirely on the examinations made by himself.

Now it is undoubtedly true that some of the acid treated trees are in good condition; but so far as appearances could indicate they had never been any worse. On the other hand, a much greater number of treated trees showed scales breeding in great abundance above the range of the application. crude carbolic acid kills what it touches. There is absolutely

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not one iota of evidence that the effect of the material extended even one inch beyond the range of the direct application.

Plant physiologists whom I have consulted agree absolutely in the assertion that no application made on the surface of the bark on a tree trunk could enter the general sap circulation through this bark. The absorption of the juices that enter into the circulation follows a perfectly well defined course, and while the acid might reach the edge of this circulation it would not be carried into it. Besides, even assuming that the surface application did get through the bark of an apple tree and did get into the circulation—how much would there be left of it by the time it was divided among the cells of the foliage and sap wood generally? Mighty little would reach the sap-feeding scales at the tips of the fruiting twigs. It simply does not do it and direct observations on treated trees showed no benefit whatever and absolutely no check on scale development.

What did develop, however, was a point that I had already noted and had even referred to: trees that made a slow hard growth resist scale attack much better than those that are forced and stimulated by fertilizers and cultivation to quick growth and heavy bearing. A tree that makes a six-inch growth early in the season and simply holds its own later and hardens this growth does not offer nearly so good a culture medium for scale and remains comparatively free even without treatment where a quick and longer growing tree would become completely incrustated. This is especially true of peach trees and some varieties of plums and pears.

Of the lime and sulphur preparations we have seen everything from the self-boiled to the steam-boiled mixtures with and without salt, fail and succeed on all kinds of trees, and we have come very close to the reasons for both the successes and failures.

We can say now, safely, that any lime and sulphur combination with or without salt, properly made and properly applied, will kill every scale covered by it; but no others.

A properly made lime and sulphur mixture consists of a combination by heat of approximately equal part of sulphur and lime, forming what may be loosely called a sulphide of lime. It requires heat to make the combination and it makes no differ-

ence where that heat comes from so that it is enough. If I take a pound of good lime and a pound of sulphur and boil over a fire with enough water to prevent burning, I get a union of lime and sulphur and have a little lime left over in the form of milk of lime or whitewash. If, instead of using fire or steam I get my heat from slaking lime, I am simply using lime instead of coal or wood and when I use three pounds of lime and one pound of sulphur I am using two pounds of lime to get the heat necessary to combine the sulphur with the other pound. The extra two pounds of lime is merely whitewash and adds nothing to the killing power of the resulting combination.

The same is true of course when caustic potash or sal soda are used to add to the heat of the slaking lime and to favor its combination with the sulphur. I place especial stress on these points because, unless the farmer understands precisely what he is driving at he is apt to make mistakes and may think this, that or the other detail is immaterial.

And this brings us to another point in making the self-boiled mixtures: don't waste the heat in your lime to warm up the surroundings. If you put the materials in a cold barrel and use cold water to slake, there can be no combination of lime and sulphur until the barrel is warm and the water is brought to the boiling point. Then if you leave the barrel uncovered while you stir up with a hoe, the heat that is formed will escape into the outer air and your resulting mixture will be whitewash with some uncombined sulphur mixed with it.

Heat your barrel with hot water, slake with hot or boiling water and keep your barrel covered while the lime is slaking—and then when you reckon three pounds of lime to one of sulphur and the thickness of the spray mixture, you have just as much work and as much expense as if you had used just enough lime and had boiled directly.

I wish to make it entirely clear that any lime and sulphur mixture in which one pound of sulphur is combined by heat with about one pound of good lime is the equivalent of any other lime and sulphur mixture so far as effect is concerned. Therefore use any formula you like and any method you like, but get your combination.

In making up the mixture only enough water is used to prevent burning and this concentrated liquid is then thinned out until there are three gallons of water for every pound of sulphur in the combination. This holds whether you use salt, soda, potash or an excess of lime and your normal strength wash which can be relied upon has that proportion or very near it.

Now given a properly made wash, as much depends upon putting it on right as upon the wash itself. Put on without much force in a coarse spray it will form a beautiful surface coating over your trees that will answer very nicely for peach, which has a bark just adapted to hold such a wash; but it will be a frightful disappointment on other fruit trees, and especially on apple; and the more lime you use the poorer will be your results. The sulphide of lime is a contact insecticide and must cover to kill. Therefore it must be applied with sufficient force and sufficiently fine to get behind and under bark scales, through plant hairs and under and behind bud scales. A thick wash will form a shell or coat over the surface of plant hairs, or will skin over a crevice, or will seal down a bark or bud scale, and it will leave all those half grown scales especially near the tips of twigs and around the fruit buds untouched.

My advice is, in using L and S washes, especially on apples, use no more lime than necessary so as to keep the wash thin; have the spray mixture warm, not because it is more effective so, but because it is then more fluid and spreads better; spray with just as much force as you get, through as fine a nozzle as practicable, and drive into every hole and over every surface of the bark. You will kill every scale you cover, and if your results are not satisfactory that is not due to the mixture but to the method of applying it.

The experience with lime and sulphur was almost exactly duplicated with the petroleum preparations. Gratifying success in many cases, absolute failure in others, and our conclusions at the end of the season read very much like those just recorded. Any of the petroleum combinations properly made and applied will give satisfactory results.

The New Jersey Station has led in the development of petroleum oils as scale killers and I am as firmly convinced of

their usefulness as I ever was, while quite ready to admit that they have not been everywhere successful. But there never was a material developed for use which did not record failures as well as successes, until its range was fully established and its limitations understood.

Crude oil, undiluted, was first used against the scale by a Jerseyman, and while some horticulturists have killed more trees with it than scales, others have saved trees that would otherwise have been destroyed by the scales. Some fruit growers even yet resort to it when they want to clean up badly infested apple or pear trees, and I was astonished to learn how much of the material was used regularly by those who had learned of its effects, both good and bad. It is an edged tool; excellent in the hands of a good workman; very dangerous otherwise. There is no more certain scale killer than crude petroleum.

Kerosene undiluted has also been used to a limited extent and with general good success. One pear orchard was almost completely freed from scales by a single application made under almost ideal conditions and without hurting even a bud. But more generally when kerosene was used, it was either combined with limoid or with water in an emulsion sprayer.

Kero-water pumps, by the way proved quite successful in a number of localities and in some of the peach-growing districts orchards have been continuously sprayed for 4 to 5 years in succession with 15-20 per cent. crude oil with excellent effect against the scale and no harm to the trees. With a good pump, and a good man to use it, the mechanical mixtures especially with crude oil have been entirely effective.

The k.-l., or kerosene-limoid has had only a limited use so far as I have been advised, and here a 15 per cent. kerosene mixture has proved quite effective. The lime or limoid is only a carrier of the oil, be it understood, and adds nothing to the combination which simply spreads the oil over a larger surface than could be readily done if applied undiluted.

But of all the petroleum preparations, the so-called soluble oils have been most generally used, and with as conspicuous successes as failures. And the failures were due in almost every instance to the fact that the mixtures were too much dilluted. Of

the three combinations that are most generally used, Kill-O-Scale contains about 65-70 per cent. of oil; Scalecide about 70-75 per cent., and Target Brand from 75-80 per cent. The general recommendations heretofore made have been to dilute with twenty parts of water, giving an actual oil content in the spray mixtures of from 3 per cent. to 4 per cent. only. As against the 15 per cent. of k. l., and mechanical mixtures, this is extremely low, and it speaks well for the thoroughness of the oil combinations that so small a percentage produced so good a result. But for general use a dilution of 1 to 20 is too little, and 1 to 15 is much more satisfactory.

Now I have no hesitation whatever in claiming for the New Jersey Station general credit for the production of the soluble oils, and especially Scalecide. Which does not mean that the formula was produced by the Station, or that I or any other member of the staff has even a penny-worth of commercial interest in it. After the trials made with the various crude oils, I realized the importance of some process that would give the advantage of the oil effects without the dangers, and I said, whenever opportunity offered, that this was an opening for an insecticide along the general lines mentioned by me. Dr. P. Karutz, a chemist and specialist in oils, produced Kill-O-Scale for the Griffith & Turner Company, of Baltimore, and the Target Brand emulsion for the American Horticultural Distributing Company, and these are only two of the combinations that he sent me from time to time in response to suggestions made by me, or which occurred to him from my statement of the needs.

Mr. B. G. Pratt sent me a number of combinations and "soluble oils" before Scalecide in its present form was produced. Scalecide and Kill-O-Scale, independently originated, are very similar in composition; but the latter has less actual oil, and has an addition of sulphur which, it is claimed, gives it some value as a fungicide. Scalecide has only the sulphur naturally present in the oils used, and it is very nearly a liquid petroleum soap. None of the oils used are clear crudes; all are based on distillates from which all vaseline has been removed, hence there cannot be any cumulative effect from frequent use. There is nothing that remains permanently on the tree, and these preparations are,

therefore, entirely safe at the recommended strength, which at a dilution of 1 to 15 is only from $4\frac{1}{2}$ to 5 per cent. of actual oil, as against the 15 per cent. of the k.-l., or mechanical mixture, or 6-7 per cent. of the normal kerosene emulsion diluted 9 to 10 times. That even a 1 to 20 dilution will kill the scales has been proven conclusively; but there is too little oil to soak through a dense incrustation of scale, and unless the application is very liberal, not enough oil gets on the tree to do the required work.

While these oil preparations have greater penetrating and spreading powers than the lime and sulphur washes, they are nevertheless equally limited in their effectiveness to those insects with which they are brought into actual contact; hence thorough, forcible application is just as necessary and the results are equally in proportion to the care with which the work is done.

The entomologist is not ready to say that there is nothing left for him to do with the San José scale. He is ready to say that he has placed at the command of the fruit-grower the information that will enable him to control it, and that the remainder is a matter of mechanics, not of entomology.

[The points made in this lecture were illustrated by lantern slides, which showed also the plants for making Scalecide and Target Brand emulsion, the general method of making being explained by the speaker.]

Report of the State Entomologist.

JOHN B. SMITH, SC.D.

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Report of the State Entomologist.

JOHN B. SMITH, SC.D.

During the calendar year 1906, work was continued along the same lines as in the previous year, but considerably amplified in some directions. The work concerned with the nursery inspections continues to be about the same, but the work of orchard inspection was continued through the entire year. Through almost every county in the State visits have been made and orchardists have been informed and helped. Mr. E. L. Dickerson has been continued as assistant, and throughout the summer did practically all of the orchard work.

Especial attention has been paid to the use of insecticide materials against the pernicious scale, and a large amount of experience has been systematized, until we know fairly well at present the reasons for success and failure with the mixtures in most common use.

A feature of the work that has become more important is cooperation with improvement societies and with less formal bodies, whose object it is to improve the appearance of towns and villages, and to deal with injurious insects in village and town gardens.

In quite a number of cases the residents in particular sections have employed a man or men to keep their trees and plants in good condition, and to spray so as to destroy scales and other injurious insects. In some instances a great deal of such work has gone for naught, because of some one individual who, for reasons of his own, refused to keep his place free, and allowed his trees and plants to become a nursery, from whence scales and

other pests were distributed to his neighbors. Appeals made to the State Entomologist have always been heeded, and in practically every case a fair representation of the matter to the party in fault has resulted in his joining, with more or less grace, in the work done by the neighborhood. Resort to the compulsory powers of the law has been thus avoided, and the end sought has been obtained by persuasion.

The nurserymen understand the requirements of the law very thoroughly by this time, and, with few exceptions, try honestly to live up to it. A number of persons who have in the past preferred to do business free of restrictions have found it convenient to retire from business altogether, and their places are filled by others in better accord with modern requirements.

The following is a list of the certificates issued under the series of 1905, but granted after the presentation of my previous report:

- No. 65. R. D. Cole, Bridgeton (general).
- No. 66. John McCleary, Sewell (general).
- No. 67. William Rose, Red Bank (dealer).
- No. 68. Albert Garbrois, Vineland (limited to dewberry).
- No. 69. Julius Roehrs, Rutherford (limited to ornamentals).
- No. 70. Carl W. Newcomb, Cedarville (limited to strawberry).
- No. 71. S. H. Paulmier, Madison (limited to shade trees).
- No. 72. C. M. Harrison, Vineland (limited to shade trees).
- No. 73. G. O. Gerard, Washington (dealer).
- No. 74. Samuel Brant, Madison (limited to peach).
- No. 75. Fleming Bros., Califon (limited to peach).
- No. 76. E. B. Conover, Fairmount (limited to peach).
- No. 77. Frank H. Leaming, Bridgeton (limited to strawberry).
- No. 78. James McIntyre, Morristown (dealer).

The certificates granted for 1906 to the date of writing are as follows:

- No. 1. T. C. Kevitt, Athenia (limited to strawberries).
- No. 2. Elizabeth Nursery Co., Elizabeth (general).
- No. 3. Hiram T. Jones, Elizabeth (general).

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- No. 4. Jos. H. Black, Son & Co., Hightstown (general).
 No. 5. Henry A. Dreer, Inc., Riverton (general).
 No. 6. William Flemer, Springfield (general).
 No. 7. James L. Hall, Farmingdale (dealer).
 No. 8. George A. Steele, Eatontown (general).
 No. 9. Arthur J. Collins, Moorestown (dealer).
 No. 10. William Henry Maule, Hightstown (dealer).
 No. 11. North Jersey Nursery Co., Newark (dealer).
 No. 12. Chas. B. Horner & Son, Mount Holly (shade and ornamental).
 No. 13. S. E. Rodgers & Sons, Mount Holly (general).
 No. 14. I. D. Cole, Rutherford (dealer).
 No. 15. Carlman Ribsam, Trenton (dealer).
 No. 16. Peter Henderson & Co., Jersey City Heights (general).
 No. 17. Charles Black, Hightstown (general).
 No. 18. Charles L. Stanley, Plainfield (dealer).
 No. 19. Hartung Bros., Jersey City (dealer).
 No. 20. Ellsworth Pedrick, Bridgeton (limited to strawberries).
 No. 21. J. T. Garrison & Son, Bridgeton (limited to strawberries).
 No. 22. S. B. Stevens & Son, Bridgeton (limited to strawberries).
 No. 23. Henry Richards, Bridgeton (limited to strawberries).
 No. 24. William H. Morgan, Westmont (dealer).
 No. 25. J. F. Randolph, Rutherford (dealer).
 No. 26. Michael N. Borgo, Vineland (limited to dewberry).
 No. 27. T. E. Steele, Palmyra (shade and ornamentals).
 No. 28. Henry E. Burr, South Orange (general).
 No. 29. W. A. Manda, South Orange (general).
 No. 30. J. T. Lovett, Little Silver (general).
 No. 31. J. H. O'Hagan, Little Silver (general).
 No. 32. A. S. Wallace, Montclair (dealer).
 No. 33. S. T. Hillman, West Cape May (dealer).
 No. 34. James McColgan, Red Bank (general).
 No. 35. S. H. Paulmier, Madison (shades and ornamentals)

- No. 36. Charles A. Bennett, Robbinsville (shade and ornamentals).
- No. 37. W. H. Forristel, Plainfield (general).
- No. 38. Theo. A. Ball, Westfield (general).
- No. 39. Ralston Bros., Allenhurst (general).
- No. 40. Bobbink & Atkins, Rutherford (general).
- No. 41. K. E. de Waal Malefyt, Ridgewood (general).
- No. 42. K. Herman Stoye, Eatontown (general).
- No. 43. Jos. J. Ayars, Williamstown (dealer).
- No. 44. Stanton B. Cole, Bridgeton (general).
- No. 45. Fred. Menzi, Irvington (general).
- No. 46. Charles Momm, Irvington (general).
- No. 47. K. Herman Stoye, Eatontown (dealer).
- No. 48. William B. Ellis, Vineland (general).
- No. 49. William M. Bassett & Son, Hammonton (general).
- No. 50. Willard H. Rogers, Mount Holly (general).
- No. 51. John Casazza, Vineland (limited to blackberry and dewberry).
- No. 52. George H. Peterson, Paterson (general).
- No. 53. W. G. Eisele, West End (general).
- No. 54. M. H. Kruschka, Asbury Park (general).
- No. 55. Charles Bird, Arlington (general).
- No. 56. Red Towers Greenhouses, Hackensack (general).
- No. 57. Samuel Brant, Madison (limited to peach).
- No. 58. Wm. M. Simanton, Asbury (limited to peach).
- No. 59. The Julius Roehrs Co., Rutherford (general).
- No. 60. William Rose, Red Bank (general).
- No. 61. J. C. Williams, Montclair (dealer).
- No. 62. J. H. Shoemaker, Bridgeton (general).
- No. 63. Jos. J. Ayars, Williamstown (general).
- No. 64. Edwin Allen & Son, New Brunswick (general).
- No. 65. Warren Shinn, Woodstown (general).
- No. 66. Samuel C. DeCou, Moorestown (dealer).
- No. 67. John McCleary, Sewell (general).
- No. 68. David Baird & Son, Baird (general).
- No. 69. David V. Higgins, Ringoes (limited to peach).
- No. 70. W. C. Bates, Whippany (limited to maple).

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- No. 71. A. W. Wadley, Bound Brook (dealer).
 No. 72. N. P. Creely, Burlington (limited to strawberries).

For convenience of reference, different forms of certificates have been prepared for the different classes of business, and these are as follows:

Fumigation certificates, issued to all growers of stock that have a satisfactory fumigating house and treat all their stock with hydrocyanic acid gas,	23
General certificates making no reference to fumigation, issued to all growers of stock that have no satisfactory house or box of their own; but either fumigate in a temporary chamber, in the house of another nurseryman, or not at all,	26
Strawberry certificates, issued to strawberry growers when they request them for use in shipping to other States; no certificates for local trade in strawberries are required,	6
Dealers' certificates who grow no stock of their own or only one line which for any reason should not be used to base a claim for a general certificate,	17
	—
Total,	72

An additional feature of the work done by the State Entomologist during the summer of 1906 is the following up of reports that were made from time to time of the occurrence of the Gypsy or Brown-tail moths within the limits of the State. Several such reports appeared in the newspapers, or were made to us by letter, and every case was investigated. Fortunately, up to the present time, there is no reason to believe that either of these insects occur within the State limits. The spread in the New England States, especially in the case of the brown-tail moth, has been so considerable, however, that it is necessary for us to keep the closest lookout in New Jersey, so as to be ready to take vigorous measures for the extermination of the first introduction that may appear within our borders.

The office assistance has been the same as during previous years.

Growing Hay for Market.

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BY J. G. CURTIS, ROCHESTER, N. Y.

Growing Hay for Market.

BY J. G. CURTIS, ROCHESTER, N. Y.

Mr. President, Ladies and Gentlemen—It is a pleasure and I esteem it a great privilege to address this meeting on a subject which I consider of great and increasing importance for several reasons:

First, growing hay for market on a portion of the farm is a partial solution of the serious labor problem; since it is much easier to get several hands during the rush of the short haying season than to get good efficient labor for eight or nine months of the year.

Second, there are usually several fields on nearly every farm in most sections of the State, which, owing to the heavy character of the soil, or for various other reasons, are more suitable for growing hay than for growing the several crops usually grown in a regular rotation.

Third, where the method of seeding down a portion of a large farm to hay has been practised it has frequently proven that the net profit per year from the smaller acreage devoted to grain and hoed crops, because of the more liberal fertilizing and better cultivation given them, was as great as was formerly obtained from the entire farm, leaving the entire value of the hay as clear gain over the old method.

In America growing hay for market and growing hay for feeding upon the farm are two distinct propositions from the business farmer's standpoint; for while it is always advisable for us to grow alfalfa, clover, or some other one of the leguminous plants, or at least mixed hay containing a large proportion of

clovers for feeding to our own work horses, growing animals, and dairy cows upon the farm, because of the high protein content of this class of plants, and its universally recognized function as a producer of blood, muscle, growth, and milk, and also because of the known value of these plants in improving the physical condition and increasing the nitrogen content of the soils in which they are grown; it is also true that hay made from these plants is considered too laxative in its effects for feeding to city horses under the conditions existing there, and as the great bulk of the hay sold on our markets is consumed by city horses, and as timothy hay seems to be best adapted to meet these requirements, it has resulted in such a demand for timothy hay as to cause it to bring a price on the market far in advance of its actual feeding value; while clover hay, in the absence of such a demand, has sold for a price much below its actual feeding value.

The great discrepancy between the comparative feeding and selling values of timothy and clover hay in the market of the United States has long been a matter of comment in the European countries, where the comparative selling price of all animal foods is based upon the actual value of the food nutrients contained.

Since the market here wants clean timothy, and pays a price for it out of all proportion to its real feeding value, it is good business to supply that want, although I believe that in the near future the clovers and alfalfa will have their true value established in our markets.

I do not wish to be understood as recommending that farmers generally should stop growing clover and mixed hay but rather that until the prevailing conditions of the markets change, the farmer who grows hay to be sold in the city markets should grow timothy every time, and when the conditions of soil and market seem to justify making timothy one of the money crops it should be given the requisite care and attention that it deserves. The character of the plant should be studied, also its needs in regard to special soils and plant foods.

Is it any wonder that the recent census report gives the average yield of hay in the United States as one and one-half tons per

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acre when we consider how we have been trying to grow timothy by seeding it with wheat or rye and smothering it out with the grain crop the first year and again with clover the second year and then be surprised that the few timothy plants remaining alive the next year did not give us a maximum crop? Have we not been doing our level best to kill the timothy plants during all of the first two years of their life by the method we have followed?

It is plain that where two crops occupy the same ground at the same time one of them must be a robber crop as far as its effects on the other crop is concerned, and as it is generally conceded that there is no profit in raising wheat in the eastern United States at the present range of prices there is no longer any excuse for the practise of sowing timothy and wheat together and thereby robbing the timothy of the necessary plant food which is so essential during the first year in order that the plants may get a strong, vigorous start and thus lay the foundation for a succession of large crops of hay.

It has been my good fortune during the past three years to superintend the plowing, fitting and seeding of upwards of forty acres of land on a farm in New York State to timothy hay after the general method which I shall describe to you and with results which answer affirmatively the following query which is so frequently heard: Can the farmer, in a practical way and on larger areas of land, approximate the results obtained by several of the experiment stations in growing crops after the intensive system of farming? *Prime* timothy hay cannot be grown for market at a good profit because prime quality is invariably related to a light and unprofitable yield. It should rather be our endeavor to grow a maximum crop of good, clean, number one timothy and get it to market in the best possible shape. I think we are generally agreed that the greater number of tons we can produce on an acre the lower will be the cost of production per ton, and since we cannot grow a maximum crop of timothy when sown with wheat or other crops I think the fields selected for timothy growing should be taken out of the regular rotation and thoroughly fitted and heavily seeded and fertilized so that the seeding would have to be renewed only once in seven

or eight years instead of in two or three years as is usually the case. This simply means the selection of those low-lying, moist or heavy clay soils that seem to be better adapted for meadows than for anything else, and with the intention of making the hay crop a money crop instead of a catch crop as is the usual custom.

In order to grow a maximum crop we must have every square foot of the ground covered with a thick seeding of strong, healthy timothy plants and furnish them with a sufficient amount of readily available plant food to overcome the natural deficiency which we have reason to believe exists in the particular soil when the crop is being grown. It is also known that timothy does not thrive in a sour soil, so where there are indications of acidity it is well to apply about thirty or forty bushels of lime to the acre either before plowing or broadcasting upon the furrows immediately after. The plowing should be done as early in the spring as the best condition of the soil will permit, and much will depend upon the care and thoroughness of this part of the preparation, and if there are several large rocks in the field that would interfere with the future operations it will pay to use a few dollars worth of dynamite where it will do the most good.

The ground should be thoroughly worked with a cutaway or disc harrow every eight or ten days up to seeding time, about August 15th, to destroy weeds, quack, and wild grasses if they are present, and I am a firm believer in frequent rolling as it is necessary to have a firm seed bed for best results.

About a week before seeding there should be at least six hundred pounds of fourteen per cent. acid phosphate and one hundred pounds of sulphate of potash drilled into the soil broadcast about three or four inches deep, and if the soil is sandy or gravelly and known to be badly lacking in available fertility, the amount of each should be doubled. The use of this seemingly large application of the mineral plant food elements at this time is for the reason that after the seed is sown it is impossible to put them down under the surface and where they ought to be.

The point that I wish to emphasize especially is this; that in the application of potash and phosphoric acid to our soils it should be our chief aim to put them in the very best possible place, which is from three to four inches under the surface and where the great bulk of the feeding roots are, and not to put them on or near the surface since they become fixed there and tend to attract the feeding roots too near the surface and consequently the crop is much more liable to serious injury from drought. This is of unusual importance in the case of grass and grain crops since the entire ground is occupied with the plants and there is no chance to conserve moisture by cultivation as is done with the hoed crops, and it is known that very often the limited factor in the growth of crops is a lack of moisture at a critical time rather than a lack of plant food in the soil.

About the middle of August the time that timothy naturally reseeds itself here, is the best time to sow the seed and the best quantity is twenty quarts per acre of the very best re-cleaned timothy seed that can be obtained. Always remembering that we cannot afford to jeopardize our chance of a large crop by using seed of an uncertain quality. The seed should preferably be sown with a wheelbarrow seeder, sowing one-half lengthwise and the other half crosswise of the field to insure an even seeding, and then harrow the seed in about one-inch deep by going over the field with a roller to roll down the loose stones and make a smooth surface, and bring the moisture up to the surface so that the seed will sprout at once and come up evenly over the entire field.

About the first of April, or as soon as the excess moisture has settled down out of the surface soil and growth starts in the spring, it will be necessary to apply broadcast as a top-dressing two hundred pounds per acre of nitrate of soda to furnish the plants with an abundant supply of immediately available nitrogen for their growth during the early part of the season. I have found this to be the best amount to apply on good upland soil under the conditions of heavy seeding such as I have described, while moist river bottom lands that are subject to overflow and therefore naturally moist and fertile, an application of one hundred pounds per acre is enough. It is also possible to

grow a second crop of from one and one-half to two tons per acre on good moist river bottom land if the first crop is gotten off the field by July 4th, and an extra application of about one hundred pounds of nitrate is applied at once to start the second crop off quickly. In this way it is not difficult to grow six tons of field cured hay per acre in two cuttings.

It is true that hay that yields four tons per acre at one cutting is more apt to become lodged before cutting time than is the ordinary crop of one and one-half tons per acre, especially the first season after seeding, and the thick seeding will cause the lower part of the stems to be somewhat bleached because of the dense shade near the ground, but if it is cut when in bloom and carefully cured it will sell on the market for number one timothy and for the number one price, which at this time is twenty-five dollars per ton.

This bunch of timothy heads which I have here, several of which are ten and three-quarters inches long, are some that I grew upon an upland field which yielded three and one-half tons per acre the past season and in several places the hay was sixty-six inches high at cutting time.

During the few minutes that are left I wish to say a few words in regard to cutting and curing large crops of timothy after you have grown them. Timothy should be cut when in full bloom and the best time of day to cut it is between three and six in the afternoon for two reasons; first, the plant contains much less moisture at that time than at any other time during the day, which means less time and labor necessary for the proper field curing, and if cut late in the afternoon it will not damage it seriously if it should get rained on while lying in the swath that night, especially if the tedder is started early the next morning. Usually the tedder should be started at seven o'clock in the morning, anyway, instead of waiting until nine or ten o'clock for the sun to dry the dew off the top of the swaths, remembering that it is air and not sunlight that cures hay, and the earlier we loosen up the swath and give the air a chance to dry it, the sooner it will be in fit shape to go to the barn.

After the hay has been tedered two or three times it should be raked into windrows and tedered in the windrow two or

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three times, and then the windrows should be turned over onto the dry stubble between the windrows with the rake and then teddered as long as necessary.

It should be ready for the barn by one o'clock the second afternoon after it is cut in good haying weather, and it should not be cocked up in the field unless it looks like rain the second night after it is cut.

When unloading hay in the mow, care should be used to spread it evenly and keep it well tramped down, especially if it is unloaded with a horsefork.

The rakings and stained hay should be kept separate from the good hay for convenience in selling or baling.

The practice of sprinkling four quarts of dairy salt on each load of hay, when putting in it in the mow, was not shown to be of any value, but the purchase of one hundred hay caps proved to be a most profitable investment.

I thank you for your attention.

Mr. Roberts—I feel thankful that I reside in Burlington county, New Jersey. There was a time when I used nitrate of soda on my timothy in the spring, but we have gotten away from that; we don't do it any more; we don't believe it is wise. I had a very good foreman two years ago, and he said, "I wish you would not put nitrate of soda on the grass on our land; if it is anything like an ordinary season, we will get as much hay without the nitrate of soda;" and I found that my customers that had taken hay from me for years were dropping off and getting somebody else's hay. It is not so good, not so nicely colored, and not so satisfactory, and I thought I would like to stick to my old friends, and I abandoned the nitrate of soda; and I caution you to use it with discrimination. One hundred pounds to the acre is as much as I would ever recommend. We raise good big crops. I won't say we get five or six tons to the acre, but we raise as much as we can lay on the ground. I use it, almost a carload if not more at a time, but I am very careful how we apply it. We get big crops of grass, and we raise timothy hay. I had some controversy with a gentleman from Rhode Island who recommended

300 or 400 pounds of nitrate of soda to the acre. Where you do that on our land you get a big rank growth such as you have seen where a manure heap laid. You don't know what to do with such stuff.

Mr. Curtis—Some gentlemen have asked what is the best top dressing for timothy in the spring. I don't recommend sowing as top dressing on your own meadows more than 100 pounds to the acre, but where you use heavy seeding in trying to get big crops for market, 100 pounds is not enough to give the plant enough nitrogen to grow the crop that it should. I am glad that question came up.

Mr. Dye—We haven't all as good land as Brother Roberts has; every man must be the judge, and test those things for himself. We can apply too much and give that discolored condition to the hay, which we have all seen, and thereby reduce its market value.

A Delegate—Is there any danger of putting it on too early?

Mr. Curtis—Put it on as soon as the growth starts. In the spring the frost goes out, and then the excessive moisture begins to settle; after the water begins to settle there is no danger of putting on the nitrogen, because after that season of the year our warm weather comes. This question of a poorer quality of hay—I didn't have time to bring that out—but you can't grow big tonnage and have prime hay; but anybody can't get prime quality and get enough tons per acre to pay to grow it. Your timothy hay, yielding four tons to the acre, will be bleached at the bottom, and, when that bleached hay cures, the lower leaves will turn a dark color, and that is going to put you out of the prime hay class; but you are going to get hay that is so clean, because the heavy timothy won't allow the weeds to grow, that your hay will sell for the top of the market, and that hay has been selling this year for \$19.00 to \$25.00, which is the top of the market.

A Delegate—What do you use as a substitute?

Mr. Roberts—Don't have any substitute.

A Delegate—The ground is so rich he don't need it.

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Mr. Roberts—That is largely it. I will give you my system, and it is a good one. I have worked it a long time, and those that know me know that I have good results. When we plow our land over, we ordinarily give it a light coat of lime, say twenty bushels of stone lime to the acre. The next year we raise a pretty good crop. The next year we plant that land in potatoes or some market crop of that kind, and then we fertilize reasonably well—give it a pretty good coat of barnyard manure and fertilizer, what we think will do the potatoes good; feed it well and generously. After the potatoes come off, we sow that lot in wheat. We don't put on any fertilizer—rather not have it. When we sow the wheat we sow about six quarts timothy to the acre with the wheat. In the winter we give it a light dressing of manure that we gather up around the premises, broadcast right all over the ground. The object of that is to give the grass and the timothy and the clover something to start and feed on, the clover especially. Then along in March we sow four quarts of red clover and four quarts of alsike clover—mix them together and sow them all over—and we hardly ever miss getting a good stand of clover. We cut a crop of wheat, generally get about as much as we know how to manage, and then sometime in July, toward the latter part, we cut that stubble down as high as we can cut it. The object is to get rid of the bitter weeds. They give me the hay fever, and I won't raise them—and I cut a nice crop of clover that year. That is the system I have been following for years and years. The next year I get a crop of mixed hay, which brings me just as much as the best timothy. Later in the season we mow it again and get a good crop, and sometimes we mow it twice; and next year it will come up full of timothy, and the next year it will come again—six or seven years. We never put on any fertilizer, and we get crops all the time. That is the advantage of having good soil. (Applause.)

Mr. Braddock—When our friend speaks about Burlington growing good hay, he is speaking about the county. In reference to the hay, if I understand the speaker, he takes this land and works it for weeks and gets it in good shape, which of course is all right. But our farmers on their best land take the

land and manure for corn, probably. The next year, after the corn, they plant mainly to potatoes. They do grow other products, but where they plant potatoes they come off so that it can be sown down at the latest by the first of September, and they grow a fine crop of hay the following season, and even the second mowing is good as Mr. Roberts says. I know one young man that has taken the second crop to the Camden market and sold it at \$15.00 per ton, and I know another young man who has taken baled hay to Camden and got \$20.00. We have some bright young men in this room that are doing that. You see they are getting this crop of hay very quick. They grow potatoes, and hay does well after the potatoes. They fertilize freely, and after they take off the potatoes, it is sown, and they get a fine crop of hay.

State Grange of New Jersey.

REPORT BY GEORGE W. F. GAUNT, MASTER.

State Grange of New Jersey.

REPORT BY GEORGE W. F. GAUNT, MASTER.

Mr. President, it affords me great pleasure to report the State Grange of New Jersey in a very prosperous condition; more so than at any time since its organization. During the past year the grand total of new members added to the list exceeds 2,500, and coming from every county in the State the results are very gratifying. The gain in membership and the gain in new Subordinate Granges does not begin to tell the whole story. The constantly increasing interest in the organizations in the localities in which the Subordinate Granges are located, tells very much more for itself than I can tell you here this morning.

The Subordinate Granges throughout the State are holding their meetings regularly, and are always doing a vast amount of good in their jurisdictions. They are breaking up the isolation of farm life and bringing the members, the farmers of that community in closer touch with each other, and opening up subjects which are of great interest to the members of the Grange and to the farmers of the State at large. Not only are they benefiting the agricultural industry, but they are benefiting all industries, because they are bringing the farmer and all classes of business in closer touch with each other, breaking up any misunderstanding, if there is any, between the city merchant, the city people and the farmer. The latter is a Grange proposition of national importance.

It is with pleasure we report a membership of over 12,000 in the State at this time, fully enthused with Grange principles, and ever ready to work and coöperate with you in everything that pertains to legislation for the benefit of the agriculturists of the

State. Coöperation is the object of the organization, and we want it with the State Board and every other State institution that tends to up-lift, tends to strengthen the cause of the farmers of New Jersey. That is, in part, the work of the Grange for the past year.

Now, in a social way, the Grange has been the means of building up the social conditions of the farmer of our State to a great degree, and they are showing the benefits received in more ways than I can attempt to tell you.

In the way of legislation, an evidence of what the two organizations, working hand in hand, can do, was brought prominently before us last year when something like two hundred farmers and business men came here to attend a hearing on the trolley freight bill. The result was the cause of having that bill passed. We have heard some say, "We haven't seen any trolleys carrying freight." The Legislature didn't agree to furnish capital to build these roads, but to give franchises so the independent trolley company could work on it; and it was a step in the right direction, and I presume the Legislature will follow it up this year so as to aid the extending of electric railroads to the rural communities. This is only an illustration of what can be accomplished through organization. There is no reason why the farmers of New Jersey who want to advance their cause in anything within reason, should not get it if they go to work hand-in-hand and know what they want in the beginning, and all get together on the "united we stand, divided we fall" plan. If any section is pulling against the other, there is good reason for the Legislature to believe that the farmers are not a unit and not well organized. One of the thoughts we want to impress upon ourselves and the members of the Grange is that if we want legislation we must thoroughly understand what we do want, make up our minds the way to go about it, and get it.

Now, I want to say, Mr. President, that the Grange stands ready to assist you in your work, and we all realize the fact, farmers of the State here represented, that in our President we have a man who is doing very much for the agriculturists of this State, and with the establishment of the short courses at the College Farm, the Grange stands ready to furnish the channels

through which the information they have to send out from there will reach most of the farmers of the State.

I pledge the hearty coöperation of the State Grange in everything that will advance the cause you are so earnestly engaged in, and in which you are doing so much good for the State.

Prof. Voorhees started out on a course of lectures in our county to show the young men, when starting in business, how soils were formed, and the methods of getting plant food; and it was those lectures more than anything else that established in our section the proper thoughts and methods. The scientific knowledge that was obtained through those lectures was of great benefit. I have traveled through many other States, and we want to realize that we have now in the director of the Experimental Station a man wanted by several other States in the Union. While I was traveling through New Hampshire and other States I have had them say, "We ought to have your man here," and I found that he was a native of New Jersey, born and educated near New Brunswick, I think I heard him say, and that he feels that his duty is to the New Jersey farmers instead of accepting a more lucrative position in some other State; and I say the Grange stands ready to assist him in any way and every way it possibly can to extend the agricultural education in every way that it can.

We have well organized Granges throughout every county in the State except Hudson county, where manufacturing and not agriculture predominates, although we have members of the Grange living in that county. So with the organization so well established, and with 12,000 members in that organization, our work is only beginning. The organization must increase, not only in membership, but it must develop and aid members and those outside along certain lines that ours will be the State of ideal citizenship and contributors as well to the commercial welfare of our State; this is one of the fundamental principles upon which the organization stands. (Applause.)

**Officers of the State Grange of New Jersey,
P. of H., 1907.**

Master—GEORGE W. F. GAUNT,Mullica Hill, Gloucester county
Overseer—CHARLES CHALMERS,Vineland, Cumberland county
Lecturer—DAVID H. AGANS,Three Bridges, Hunterdon county
Steward—JOHN M. WOOLMAN,Elmer, Salem county
Assistant Steward—HENRY M. LOVELAND,Cohansey Salem county
Chaplain—ROBERT M. TORBET,Paterson, R. F. D., Passaic county
Treasurer—CHARLES COLLINS,Moorestown, Burlington county
Secretary—H. F. BODINE,Flemington, R. F. D., No. 2, Hunterdon county
Gate Keeper—R. M. HOLLEY,Sussex, Sussex county
Ceres—ELLA STEVENSON,Blackwood, Camden county
Pomona—ALICE G. MAC KISSIC,Cape May City, Cape May county
Flora—ETHEL LAWLIN,Wyckoff, Bergen county
Lady Assistant Steward—LAURA E. STRONG,Ringoos, Hunterdon county

EXECUTIVE COMMITTEE.

GEORGE W. F. GAUNT,Mullica Hill, Gloucester county
 ALBERT HERITAGE,Mickleton, Gloucester county
 NICODEMUS WARNE,Broadway, Warren county
 JOHN T. COX,Readington, Hunterdon county
 C. C. HULSART,Matawan, Monmouth county
 H. F. BODINE,Flemington, R. F. D., No. 2, Hunterdon county
State Grange meets first Tuesday in December, 1907.

POMONA GRANGES.

MASTERS AND SECRETARIES. WITH P. O. ADDRESSES.

1. Burlington—*Master*, ISAAC COLLINS,Moorestown, Burlington county
Secretary, GEO. L. GILLINGHAM,Moorestown, Burlington county
2. Sussex—*Master*, A. P. SHAW,Vernon, Sussex county
Secretary, GEO. E. HURSH,Normanock, Sussex county
3. Hunterdon—*Master*, GEO. B. HARTPENCE,Ringoos, Hunterdon county
Secretary, WM. Y. HOLT,Flemington, Hunterdon county
4. Cumberland—*Master*, WALTON E. DAVIS,Shiloh, Cumberland county
Secretary, L. F. GLASPEY,Shiloh, Cumberland county
5. Mercer—*Master*, WALLACE LANNING,....Trenton, R. F. D., Mercer county
Secretary, J. T. ALLINSON,Yardville, Mercer county
6. Salem—*Master*, JOHN M. WOOLMAN,Elmer, Salem county
Secretary, CARRIE R. ATKINSON,Woodstown, Salem county

SUBORDINATE GRANGES.

Number.	GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
1	Pioneer,	D. C. Mershon, Prospect Plains, Middlesex co.,	H. J. Butcher, Cranbury, Middlesex co.,	Mrs. J. B. Perrine, Cranbury, Middlesex co.
2	Marl Ridge,	G. Ulmer Foulks, New Egypt, Ocean co.,	Wm. H. Davis, Cream Ridge, Burlington co., . . .	R. T. Ridgway, New Egypt, Ocean co.
3	Hammonton,	A. J. Rider, Hammonton, Atlantic co.,	H. M. Salinas, Hammonton, Atlantic co.,	Miss Cora Bassett, Hammonton, Atlantic co.
5	Swedesboro,	Chas. H. Brown, Swedesboro, Gloucester co., . . .	Caddie J. Gill, Swedesboro, Gloucester co.,	Rebecca Gill, Swedesboro, Gloucester co.
7	Somerset,	J. McCracken, New Brunsw'k, R. D. 6, Som. co.,	H. W. Kline, New Brunswick R. D. 6, Som. co.	Mrs. Kline, New Brunswick R. D. 6, Som. co.
8	Moorestown,	Samuel R. Cole, Merchantville, Camden co., . . .	Caroline B. Zolley, Moorestown, Burlington co.,	Clara Stiles, Moorestown, Burlington co.
9	Woodstown,	John S. Borton, Woodstown, Salem co.,	Carrie R. Atkinson, Woodstown, Salem co., . . .	Lizzie C. Coles, Woodstown, Salem co.
11	Vineland,	Robert E. Chalmers, Vineland, Cumberland co.,	Geo. H. Putnam, Vineland, Cumberland co., . . .	Mrs. C. M. Burger, Vineland, Cumberland co.
12	Ringoes,	Geo. B. Hartpence, Ringoes, Hunterdon co., . . .	John Q. Holcombe, Ringoes, Hunterdon co., . . .	E. N. Strong, Ringoes, Hunterdon co.
16	Hopewell,	C. F. Claspey, Bridgeton, R. D. 1, Cum. co., . . .	W. E. Davis, Bridgeton R. D. 1, Cumb'l'd co.,	L. F. Glaspey, Shiloh, Cumberland co.
18	Cumberland,	Wm. H. Glaspey, Greenwich, Cumberland co.,	Morris Goodwin, Greenwich, Cumberland co.,	Anna T. Goodwin, Greenwich, Cumberland co.
20	Fenwick,	Jos. Beaston, Canton, Salem co.,	Anna E. Harris, Harmersville, Salem co.,	Mollie Finlaw, Quinton R. D. 1, Salem co.
25	Mannington.	Walter Crispin, Salem R. D. 1, Salem co.,	J. Lorene Hackett, Salem R. D. 1, Salem co.,	Mrs. Clara Hamilton, Salem R. D. 1, Salem co.
26	Harrisonville, . . .	Wm. Seahontz, Woodstown, Salem co.,	Ada Oliphant, Harrisonville, Gloucester co., . . .	Maribel Coles, Harrisonville, Gloucester co.
29	Elmer,	John B. Moore, Elmer, Salem co.,	Mary W. Grant, Elmer, Salem co.,	Emma F. Graf, Monroeville, Salem co.
32	Bridgeport,	John Folker, Bridgeport, Gloucester co.,	S. L. Kille, Swedesboro R. D. 2, Gloucester co.,	Susie E. Justice, Swedesboro R. D. 2, Glou. co.
34	Cedarville,	L. R. Brandriff, Cedarville, Cumberland co., . . .	N. E. Diament, Cedarville, Cumberland co., . . .	.....
36	Medford,	Garret V. Margerum, Medford, Burlington co.,	Lorena M. Brick, Medford, Burlington co.,	Susan Darnell, Medford, Burlington co.
38	Haddon,	Wm. M. Horner, Merchantville, Camden co., . . .	Daniel W. Horner, Merchantville, Camden co.,	Amelia Bates, Haddonfield, Camden co.

SUBORDINATE GRANGES—CONTINUED.

Number.	GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
39	Mantua,	Jesse Hendrickson, Wenonah, Gloucester co., . . .	Hiram S. Leap, Wenonah, Gloucester co.,	Abbie Kirkbride, Sewell, Gloucester co.
40	Windsor,	Wm. J. Tindall, Trenton R. D., Mercer co., . . .	R. D. Perrine, Windsor, Mercer co.,	Mrs. John M. Rogers, Windsor, Mercer co.
43	Hope,	Joseph Flanigan, Bridgeton, R. D. 4, Cum. co.,	Mrs. Mary Miller, Bridgeton R. D. 2, Cum. co.,	Mrs. Ruth Holmes, Bridgeton R. D. 2, Cum. co.
45	Marlton,	Wm. F. Powell, Marlton, Burlington co.,	Geo. P. Lippincott, Marlton, Burlington co., . . .	Mary W. Whitacre, Marlton, Burlington co.
50	Pemberton,	John B. Evans, Birmingham, Burlington co., . . .	Henry R. Lippincott, Pemberton, Burl. co., . . .	Virginia Forsyth, Pemberton, Burlington co.
51	Mullica Hill, . . .	C. B. Kirby, Mullica Hill, R. D. 2, Glou. co., . . .	P. Howard Avis, Mullica Hill, Gloucester co., . . .	Abbie Duffield, Sewell R. D., Gloucester co.
52	Deerfield,	Jacob Ott, Bridgeton, R. D. 5, Cumberland co.,	L. S. Padgett, Bridgeton R. D. 5, Cumb'l'd co.,	Mrs. M. M. Irens, Bridgeton R. D. 5, Cum. co.
57	Centre Grove, . .	Elwood Zimmerman, Millville, Cumberland co.,	W. H. Taylor, Millville, Cumberland co.,	Jacob Zimmerman, Millville, Cumberland co.
58	Columbus,	David Haines, Columbus, Burlington Co.,	Rilla E. Kirby, Columbus, Burlington co.,	Anna E. White, Burlington, Burlington co.
59	Thorofare,	Chas. H. Budd, Thorofare, Gloucester co.,	Rodman W. Clement, Thorofare, Gloucester co.,	Annie Reed, Thorofare, Gloucester co.
60	Courses Landing,	Lambert C. Richman, Sharptown, Salem Co., . . .	Helen D. W. Richman, Sharptown, Salem co., . . .	Rebecca D. Newton, Sharptown, Salem co.
61	Crosswicks,	Dr. Chas. L. Dey, Crosswicks, Burlington co., . . .	Elsie M. Haines, Georgetown, Burlington co., . . .	Viola W. Haines, Georgetown, Burlington co.
64	Pennington,	N. F. Woodward, Pennington, Mercer co.,	Jos. R. Burroughs, Pennington, Mercer co.,	John Fleming, Pennington, Mercer co.
73	Ewing,	Hodoram M. Fine, Trenton R. D. 1, Mer. co.,	W. H. Cadwallader, Trenton R. D. 1, Mer. co.,	E. L. Cadwallader, Trenton R. D. 1, Mer. co.
77	Mercer,	George Whitenack, Skillman, Mercer co.,	F. W. Crusier, Hopewell, Mercer co.,	Mrs. H. E. Dalrymple, Hopewell, Mercer co.
78	Wantage,	Newman Hall, Sussex, Sussex co.,	Mrs. Eva Vandruff, Sussex, Sussex co., . . . . .	.....
79	Hamilton,	J. T. Allinson, Robbinsville R. D. 2, Mer. co.,	Thos. Q. Taylor, Robbinsville R. D. 2, Mer. co.,	Mrs. T. Q. Taylor, Rob'n'ville R. D. 2, Mer. co.
81	Friesburg,	Lewis Dare, Bridgeton R. D. 1, Cumb'l'd co., . . .	Jos. W. Perry, Elmer R. D. 3, Salem co.,	Mrs. C. Dare, Bridgeton R. D. 1, Cumb. co.
85	Williamstown, . .	James M. Tweed, Williamstown, Gloucester co.,	James Taggart, Williamstown, Gloucester co., . . .	Mrs. James Taggart, Williamstown, Glou. co.

SUBORDINATE GRANGES—CONTINUED.

Number.	GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
88	Locktown,	S. G. Sherman, Flemington R. D. 2, Hun. co.,	G. J. Fisher, Sergeantsville, Hunterdon co.,	Louisa Snyder, Flemington R. D. 2, Hunt. co.
90	Blackwood,	Martin Shubert, Kirkwood, Camden co.,	C. C. Stevenson, Blackwood, Camden co.,	Maria Stetser, Blackwood, Camden co.
92	Monmouth,	Jacob L. Pittenger, Freehold R. D. 2, Mon. co.,	Lewis R. Reid, Freehold, Monmouth co.,	Wm. J. Campbell, Millhurst R. D. 6. Mon. co.
96	Hightstown,	C. A. Mason, Cranbury R. D., Middlesex co.,	Chas. S. Lee, Hightstown R. D., Mercer co.,	Hattie Cunningham, Hightstown, Mercer co.
98	Allentown,	A. G. Hendrickson, Robbinsville R.D.2, Mer. co.,	W. B. Burtis, Allentown R. D. 1, Mercer co.,	Mrs. A. C. Otterson, Cream Ridge, Burling. co.
99	Liberty,	B. D. E. Smock, Wiclatunk, Monmouth co.,	S. B. Wells, Marlboro, Monmouth co.,	Nettie Wells, Marlboro, Monmouth co.
101	Sergeantsville,	W. E. Rittenhouse, Stockton R. D. 1, Hun. co.,	E. C. Rockafellow, Stockton R. D. 1, Hun. co.,	N. B. Rittenhouse, Sergeantsville, Hunt. co.
104	Livingston,	A. W. Fund, Chatham R. D. 3, Morris co.,	Rev. Wm. R. Burrell, Livingston, Essex co.,	H. H. Haven, Livingston, Essex co.
105	Morris,	A. M. Webb, Hanover, Morris co.,	Wm. A. Howell, Florham Park, Morris co.,	Mrs. Robert Sanders, Hanover, Morris co.
106	Kingwood,	W. J. Thatcher, Barbertown, Hunterdon co.,	Alvah L. Larason, Barbertown, Hunterdon co.,	Mrs. Katie Thatcher, Barbertown, Hunt. co.
107	Caldwell,	A. E. Hedden, Verona, Essex co.,	F. C. Goble, Verona, Essex co.,	C. B. Crane, Caldwell, Essex co.
108	Roseland,	Marcus W. DeCamp, Roseland, Essex co.,	Hattie M. Condit, Roseland, Essex co.,	Mary J. Condit, Roseland, Essex co.
110	Warren,	John S. Baylor, Broadway, Warren co.,	Miss Mae Oberly, Broadway, Warren co.,	Henry J. Beers, Stewartville, Warren co.
111	Mickleton,	A. N. Bahman, Clarksboro R. D. 1, Glou. co.,	W. Heritage, Swedesboro R. D. 1, Glou. co.,	Edward M. Borden, Mickleton, Gloucester co.
112	Lyons Farms,	Dr. J. B. Ward, Lyons Farms, Union co.,	James I. Headley, Union, Union co.,	.....
113	Pohatcong,	D. C. Donnelly, Springtown, Warren co.,	Hattie A. Donnelly, Springtown, Warren co.,	John R. Seigle, Finesville, Warren co.
115	Hurffville,	Josiah Eldredge, Sewell R. D. 1, Gloucester co.,	Walton H. Chew, Sewell R. D. 1, Glou. co.,	Thos B. Kier, Sewell R. D. 1, Gloucester co.
116	Rocksburg,	John H. Young, Belvidere R. D., Warren co.,	Warren Herman, Belvidere R. D., Warren co.,	Irvin Miller, Phillipsburg, Warren co.
117	Washington,	Samuel T. Bowman, Washington, Warren co.,	Mrs. Jos. Bodine, Washington, Warren co.,	M. L. Rush, Washington, Warren co.

SUBORDINATE GRANGES—CONTINUED.

Number.	GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
119	Oak Grove,	John A. Quick, Pittstown, Hunterdon co.,	Andrew R. Allen, Pittstown, Hunterdon co.,	Dr. M. H. Leaver, Quakertown, Hunterdon co.
120	Spring Mills, . . .	M. W. Angell, Milford, Hunterdon co.,	Mary E. Woolfe, Milford, Hunterdon co.,	Mrs. L. I. McCullough, Bloomsbury, Hunt. co.
121	Stewartsville, . . .	Harris A. Godfrey, Stewartsville, Warren co.,	John C. Boyer, Stewartsville, Warren co.,	Mrs. Geo. Hager, Stewartsville, Warren co.
122	Aura,	Nathan Skinner, Clayton, Gloucester co.,	I. B. Pancoast, Clayton, Gloucester co.,	Lizzie Kandle, Clayton, Gloucester co.
123	Cross Keys,	Jacob Harper, Cross Keys, Gloucester co.,	Edw. B. Gant, Cross Keys, Gloucester co.,	Stella Hurff, Cross Keys, Gloucester co.
124	Grand View,	Joseph Bodine, Flemington, Hunterdon co.,	W. E. Cornog, Flemington, Hunterdon co.,	Wm. Y. Holt, Flemington, Hunterdon co.
125	Riverside,	J. Spencer Dilts, Three Bridges, Hunterdon co.,	John Huff, Centreville, Hunterdon co.,	John R. Foster, Three Bridges, Hunterdon co.
126	Delaware,	Wm. C. Addis, Delaware R. D. 2, Warren co.,	F. R. Addis, Delaware R. D. 2, Warren co.,	J. J. Hess, Mt. Bethel, Pa.
127	Iona,	W. B. Nichols, Franklin Valley, Gloucester co.,	E. R. VanValin, Newfield R. D. 2, Glou. co.,	Mrs. Buttrick, Malaga, Gloucester co.
128	Cape May,	Thos. H. Douglas, Dias Creek, Cape May co.,	A. T. D. Howell, Dias Creek, Cape May co.,	Truman Heckman, Green Creek Cape May co.
129	Bergen,	Arthur Lozier, Ridgewood, Bergen co.,	Mrs. C. C. Basley, Maywood, Bergen co.,	Chass. C. Basley, Maywood, Bergen co.
130	Franklin,	J. R. VanHouten, Mid'l'd Park R. D. 1, Ber. co.,	Mrs. A. A. Yeomans, Mid'l'd P'k R. D. 1, Ber. co.	Arthur Ronald, Midland Park R. D. 1, Ber. co.
131	Rancocas,	H. E. Dubell, Mt. Holly R. D. 1, Burling. co.,	Cornelia S. Wills, Burlington R. D., Bur. co.,	Emile B. Grant, Burlington R. D., Burl. co.
132	Cold Spring, . . .	Michael Brown, Cold Spring, Cape May co.,	J. P. MacKissack, Cape May City, C. M. co.,	Jennie McPherson, Erma, Cape May co.
133	Hickory,	Albert Johnson, Pattenburg, Hunterdon co.,	Wm. Bird, Pattenburg, Hunterdon co.,	Frank Godown, Pattenburg, Hunterdon co.
134	Vernon Valley, . . .	Thos. W. DeKay, New Milford, N. Y.,	Andrew S. Drew, Vernon, Sussex co.,	John T. Truesdale, Vernon, Sussex co.
135	Ramsey,	J. D. Carlough, Allendale R. D. 1, Bergen co.,	Eudora Coe Gunney, Suffren, N. Y. R. D.,	Dr. Godfrey Pottis, Allendale, Bergen co.
136	Lincoln,	C. H. DeVoe, Westwood R. D. 1, Bergen co.,	F. J. Ludwig, Westwood R. D. 3, Bergen co.,	James H. Ackerson, Westwood, Bergen co.
137	Mountain View, . . .	E. W. Clark, Beemerville, Sussex co.,	Grace Clark, Beemerville, Sussex co.,	W. D. Haggerty, Beemerville, Sussex co.

SUBORDINATE GRANGES—CONTINUED.

Number.	GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
138	Berlin,	A. H. Hurff, Berlin, Camden co.,	X. F. Ottiger, Berlin, Camden co.,	Mrs. A. S. Bartow, Berlin, Camden co.
139	Upper Township,	E. D. Burley, Tuckahoe, Cape May co.,	Z. A. Townsend, Tuckahoe, Cape May Co.,	Mrs. Eliz. Wallace, Tuckahoe, Cape May co.
140	Montague,	H. E. Cortright, Port Jervis R. D. 1, New York,	Clayton Quick, Port Jervis R. D. 1, New York,	L. T. Cole, Port Jervis R. D. 1, New York.
141	Pascack,	Edwin M. Lyman, Park Ridge, Bergen co.,	John J. Brickell, Park Ridge, Bergen co.,	Mrs. Edith Bowen, Park Ridge, Bergen co.
142	Olive Branch,	J. H. Douglas, Matawan, Monmouth co.,	J. S. Crawford, Matawan, Monmouth co.,	C. C. Hulsart, Matawan, Monmouth co.
143	Delaware Valley,	Ira C. Stoll, Layton, Sussex co.,	Geo. E. Hursh, Normanock, Sussex co.,	C. A. Dalrymple, Layton, Sussex co.
144	Saddle River,	J. R. Ackenback, Saddle River, Bergen co.,	T. M. Woodruff, Saddle River, Bergen co.,	Mrs. Jessie Ackerman, Saddle River Bergen co.
145	Wayne Township,	R. M. Torbet, Paterson R. D. 1, Passaic co.,	H. M. Berdan, Paterson R. D. 1, Passaic co.,	Chas. Newton, Paterson R. D. 1, Passaic co.
146	Egg Harbor,	Henry Pfeifer, Cologne, Atlantic co.,	L. P. Schmidt, Egg Harbor City, Atlantic co., . . . . .	.....
147	Wrightstown,	Rosha Thompson, Wrightstown, Burlington co.,	Samuel S. Fort, Wrightstown, Burlington co.,	Kate Meaney, Wrightstown, Burlington co.
148	Stanton,	John V. Painter, Stanton, Hunterdon co.,	Alice N. Smith, Stanton, Hunterdon co.,	Mrs. Jacob Hudnit, Stanton, Hunterdon co.
149	North Arlington,	Edw. Farier, Rutherford R. D. 4, Bergen co.,	Effie G. Millar, North Arlington, Bergen co.,	J. A. McKenna, Rutherford R. D. 4, Bergen co.
150	Burlington,	Wm. B. Shedaker, Burlington, Burlington co.,	Mrs. Hannah E. Shedaker, Burlington, Bur. co.,	Mrs. Amanda Bowne, Burlington, Burl. co.
151	Milltown,	G. A. Billings, New Brunswick, Middlesex co.,	F. H. Smith, Box 18, South River, Mid. co.,	Mrs. A. Perrine, N. Brunswick R. D. 3, Mid. co.
152	New Market,	B. DeWitt Giles, New Market, Middlesex co.,	F. O. Nelson, New Market, Middlesex co.,	Mattie Giles, New Market, Middlesex co.
153	Raritan Valley,	A. G. VanNest, South Branch, Somerset co.,	Mrs. C. S. Phillips, South Branch, Somerset co.,	C. S. Hamilton, South Branch, Somerset co.
154	Union,	Jesse Smith, Leesburg, Cumberland co.,	Wm. Newcombe, Leesburg, Cumberland co.,	Mrs. Maud Smith, Leesburg, Cumberland co.
155	Fairlawn,	Aaron Courter, Fairlawn, Bergen co.,	G. H. Demarest, Ridgewood R. D. 2, Ber. co.,	P. D. Henderson, Ridgewood R. D. 2, Ber. co.
156	Raritan,	John L. T. Webster, Hazlet, Monmouth co.,	J. P. Brower, Keyport, Monmouth co.,	Jas. C. Hendrickson, Middletown, Monm'th co.

SUBORDINATE GRANGES—CONTINUED.

21 AG Number.	GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
157	Farmingdale, ...	Jos. C. Winsor, Farmingdale, Monmouth co.,...	Clara Palmer, Farmingdale, Monmouth co.,....	Mrs. Sarah Merchant, Farmingdale, Mon. co.
158	Lafayette,	R. L. Everett Lafayette, Sussex co.,.....	Geo. C. Smith, Lafayette, Sussex co.,.....	Jacob S. Losey, Lafayette, Sussex co.
159	Whitehouse,	Grant Davis, White House, Hunterdon co.,....	Ethel M. Burdette, White House, Hunt. co.,..	W. H. Opie, White House, Hunterdon co.
160	Frankford,	Geo. A. McDonald, Branchville, Sussex co.,...	Robert O. Bale, Augusta, Sussex co.,.....	Mrs. Andrew Sherred, Branchville, Sussex co.
161	Shrewsbury,	J. C. Richdale, Red Bank, Monmouth co.,.....	A. C. McLean, Eatontown, Monmouth co.,....	H. C. McLees, Eatontown, Monmouth co.
162	South Seaville,..	L. T. Swain, Swainton, Cape May Co.,.....	Eli Townsend, Clermont, Cape May co.,.....	Paul Hensen, Clermont, Cape May co.
163	Titusville,	J. Warren Fleming, Titusville, Mercer co.,....	H. A. Drake, Titusville, Mercer co.,.....	Mrs. I. B. Scudder, Titusville, Mercer co.
164	Hardyston,	Caleb Farber, Hamburg, Sussex co.,.....	Minnie F. Little, Hamburg, Sussex co.,.....	Dr. J. G. Coles, Hamburg, Sussex co.
165	{ Farmers' Enterprise,	Sanford J. Crawen, Newton, Sussex co.,.....	Wm. S. Hardin, Newton, Sussex co.,.....	Geo. W. VanHorn, Newton, Sussex co.
166	Blue Anchor,....	Benj. Barrett, Blue Anchor, Camden co.,.....	Chas. H. Croft, Blue Anchor, Camden co.,....	Carrie E. Hunter, Blue Anchor, Camden co.
167	Palermo,	H. Stephens, Beesley's Point, Cape May co.,..	Jesse T. Young, Beesley's Point Cape May co.,.	Isabel Burer, Beesley's Point, Cape May co.
168	Glendola,	G. E. Rogers, Belmar R. D. 2, Monmouth co.,	F. C. White, Belmar R. D. 2, Monmouth co.,.	Annie E. Law, Asbury Park R. D. 2, Mon. co.
169	Millstone Valley,.	Geo. B. Randolph, Weston, Somerset co.,.....	E. M. Davis, Millstone, Somerset co.,.....	Mrs. R. R. Craig, Millstone, Somerset co.
170	Lawrenceville, ..	Richard W. Cook, Lawrenceville, Mercer co.,..	Chas. H. Smith, Trenton R. D. 4, Mercer co.,.	Frank Applegate, Princeton, Mercer co.
171	{ Washington Valley,	H. D. Opdyke, Martinsville, Somerset co.,....	L. C. Waldron, Martinsville, Somerset co.,....	Miss P. E. Davis, Martinsville, Somerset co.

Statistical Tables---Farm Crops.

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STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	CORN.			WHEAT.			RYE.			OATS.		
	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price.	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price.	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price.	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price.
Atlantic,	110	33	\$0 35	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bergen, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Burlington,	50	40	65	100	15	\$0 80	100	14	\$0 65	50	30	\$0 40
Camden,	90	35	55	100	20	90	.....	.....	.....	.....	.....	.....
Cape May,	90	25	60	75	15	.....	.....	.....	.....	.....	.....	.....
Cumberland,	95	38	50	65	12	82	.....	.....	.....	.....	.....	.....
Essex,	110	65	55	.....	.....	.....	105	25	70	60	15	45
Gloucester,	100	68	60	100	25	75	.....	.....	.....	.....	.....	.....
Hunterdon,	89	31	60	150	18	72	140	18	56	85	30	32
Mercer, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Middlesex,	100	30	50	100	18	75	110	18	56	75	20	40
Monmouth,	75	45	55	90	23	75	100	18	60	.....	.....	.....
Morris, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ocean, .....	.....	.....	50	.....	.....	68	.....	.....	.....	.....	.....	.....
Passaic, .....	.....	.....	.....	.....	.....	.....	.....	25	40	.....	.....	.....
Salem,	80	30	50	100	20	70	.....	.....	.....	.....	.....	.....
Somerset,	85	30	44	95	18	75	90	16	50	50	30	40
Sussex,	105	65	65	95	16	1 00	100	18	60	85	30	50
Union,	90	50	56	.....	.....	.....	75	25	60	50	40	40
Warren,	95	50	45	85	20	70	80	15	60	90	50	35

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	BUCKWHEAT.			HAY.			WHITE POTATOES.			SWEET POTATOES.		
	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price.	Product compared with last year—per cent.	Average yield per acre—tons.	Average price per ton.	Product compared with last year—per cent.	Average yield per acre—barrels.	Average price per barrel.	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price per barrel.
Atlantic,				75	1½	\$20 00	80	60	\$2 00	100	60	\$1 50
Bergen,				100	1	15 00	90		2 10	100		1 50
Burlington,				100	1¾	15 00	85	80	1 40	100	85	1 50
Camden,				125	1¾	15 00	125	35	1 70	90	40	1 25
Cape May,				95	1½	15 00	100	14	1 95	125	35	1 00
Cumberland,				100	1½	20 00	100	35	2 00			
Essex,				85	1½	16 00	100	75	1 60	95	80	1 75
Gloucester,				200	1½	16 00		90	2 50			
Hunterdon,	60	12	\$0 55									
Mercer,												
Middlesex,				110	1¼	15 00	110	50	1 50	100	50	1 50
Monmouth,				75	1½	17 00	80	60	1 15	100	50	2 00
Morris,												
Ocean,						13 00			1 50			1 50
Passaic,												
Salem,				75	1	15 00	100	30	1 50	100	45	1 50
Somerset,				80	1½	13 00	100	150				
Sussex,	95	25	70	125	1½	14 00	100		2 50			
Union,				110	1¼	22 00	75	35	2 00			
Warren,				85	1	16 00	90	24	65			

FARM CROPS.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	APPLES.			PEARS.			PEACHES.			GRAPES.		
	Product compared with last year—per cent.	Average yield per acre—barrels.	Average price per barrel.	Product compared with last year—per cent.	Average yield per acre—barrels.	Average price per barrel.	Product compared with last year—per cent.	Average yield per acre—baskets.	Average price.	Product compared with last year—per cent.	Average yield per acre—pounds.	Average price per pound.
Atlantic,	10	10	\$2 00	100	100	\$1 00	500	400	\$0 50	125	2,500	\$0 03½
Bergen,												
Burlington,	60		2 50	90		1 25	50		1 25	90		4½
Camden,	70			85	80	75				100	7,000	2¼
Cape May,	35			125		1 00	200		50	150	3,000	1¾
Cumberland,	90	50	2 50	110	100	1 10	75	200	70			
Essex,	25			200			100			110		
Gloucester,	100	30	1 50	100		1 00	110		40			
Hunterdon,	80		1 00					250	95			
Mercer,												
Middlesex,	60	45	2 00	125	100	70	100		1 00			
Monmouth,	25			75		70	25			50		
Morris,												
Ocean,			1 75									
Passaic,												
Salem,			1 25									
Somerset,	50		1 25						60	50		06
Sussex,	25		2 00	100		1 50	60					
Union,	150		1 25									
Warren,	10		2 00	75		1 50	80		1 25	75		05
Warren,	40	25	60	50		1 00	60		1 00	90		15

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	STRAWBERRIES.			RASPBERRIES.			BLACKBERRIES.			WATERMELONS.		
	Product compared with last year—per cent.	Average yield per acre—quarts.	Average price per quart.	Product compared with last year—per cent.	Average yield per acre—quarts.	Average price.	Product compared with last year—per cent.	Average yield per acre—quarts.	Average price.	Product compared with last year—per cent.	Average yield per acre.	Average price per hundred.
Atlantic,	110	2,200	\$ 05	50	1,000	\$ 07	110	2,700	\$ 06	.....	.....	.....
Bergen, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Burlington,	75	.....	08	100	.....	10	90	.....	09	100	.....	\$15 00
Camden, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cape May, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland,	50	300	05½	.....	.....	.....	.....	.....	.....	50	.....	5 00
Essex,	100	.....	.....	100	.....	.....	90	.....	.....	90	1,500	9 00
Gloucester,	100	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hunterdon, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mercer, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Middlesex,	100	.....	10	.....	.....	.....	.....	.....	.....	50	.....	15 00
Monmouth,	100	.....	.....	100	.....	.....	100	.....	.....	25	.....	.....
Morris, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ocean, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Passaic, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salem, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Somerset,	75	.....	07	50	.....	10	40	.....	10	.....	.....	.....
Sussex, .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union,	100	.....	10	40	.....	12	50	.....	15	.....	.....	.....
Warren,	75	.....	10	40	.....	10	50	.....	10	.....	.....	.....

FARM CROPS.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	CITRON MELONS.			CUCUMBERS.			CABBAGES.			TOMATOES.		
	Product compared with last year—per cent.	Average yield per acre —baskets.	Average price per basket.	Product compared with last year—per cent.	Average yield per acre	Average price per basket.	Product compared with last year—per cent.	Average yield per acre.	Average price.	Product compared with last year—per cent.	Average yield per acre —Tons.	Average price per basket.
Atlantic,							50	2,000	\$4 00	50	1½	\$0 30
Bergen,												
Burlington,	110		\$0 35	100		\$0 25	80		4 00	50		40
Camden,										75	0	35
Cape May,	50		25							50	4	30
Cumberland,	50		30				100	750		100	3	
Essex,							100			100		
Gloucester,	25	55	30	100	300	30	70	300		100	4	30
Hunterdon,												
Mercer,												
Middlesex,	110		75									
Monmouth,	25						100	5,000	3 00	75		30
Morris,										100		
Ocean,												
Passaic,												
Salem,										100	4	
Somerset,										80		30
Sussex,							65		3 50			
Union,							50		5 00	75		40
Warren,							80	500	2 50	85		60

STATISTICAL TABLE OF FARM STOCK AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	HORSES.		MULES.		COWS.	
	Total number compared with December 1st, last year, per cent.	Average price between 3 and 7 years old.	Total number compared with December 1st, last year, per cent.	Average price between 3 and 7 years old.	Total number compared with December 1st, last year, per cent.	Average price between 3 and 7 years old.
Atlantic,	100	\$200 00	100	\$200 00	100	\$50 00
Bergen,	100	175 00	110	225 00	90	40 00
Burlington,	100	175 00	100	190 00	100	45 00
Camden,	100	140 00	100	125 00	100	40 00
Cape May,	100	200 00	100	100	110	50 00
Cumberland,	100	150 00	100	100	100	60 00
Essex,	100	160 00	100	100	105	50 00
Gloucester,	100	150 00	100	150 00	90	30 00
Hunterdon,	100	200 00	100	200 00	100	45 00
Mercer,	100	150 00	100	150 00	100	40 00
Middlesex,	100	150 00	100	150 00	100	40 00
Monmouth,	100	150 00	100	150 00	100	40 00
Morris,	100	150 00	100	150 00	100	40 00
Ocean,	100	150 00	100	150 00	100	40 00
Passaic,	100	150 00	100	150 00	100	40 00
Salem,	100	150 00	100	150 00	100	40 00
Somerset,	100	140 00	75	125 00	115	45 00
Sussex,	105	140 00	100	100 00	100	60 00
Union,	100	125 00	100	100 00	90	40 00
Warren,	40	175 00	100	100 00	40	50 00

FARM CROPS.

STATISTICAL TABLE OF FARM STOCK AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	VEAL CALVES.		SHEEP.		LAMBS.		SWINE.		TURKEYS.		CHICKENS.		WINTER WHEAT.		WINTER RYE.	
	Total number compared with December 1st, last year, per cent.	Average price per pound for season.	Total number compared with December 1st, last year, per cent.	Average price per head for store sheep.	Total number compared with December 1st, last year, per cent.	Average price per head for spring lambs.	Total number compared with December 1st, last year, per cent.	Average price per pound December.	Total number compared with December 1st, last year, per cent.	Average price per pound November and December.	Total number compared with December 1st, last year, per cent.	Average price per pound November and December.	Area sown compared with last year—per cent.	Average condition December 1st.	Area sown compared with last year—per cent.	Average condition December 1st.
Atlantic,	100	\$0 07					100	\$0 08			100	\$0 16			100	100
Bergen,																
Burlington,	90	07	90	\$4 00		\$6 00		08½		\$0 23		18	100	100	100	
Camden,							100	08		20	100	15	100	100	100	
Cape May,		06					75	08		100	20	100	80	100	150	100
Cumberland,	100	06½					95	09		100	14	125	15	100		
Essex,	100						100			100		100	100	100		
Gloucester,	100	07	100	5 50		6 50		08				18	100	100		
Hunterdon,	100	08	100		100		105	08½		90	20		12	100	100	90
Mercer,																
Middlesex,	100	07	100	5 00	100	4 50	90	08		100	25	100	15	100	90	100
Monmouth,	100	05	100	7 00	100	5 00	100	08		60	25	100	16	100	100	100
Morris,																
Ocean,																
Passaic,																
Salem,							90	08								
Somerset,	100	07								25	21	125	17	75	100	
Sussex,		07½	100	6 00	100	4 75	100	07		60	25	100	12	100	85	110
Union,	105	07	100		100	6 00	110	08		105	20	115	11	95	105	95
Warren,	80	06½	70	5 00	75	5 00	70	07¼		35	28	80	15		100	100
													90	75		

Reports of County Boards of Agriculture.

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Atlantic County.

OFFICERS FOR 1907.

<i>President</i> , L. H. PARKHURST,	Hammonton
<i>Vice-President</i> , JOSEPK BUTTERHOF,	Egg Harbor City
<i>Secretary</i> , VALENTINE P. HOFMANN,	Egg Harbor City
<i>Treasurer</i> , WILLIAM LIEPE,	Cologne

DELEGATES TO STATE BOARD OF AGRICULTURE.

JOSEPH BUTTERHOF, for two years,	Egg Harbor City
L. H. PARKHURST, for one year,	Hammonton

BOARD OF DIRECTORS.

J. E. HOLMAN, Fruit Shippers' Union,	Hammonton
HENRY PFEIFFER, Germania Fruit Growers' Union,	Cologne
CHARLES NELSON, Hammonton Grange,	Hammonton
EMORY SCHULTZ, Egg Harbor Grange,	Egg Harbor City
CHARLES KRAUS, At-Large,	Egg Harbor City

REPORT

BY THE SECRETARY.

That the interest in Farmers' Institutes in this county is not waning was shown by the large attendance which was bestowed upon both Institutes, held in different parts of the county.

The first was held at Hammonton, on December 11th, 1906, with the following program:

"Management of Orchards," by Prof R. L. Watts; "The Fertility of the Land—How to Increase and Maintain It," by Jared Van Wagenen, Jr.; "A Few Words for the Cow and for Better Dairying," by Mr. Van Wagenen; "The Farm Market Garden and Small Fruit Culture," by Prof. Watts; "Sweet Potato Production," by Charles Chalmers; "Dry Feeding—the New Poultry Culture," by Mr. A. F. Hunter; and "America's Beauty Spots," by Rev. D. E. Clair.

The second Institute was held at Germania, on January 25th, 1907, where all sessions were well attended, especially by the younger farmers, and included the following program:

Remarks by Conductor, "Farm Wastes"; "How to Study Your Soil, How to Maintain Fertility," by J. G. Curtis; "How Can the Farmer Prevent and Overcome the Common Diseases of Farm Animals," by Dr. C. D. Smead; "The Man with the Cow—How Shall He Care for and Feed Her to Secure the Largest Profit," by Mr. H. E. Cook, was practically demonstrated in a near-by barnyard; "Sweet Potato Production," by Charles Chalmers; "The Production of Early Tomatoes for Market," by C. C. Hulsart; "The Place for Clover Crops," by Mr. Curtis; "Spraying Mixtures and Methods," by E. L. Dickerson, assistant to Prof. J. B. Smith; "Astride the Backbone of the American Continent and Beyond," by Rev. D. E. Clair.

GENERAL REMARKS.

The season of 1906 opened rather unfavorably with a drought of nearly a month's duration, which acted quite adversely on a number of crops. It was followed by an extended rainy season, which benefited a number of other crops. The first frost in this neighborhood occurred about October 12th.

The following crops showed a decrease compared with 1905: Hay, white and sweet potatoes, strawberries, raspberries, blackberries, cabbage and tomatoes.

The apple crop, on account of leaf blight, was nearly a total failure.

Corn, peaches, pears and grapes showed an increased yield.

Very little winter grain is grown in this county; what is grown is mainly used for forage or soiling purposes.

The prices realized for farm products were somewhat higher than in 1905.

Spinal-meningitis carried off a number of valuable horses, otherwise the health of farm animals was generally good.

Bergen County.

OFFICERS FOR 1907.

<i>President</i> , JOHN F. BOMM,	Westwood
<i>Vice-President</i> , CHAS. C. BASLEY,	Maywood
<i>Secretary</i> , GEORGE P. F. MILLAR,	North Arlington
<i>Treasurer</i> , FREDERICK V. STROHSAHL,	Park Ridge

BOARD OF DIRECTORS.

FREDERICK M. CURTIS,	Harrington Park
ABRAM C. HOLDRUM,	Westwood
MALCOLM H. ANGELL,	Etna
JOHN C. VAN SAUN,	Maywood
HERMAN TICE,	Woodcliff
WILLIAM BRANDENBURG, JR.,	North Arlington
JOHN H. ACKERMAN,	Teaneck
JOHN ACKERMAN,	Wyckoff

DELEGATES TO STATE BOARD.

JOHN F. BOMM, for two years,	Westwood
A. G. SMITH, for one year,	Wyckoff

REPORT

BY THE SECRETARY.

The Board held six meetings during the past year, four business meetings and three Institutes; one of these was held in February in connection with a quarterly meeting, forming the Spring Institute.

There is more interest manifested from year to year in our Board, which shows that the farmers are realizing the value of the work, which has also been taken up by the Grange.

The Spring Institute, held at Wyckoff, had a good attendance of farmers, ready to receive and practice new methods as given

by Prof. George F. Warren, who prepared Bordeaux mixture three ways and explained each.

The Fall Institutes were held at Wyckoff and Woodcliff on succeeding days, which caused smaller attendance at both places. Besides the regular speakers furnished by the State, F. M. Curtis, Henry Hales and Mr. Kevitt spoke.

At Wyckoff there were two sessions on the program, but as the train does not run until late in the evening, Mr. Frederick M. Curtis gave some valuable information concerning the care of bees, making in all three sessions. Between these sessions the ladies of the Franklin Grange furnished lunch. At Woodcliff three sessions were scheduled. The ladies of the Pascack Grange furnished a fine dinner and supper, and the Pascack choir rendered selections between the addresses.

Bergen county, lying as it does near three large cities: New York, Newark and Paterson, intensified market gardening is carried on on a large scale. But some parts are so remote that general farming is alone profitable. Some farmers, near cities or large towns, have gone into dairying on a large scale; some have silos, and one has gone so far as to have a steam plant to milk.

Fruit and poultry are profitable in Bergen county. The ravages of the San José scale are being kept down on some farms by the proper use of the oil, and the lime and sulphur sprays. Unsprayed orchards dying gives the sprayer courage to put up a hard fight to save his orchard. Crops of fruit were short, but prices were higher, which made it about even. Poultry raising is generally carried along with fruit growing. More poultry, better and purer breeds are being kept.

The great drawback to agriculture is the labor question. Machinery, wherever possible, is used, the best being procured. Straighter rows and anything to save labor, as it is almost beyond obtaining.

Burlington County.

OFFICERS FOR 1907.

President, SAMUEL FORT,Wrightstown
Vice-President, LEVI DUDLEY,Moorestown
Secretary, BENAJAH P. WILLS,Mount Holly

DIRECTORS.

EZRA E. DARNELL,Mt. Laurel Farmers' Club
 GEORGE L. GILLINGHAM,Moorestown Grange
 W. D. COWPERTHWAIT,Medford Grange
 W. J. MCFARLAND,Rancocas Grange
 AMER GAUNTT,Columbus Grange
 HENRY LIPPINCOTT,Pemberton Grange
 W. T. BAGGS,Burlington Grange
 VICTOR M. DAY,Crosswicks Grange
 R. THOMPSON,Wrightstown Grange

DIRECTOR-AT-LARGE.

EZRA ENGLE,

DELEGATES TO STATE BOARD.

W. S. TAYLOR,2 years
 JOHN C. DUDLEY,1 year

REPORT.

BY THE SECRETARY.

The winter of nineteen hundred and five and the spring of nineteen hundred and six, just past, was one of the mildest for several years; very little snow fell during the time. The farmers had an opportunity to do much of their spring work, and many fields were plowed during the pleasant weather.

It was well that such was the case, as many of them were unable to get sufficient help to assist them in getting their spring

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work done and prepare for seeding. The greatest obstacle the farmer has to contend with at the present time is the scarcity of help in and out of doors.

The wheat crop was a large one, both in grain and straw, while the price was not as satisfactory as desired.

Rye was a good crop also, both in straw and grain; straw was very low in price in the first part of the year, though it advanced later in the fall, but not very high.

The dry weather in the month of April and May shortened the hay crop very materially, and it was not more than two-thirds of a normal one.

The dry weather in May interfered much with pasture, and it became very short, scarcely sufficient to feed the stock, though when the rains came in the latter part of July and August it made abundance of fall pasture and second-crop hay.

Milk. The production of milk is on the decrease, and many dairymen are going out of the business on account of the scarcity of help, the high price of cows, the high price of feed, and that they are compelled to sell milk by dry measure and fill cans containing from forty-five to fifty quarts of milk and receive pay for forty, while the dealer sells it to the consumer for just what it is, liquid measure, and receives pay for the forty-five to fifty quarts, double the price the producers receive, and the producers pay the freight. Producers and consumers should make a move at a very early date to have some legislation upon this matter, as it is impossible for the producers of milk to continue to sell it at the price they are receiving, while everything they are compelled to use for the production of milk has increased from fifty to one hundred per cent. It is the most slavish business that a man can engage in, because he is compelled to arise in the morning about four o'clock to prepare his milk for market, and they claim, and justly so, that trucking and other branches of farming are more profitable, require less work and are not so confining as the production of milk.

Potatoes. The acreage of potatoes was much greater than the previous year, while the yield was much less on account of many potatoes rotting, owing to heavy rains and hot sun in the latter

part of July and August, though the price was better than the year of nineteen hundred and five.

Boiling Corn was less than a full crop. The dry weather the first of the season and the wet weather later on interfered very much with its growth and maturity.

Cantaloupes suffered very much from heavy showers, and cold, damp nights interfered with producing a full crop; consequently, it was not more than one-half a crop and of very poor flavor.

Pork. The production of pork is not as great as in previous years. It appears to be on the decrease, although the price is good and would be a profitable business at the present time.

Very few sheep are fed for market in this section, and scarcely any for raising early lambs. Those who engage in the business are well paid for their work.

Turkeys are not plentiful, and seem to be very delicate and difficult to raise; consequently, they are in great demand and prices high.

Eggs are high and scarce at this season of the year.

The squab industry appears to be on the decline, as the business seems to be overdone.

Cranberries suffered by the late frosts in the spring and the heavy floods and vine worm, and the crop was one-third short, but the price was very satisfactory.

Peaches. In the early part of the season it looked as though we would have a big crop of fruit, but the wet weather and hot sun destroyed the greater part of them; consequently, they were not more than one-third of a crop and very poor quality.

Cherries were in abundance, and many were not picked on account of the low price obtained for them.

There is a great complaint among the dairymen who have had the misfortune to be troubled with tuberculosis in their herds, and have been compelled to have many of their cows slaughtered by order of the State. They feel that it is unfair for them not to receive more than one-half of the value of their cows. No matter how valuable a cow one has, under the present law he cannot receive more than thirty dollars for her, and he is compelled to replace the cow and pay from sixty to sixty-five dollars for one

that is not as good. They feel it is no more than just that if they are unfortunate to have tuberculosis in their herds, they should receive the value of their animal, as slaughtering their cows to prohibit the spread of the disease is a benefit to the people, as it is unhealthy for the consumers of milk to use milk from a diseased cow, and the one and only way to stamp out the disease, in my opinion, is to pay the farmer for just what his cow is worth. I think every reasonable person will agree with me in this respect, as it is unfair for him to make such a loss and sacrifice.

CLIMATIC HISTORY OF BURLINGTON COUNTY, N. J., 1906.

The latest killing frost in spring was May 11th (35°); the earliest in autumn October 12th (30°), making 154 days for out-of-door growth of tender vegetation. The frost of May 11th was very harmful, killing many tomato and sweet potato plants. There were no abnormal extremes of temperature during the year.

There was a very light snowfall. The rainfall and melted snow was about four inches greater than average.

The rainfall in April and May was so light that many crops were affected adversely. Throughout the rest of the year rain supply was abundant.

The individualizing feature of the year was the five visitations of breaking, drenching, soil-washing downpours of rain. That of June 16th, 4.25 inches in 24 hours, and 6.12 in storm; this being exceeded but twice in 43 years' record. That of July 3d and 4th, 2.41 inches in 24 hours. That of August 2d and 3d, 3.46 inches in 24 hours, and 5.30 inches for storm. That of September 12th, 3.50 inches in 12 hours, and 3.99 inches for storm. That of October 5th, 1.67 inches, washing very badly.

The precipitation for August was 9.43 inches, being exceeded during record only by August, 1882, 9.44 inches, and August, 1903, 10.37 inches. On coarse, without subsoil, sands these downpours were very harmful, carrying away the soluble elements of applied fertilizers. Where there were retentive subsoils such results did not occur, but much harm ensued from washing of surface soils and roads.

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After September 13th there was a period of fine weather that developed fine quality in melons and tomatoes.

Rainfall in 140 days not equaled during record.

Corn fodder was upright throughout the season, with scarcely a blade stripped off by wind.

CLIMATIC HISTORY OF BURLINGTON COUNTY, N. J., IN RELATION TO AGRICULTURE, FOR THE YEAR 1906. BY THOMAS J. BEANS.

Obs. Lat., 40°; Long., 74° 54'; Elevation above tide, 71 ft.

	Temperature.			Rain and Melted Snow—Inches.	Snow—Inches.	Number Days 0.01 in. or more of Rain Fell.	Number of Clear Days.	Number of Partly Cloudy.	Number of Cloudy Days.
	Maximum— Degrees.	Minimum— Degrees.	Mean— Degrees.						
January,	72	5	37.2	2.85	2.3	12	7	8	16
February,	61	4	32.2	2.06	5.2	7	14	5	9
March,	58	13	35.4	5.37	6.8	16	8	9	14
April,	81	26	52.4	2.71	.....	8	13	8	9
May,	90	35	62.1	2.66	.....	11	16	7	8
June,	92	48	71.5	7.33	.....	13	8	12	10
July,	90	53	73.8	4.11	.....	14	13	11	7
August,	92	62	75.2	9.43	.....	18	5	8	18
September,	89	45	69.2	3.99	.....	6	13	9	8
October,	75	29	55.1	4.20	.....	14	7	6	18
November,	68	22	44.3	1.70	.....	7	16	5	9
December,	65	8	34.2	3.34	0.6	14	7	7	17
Year,	92	4	53.6	49.75	14.9	140	127	95	143

Camden County.

OFFICERS FOR 1907.

President, MARTIN SCHUBERT,Kirkwood
Vice-President, R. COOPER MORGAN,Blackwood
Secretary and Treasurer, DANIEL W. HORNER,Merchantville

DIRECTORS.

MR. AND MRS. JACOB LIPPINCOTT,Kirkwood
MR. AND MRS. TIMOTHY S. FOX,Laurel Springs
MR. AND MRS. ALVIN EBERT,Ashland
MR. AND MRS. M. COOPER BROWNING,Merchantville
MR. AND MRS. H. H. BELL,Mt. Ephraim
MR. AND MRS. JOHN GARWOOD,Ashland
MR. AND MRS. AMOS HAINES,Ashland
MR. AND MRS. S. R. COLES,Merchantville
MR. AND MRS. WATSON MATLACK,Haddonfield
MR. AND MRS. R. LEVIS SHIVERS,Camden
MR. AND MRS. A. H. HURFF,Berlin
CLARENCE ENGLE,Kirkwood

DELEGATE TO STATE BOARD.

DANIEL W. HORNER,2 years

REPORT.

The twenty-third annual meeting of the Camden County Board of Agriculture was held at Blackwood November 23d, 1906. It is our custom to hold these meetings alternately at Haddonfield and Blackwood. Local talent to a large extent is billed, and speakers unselfishly give their experience, in fact it is the aim to make these meetings experience meetings—to that end specialists in their line are often called to contribute. Political, economic and educational questions are also considered, as the following program for 1906 will show :

Address by the President, and reading of minutes of last meeting, election of officers; "The Milk Question," by Wm. Goldy; "Book-keeping on the Farm," by Chas. Barton; "The Education for the Boy of the Future," by Sam'l Allen of Moorestown, N. J.; "Woman as a Factor in the State," by Mrs. Lucretia Blankenberg of Philadelphia; "Experiences and Observations in the West," by Chas. Stevenson; "Asparagus Culture," by Frederic Sleater. The following questions were also submitted to various persons in the audience: "Has the equal taxation measure, or the present method of assessing property reduced your taxes, and is the measure a success in your neighborhood?" "The Government prohibits many of its employes from working more than eight hours a day, many mechanics work but eight hours a day—what would be the effect upon the farming industry and upon the community in general if farmers were to adopt that custom?" Have you been successful in canning fruits and vegetables this season—if so, please give your method?"

It was a varied program, the subjects were interesting and brought out a good deal of interest on the part of the audience; facts and figures were given by the speakers. Opinions were freely exchanged, as the subjects in their entirety provoked a deal of discussion. The automobile got a share of attention, the consensus of opinion being that in spite of the drastic Free-linghuysen measure, the road hog is still driving his machine among us. Two Farmers' Institutes were held this year, one at Haddonfield and one at Berlin, presided over by Secretary Dye of the State Board; but one has been held heretofore. Both meetings were largely attended, showing that the standard is being raised all along the line. In general the farmers in Camden county show but little discontent. While there has been partial failure in some crops, the prices have ruled fairly remunerative, and there are but few instances where the buckling strap don't lap over a few inches. The San José Scale is still with us, and, though small, is yet a big thing. While there is no hope, of course, that it will ever be exterminated, there is a hope that the volatile oils will keep it in check; but little faith is placed in the efficiency of lime, salt and sulphur, as many of

CAMDEN COUNTY.

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our fruit growers can testify. Through the influence of a "know all" farm paper, many of us were induced to discard the oils and use the lime, salt and sulphur, with the result that we are out a good many trees. There are some districts which have it yet to learn. Quite a number of our people visited New Brunswick on the "Field Day" occasion, and our county is represented in the Short Course study.

Cape May County.

OFFICERS FOR 1906-1907.

President, DR. E. H. PHILLIPS,Cape May City
Vice-President J. D. LUDLAM,South Dennis
Secretary, J. W. PINCUS,Woodbine
Treasurer, VOLNEY VAN GILDER,Ocean View

DIRECTORS.

HARRY LEAMING, Lower Township,Fishing Creek
HOWARD HOFFMAN, Lower Township,Cold Spring
CLINTON CRESSE, Middle Township,Cape May Court House
WINFIELD COOMBS, Middle Township,Goshen
HON. F. L. LUDLAM, Dennis Township,South Dennis
HON. J. D. LUDLAM, Dennis Township,South Dennis
WASH. VAN GILDER, Upper Township,Petersburg
N. S. YERKES, Upper Township,Tuckahoe
O. O. BARR,Cape May City
A. D. T. HOWELL, Cold Spring Grange,Dias Creek
J. P. MACKISSIC, Dias Creek Grange,Cold Spring
Z. A. TOWNSEND, Upper Township Grange,Tuckahoe
T. E. VAN GILDER, South Seaville Grange,Ocean View

DELEGATES TO STATE BOARD OF AGRICULTURE.

DR. E. H. PHILLIPS (one year),Cape May City
RALPH SCHELLINGER (two years),Green Creek

REPORT

BY THE SECRETARY.

During the past year two meetings of the Board were held. The first on January 31st at Cape May Court House. This meeting was largely devoted to the program provided by the Farmers' Institute. Very interesting and instructive addresses were delivered by Dr. C. D. Smead, Professors G. M. Gowell, G. F.

Warren, J. G. Lipman and H. A. Surface. The former spoke on "Poultry Problems," and gave some very valuable instructions and suggestions to the farmers.

The second meeting was the annual meeting; it was also held at Cape May Court House, on November 1st, when the officers were elected for the year and other routine business was transacted.

Mr. J. Wolferth, tomato grower of Clarksboro, N. J., delivered a very interesting paper on "Growing Tomatoes," with particular reference to grading and packing them for market.

A new Grange at South Seaville has been organized during the past year, which makes the total number of Granges four. About five years ago there were no Granges in the county.

With the increase of the Granges we may hope for an increased attendance at our agricultural meetings and farmers' institute.

General Standing of Agriculture—The season of 1906 was, on the whole, quite favorable to most of the farm crops. In the spring, particularly May, there was somewhat of a deficiency in the rainfall, but August and September were exceedingly wet. This latter condition injured the tomatoes for canning, and prevented many farmers from cutting their salt meadows, and as a result good meadow hay is scarce and high in price. The moist weather injured the growth of cantaloupes also, and in some sections caused mildew on the lima beans.

The crop of potatoes was very good. Sweet potatoes yielded a fair crop.

The lima bean is becoming quite a profitable crop, and its area is slightly increasing.

Peaches yielded a heavy crop, and the prices were fairly remunerative.

Strawberries were injured by drought and yielded very poorly.

Grapes yielded a good crop. Several growers of Woodbine reported over two tons per acre.

Crimson clover was cut for hay at Woodbine, and it was excellent. Some cow peas were also made into hay. Crimson clover, cow peas and soja beans are remarkably well adapted to our soils, and should be more generally used for soil improvement.

CAPE MAY COUNTY.

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A new canning factory was established in Goshen, which makes four canning factories for the county. There was a large acreage of tomatoes planted, and the canning people paid \$8 per ton. Very few farmers had very large yields, most yields were very small.

Army worm invaded the Woodbine Land Company's Farm and destroyed about ten acres of millet, also injured Indian corn and Kaffir corn. The worms were discovered about the 20th of August, but, owing to continuous rainy weather, no strenuous efforts were made until September 1st. The pest was prevented from migrating into other fields by digging trenches two feet deep and one to one and one-half feet wide. The worms after falling into these ditches could not get out. The outside rows of crops were sprayed with paris green, and the worms were also sprayed with kerosene.

Cumberland County.

OFFICERS FOR 1907.

President, E. L. BOLLES, Vineland
Vice-President, WILLIAM SHUTE, Bridgeton
Secretary and Treasurer, CHARLES H. DUNSAFE, Cedarville

EXECUTIVE COMMITTEE.

CHARLES WALLACE, Greenwich Township
JACOB ZIMMERMAN, Millville Township
JOSEPH SHROPSHIRE, Commercial Township
THEOPHILUS DICKINSON, Stow Creek Township
WINFIELD S. BONHAM, Hopewell Township
D. K. BURGE, Landis
JEREMIAH CHAMBERS, Maurice River
EDWIN DIAMENT, Lawrence
ELI WHARTON, Downe

DELEGATES TO STATE BOARD.

ROBERT PEACOCK (two years), Deerfield
ARTHUR SEABROOK (one year), Dearfield

REPORT.

BY THE SECRETARY.

The Cumberland County Board of Agriculture held its annual meeting at the Court House, Bridgeton, when the Treasurer made his annual report, and the officers were elected for the ensuing year.

Mr. Jacob Zimmerman spoke on the need for improving the soil, and said the problem in this section is to properly fertilize the soil without using up all the profits made on the farm.

Others spoke on the milk question, saying that there was considerable money lost to the farmers and dairymen by the fact

that they sold their milk by dry measure. The milk cans hold forty-six and one-half quarts liquid measure, but the dealers pay for only forty quarts. It was suggested that the Board petition the Legislature to pass a law making it a misdemeanor to sell milk by dry measure or forty-six and one-half quarts for only forty quarts.

This was considered by some to be a matter between the farmers and the dealers. It was stated that at the State Grange meeting the subject was brought up, and no action was taken, as the standard measurements, both dry and liquid, are already established by law.

A member facetiously remarked that the farmers are liberal; they like to sell generous measure and enjoy giving 46 quarts of milk for the price of 40.

The plan of forming a Milk Association was advanced, the idea being that all the farmers and dairymen should agree on the price of milk at wholesale, and should sell by liquid measure. The sense of the meeting seemed to be that the farmers should receive and will receive fair treatment at the hands of the dealers. Arthur Seabrook, delegate to the annual meeting of the State Board, gave a report of the interesting sessions held, and brought out some of the points made by the able speakers present. He spoke particularly of farming affairs in the Province of Ontario and in Denmark.

Some considerable time was taken up with discussion about alfalfa, President Bolles giving his experience along that line. This and the experience of others showed that once alfalfa is fairly started, one can cut from it three or four times a year.

The matter of selling milk was left with the Pomona Grange, each member present agreeing to have the question brought before the Grange of which he is a member. Delegates to Pomona Grange will then be ready to take definite action.

Prof. Edward B. Voorhees, of the State Experiment Station, was the speaker for the afternoon. He spoke on feed and fertility, and showed how closely the two are allied, and how important both are to the agriculturist. In discussing the balancing of rations he discussed the question often asked as to whether

the farmer should raise all the feeds needed or whether he should buy the finer ones. He then went on to show that crops well selected and sown in proper rotation, not only furnished well balanced rations for the stock but actually increased the fertility of the soil if properly managed. He declared that there had been greater development and advancement in agriculture during the last fifteen years than in any other science. He also highly recommended the growing of alfalfa, as it contains the elements most necessary to the well being of a farm.

The address was largely of a technical nature, but was presented in a pleasing style and appealed strongly to the farmers present.

This has been a fairly prosperous season for the farmer of Cumberland county, except in Lawrence township, where floods and hail did much damage to crops and fruit.

The Grange has gained in members in this county in the past year. A new Grange was organized in Cedarville last fall with twenty-one members; it numbers now about seventy, with more to come in very soon. The Grange is a great educator to the farmer, and Mr. Robert Peacock, the County Deputy, deserves much credit for the interest he takes in Grange work. The hired help question is a serious one for the farmers of this county. So much of the help that is available is not what it should be in regard to morals. We want men who have ability as helpers; who will do honest work when not watched; but above all are clean in moral character. There is a close relationship between the hired man and the boys and girls of the home.

The Farmers' National Congress did some good resolving, but it wants us farmers to back up the resolutions with red-hot letters to our congressmen. We want parcel-post, and don't care to have the free-seed humbug longer perpetuated.

There are certain localities particularly adapted to the growing of certain vegetables, and advised the farmers to get their seed from these localities.

He gave directions for selecting and testing seeds.

This lecture was particularly useful at this time, as several of our members had reported a partial or total loss of their crops, which by Mr. Hulsard's help we were enabled to trace to poor seed.

An interesting discussion followed.

Dr. Ward, delegate to the State Board of Agriculture, reported.

The address of the President, Prof. Voorhees, was very highly spoken of.

Secretary Dye's report was favorably received, and the members of our board expressed their sympathy and hopes of a speedy recovery from his illness.

Our third meeting was held March 10th.

The first topic on the program was "Fertilizers and the Best Methods of Application."

Second topic, "The Composition of Fertilizers."

A resolution was passed requesting the Secretary of the Board to write our representative in the Legislature (Mr. W. F. Morgan) that we as a Board endorse the bill allowing trolley companies to carry freight, and request him to do all in his power to have it passed.

The members combined their orders for fertilizers and purchased in carload lots.

Our fourth meeting was held November 16th.

The principal topic was "Reports on Crops, their Successes and Failures."

This was a very interesting meeting, allowing members to compare their methods and results, and probable causes of poor crops.

A committee was appointed to communicate with other organizations in regard to co-operating in purchasing.

Our annual meeting was held December 12th, when President Crane delivered his annual address. He spoke of the prosperity of the farmers, and advised, as a means of making farming more profitable, and reducing the cost of fertilizers by the growing of nitrogenous crops, such as clover, cow peas, &c.

ESSEX COUNTY.

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The Secretary gave a report of the meetings of the year which showed an increasing interest.

Officers and delegates were then elected for the year.

Dr. J. B. Ward gave a report on the Short Course in agriculture and spoke of the advantages offered.

A Farmers' Institute was held in the Verona Methodist Church February 6th.

Owing to the sickness of Secretary Dye, Mr. J. T. Cox had charge of the Institute. It was very interesting and well attended.

We can report for this county three crops above the average.

The season has been very favorable for corn and a large crop has been harvested.

Rye we report above the average.

Pears, especially the Keifer, a large crop, but size smaller than usual.

Hay an average crop, but the wet weather the latter part of June and first of July interfered in the harvesting.

Peaches, strawberries, raspberries; white potatoes, cabbage and tomatoes were an average crop.

Apples were very poor.

Alfalfa about a failure. Impossible to get a stand.

Nearly all our farmers are producing milk, and are complaining of the high price of feeds and low price of milk: 3-3½ cents in summer, 3½-4 cents in winter.

Gloucester County.

OFFICERS FOR 1907.

President, ELMER E. CLEMENT,Thorofare
Vice-President, LEWIS M. MORGAN,Woodstown, R. F. D.
Secretary, M. ELLA MORGAN,Woodstown, R. F. D.
Treasurer, WM. H. BORDEN,Mikleton

EXECUTIVE COMMITTEE.

GEO. C. TONKIN,Mullica Hill, R. F. D.
 EMMA CARTER,Mickelton
 DEBBIE KIRBY,Mullica Hill, R. F. D.
 SUE M. BROWN,Swedesboro
 BARCLAY D. KILLE,Swedesboro

DELEGATES TO STATE BOARD.

MASON CARTER (two years),Clarksboro, R. F. D.
 JOHN WOLFERTH (one year),Clarksboro, R. F. D.

REPORT.

BY THE SECRETARY.

The Board held four meetings during the year, had very interesting program at each meeting, and all questions well discussed.

Some of the topics under consideration were:

“How would you protect the women and children on our farms from the outrages committed by the ruffians that infest our rural districts?”

“Some points on which is the more profitable, the hen or cow?”

“The Farmer’s Garden: How large, what to plant and how to care for it?”

“What is your experience in spraying white potatoes with Bordeaux Mixture?”

“What benefit, if any, is to be derived from the closing of our small public schools?”

“Proper packing.” Using tomatoes in actual pack.

“What are the most urgent needs of the farmers to-day?”

“Some methods of canning peaches.”

“What are the advantages of improved farm machinery?”

“What is your experience with cover crops?”

“The meat supply for the farmer’s table.”

“Does the steam cooker save time and fuel?”

There were two Institutes held in the county during the year.

A very interesting Institute was held at Mullica Hill on November 15th, 1906. Prof. R. L. Watts spoke on “The Management of the Orchard,” “The Farm as a Factory,” and “Agricultural Education.”

Jared Van Wagenen, Jr., spoke on “The Fertility of the Land and How to Maintain it,” “The Building of the Dairy Herd,” and “The Education of the Farm Boy.”

Some other subjects were: “Poultry and Egg Production as a Business,” “How to Grow a Large Crop of Potatoes.”

Two very good essays, one “A Pea for the Common People,” and the other on “Sunshine.”

An Institute was also held at Williamstown on December 19th.

The Grangers Picnic was held three days during August, with a very good attendance and a very fine display of farm products and machinery.

Hunterdon County.

OFFICERS FOR 1907.

President, E. M. HEATH, Flemington, Route 2
Vice-President, FRANK TROUT, Lambertville
Secretary, WM. W. CASE, Frenchtown, Box 55, Route 1
Treasurer, F. J. TOMLINSON, Pittstown, Route 1

DIRECTORS.

H. F. BODINE, Hunterdon County Pomona Grange.
 JOHN Q. HOLCOMBE, Ringoes Grange.
 WM. B. HOCKENBURY, Locktown Grange.
 NEWTON B. RITTENHOUSE, Sergeantsville Grange.
 ELLIS B. HUFFMAN, Kingwood Grange.
 WILLIAM SCOTT, Oak Grove Grange.
 M. W. ANGELL, Spring Mills Grange.
 WILLIAM PRALL, Grand View Grange.
 W. H. OPIE, Riverside Grange.
 URIAH SUTTON, New Jersey Fruit Exchange.
 A. P. ALLEN, Hunterdon County Peach Exchange.

COMMITTEE ON FRUIT STATISTICS AND REPORT TO STATE BOARD.

WILLIAM W. CASE, Frenchtown, Box 55, Route No. 1

DELEGATES TO STATE BOARD.

W. H. OPIE, one year, Readington
 H. E. DEATS, two years, Flemington

REPORT.

BY THE SECRETARY.

Two meetings of the Board were held during the year, in August and November. The August meeting, held at Frenchtown, notwithstanding a very heavy shower, was well attended. President E. B. Voorhees, of the State Board, gave a much

appreciated address on "The Dairy, and Stock Breeding for the Dairy," and Secretary Dye spoke ably and at length on "What the rural schools need and what they may expect in the new line of education on agricultural principles soon to be inaugurated."

It is high time that our educational authorities were waking up to the need of teaching agricultural science, especially in rural districts. For the last thirty years our education has all tended to wean the country boy and girl away from country life, with the result that the more education the child receives of the kind he now gets the more he despises the dirty finger and blue overalls, and the more he admires the white hands and natty appearance of his city cousin who sits listening to the click of a telegraph sounder sixteen hours at a stretch, or is keeping books in a stuffy office at eight dollars a week. An experience of twenty-five years in the school-room compels me to the conclusion that not more than ten per cent. of the work in the school in the past—excepting, of course, the ability to read, write and reckon—is of any real value to those who expect to stay on the farm and become farmers, and most of our brightest boys, and those who have the best advantages, especially, recognize that their schooling has tended to every end but country life and act accordingly, while in after years they regret having left the farm. More than one young man has frankly stated on leaving school, "after all my study and pains in acquiring an education, I have learned absolutely nothing of plant life, growth, development, requirements of food, pruning, propagating, budding, etc.," and he is at the mercy of every commercial fertilizer agent in the country, as he knows nothing of what a fertilizer should contain, nor the requirements of different crops to obtain a full maximum crop at the minimum expense of fertilizer.

HUMAN TUBERCULOSIS.

WHEREAS, The impression is general that human consumption is a result of tuberculosis in cattle, which is still unproven; and

WHEREAS, It is clearly demonstrated and proven that the disease is not an inherited one, as long supposed, but is an infectious one; and

WHEREAS, It is clearly demonstrated that whole families have eventually been destroyed from using bedding, clothing, utensils, etc., formerly used by deceased consumptives; therefore, be it

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Resolved, That the Hunterdon County Board of Agriculture demand such legislation as shall compel the thorough disinfection of a dwelling occupied by a consumptive patient before being re-occupied as a dwelling by another family, and, after the death of such consumptive patient, the total destruction by fire of all bedding, clothing, utensils, etc., as cannot be safely and surely disinfected, such disinfection and destruction to be done according to rules formulated by the State Board of Health; all such bedding, clothing, utensils, etc., so destroyed to be first appraised at their actual value by the State Board of Health, or some one duly deputized by that board to act for them, and paid for out of the general funds of such municipality in which said consumptive resided at time of death.

Resolved, further, That we most earnestly request the State Board of Health to use their best efforts to secure from the next New Jersey Legislature such legislation as shall secure to the citizens of this State the benefits and protection asked in the above resolutions.

Attest:

WM. W. CASE,

Sec'y Hunterdon Co. Board of Agriculture.

Adopted, FLEMINGTON, N. J., November 17th, 1906.

The November meeting was mainly a business meeting, Superintendent of schools, Jason S. Hoffman, Esq., of Hunterdon county, however, read a valuable paper on "The Introduction of Agricultural Education into our School System."

Resolutions were unanimously adopted urging more stringent laws regarding contagion from tuberculosis in cattle; also concerning human tuberculosis. (See latter resolutions of State Board report in minutes.)

The Board adjourned after canvassing crop returns for past season.

CROP YIELDS AND CONDITIONS.

Crop returns have been fairly satisfactory, although excessive wet, and drowning floods at corn planting, succeeding prolonged drought, prevented corn from germinating, although matters were balanced by a bountiful crop of hay and oats. Owing to excessive wet during August many fields of corn failed to set satisfactorily, in some instances more than half the stalks being barren. Later conditions, however, were such that practically all corn fully matured.

FARM VALUES, ETC.

Notwithstanding the general advance in price of farm products land values seem very slow to respond. Good dairy farms within one mile of school, creamery and post-office selling in November as low as fifteen dollars per acre; while some of the most desirable farms in the county have been withdrawn from market, lacking satisfactory offers. A few German, Swede and Danish people are taking up some of our cheap lands. While in the past I have looked for lower levels in farm values, I believe now our farm land has reached rock bottom and that any change must be for much higher prices, and any one now investing in Central New Jersey farms will find the investment a profitable one, and with an assured prospective increase in value.

The advent of the trolley and macadam roads, free rural delivery of mails, and a better system of rural schools in the future should soon work wonders with our social conditions and privileges. The R. F. D. now reaches practically all over our country, but in the name of a square deal, the salary of rural drivers should be increased. On the average they receive much less than the letter carriers of our cities. The R. F. D. driver has to buy and maintain two horses, coach and sleigh, while rent of house and barn is fully equal to the rent paid by his city fellow mail carrier. Indications now point to the voluntary abandonment of some R. F. D. routes, the present drivers not being able to make expenses. We do not wish the city carriers' salary reduced—far from it—but we do ask in all fairness that our rural drivers be paid live and let live salaries, *and we demand the establishment of the parcels post* in connection therewith.

GAME LAWS.

City sportsmen in large numbers still persist in searching our premises with dog and gun for rabbit and quail that have lived on our farms during the summer. The scarcity of game has enabled the country boys to "sell out" all the game they can find to city gunners at prices double those of a few years since. In this way many enormous "bags" are "shot" (?) and taken to the city.

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Our county authorities have withdrawn the bounty on foxes, and it is well. Foxes do little or no damage to poultry, but subsist in the main on meadow mice and large numbers of ground hogs, which, with the disappearance of the fox, promise to become as great a pest as the rabbits of Australia. In a recent drive of a third of a mile we counted twenty-four ground hog holes along the roadside, where fifteen years ago a ground hog had never been seen—the first pair locating there in 1902. The colony now numbers several hundred, and is doubling, apparently, every year. Similar reports come from other sections, and it is high time to sound the note of alarm.

INSECT RAVAGES, SCALES, ETC.

As predicted in my reports of several years back, the Colorado potato beetle has about run its course of devastation, nature having effectually “balanced up” in this section at least, and their enemies have so numerously developed that it is now the exception that Paris green spraying has to be resorted to to save a crop, and had spraying never been resorted to this condition would have arrived at least a dozen years sooner. Spraying never has and never will eliminate an insect pest, as it prevents the development of nature’s means of control—antagonistic insects or fungi. While our scientists are vainly trying to concoct sprays to eliminate the San José scale, some of the sprays and the scale combined are eliminating, with the possible exception of the peach and cherry, all our hard-wood fruits, and the San José scale never will be conquered until it is done by nature’s own means. Somewhere on the earth will be found both insect and fungous enemies that in the end will render the scale inert and harmless, but until our scientists solve the problem in the proper and natural manner our apple orchards must and will perish. As to what nature is able to accomplish when left to herself we have but to realize that one pair of the common willow aphid is capable of generating by successive generations in regular geometrical progression in a single season enough progeny to cover a circle of five miles radius *sixty feet deep*; yet by nature’s own control the sum total of

willow aphid remains constant year after year, and only serve the same purpose to ants that cows do to man—a source of nourishment. When nature has her proper forces conveyed from the same fields to those to which the scale has been conveyed, *and finds her efforts encouraged and not poisoned*, then, and not till then, will the scale disappear as frost before the sun, and our future generations will really wonder if the tales told concerning scale ravages in ye olden time were not greatly effected by lurid imagination.

So far as the carbolic acid treatment is concerned, all that has come directly under my own attention has proven wholly ineffectual. Many peach growers in the northern part of our county are meeting fair success, aided by the lime, salt and sulphur spray, although reporting entirely negative results with same spray on their beautiful apple orchards, which are going rapidly to the wood-pile.

The Angoumois grain moth has again appeared in destructive numbers, and much wheat has been rendered worthless by its ravages.

Neither Gypsy nor Brown-tail moths have as yet appeared, although from rumor I fear that the former may have invaded one part of our county.

HORSES, CATTLE AND OTHER STOCK.

In touch with the upward trend of butter prices, cows have also advanced, but the relative high prices of concentrated feeding stuffs tends to diminish high profits from the dairy. Prime cows hug close to fifty dollars, and in some cases exceed that figure. Butter fat at creameries firm at 32 to 33 cents, December first payment, while the best milk shipping stations paid \$1.65 per cwt. on that date. Since my last report new creameries have been established at Milford, Ringoes and Frenchtown.

Horses still remain high, and Western horses sell fast at stiff prices, Sheriff E. W. Opdycke selling fifteen carloads, three hundred and thirty head, of Western horses during the past year at his Frenchtown stables at an average price of considerably more than two hundred dollars per head.

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Hogs, heavy and light, are bringing large checks to their owners, an average of eight to eight and one-half cents per pound dressed weight. Their number increases directly in the ratio of our dairy growth and development, while under the same laws the sheep are finally disappearing.

FRUIT.

The apple crop, while not heavy, has been fair, of fair quality and generally low in price, ranging from \$1.00 to \$1.40 per barrel. Much fruit was badly spotted with scale.

Small fruits of all kinds were abundant, the wild blackberry crop being unusually heavy, while cherry trees were loaded with luscious fruit; the finer varieties, however, were entirely destroyed by the plum rot.

In Annandale and Lebanon vicinity the peach crop was good and highly remunerative, there, at least, spraying brought a definite and satisfactory answer.

The Annandale Peach Exchange sold 27,000 half-bushel baskets at an average of 89 cents per basket, including culls, out of 29,645 baskets shipped from that point. The Exchange at Lebanon sold 41,707 baskets at an average of 97 cents per basket, besides which several thousand baskets were shipped direct to city markets. This is a fine showing, scale being considered, but is a sad comparison to the time when 275,000 or more baskets were shipped from single stations per year.

The tomato pack is one of the lightest on record, being practically ruined by a hail storm and later by our excessively wet season. H. E. Scarborough now has the only tomato canning factory in the county, the building at Ringoes having been dismantled and machinery sold. Mr. Scarborough's pack this year only amounted to 2,000 cases No. 3 cans.

The abandoning of the tomato business will, we think, prove a serious mistake, as the experimental work of a few farmers in Flemington vicinity shows that New York City dealers highly esteem the high grade fruit of our high lands and the past season

they were ready to pay a high premium on every crate of Hunterdon county tomatoes that reached their markets, a price equal to or greater than that usually received for peaches.

BEE-KEEPING.

While apiaries are rapidly recovering the numbers lost in the severe winters of two or three years ago, the honey crop was both light and poor of quality. Bees, however, generally went into winter quarters in fine condition and with heavy stores.

POULTRY.

Poultry and egg production still hold their own, egg prices being about five per cent. lower than last year, as shown by the report of S. O. Heath, Esq., who from four hundred and fifty hens sold 3,307 dozen for \$627, an average of 19 cents per dozen for the year, against 20 cents per dozen from the same yards last year, no account being kept of large numbers used for hatching. Poultry prices, however, remain firm, while poultry feeds are slightly higher than one year ago.

Mr. C. R. Peterman sends the following report of milk received by him at his creameries for the year ending October 31st, 1906:

Cherryville Creamery,	1,179,426	pounds
Oak Grove "	995,471	"
Average price of butter fat,	26	¾ cents

Locktown creamery report shows that, taking the year as a whole, prices have been about the same as for 1905; although autumn prices in 1906 range fully 25 per cent. higher than during same months of 1905.

Much inconvenience has been experienced by many of our creamery proprietors in complying with the creamery license law, which seems, where applied in some cases, both harsh and unjust.

The report of Locktown Creamery, which is appended, shows practically no change in volume of business; in fact, there being but eight pounds difference in butter product of 1905 and 1906.

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REPORT OF THE WORKINGS OF LOCKTOWN CREAMERY FOR THE YEAR ENDING OCTOBER 31ST, 1906, AS TAKEN FROM THE BOOKS BY GEO. W. HOCKENBURY, SECRETARY AND SUPERINTENDENT.

	Number of pounds of milk received.	Number of pounds of butter made.	Butter sold for	Skim milk sold for	Average test of all milk received.	Price paid per pound for butter-fat.	Average price per cwt. for milk.
1905.							
November, ...	154,326	7,735	\$1,953 39	\$75 41	4.33	\$0 27	\$1 17—
December, ...	132,856	6,987	1,953 45	65 58	4.47	30	1 34+
1906.							
January,	140,379	7,095	2,163 88	65 81	4.37	32	1 40—
February,	124,139	6,274	1,967 25	55 48	4.27	34	1 45+
March,	134,543	6,644	2,079 35	63 31	4.10	34	1 39+
April,	140,426	6,551	1,545 98	71 87	3.95	25	99—
May,	177,385	8,458	1,921 23	86 19	3.97	25	99+
June,	191,458	9,310	2,079 71	96 90	3.93	25	98+
July,	156,845	7,445	1,726 58	85 62	3.92	25	98—
August,	161,733	7,385	1,962 54	91 61	3.84	27	1 04—
September, ...	149,302	7,192	1,990 98	79 71	4.04	30	1 21+
October,	135,984	6,928	2,035 77	71 50	4.19	33	1 38+
Total,	1,799,376	88,004	\$23,380 11	\$908 99	4.11+	\$0 28¾+	\$1 19⅓
Average, ...							

Mercer County.

OFFICERS FOR 1907.

President, JOHN V. GREEN,Trenton
Vice-President, THEODORE CUBBERLE,Hamilton Square
Treasurer, LAURA A. BLACKWELL,Titusville
Secretary, FRANKLIN DYE,Trenton

DIRECTORS.

J. W. HENDRICKSON,	CHARLES BLACK,	W. N. CUNNINGHAM,
WM. D. HILL,	H. H. HUTCHINSON, JR.,	D. C. MCGALLIARD,
J. T. ALLISON,	FERDINAND BLACKWELL.	

DELEGATES TO STATE BOARD.

JOHN M. DALRYMPLE (two years),Hopewell
 SAMUEL B. KETCHAM (one year),Pennington

REPORT

BY THE SECRETARY.

The twenty-second annual meeting of the Mercer County Board was held March 23d, 1906. A good attendance encouraged those who desire the prosperity of agriculture in the county. The program of business included the election of the officers named above, and discussion of "Farm Drainage," "Chemistry of Crop Production," and "The Practical Side of Protecting Farm Buildings from Lightning."

The President, D. C. McGalliard, being sick, H. E. Hale was elected President *pro tem*.

The paper on drainage by Treasurer Blackwell was comprehensive, and led to a very profitable discussion of this important question. Some of the points to which attention was called are:

It is not profitable to cultivate land (that is capable of producing maximum crops if drained) year after year, and receiving only a partial crop because the land is not drained. Ditching machines have reduced the cost of underdraining very much, and a board drain will keep in good condition from fifteen to twenty years—tile, thirty to forty years. Land should be drained so that it can be worked and also hold moisture. The way to get moisture is to start with a mellow soil, follow with surface tillage all cultivatable crops and the plants will draw upon the moisture below; without tillage it will escape.

Draining well done is done for a life time. The speaker outlined the methods of laying out a drain, the necessary implements and machinery for doing the work and the probable cost.

Mr. S. B. Ketcham gave his method of keeping celery for winter use. He advocated the use of a wooden box, without a bottom board, to which the celery should be transplanted at the beginning of the cold season. This box should be carefully drained and heaped with earth sufficient to keep frost from the plants.

The necessity for ventilating the box was emphasized.

Dr. Voorhees spoke on "The Chemistry of Crop Production." The farmer's business is to so adjust conditions as to produce the largest crop from land and fertilizer used, and he must see to it that the crop produced, when sold, shall fully and properly compensate, comparing cost of fertilizers, lands, labor, &c. In producing and selling a crop the farmer must know how much fertility each crop is carrying off the farm.

What crops take off the farm the most plant food, and what was the cost of the plant food applied? Does the crop sold bring such a price for the fertility contained in it? Crops that take off little plant food, produce well and sell comparatively high are the ones to sell in the natural state. Thus, in potatoes, he can afford to fertilize heavily.

Similarly, the asparagus crop is capable of large returns for liberal feeding. But little fertility is carried off in the crop. Fruits will pay better than the cereal crops for the same reason. The small fruits are still better, as blackberries, raspberries and

strawberries. But little fertility is carried away. Of course the extra labor required in the production of market garden crops is to be considered.

The question of quick availability is to be considered, when procuring a fertilizer for a summer crop. They differ from a crop like wheat, that occupies the ground from autumn until the next harvest. Questions followed the address and were answered by Dr. Voorhees.

At the conclusion of Dr. Voorhees' address, Rev. Mr. Tomlinson spoke on the subject of "Protecting Farm Buildings from Destruction by Lightning." Much interest was shown in this question and many questions were asked the speaker.

The second meeting was held at Pennington, December 1st, in connection with a Farmers' Institute, when the statistical report covering crop and stock yields and values was made up, and a director of the State Board for two years was elected, and two delegates to the State Horticultural Society for one year.

At this meeting the following resolution was adopted, viz.: Believing that the money (\$242,000) now expended by the United States Department of Agriculture for free seed distribution, as appropriated by Congress for that purpose, is largely of no actual benefit to the agriculturists of the country, although nominally appropriated for their benefit; and believing that a large proportion of this sum might better be expended for the distribution of rare and valuable seeds from all parts of the world, and the surplus, if any, allotted to the Agricultural Colleges and Experiment Stations; therefore,

Resolved, That the Mercer County Board of Agriculture request the State Board of Agriculture to petition our Senators and Members of Congress to use their influence to direct that said sum be appropriated and expended according to the foregoing preamble.

The following table represents approximately the acreage, yield, and value of the crops named:

STATE BOARD OF AGRICULTURE.

<i>Crop.</i>	<i>Acreage.</i>	<i>Bu. Per Acre.</i>	<i>Total Bushels.</i>	<i>Price.</i>	<i>Total Valu.e.</i>
Corn,	2,200	46	101,200	\$0 50	\$50,600
Wheat,	1,200	20	24,000	70	16,800
Rye,	4,000	20	80,000	57	45,600
Oats,	10,000	35	350,000	37	129,500
Hay,	23,000	1½ tn.	31,625	14 00	442,750
White potatoes,	1,800	125	225,000	55	123,750
Sweet potatoes,	200	111	22,000	60	13,320
					\$822,320
Miscellaneous vegetables and fruits,					613,000
Milk,					475,000
					\$1,910,320

The Hopewell Valley Canning Company, through J. M. Dalrymple, Esq., submits the following report for the season of 1906: Tomato cans filled, 170,000; tons of tomatoes brought to factory, 460; average tons of tomatoes per acre, 5½; price paid per ton for tomatoes, \$8.00.

In general it may be said the agricultural and horticultural interests of Mercer county are in a prosperous condition. Farmers find a ready, nearby market for all products. The season was generally favorable to the production of maximum yields, barring drought in May. Cherries and strawberries were abundant. Orchard fruits not a full yield. Scale very injurious. Potatoes blighted some. Wheat seriously injured by the Angoumois grain moth. Where this prevails, farmers should thresh immediately when the wheat is harvested, and sell; or, if stored, follow the directions of Dr. Smith to prevent the moth from invading the grain in the bag or bin.

There is not much variation in the area devoted to the several crops from previous years. Mixed farming is more general than special branches, although in a few localities market garden crops are grown for the near markets. The production of poultry and eggs is claiming increased attention. Dairying is still a leading farm business, especially for those who can retail their product in the city of Trenton.

Middlesex County.

OFFICERS FOR 1907.

President, B. DE WITT GILES,New Market
Vice-President, SEWARD APPLGATE,Helmetta
Secretary and Treasurer, LEWIS D. WALKER, JR.,
New Brunswick, R. F. D. No. 1

DIRECTORS.

W. C. VOORHIES,Cranbury
J. E. BENNETT,Cranbury
C. S. Boice,New Brunswick, R. F. D. No. 2
D. J. Perrine,New Brunswick, R. F. D. No. 2
DE HART VOORHEES,New Brunswick
FRANK HART,New Brunswick
I. S. BENNETT,Jamesburg
J. S. ROBBINS,Monmouth Junction
SEWARD APPLGATE,Helmetta
A. S. CONOVER,New Brunswick, R. F. D. No. 3
WALTER GREEN,Browntown
W. T. WOERNER,New Brunswick, R. F. D. No. 1
N. D. RUNYON,Stelton
H. E. PERRINE,Prospect Plains
CHARLES EDWARDS,Prospect Plains

DELEGATES TO STATE BOARD.

G. W. MOUNT (two years),Monmouth Junction
B. DE WITT GILES (one year),New Market

REPORT.

The Board held three meetings for business and one for pleasure during the past year, the usual meeting day in August being used for an excursion on the boat of one of our members, and was much enjoyed by those who went.

At the February meeting we listened to a good address by Mr. Samuel Fort, a member of the Executive Committee of the

Milk Producers' Union of Philadelphia. Also heard reports by our delegates from the State Board meeting and the meeting of the Horticultural Society.

At the meeting in May we had two addresses, one by Dr. Joseph B. Ward, of Lyons Farms, on "Small Fruit Growing," in which he gave his method of culture, harvesting and marketing for strawberries, currants and peaches. The other by Prof. Voorhees, of the Experiment Station, who spoke on "Corn and Other Forage Crops." Both were very helpful and practical.

The time was occupied at the annual meeting with the election of officers and in filling out the blank with the crop report. Our meetings are not as well attended as they should be, but several who were present told of the benefits they had received from attending, and expressed a determination to stand by the meetings and try and increase the interest.

The year is more prosperous for farmers of this section than last. The weather was more suited to the growing of crops, and prices are good.

The hay crop is a fair one, not as large as some years, with a good price for the prime article.

Potatoes, a good yield, with almost no rot.

Corn, with a few exceptions, is a good yield, and unusually sound.

Oats, not as good as last year.

Milk is scarce, also good milch cows.

Several farms have changed hands, mostly bought by city people.

Monmouth County.

OFFICERS FOR 1907.

<i>President</i> , JOHN H. DuBois,	Freehold
<i>Vice-President</i> , D. HOWARD JONES,	Freehold
<i>Secretary</i> , D. AUG. VANDERVEER,	Freehold
<i>Treasurer</i> , WM. M. MOREAU,	Freehold

EXECUTIVE COMMITTEE.

JOHN H. DENISE,	Freehold
WM. H. REID,	Tennent
H. V. M. DENNIS,	Freehold
GEO. L. DU BOIS,	Freehold, R. F. D. No. 5
GEORGE S. JONES,	Freehold

DIRECTORS.

H. E. HULSHART,	Lower Squankum
WM. H. DU BOIS,	Freehold
GARRETT B. CONOVER,	Englishtown
JAMES C. HENDRICKSON,	Keyport, R. F. D. G.
G. W. PATTERSON,	Ardena
WM. R. CONOVER,	Englishtown
WM. M. CONOVER,	Colt's Neck
C. C. HULSART,	Matawan
H. W. Buck,	Marlboro

DELEGATES TO STATE BOARD.

WM. M. MOREAU (one year),	Freehold
D. HOWARD JONES (two years),	Freehold

REPORT.

BY THE SECRETARY.

Two meetings were held during the year. The first on March 10th, 1906, at the Court House, Freehold. Reports of delegates to the State Board of Agriculture and State Horticultural

Society were read. Prof. G. F. Warren, State Horticulturalist, New Brunswick, N. J., gave a very instructive lecture on "Methods and Results of Spraying Potatoes for the Prevention of Blight. Other topics were discussed by members. The annual meeting was held November 17th, when officers and delegates were elected for the ensuing year. The topic, "Has Spraying with Scalecide for the Scale been a Universal Success?" was discussed by the members. D. A. Vanderveer said that last year he had his peach orchard of 1,300 trees sprayed with the salt, sulphur and lime mixture at a cost of \$103.75, and the past year he had sprayed with the Scalecide, costing \$50.75 for the same orchard, both had proved beneficial. He preferred the Scalecide on account of its being cheaper to use and cleaner to handle and equally effective.

Frank Denise said that he had found that spraying once a year only was not enough, he sprayed three times. Institute meetings were held under the direction of the State Board at Freehold, Matawan, Key Port and Allentown. The Monmouth County Horticultural Society held a flower exhibit at Red Bank, and the Elberon Society one at Elberon. Five Granges have lately been organized in the county, and have a large membership. Monmouth Grange, No. 92 (reorganized), Freehold; Olive Branch Grange, No. 142, Matawan; Raritan Grange, No. 158, Key Port; Farmingdale Grange, Farmingdale; Shrewsbury Grange, Red Bank.

Farmers have had a good year. Most crops have yielded well and sold for good prices. Small fruits gave good returns. Apples a light yield, prices good. Peaches set very full and promised a large yield, but the extremely wet season caused the fruit to rot on the trees before ripening, causing a loss of three-quarters of the crop. Those that were marketed were of inferior quality and sold low. Melons and cucumbers a very light crop. Tomatoes a full yield, sold from 10 cents to \$1.25 per basket.

There is no change of moment in live stock conditions. Milch cows are a little higher. Pork is higher than last year. Turkeys scarce and high. Horses a little higher. There is a good demand for farms, several have changed hands lately. Farmers

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from Long Island who have sold their farms there for building lots and to large buyers for country seats have been buying farms in this county, as it is the most desirable location for farming and trucking near New York, Newark and other large cities, and the summer resorts along the New Jersey coast. The demand for fresh vegetables of all kinds and fruits, from the summer resorts along the Monmouth county shore, is so large that two markets have been established in the county, one at Freehold and one at Red Bank, where the farmers meet the carters or peddlers three days every week to sell them their crops, Mondays, Wednesdays and Fridays. A very large amount of produce is disposed of in that way at better prices than if sent to the city market.

NEW JERSEY STATE LIBRARY

Morris County.

OFFICERS FOR 1907.

President, GEORGE E. FELCH,Florham Park
Secretary, W. F. ELY,Madison
Treasurer, WESEY D. HOPPING,Hanover

BOARD OF DIRECTORS.

S. E. YOUNG,Rockaway
WILLIAM JAMES,Florham Park
EDGAR C. HOPPING,Florham Park
FRANK P. COOK,Hanover
JAMES COOK,Hanover
JOHN J. MITCHELL,Whippany
JOHN OLIVER,New Vernon
W. B. LINDSLEY,New Vernon
N. D. GOBLE,New Vernon

DELEGATES TO STATE BOARD.

GEORGE E. FELCH (one year),Florham Park
S. E. YOUNG (two years),Rockaway

REPORT

BY THE SECRETARY.

The Morris County Board of Agriculture through their Secretary has taken much interest in trying to have them awaken to the fact, if they wish to have their fruit trees saved something must be done to destroy the scale, which is destroying whole orchards in some parts of Morris as well as in other counties. Prof. Smith has been giving us all the assistance he could in giving us a number of lectures and having the Experiment Station furnish information, and in the past year had Mr. Brehme spend two days with the Secretary, examining orchards

in different parts of Morris, where they found orchards which had been the pride of their owners, beyond all hope, and nothing to be done but to have them cut down. Thousands of trees affected no doubt could be saved if properly sprayed. Prof. E. L. Dickerson also spent a day with the Secretary to learn the results of the different formulas and the time of spraying, and has been requested to give us an address, also the results and conclusions he has arrived at in visiting the different parts of the State. The Board has held but one extra meeting the past year, when by request Prof. E. L. Dickerson gave an address in Morristown at the County Hall, regarding the San José scale, which was very interesting. Much interest was shown and a strong sentiment manifested to compel all orchards infested to be either sprayed or destroyed. But very few are paying any attention either to the scale or to any law, and the result will be very few trees saved. Certainly those who do look after their trees will be benefited in having finer fruit and better prices. No one seems to be taking any interest in setting out fruit trees, at least compared to thousands of trees dying each year. In a few years the old orchards will be gone, and, if not replaced, the people must depend on other sections for fruit for their own use.

Ocean County.

OFFICERS FOR 1907.

President, C. M. RORER,Cassville
Vice-President, P. DAVITT,Toms River
Treasurer, H. R. WILLS,Toms River
Secretary, ROBERT C. GRAHAM,Holmeson

DIRECTORS.

J. W. JAMIESON,	C. C. REED,	E. H. LEMING
A. B. CLUTE,	E. APPEGATE,	W. H. WOOD.

DELEGATES TO STATE BOARD.

ROBERT C. GRAHAM (two years),Holmeson
 C. M. RORER (one year),Cassville

REPORT

BY THE SECRETARY.

The meetings, although no so largely attended by the members, were made up by visitors who have taken great interest in the work; discussing and advancing questions of importance to the fruit growers and dairymen. The agriculturist living in close proximity to railroads and cities has the advantage of their far-off brethren, who have to study economy to make fair returns for money invested. Even with improved machinery, it is difficult to complete work in time, owing to lack of labor. This question is a hard one to solve; the high wages paid for other occupations attracts the young men to the cities.

The past year has been a fairly prosperous one in some parts of our county. A severe hailstorm passed over the northern section, June 23d, doing great damage, destroying all crops in its wake, even killing small chickens and birds.

Our long-talked-of railroad, the building of which has stopped owing to the short-limit franchise, is a detriment to all rural communities. In some of our rural districts the school system is almost a failure. Young and incompetent teachers discourage the children from attending.

The price of land about the same; produce a trifle higher than last year. Corn on some lowland farms almost a failure.

Passaic County.

OFFICERS FOR 1907.

President, D. F. DUNCAN, Preakness, R. F. D. No. 1
Vice-President, LEONARD PIKAART, Paterson
Secretary, AARON LAAUWE, Preakness, R. F. D. No. 1
Treasurer, F. T. TORBET, Preakness, R. F. D. No. 1

BOARD OF DIRECTORS.

C. W. SIMMOND, Preakness, R. F. D.
 C. T. DAY, Preakness
 A. LAAUWE, Preakness
 RALPH TORBET, Haledon
 JOHN ACHERMAN, Preakness, R. F. D.

DELEGATES TO STATE BOARD.

LEONARD PIKAART (two years), Paterson
 AARON LAAUWE (one year), Preakness

REPORT

BY THE SECRETARY.

The Passaic County Board of Agriculture has held three meetings during the year 1906, the first being held on June 7th at Wayne township Grange Hall, when the County Board was organized, and an address was given by Secretary Dye on organizing a County Board. Also an address by Professor Lipman on "Soil Bacteria and Their Work," which was well received. The next meeting was held August 15th, when business of a routine character was carried out. The next meeting was on December 18th, when officers for 1907 were elected. The farmers of Passaic county are slowly but surely waking up to the benefits that will be derived from a strongly organized County Board,

and we hope to make the year 1907 prosperous in more ways than one.

Passaic county has one Grange which is in a very encouraging condition, being less than three years old, yet having a membership of over two hundred and owning its own commodious hall, 40x60 feet, two stories high, and basement.

Nearly all crops were above the average. Hay was fine. Wheat, rye and corn were good. Tomatoes were excellent. I never saw finer fruit than we had this year, with good prices, forty cents per bushel being the lowest. Potatoes fairly good, although considerable damage was done by the white grubworm. Prices from 70 to 90 cents per bushel. Cabbage very poor, on account of blight. Apples a very short crop. Milk from 3½ to 4 cents per quart at the door.

Salem County.

OFFICERS FOR 1907.

President, JOHN G. BORTON.
Vice-President, SAMUEL H. MOORE.
Secretary, GEORGIE A. DUELL.
Treasurer, JOEL BORTON.

EXECUTIVE COMMITTEE.

BENJAMIN F. STRAUGHN, EDGAR C. MOORE, JESSIE L. COLSON, C. FRENCH
MOORE, S. JACKSON MORGAN, M. D. DICKINSON, GEORGE H. KIRBY.

REPORT

BY THE SECRETARY.

Salem County Board of Agriculture has held three meetings during the year, at which very interesting papers were read and subjects discussed which have been of great profit to those who were present. The meetings were held in January, April and November. The July meeting was omitted, as the farmers were very much rushed with their work, and as the time for field meetings was drawing near. One field meeting was held in the county under the direction of the Grange which was well attended, and at which there was some good agricultural talks.

The greatest problem of our farmers is the one of farm help, both for the home and for the farm work; on this account many of our farmers are leaving the large farms, and small farms are in great demand.

Crops this year have been quite good, fully equal to the average. Early potatoes produced well, and the price was good. Tomatoes have sold well, foreign buyers at one time paying twenty-two dollars per ton, but the average price was much below this.

STATE BOARD OF AGRICULTURE.

While chickens have not been as high priced as last year, yet the numbers raised have made them quite profitable. Eggs have been very high, reaching at one time forty-four cents a dozen.

Very few turkeys have been raised, owing to the wet weather in the late spring. Ducks have done well, but the price has been low.

Farmers are seeing the necessity of spraying, and many outfits have been purchased.

We have free delivery throughout most of the county, and now are looking forward to the time when we can have the parcels post. The trolley service has not reached us yet.

Somerset County.

OFFICERS FOR 1907.

President, ABRAM A. CORTELYOU,Somerville
Vice-President, BERNARD MEYER,Finderne
Secretary and Treasurer, ARTHUR P. SUTPHEN,Somerville

REPRESENTATIVE TO STATE BOARD.

JOHN GROENDYKE (two years),Finderne

ALTERNATE REPRESENTATIVE TO STATE BOARD.

HARRY S. VAN NUYS,Millstone

DIRECTORS.

Bedminster,....C. MARTIN WYCKOFF,Bedminster
 WILLIAM C. LANE,North Branch
Bernards,.....G. S. VOORHEES,Baskingridge
 FRED. C. SUTRO,Baskingridge
Branchburg,....S. D. OPIE,Neshanic Station
 JAMES H. VAN DYKE,South Branch
Bridgewater,....JOHN S. SCHNEDEKE, SR.,Somerville
 BERNARD MEYER,Finderne
Franklin,.....A. V. D. POLMEMUS,Franklin Park
 GEORGE B. RANDOLPH,Weston
Hillsborough,....JOHN GROENDYKE,Finderne
 JACOB D. QUICK,South Branch
Montgomery,....CHARLES HOWELL COOK,Trenton
 HUESTON LABAW,Harlingen
North Plainfield, ..CHARLES F. DEBELE,Plainfield
 HUBERT P. PHILLIPS,Plainfield
Warren,.....WM. H. ROGERS,Watchung
 MARK STULTZ,Plainfield, R. F. D.

REPORT

BY THE SECRETARY:

So far as farming interests are concerned, the conditions in Somerset county are as diversified as those existing in the State

of New Jersey. Conditions of soil and climatic influences seem to differ so greatly, that successful treatment for crops is difficult, and success follows only in the intelligent preparation of the soil, in meeting the different conditions, in the application of such fertilizers as are required at the time, and in the intelligence that is best obtained by study and application. Our best and most successful farmers of fifty years ago obtained their success by intelligent application.

Great advancement has been made in our county during the past ten years in the preparation of the soil, in the selection of seed, and in the application of such fertilizer as the conditions of the soil require.

Thus improvements will continue and advance only in such degree as intelligence and application are exercised.

Conferring with one another and exchanging experiences among the farmers is instructive and stimulating—experiments are educative, association is helpful. In this respect I believe this County Board has proved a benefit to many farmers, promoting both encouragement and success.

Statements made by our successful members, relating to the treatment of soil and abundant crops produced, seem to appeal to the average farmer, and give him more encouragement in making the attempt to accomplish the same result, than the carefully prepared lecture of an experienced college professor, who is apt to be looked upon as a farmer in theory only. Following these ideas we have this year held five well attended and interesting meetings, at which we discussed certain selected subjects.

At the first, which was the annual meeting, held January 6th, the President, Hon. L. H. Schenck, presented his annual address, taking for the foundation "How shall I make my business a success?" He proceeded under the three following heads: First—A taste for the business; Second—Strict application and attention to the business; Third—A thorough knowledge of the business.

The address, which was practical in all its parts, was listened to with interest and profit, and was published in full in the county newspapers. Delegates to the State Horticultural Society re-

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ported orally their impressions of the annual meeting of that society, and, after the election of officers at the afternoon session, Prof. G. F. Warren, State Horticulturist, gave an interesting address upon his selected subject, "The Renewal of the Peach Crop."

At the next meeting, held February 17th, Mr. Hubert T. Phillips opened the discussion on the subject of "Potatoes." This was followed by a general discussion and exchange of experiences, and proved an interesting and profitable meeting.

On April 21st the third meeting was held, and was addressed by Mr. D. F. Ginna, of the Wood Brook Farm, near Plainfield, who opened the discussion on the subject of "Dairying," and was followed by members Cook, Cortelyou, Phillips and others, resulting in a successful and helpful meeting.

Our fourth meeting was held June 16th, at which Mr. Geo. M. Clark, of Higganum, Conn., spoke on "Grass Culture," and presented exhibits of timothy, red top and alfalfa grown by him. His exhibits were fine, but one of our members, Mr. Wm. J. Logan, brought samples of timothy grown by him along the mountain that far surpassed Mr. Clark's in growth, as they were nearly one-third taller.

Mr. E. R. Collins, of the *New Jersey Farmer*, was present, and interested the members in a talk on the importance of education for intelligent and successful farming, and the necessity of organization and combination.

Our last meeting was held October 20th, at which Mr. Charles Howell Cook told the members "How to pay off the mortgages on the farms in Somerset county."

The Secretary of the State Board and Dr. J. B. Ward, of Lyons Farms, were also present at this meeting, and earnestly addressed the members. A general discussion was participated in, and the meeting was alert, interesting and profitable.

The Somerset County Board is annually increasing in members and interest. Appended is a statement of the average crops raised in the county for the year 1906, furnished the Secretary by Joseph Fitzga, Esq. (See Statistical Report for the State.)

Sussex County.

OFFICERS FOR 1907.

President, THEO. M. ROE,Branchville
Vice-President, D. C. HOWELL,Beemerville
Secretary and Treasurer, GEORGE A. DICKERSON,Beemerville

REPORT

BY THE SECRETARY.

The annual business meeting of the Sussex County Board of Agriculture was held in connection with the Farmers' Institute at Branchville, November 23d, 1906, and the officials named above were chosen for the ensuing year. We are glad to report an increasing interest in the Board, and believe it will continue.

The past year has been a fairly prosperous one for our farmers, it having been a very good growing season for most crops, though the rainfall was rather too heavy for corn during the early part of the growing season, resulting in a very rank growth of stalk. Hay was a good crop, but considerably damaged by wet weather at the time of gathering. Oats grew well, but lodged badly. Wheat, rye and buckwheat were good crops.

Grass grew well in pastures all through the summer, and seedings did well, in some instances making growths large enough to cut for hay after the grain was harvested.

Potatoes were a good crop, bugs and blight not so troublesome as in some previous years. Late planting rotted some before digging, owing to very wet, warm weather.

The apple crop was good this year, though the scale is claiming more orchards each year, there being comparatively little done to destroy the pest on the older trees, though most farmers who are raising young orchards, either of apples or peaches,

are trying to prevent its spread. We see a few large orchards of peach trees set, and some apples, though the majority of our farmers are planting only on a small scale, with a view of having a good supply for home use and some for market. The growing of small fruits and vegetables is somewhat on the increase, there being a growing demand for such produce at the lake resorts, which are becoming so popular from year to year.

Milk producing continues to be the leading pursuit among our farmers. Prices have ruled higher this year than for several years past, yet when one considers the prices of feeds, and other commodities the farmer has to purchase, one may doubt if any more money is being made in the sale of milk. Many farmers have sold their cows, owing to the scarcity of help. Good single men are in demand at \$22 to \$25 per month, with board, and married men \$28 to \$35, with house and garden.

Milch cows sell at \$40 to \$70; farm horses at \$100 to \$200.

Hog raising slightly increasing. Poultry raising is increasing more rapidly. The incubator and brooder are finding their way to many farms, new and better houses are being built and up-to-date methods used, and the business is found to be very profitable, either as a side issue or as a specialty.

Union County.

OFFICERS FOR 1907.

President, E. P. BEEBE, Elizabeth
Vice-President, J. E. MILLER, Roselle Park
Secretary, F. E. WOODRUFF, Cranford
Treasurer, OGDEN WOODRUFF, Elizabeth

EXECUTIVE COMMITTEE.

J. L. HEADLEY, D. T. MAGIE, E. R. COLLINS,
 E. P. BEEBE, F. E. WOODRUFF.

DELEGATES TO STATE BOARD.

J. L. HEADLEY, Two years
 G. E. LUDLOW, One year
 E. P. BEEBE, Alternate

REPORT.

BY THE SECRETARY.

The Board has held eleven meetings during the year, and nine members have been elected.

The attendance has been larger than for some years past, and a greater interest has been manifested by the members.

At the meeting on January 11th the question came up as to the advisability of holding a Farmers' Institute. It was decided that the Secretary send a letter to the farmers of the county to find out if they wanted one. Accordingly a letter was sent to about one hundred farmers. Favorable responses were received from quite a number, but we did not think the probable attendance would warrant the expense, so it was decided not to hold the Institute, and to urge the farmers to attend the Middlesex County Institute.

The following topics, among others, have been discussed during the year: "How to Increase Yield of Potatoes," "Fruit

Growing," "Parcels Post," "Coöperation and Education," "Cultivation and Fertilization of Farm Crops."

Quite a number of our members attended the "Field Meeting" at the Agricultural College Farm in August, and had a profitable and enjoyable time. The desire was expressed that the State Board would arrange for a similar meeting next year.

Our county is being built up more and more each year to supply the ever increasing demand for suburban residences for the people of New York and other nearby cities. Factories are constantly locating here, and farms are being rapidly cut up into building lots. The scarcity of farm help is, perhaps, the greatest drawback to successful farming. Most farm laborers know that, as a rule, to work on a farm means long hours and small pay; consequently, men are seeking employment in factories and other lines of business. As to reliable, experienced and educated farm foremen and superintendents, they are difficult to secure at any price. In these days of high prices of labor and farm supplies of all kinds we realize more and more that a scientific knowledge of agriculture is indispensable to the young man intending to engage in that occupation. We think that the opportunities afforded our young men by the State of getting an agricultural education is a step in the right direction, and we hope to see the day soon when agriculture is taught generally in our public schools. In agriculture, as in all other lines of business, the more education and business ability a man has the greater success he will have in his business.

The past season has been characterized by a great lack of sunshine and many rainy and cloudy days, but no floods. The spring was late, and a dry spell in June interfered somewhat with growing crops. The cloudy, wet weather during harvest damaged the hay and grain crop considerably. The crop was a large one and prices are high, which makes up for the damage.

Potatoes yielded well, but the wet weather in July after the dry spell caused a second growth, which, we think, affected the cooking quality. Truck crops were damaged to some extent by rotting before maturity, but, taken as a whole, we think the past seasons crops, as far as profits are concerned, have been above the average.

Warren County.

OFFICERS FOR 1907.

President, WILLIAM C. ADDIS, Delaware
Vice-President, NICODEMUS WARNE, Broadway
Secretary, W. EUGENE OBERLY, Asbury
Treasurer, JOHN ALBERTSON, Delaware

DIRECTORS.

HENRY PURSEL, Phillipsburg
 W. M. H. BOWERS, Hope
 SAMUEL REED, Mount Hermon
 A. D. ROSEBERRY, Belvidere
 AZARIAH FREY, Stewartsville
 A. B. MARTIN, Blairstown
 FRANK HOUSEL, Asbury

DELEGATES TO STATE BOARD.

WILLIAM C. ADDIS (two years), Delaware
 CHARLES M. OBERLY (one year), Shimers, P. O. Phillipsburg

REPORT

BY THE SECRETARY.

The Warren County Board of Agriculture has held three meetings during the year. At the August meeting Prof. E. B. Voorhees made an address. He spoke of the importance of building up our land, stating how to enrich our soil to raise larger crops; that land should not lay idle, as soon as one crop was taken off another should be planted; suggested that we should grow crimson clover to raise a good corn crop. By using lime realized good crop of Crimson clover, using about twenty-five bushels to the acre. On land where lime was not used had poor results.

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In regard to cow peas, he stated that lime was not so necessary in order to secure a crop.

Crops for the past year have been fair, and prices on an average very low. Corn, fifty cents; rye, fifty cents; wheat, seventy cents. Hay was a half crop, price \$17 per ton. Fruit a failure throughout the county. The greatest task the farmer has to contend with is to get farm help.

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