STATE OF NEW JERSEY

Thirty-Sixth Annual Report

OF THE

State Board of Agriculture

1908

Printed by Order of the Legislature

TRENTON, N. J.:
STATE GAZETTE PUBLISHING COMPANY, PRINTERS.
1909.

State Board of Agriculture.

OFFICERS AND EXECUTIVE COMMITTEE FOR 1909.

PRESIDENT.

E. B. VOORHEES.....New Brunswick.

VICE PRESIDENT.

JOHN T. COX.....White House.

TREASURER.

WALTER HERITAGE.....Swedesboro.

SECRETARY.

FRANKLIN DYE .....Trenton.

GEORGE E. DeCAMP.....Roseland.
JOHN M. LIPPINCOTT.....Moorestown.
A. J. RIDER.....Hammonton.

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.

To the Hon. John Franklin Fort, 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 1908.

FRANKLIN DYE,
Secretary.

Dated Trenton, November 30th, 1908.

BOARD OF DIRECTORS

New Jersey State Board of Agriculture.

Term of office, one year, dating from January 1st, 1909, to December 31st, 1909, for all except County Board Directors.

CLASS A.

P. KENNEDY REEVES.....Geological Survey.
E. T. GILL.....
CHARLES HOWELL COOK..... } Board of Visitors, Agricultural College.
EDWARD B. VOORHEES.....Professor of Agriculture.

CLASS B.

GEORGE W. F. GAUNT.....Master of State Grange, P. of H.
HENRY F. BODINE.....Secretary of State Grange, P. of H.

CLASS C.

JOSEPH B. WARD..... } State Horticultural Society.
ELIAS S. BLACK.....
GEORGE P. F. MILLAR.....Bergen County Pomona Grange.
CHARLES B. JESSUP.....Burlington County Pomona Grange.
M. C. BROWNING.....Camden and Atlantic County Pomona Grange.
N. E. DIAMENT.....Cumberland County Pomona Grange.
EMMA W. HEDDEN.....Centre District Pomona Grange.
J. OMAR HERITAGE.....Gloucester County Pomona Grange.
E. N. STRONG.....Hunterdon County Pomona Grange.
L. W. CARMAN.....Mercer County Pomona Grange.
D. J. PERRINE.....Middlesex County Pomona Grange.
GEORGE E. RODGERS.....Monmouth County Pomona Grange.
RICHARD WARE.....Salem County Pomona Grange.
GEORGE E. HURSH.....Sussex County Pomona Grange.
JAMES I. COOK.....Warren County Pomona Grange.

BOARD OF DIRECTORS.

NAME.	ADDRESS.	TERM.	COUNTY.
JOSEPH BUTTERHOF	Egg Harbor City	2 years	Atlantic.
JACOB E. HOLMAN	Hammonton	1 year	"
JOHN F. BOMM	Westwood	2 years	Bergen.
FRED. V. STROHSAHL	Park Ridge	1 year	"
HENRY R. GILBERT	Burlington	2 years	Burlington.
HARRY ALBERTSON	Wrightstown	1 year	"
MARTIN SCHUBERT	Kirkwood	2 years	Camden.
SAMUEL R. COLES	Merchantville	1 year	"
RALPH SCHELLENGER	Green Creek	2 years	Cape May.
RICHARD LLOYD	Dias Creek	1 year	"
ARTHUR P. SEABROOK	Deerfield	2 years	Cumberland.
ROBERT PEACOCK	Deerfield	1 year	"
CYRUS B. CRANE	Caldwell	2 years	Essex.
A. E. HEDDEN	Verona	1 year	"
A. CLARK GARDINER	Mullica Hill	2 years	Gloucester.
E. T. RIDGEWAY	Mullica Hill	1 year	"
F. J. TOMLINSON	Pittstown	2 years	Hunterdon.
JAMES LANE	Readington	1 year	"
J. M. DALRYMPLE	Hopewell	2 years	Mercer.
JOHN V. GREEN	Trenton	1 year	"
GEORGE W. MOUNT	Monmouth Junction	2 years	Middlesex.
R. F. P. VON MINDEN	New Market	1 year	"
C. D. B. FORMAN	Freehold	2 years	Monmouth.
H. W. BUCK	Freehold	1 year	"
WILLIAM E. JAMES	Florham Park	2 years	Morris.
EDGAR C. HOPPING	Florham Park	1 year	"
R. C. GRAHAM	Holmeson	2 years	Ocean.
C. MILTON RORER	Cassville	1 year	"
IRA MITCHELL	Paterson	2 years	Passaic.
JOHN ACKERMAN	Paterson	1 year	"
JOHN G. BORTON	Salem	2 years	Salem.
E. C. MOORE	Woodstown	1 year	"
BERNARD MEYER	Finderne	2 years	Somerset.
CHARLES F. DEBELE	Plainfield	1 year	"
LINUS CLARK	Branchville	2 years	Sussex.
JACOB N. VAN AUKEN	Beemerville	1 year	"
G. E. LUDLOW	Cranford	2 years	Union.
E. R. COLLINS	Westfield	1 year	"
JACOB E. ALBERTSON	Delaware	2 years	Warren.
FRANK HOUSEL	Asbury	1 year	"

OTHER ASSOCIATIONS.

H. E. HALE, S. B. KETCHAM	Princeton Agricultural Association.
ROBERT T. EVANS	Mount Laurel Farmers' Club.
JOSEPH EVANS	American Cranberry Growers' Association.
HAROLD HORNER	New Jersey Bee Keepers' Association.
DR. G. F. HARKER, DR. WILLIAM HERBERT LOWE	Veterinary Medical Association of New Jersey.

PROCEEDINGS OF THE

THIRTY-SIXTH ANNUAL MEETING

OF THE

New Jersey State Board of Agriculture

HELD AT THE

STATE HOUSE, TRENTON, NEW JERSEY,

Wednesday, Thursday and Friday, January 13, 14 and 15, 1909.

Thirty-sixth Annual Meeting.

FIRST DAY—MORNING SESSION.

WEDNESDAY, January 13th, 1909.

Dr. Voorhees, president, called the meeting to order at 10:30, and the proceedings were opened with prayer by the Rev. Dr. Brooks, of Trenton.

The roll was then called by Secretary Dye, and delegates responded from most of the organizations entitled to representation.

Secretary Dye—In presenting the printed order of business, I would say there will probably be no change except, perhaps, at the session this afternoon, when Dr. Smith wishes to occupy a few minutes. He has some things he wishes to state concerning his report. I present this as the programme, and move its adoption. Carried.

ORDER OF BUSINESS.

WEDNESDAY.

First Session.

10:30 A. M.–12:30 P. M.

Prayer.
Calling Roll of Delegates. All delegates are requested to be present at the opening session.
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 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.
Report of Committee on Transportation and Freight Rates, E. R. Collins, Chairman.
Report of Committee on Fish and Game Laws, Charles Collins, Chairman.
Introduction of Other Business.

Second Session.

2:00–5:00 P. M.

Address by the Governor, HON. JOHN FRANKLIN FORT.

Calling Roll of Absentees and 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 Live Stock Commission: Its Purpose and Possibilities for New Jersey Farmers," by F. C. MINKLER, Professor of Animal Husbandry, State Agricultural College, New Brunswick, N. J.

3:00 P. M.

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

4:00 P. M.

"Soil Surveys, as Related to Geology," by DR. HENRY B. KÜMMEL, State Geologist.

4:40 P. M.

Report of Commission on Tuberculosis in Animals, by the Secretary.

Third Session.

7:30 P. M.

"Insects in Their Relation to Man," by DR. JOHN B. SMITH, State Entomologist.

8:30 P. M.

"Rambles in Brazil and Argentina," by PROF. E. M. BAXTER, Mifflinburg, Pa.

The two evening lectures will be illustrated with stereopticon slides.

THURSDAY.

Fourth Session.

9:15 A. M.–12:30 P. M.

Prayer.

Unfinished and New Business.

9:45 A. M.

"Co-operative Selling of Farm Products," by Messrs. W. H. INGLING and D. D. DENISE.

10:30 A. M.

"Potato Culture—A Few Suggestions," by PROF. CHARLES D. WOODS, Director Maine Agricultural Experiment Station, Orono, Me.

11:30 A. M.

"Alfalfa Production and Silo Building," by JOSEPH E. WING, Mechanicsburg, O.

Fifth Session.

2:00–5:00 P. M.

"The Problem of Animal Tuberculosis," by DR. LEONARD PEARSON.

3:00 P. M.

"Milk Production in Its Relation to the Producer and the Consumer," by HARRY B. WINTERS, Smithboro, N. Y.

4:00 P. M.

"The Problem of Milk Production and the Present Market Demands," Illustrated, by VALANCEY E. FULLER, New York.

Unfinished and New Business.

Sixth Session.

8:00 P. M.

"Millions for Moisture," by HON. C. J. BLANCHARD, Statistician United States Reclamation Service, Washington, D. C.

This lecture on the great work being done by the United States government will be magnificently illustrated with colored stereopticon views.

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

Music will be furnished by the Orchestra and the Philomela Club of the State Schools.

FRIDAY.

Seventh Session.

9:30 A. M.–12:30 P. M.

Prayer.

Unfinished Business.

10:00 A. M.

Asparagus Production:

"Green Grass," by H. W. RIDGEWAY.

"White Grass," by C. C. HULSART.

11:00 A. M.

Address by ROBERT S. SEEDS, Birmingham, Pa.

On motion, the reading of the minutes was dispensed with.

Appointment of Committees.

Dr. Voorhees then appointed the following committees:

Credentials—E. S. Ridgeway, of Gloucester; J. T. Allinson, of Mercer; F. J. Tomlinson, of Hunterdon.

Resolutions—Cyrus B. Crane, of Essex; John G. Borton, of Salem; John M. Dalrymple, of Mercer.

Treasurer's Accounts—E. R. Collins, of Union; C. D. B. Forman, of Monmouth.

The report of the executive committee was then read by Mr. Cox, as follows:

Gentlemen—Your committee have held five meetings during the year for the transaction of the business of the board. At the February meeting action was taken to reduce the material in the county board reports by omitting all names except the officers, and also to omit from the discussions at the annual meeting all but that which contained the gist of the remarks, in order that the annual report be made less bulky. The summer meeting at New Brunswick was considered, and the continuance of the crop Bulletin recommended.

At the April meeting it was decided to hold a summer meeting, and the arrangements, which were later carried out, adopted.

As this board has taken active interest in the reclamation of our swamp and tidewater lands, the committee deemed it advisable for the board to become a member of the New Jersey Land, Reclamation and Drainage Association, and the membership fee of $5 was paid.

It was also decided at this meeting to arrange for a farmers' week, a series of lectures, at New Brunswick, the fourth week of December, institute speakers to co-operate as instructors. The president and secretary were appointed committee to arrange for institutes, summer meeting, farmers' week and the annual meeting.

At the July meeting the secretary and Mr. Rider were appointed committee to visit the Italian organization at Hammonton and enlist their interest in our work and show them that this board is ready to assist them as much as is within our power to make a success in agricultural and horticultural work in the State.

John H. Voorhees was engaged to make an agricultural survey of the soils of Salem county, with particular reference to the crop

yields on the different types of soils, and where a difference in yield occurs under the same general treatment to ascertain, if possible, why the difference obtains.

At the September meeting, President Voorhees was requested to prepare a report on agricultural education at the present time, and present the same to the committee on industrial education in this State. The president was delegated to represent this board at the meeting of the American Association of Farmers' Institute Workers in Washington, D. C., November 16th and 17th. The annual appropriations to the county boards and to the State Horticultural Society were made.

At the January, 1909, meeting the committee appointed the several committees for this annual meeting and transacted other necessary business.

In concluding the work of another year, your committee can but express its pleasure that the farmers have been so successful in their work as to receive a fair reward for their labors, and that the work of our Agricultural College and Experiment Station, in conjunction with our various agricultural and horticultural organizations and the grange, is making such an impression on the farms of New Jersey that we are producing larger crops each succeeding year, thus showing more and more the yet unknown possibilities of the New Jersey farms and the ability of our farmers.

All are not here who were with us at our meeting last year. Some of our oldest and highly valued members have been called away. We suggest that suitable resolutions be presented for adoption concerning the departed ones.

Trusting that this thirty-sixth annual meeting will equal its predecessors in interest and usefulness, and wishing all our farmers a prosperous and happy new year 1909, we respectfully submit this report.

Signed by the president and secretary.

E. B. VOORHEES, *President.*
FRANKLIN DYE, *Secretary.*

Treasurer's Report.

Report of Walter Heritage, Treasurer, for the fiscal year ending October 31st, 1908.

Dr.

Total amount received from Comptroller during the year.....		$5,192 65

Cr.

1908.			
Jan. 17.	By Delegates' expenses at Annual Meeting....	$448 01	
	Speakers' expenses at Annual Meeting....	292 06	
	Stenographer at Annual Meeting.....	104 00	
	Janitor, chairs and hall rent.....	29 00	
	Lantern service	10 00	
	Appropriations to County Boards.....	610 00	
	Appropriations to Horticultural Society...	300 00	
	Express Company's bills.....	218 62	
	Packing annual reports.....	25 00	
	Postage stamps and postal cards.....	296 96	
	Executive Committee's expenses.....	184 71	
	Expenses of Farmers' Institutes.....	2,674 29	
			$5,192 65

The report was received and referred to the auditing committee.

Report of Auditing Committee.

The auditing committee reports that the bills, books and vouchers of the treasurer have been examined and found correct.

Your committee wishes to commend the treasurer upon the comprehensive and complete manner in which he has kept his accounts.

Respectfully submitted,

E. R. Collins,
Chas. D. B. Forman.

SECRETARY DYE'S ANNUAL REPORT.

To the New Jersey State Board of Agriculture, January 13th, 1909:

GENTLEMEN—All citizens of a State who take an intelligent interest in its welfare must rejoice when its varied industries are prospering. When these flourish, business stability is guaranteed, capital is active, labor is employed and plenty, comfort and confidence abound.

Agriculture, although not the largest industry of New Jersey, occupies an important place among them. The farms of the State are worth over $186,000,000; buildings, $70,000,000; implements and machinery, $10,000,000; farm animals, not including poultry, are worth $25,000,000. The gross earnings for the year 1908 are $57,743,153, an excess over 1907 of $1,239,419. The per cent. of increase in the value of our agricultural products for the past nine years is fifty-eight per cent.

This is a flattering record, not equaled, we believe, by any other State during the same period, and it is due to better farming, and not to increased acreage. Our farmers are not complaining of hard times—our farms are in demand. Farmers and market gardeners from other States, realizing our superior advantages of good roads, quick transportation, and markets unexcelled anywhere in the United States, are purchasing farms where any are offered for sale suited to their purpose, and price of farms is advancing throughout the State.

The future of New Jersey agriculture is very encouraging. We are rapidly passing from the time of ignorant culture of the earth to the more intelligent, the scientific, the profitable.

DEVELOPMENT OF OUR LIGHTER LAND.

We have a vast acreage—1,200,000 acres—in Southern New Jersey yet to be developed. It has lain there very much as nature left it since it was thrown up from the sea, except for the annual devastation by forest fires now happily being brought under control.

But the first great national movement to improve the land was that of the honored Morrell, of Vermont, who secured, in 1862, the enactment of congress for the establishment of agricultural colleges in the States and providing in part for their maintenance from the sale of public lands. This was a great step forward and upward for the improvement of the farming lands of the country and for the education of young men concerning the science of agriculture. The wisdom of this legislation has been proved many times since by the results that have followed. Extending and amplifying the work of Morrell was that of Hatch, of Missouri, who worked earnestly in its behalf.

No national legislation has brought so much of wealth and prosperity to the United States as did this, and it is because of this supremely important work, begun so many years ago and continued and developed in the several States by the agricultural colleges, experiment stations and State departments of agriculture, that our honored secretary of agriculture, James Wilson, is able to report such enormous crop yields and values as he has, and it is because farming has improved and agriculture is prospering that financial crises are not so acute and harmful to the country as formerly. But we have only made a fair beginning.

While in New Jersey we have very many farmers who are conducting their farms according to the latest and best knowledge and are producing nearly maximum yields, the great majority are not producing to the full capacity of their lands. The improvement of the soil is the essential thing to a prosperous agriculture. It is more. National stability and prosperity can be secured and maintained only when the land is made to produce its maximum annual yield, and when the man who farms shall own the land he tills.

To advance this movement it is highly desirable that those departments of this State which are seeking the development and improvement of the soil, the forests and the water supply should co-operate, thus complementing and strengthening the work of each. And the proposed geological-chemical-physical-agricultural soil survey of the State is an encouraging movement in this direction. The State Board of Agriculture, State grange and the experiment station have worked together in this way from the organization of this board to the present time, and the splendid

progress made is largely due to this intelligent combination of effort.

Another evidence of increasing interest in agriculture is the numerous letters received at the office of your secretary, making detailed inquiries concerning the various phases of correct farming. Most of these are from men and women who have not had much, if any, practical experience in the business, but who are going back to the land for home and health such as the country alone can give. This is a good sign, and it will be a good thing when more of our people get their living directly from the land, and when a large per cent. of our future generations shall be born and developed in the country.

CROP REPORTS.

The Crop and Agricultural Bulletin begun three years ago for the purpose of reporting crop conditions during the growing season, and the harvesting, was not sustained by all our correspondents to the end of the season of 1908, hence the November number was omitted. Whether this shall be resumed the coming year will depend upon the action of the board and the interest of correspondents. Those reports seemed to be appreciated and, in my judgment, should be continued. Would it be well to place this duty on the county secretary?

The crop statistics for the year are made up from the replies received from the directors of the board and the statistics furnished by the secretaries of the county boards. They are as follows:

TABLE I.

Crop.	*Acreage.*	*Yield Per Acre.*	*Total Yield.*	*Price Per Bushel.*	*Total Value.*
Corn	278,000	41	11,398,000	.75.5	$8,605,490
Wheat	108,000	19	2,052,000	1.01	2,072,520
Rye	78,363	17	1,332,171	.76	1,012,449
Oats	60,000	34.5	2,070,000	.59.5	1,231,650
Buckwheat	12,000	22.5	270,000	.83.5	225,450
Hay	437,000	1.66	725,420	14.07	10,206,659
Potatoes, white	70,000	95	6,650,000	.88.5	5,885,250
Potatoes, sweet	21,000	154	3,024,000	.72	2,177,280
*Miscellaneous vegetables and fruits					11,069,805
*Milk					13,052,480
*Poultry and eggs					2,204,120
Total yield for 1908					$57,743,153
Total yield for 1907					56,403,734
Excess of 1908 over 1907					$1,239,419

* Same as 1907.

TABLE II., shows number, value per head and total value of Farm Animals in New Jersey, January 1st, 1909.

TABLES II. and III., from the Crop Reporter, February, 1909, U. S. Department of Agriculture, Bureau of Statistics.

TABLE II.

	Total Number.	*Value Per Head.*	*Total Value.*
Horses	102,000	$124 00	$12,648,000
Mules	5,000	137 00	685,000
Milch cows	190,000	45 50	8,645,000
Other cattle	82,000	20 50	1,681,000
Sheep	44,000	5 00	220,000
Swine	158,000	9 25	1,462,000
			$25,341,000

In the year 1900 we had 100,000 sheep in this State. The industry should be revived. The more northerly counties afford superior conditions for the production of early lambs. When the lambs are bred in the early autumn and marketed before warm weather, the injury from close pasturing of grass lands, sometimes complained of, can be largely overcome. With root crops, silage and abundance of mixed hay, sheep and lambs can be cared for in the *winter time* at a profit exceeding that of dairying and

the work less exacting. The production of heavy pork for market is not so large as it was a few years ago. It is probably true, however, that more pig pork is marketed than formerly.

TABLE III.

SHOWING THE AVERAGE VALUE PER HEAD OF FARM ANIMALS IN NEW JERSEY BY DECADES, JANUARY 1ST, 1909.

	1870–1879.	*1880–1889.*	*1890–1899.*	*1900–1909.*
Horses	$104 69	$98 90	$80 80	$101 62
Mules	119 90	118 56	96 48	113 83
Milch cows	43 55	36 29	34 65	40 92
Other cattle	33 89	33 03	26 88	21 30
Sheep	4 35	3 99	3 88	4 54
Swine	10 12	9 76	8 67	10 30

POULTRY AND EGGS.

New Jersey affords peculiarly favorable conditions of soil, climate and markets for the production of poultry and eggs. The lighter, sandy soils of the southern part of the State furnish ideal conditions for the business, and some of the largest poultry plants in the United States are located in New Jersey. The industry is increasing throughout the State. The different breeds are not amalgamated so much now as they once were. Poultry and egg producers find it far more advantageous to maintain a distinct variety. The fads of novices in the business are being discarded, the essential requirements of house construction and ventilation, of feeds and feeding, of diseases, their prevention or cure, of markets and marketing, are better known. When the business is conducted as indicated it is profitable.

The production of turkeys, however, as a market crop has been greatly reduced within recent years. This cannot be due to low prices for turkeys are higher now than at any time since the Civil War. It is probably owing to the diseases that affect the young birds. Whatever the causes, they should be sought and, if possible, removed.

MEADOW BROOK FARM, BLAIRSTOWN, N. J., JOHN C. SHARPE, PROPRIETOR

MILK PRODUCTION.

The dairy industry for the production of milk to be sold in the cities is certainly undergoing a revolution. The changes demanded of the milk producers by city Boards of Health increases the cost of production and delivery, and also the loss of many valuable milk producing cows.

At the same time the cost of feeds has been advanced out of all proportion to the market value of the product and the cost of labor. Some of the changes required are reasonable ones and dairymen are willing to comply with such, and they are doing so, but if fanciful demands are made which require a daily additional cost in the production and handling of the product, and milk producers are expected to comply with such demands, then the price of such milk must be increased. Leaving that phase of the question, producers should not overlook the weak points in the business, which they can and should abolish.

Profitless cows should be found and removed; green forage crops should be produced to supplement the pasture grasses; silos should be built wherever there is a dairy to maintain; feeds should be purchased, if that be necessary, to *supplement* the home-grown product, *i. e.,* to supply the essential constituents not existing in the home grown, thus making a balanced food. Only healthy cows should be kept and in strictly sanitary conditions, and finally producing our dairy animals rather than purchasing so many cows, most of which are *below* the average milk producer.

The report of the commission on tuberculosis in animals shows that we imported during the fiscal year ending October 31st, 1908, 7,165 cows. These at the average price ($47.64), made up from the County Board reports, aggregate a total of $341,340. If those animals were above the average as milk producers, and of good breeding and constitutional vigor, the case would be different. But we are taking this large sum from the proceeds and at the expense of some other crop to keep the dairy going and sometimes on a non-paying basis, with low-grade cows. We are also maintaining a market for the inferior cows of New York, Pennsylvania and some other States. We will never have high-grade, uniform, well-bred dairies by this indiscriminate method.

CHANGES IN CROPS.

Our farmers are choosing with greater intelligence than ever before the crops most suitable for their particular soils and location. This is wise. Every progressive farmer knows that certain soils, because of their formation, elevation, composition and plant food constituents, are better adapted for some crops than they are for others. Taking advantage of these facts, larger and more profitable crops can be grown at less cost than by striving to grow a maximum crop of certain kinds on soils not fairly well adapted to their production. Furthermore, crops that were once grown at a profit on land suited to them have been displaced by crops of greater profit. Thus market gardening and truck farming are increasing from year to year in localities where the land is adapted to these branches of agriculture; and dairying, once the leading industry in some such sections, has given place to the branches named, and with larger profit to the farmer.

In this connection it is of interest to record shipments of produce made over one division of the West Jersey and Seashore Railroad during the year 1908. They are furnished by Mr. William Coffin, division freight agent, Camden, and are as follows:

TABLE I.

PERISHABLE SHIPMENTS FROM W. J. & S. R. R., 1908.

	Packages.				
Commodities.	*Crates.*	*Barrels.*	*Hampers.*	*Cases.*	*Sacks.*
Strawberries	46,015	.....	.....	.....	.....
Blackberries	.....	.....	.....	.....	.....
Raspberries	31,195	.....	.....	.....	.....
Huckleberries	.....	.....	.....	.....	.....
Tomatoes, early	512,056	.....	.....	.....	.....
Tomatoes, late	7,040	.....	.....	.....	.....
Cantaloupes	112,861	.....	.....	.....	.....
Potatoes, sweet	5,554	289,055	307,880	.....	.....
Peppers	8,425	94,823	21,062	.....	.....
Apples	.....	4,587	.....	.....	.....
Cranberries	8,945	10,565	.....	.....	.....
Canned goods	.....	.....	.....	463,380	.....
Oysters and Clams	.....	6,047	.....	.....	141,972
*Potatoes, white	.....	211,322	.....	.....	.....
	732,091	616,399	328,942	463,380	141,972

Total number of packages, 2,282,784.

* White potatoes are shipped in bulk—number of packages shown above based on an average of 180 pounds to the barrel.

PICKING STRAWBERRIES, BRIDGETON, N. J.

TABLE II.

PERISHABLE SHIPMENTS FROM W. J. & S. R. R., 1908—TONNAGE.

Commodities.	*1908.*	*1907.*	*Increase.*	*Decrease.*
Strawberries	1,150	917	233	.....
Blackberries	.....	.....	.....	.....
Raspberries	779	384	395	.....
Huckleberries	.....	.....	.....	.....
Tomatoes, early	12,801	13,989	.....	1,188
Tomatoes, late	176	3,946	.....	3,770
Cantaloupes	2,821	3,872	.....	1,051
Potatoes, white	29,019	27,037	1,982	.....
Potatoes, sweet	33,972	18,533	15,439	.....
Peppers	4,972	3,289	1,683	.....
Apples	367	648	.....	281
Cranberries	760	1,059	.....	299
Canned goods	16,218	17,657	.....	1,439
Oysters and Clams	17,022	14,712	2,310	.....
	126,057	106,043	22,042	8,028

Net increase, 14,014, 13 per cent.

The following questions answered by the directors are given as indicating the degree of prosperity attending the work of the farmers during the year.

"Has the year 1908 been as prosperous as was 1907 to the farmers?" is answered "Yes" by fifteen, "No" by four, "More prosperous" by four.

"Are average good farms being run at a profit?" is answered by twenty in the affirmative, not one dissenting.

"If they are, what per cent. above cost of production?" The replies to this question run from three per cent. to thirty per cent., the average per cent. being ten and one-half per cent. From this return the cost of maintaining the family with certain other annual expenses, such as fertilizers, seeds, implements and machinery and their needed repairs, labor, maintenance of working teams, cost of spray mixtures, etc., must be met. These deducted will give the actual per cent. of profit on the investment.

"What is the average price per acre of average farm land?" The answers to this question vary with different sections and the character of the land. They run from $15 in Ocean county to $150 in Bergen county, the average being $70 per acre. This is a little in advance of the last estimate of the United States Depart-

ment of Agriculture two years ago, which was $64.66, but is none too high for "average farm lands," as indicated by the question.

The following questions were answered by the secretaries of the county boards:

1. Is the number of farm laborers evidently on the increase or decrease? Fourteen counties say "Increase; demand for laborers in factories and other business reduced."

2. Are farm wages higher or lower than they were last year? Give wages per month, with and without board. Nine say "Lower," five say "About the same," two say "Higher." Wages per month, with board, average $19.44; without board, $32; by the day $1.40. These rates are made up from the combined reports of the directors and the county secretaries.

3. What crops are receiving more attention than last year? Eleven counties answer as follows: Atlantic—Sweet potatoes and grapes, less winter grain. Bergen—More fruits, less potatoes. Burlington, more potatoes, less stock-raising. Cumberland—More potatoes, less strawberries. Monmouth—More potatoes, less wheat and rye. Morris—More hay, less potatoes. Ocean—More corn. Salem—More early potatoes, less tomatoes. Somerset—More corn and hay. Sussex—More corn. Union—More corn, less potatoes. Other counties reporting say "No change from previous crops."

4. State number of silos in your township. More than 150 silos are enumerated. Middlesex gives 60; Monmouth, 8; Salem, 35; Somerset, 28; Warren, 8. Others report a small number.

5. The number of creameries in the State, as reported by Hon. George W. McGuire, is above 130.

6. "There were 42 canneries in operation in New Jersey in 1907; of these, 30 are owned and operated by partnerships or individual owners, and 12 are the property of and managed by corporations. The capital invested is $775,996. The total selling value of all goods canned and marketed was, for the year, $2,263,361." (From the Thirty-first Annual Report of the Bureau of Statistics of Labor and Industries of New Jersey for the year ending October 31st, 1908. For details of products canned, &c., consult said report.)

7. Is the spraying of fruit trees and vines to destroy injurious insects on the increase among farmers in your locality? Eleven counties say "Yes;" two, "About the same;" three say "No." Union says "Decrease;" Morris, "Many trees past all hope."

8. What is the *wholesale* price paid the farmers for milk by retailers? Wholesale, 3.8 cents.

9. What is the *retail* price of milk in the towns and cities near you? Retail, 7.5 cents.

10. State average price paid at creamery? At creameries, .03 cents.

COUNTY BOARDS OF AGRICULTURE.

There are twenty of these organized according to law, one in each county except Hudson. Some of them are doing splendid work for the progress of agriculture in their particular county. Some others are not so active. One way of creating a wider interest in these organizations is to hold a summer meeting on the farm of some progressive farmer. Such meetings widen acquaintance, give opportunity to study the methods and work of others, promote sociability, and afford a day of recreation unsurpassed. Try it.

FARMERS' INSTITUTES.

The interest in this method of instruction in practical agriculture is extending, and farmers are appreciating the assistance thus rendered by the State. The meetings are attended in larger numbers, and a general desire to become better informed concerning their profession is very marked. The subjects treated comprise a majority of those enumerated under Farmers' Week.

During the months of March, November and December, forty-one institutes were held, and about twenty more additional applications for meetings are on file.

SUMMER MEETING.

The summer meeting of the board held at the Agricultural College Farm, New Brunswick, on August 14th, was well attended. The chief object of this meeting was to study the lines of work carried on at the farm, the means used and the methods pursued.

After an address by the director, Dr. Edward B. Voorhees, on "The Object of an Experiment Farm," and by Prof. K. C. Davis, principal of the Short Course School, on "Up-to-date Methods and Training in Agriculture," different members of the station staff

conducted the visitors around the farm and explained the experimental work in progress there and carried out under their direction.

FARMERS' WEEK.

A new departure in agricultural education, begun December 28th, 1908, and ended January 2d, 1909, was arranged for the dates named at the college farm. The movement seemed to be popular from the first day, when nearly one hundred practical farmers were enrolled as students. The attendance increased to about 200 on Thursday, and the interest was maintained to the closing session.

To show the scope of the lectures the titles are here given. The speakers in addition to the director, Dr. E. B. Voorhees, were the professors of the Agricultural College force and four of the institute speakers.

The topics presented and discussed were: "Farm Manures"; "Principles of Stock Breeding"; "Potato Growing"; "Composition of Soils"; "Points in Judging Dairy Cattle"; "Testing Vegetable Seeds"; "Improvement of Corn"; "Care of an Orchard"; "Soil Bacteriology"; "Lime and Green Manures"; "Horse Breeding"; "Importance of Spraying"; "Natural Improvement of our Soils"; Judging Cattle"; "Selection of Fruit Trees"; "Judging Corn"; "Making of Spray Mixtures"; "Bee Keeping"; "Nitrogenous Fertilizers"; "The Why of Feeding"; "Growing of Vegetable Seeds"; "Farm Crops and Rotations"; "Judging Horses"; San José Scale"; "Judging Grain"; "Pruning of Fruit Trees"; "Agricultural Education"; "Phosphatic Fertilizers"; "Commercial Feeding Stuffs"; "Peach Diseases"; "Hog Raising"; "Spraying Machinery"; "Judging Hogs"; "Forage Crops"; "Judging Fruits"; "Care of the Feet and Teeth of Colts and Horses"; "Fertilizer Formulas"; "Compounding Rations"; "Plant Breeding"; "Observations on Horse Breeding"; "Peach Growing"; "Strawberry Growing"; "Farm Buildings"; "Injurious Insects"; "Agricultural Education in the Rural Schools"; "How to Buy and Use Fertilizers"; "Winter Lambs"; "Insects Injurious to Fruit Trees"; "Horseshoeing"; "Plant Breeding."

No greater attention and interest in any of our work hitherto has been manifested than was shown by the farmers at this series of lectures. A meeting of this kind would have been impossible a few years ago. We shall expect a more intelligent practice in

farming affairs to follow, as a result of these lectures, on the farms of those who attended the series.

A brief statement of the work done by Dr. E. B. Voorhees, under the Field Inspection law, is given:

FEED INSPECTION.

In the inspection every county in the State was visited and 582 samples were taken from the stock of 135 dealers conducting business in eighty-two cities or towns; fourteen samples were submitted by individuals, making a total of 596 samples received at the laboratory. Three hundred and ninety-three of these samples belonged to the class requiring a guarantee and 203 belonged to the exempted class. Five hundred samples were selected for analysis, 326 of which belonged to the guaranteed class.

Of the 393 feeds collected that required a guarantee, fifty-six were not so accompanied at the time of taking the sample. This was an improvement over last year, when there were seventy-five samples received in this condition, and, in fact, this is the best showing since the law became operative. These fifty-six samples did not represent any particular kind or kinds of feed, but rather were distributed among the various brands collected. In most of these samples it would seem that the failure to meet this important requirement of the law was due to the carelessness of the dealer, for, with few exceptions, the samples represented brands that came to us from other sources properly guaranteed. By correspondence with the manufacturer or dealer, the station was able to secure the statements for all, except five of the deficient samples.

The guarantees, when given, were satisfied in 241 samples, or 74 per cent. This inspection compares very favorably with that of last year, when 75 per cent. of the samples fulfilled the requirements.

These results are included in Bulletin No. 212 of the New Jersey Agricultural Experiment Stations, which has been widely distributed throughout the State in response to numerous requests from farmers. The demand for the feed bulletins is equal to the demand for the fertilizer bulletins issued by this station.

Respectfully submitted,

FRANKLIN DYE,
Secretary.

DISCUSSION.

President Voorhees—The report is now open for discussion and comment. I hope you will take part promptly and vigorously and have a resumé of the work in the different parts of the State in connection with the report made by the secretary.

I want to comment personally upon one phase brought forward by the secretary, and that is as to the increasing number of inquiries that are made concerning farms in New Jersey. I haven't kept accurate record, but I think I can safely say that we have at least three letters a day in our office inquiring about farms for sale and about the location of farms, and all these come from parties outside of the State. They have heard of the State at last (laughter), and not through the other institutions the State represents, but through the farms, and I think that is a very encouraging fact, that the State is being heard from through its importance in agriculture, and the fact that those are coming with possibly, in some instances, better ideas of growing crops.

Yesterday I had a letter from a farmer who came from California, and is thoroughly familiar with the growing of alfalfa, and he proposes to go into that business in a large way in this State and in Hunterdon county.

It is a very encouraging fact, and it does seem that we should in this report of the secretary take up the matter and discuss it in some detail. The matter is before you.

Mr. Butterhof—I am glad the secretary laid particular stress upon the lands in the southerly part of the State. They certainly need development.

Secretary Dye—I would like the board to take some action as to the monthly crop report—whether it is of sufficient value to continue it; if it is not we will drop it. While it makes more work for the secretary it affords a medium to make an announcement occasionally to the farmers. The question is who those correspondents shall be, the county secretaries or the directors, or both.

The President—Have the members any thoughts to present in relation to the crop report? Shall it be continued? It does seem to me, speaking from a personal standpoint, that unless we have some method whereby we can get such reports, that this continuity of statistics, and which are as reliable as any, will be broken,

and we would not know five years from now whether we made any progress or not.

Mr. Elias Black—I think it is very important. The government makes its reports, but they don't give us a detailed report of New Jersey. We are Jerseymen, and we are interested in the reports of New Jersey. I hope that these crop reports will be continued.

Mr. Rider—I think a little contribution is made to the county organizations, and that is supposed to go in part to the secretary, and I propose that they be requested to make prompt reports to the secretary of the State board.

Mr. Cox—I move that this State board recommend that the secretaries of the county boards assume the duties of furnishing the crop reports. Motion seconded and carried.

The President—That carries with it the idea that we continue the crop reports.

The discussion being closed, on motion, Secretary Dye's report was received and ordered spread on the minutes, and a vote of thanks was extended to the secretary for his able work in providing the institutes in the different counties.

TRANSPORTATION AND FREIGHT RATES.

President Voorhees—There was a committee appointed last year to investigate the subject of transportation and freight rates. Mr. E. R. Collins was made chairman of that committee. We will now hear his report.

Mr. President and Gentlemen—The transportation problem is one that bears directly on the prosperity of the farmer, and as that problem is solved by those operating the means of transportation, depends to that extent the future progress or depression of our agricultural interests. Anyone who has thoughtfully watched the current of events for the past fifteen years can but connect the general prosperity of the farmers with the reduction in transportation rates that has been gradually going on, and while agriculture has been slightly relieved of the burden of transportation charges that it has borne, there is yet room for considerable improvement before the man on the farm stands on an equality with the man of the mill in transportation matters.

Prior to 1887 common carriers fixed their rates to suit themselves and there was no authority that could call in question the justice or injustice of the rates as the transportation companies fixed them. If a rate was discriminatory or burdensome there was no redress. The act of Congress, February 4th, 1887, was the first step toward a supervision of conditions and rates of transportation.

While the Interstate Commerce Commission has supervision of the traffic between the States, there was nothing between the shipper and the transportation companies in this State until 1907, when an act to create a board of railroad commissioners was passed.

So far as adjusting transportation rates are concerned the railroad commission has only power to *recommend,* and in that particular we stand as we did before the board was created.

Under the rules of the Interstate Commerce Commission freight is first divided into shipments of carload lots and less than carload lots, and the tariff on the traffic is less when there is a carload lot than when there is less than a carload lot. And again, freight is divided into six classes, from first class to sixth class, inclusive, and these six classes are in turn affected by twenty-six rules. It is in the application of the twenty-six rules to the six classifications that most of the discriminations are worked and hardships imposed upon the small shipper.

To illustrate, take eggs in less than car lots. If offered for transportation in baskets, or loose in barrels or boxes, the rate will be first class, which is the highest. If in carriers or cases of the following dimensions, namely, "sides, top and bottoms three-sixteenths of an inch in thickness, ends and centers seven-sixteenths of an inch in thickness, and cleats one and one-quarter by seven-sixteenths of an inch, cemented and fastened with wire nails three-penny fine, twelve nails on each side, bottom and top, two and three-quarter pound hard callandered medium fillers, consisting of ten trays and twelve dividing boards to be used," then they go as second class. Carriers of straw boards, corrugated, with sides, tops and bottoms not less than three-sixteenths of an inch thick, ends not less than one-quarter inch thick, fitted with ten trays and twelve dividing boards, with covers securely wired to carriers or cases, will be subject to 10 per cent. higher than second class.

Thus, in almost innumerable instances, the manner in which

the goods are prepared for shipment will affect the classification. In addition to this there is another element that will affect the tariff on a shipment.

To carry to a logical ending the rules of the Interstate Commerce Commission, in the course of time, there will be what is termed a published rate on file with the commission, between each place touched by a common carrier with every other place in the United States. A published rate is made up in this way: All of the transportation lines over which a shipment must travel between two given points agree as to what they will charge to carry a certain classification over their part of the journey, the lump rate is printed in a certain form, and a copy is filed with the Interstate Commerce Commission. Thirty days after the rate is filed and approved by the commission the railroads or other transportation companies may charge that rate for freight between the points mentioned. If there is no published rate between the points covered by a shipment going from one State to another, then each line over which it travels in making the journey charges its own rate.

The hardship often worked to a consignee, through lack of a published rate, is illustrated by a matter that was brought to the attention of your committee for investigation early in the year. These were the conditions: In March of 1907, Hamilton Square grange, through its coal committee, purchased a twenty-five-ton carload of coal of an agent at Pittstown. The coal was shipped from Bernice, Pa., to Newtown, N. J., traveling first over the Lehigh Valley road from Bernice to Phillipsburg, and was there transferred to the Pennsylvania railroad to complete its journey to Newtown over the lines of that company. When the coal was bargained for, the agent informed the purchasers that he thought the freight on the coal between the points would be about $1.85 per ton. If he did not know, he should have known whether there was a published rate on coal between the two points to be covered. With the understanding that the freight was to be about $1.85 per ton, the coal was ordered, and in due time reached Newtown. A weigh bill of about $40 accompanied the coal, which was paid and the coal distributed. A few days after, an additional bill of $61 was received, making the cost of the transportation of that twenty-five tons of coal between Bernice, Pa., and Newtown, N. J., $101, or a few cents more than $4 per ton, a rate both excessive and

unjust, and so high that it made the coal cost the people of Hamilton Square more than the local dealer would have furnished it by the single ton.

What happened was this: There was no published rate on coal in carload lots between Bernice, Pa., and Newtown, N. J. The Lehigh Valley had a published rate between Bernice and Phillipsburg, so it applied that rate, which was the $40 of the first bill, and the Pennsylvania, having no published rate on coal in car lots between Phillipsburg and Newtown, charged eleven cents per hundred pounds for hauling it between those points, which was the second bill presented, making the total charge of $101 for the shipment.

Your committee took this matter up and succeeded in having the two railroads concerned agree on a rate between the points of this shipment, and a rate of $2 per ton was put into effect the first of last June. Since that time your committee has been endeavoring to get the Pennsylvania railroad to admit that the rate charged on this shipment was excessive, and ask the Interstate Commerce Commission for permission to settle this matter according to the rate published last June, but so far have not been able to get the railroad to make this acknowledgment to the commission, and the matter is yet unadjusted.

There are many miles of trolley lines running through the farming districts of the State and connecting with the large cities. Our people very naturally look on them going past the farms, and can see no reason why they should not furnish a cheap and convenient mode of transporting farm produce in small lots to the towns and cities where consumers are.

The street railroads have tried it, and find that the larger cities, and some of the smaller towns, impose such conditions on them that it is impossible to comply with the requirements of all of them. In one instance where your chairman investigated the matter he learned that one municipality would only let freight be carried through it between eleven and two o'clock at night, and the municipality adjoining it would let it be carried only between three and seven o'clock in the morning. An instance like this, where towns are not friendly, would make it impossible to comply with the requirements of the law. The trolley roads insist that they are willing and anxious to carry small freight, especially those lines that go through lean territory.

Eighteen complaints regarding transportation and rates have been submitted to your committee this year. In eleven of these cases the apparent overcharge of freight was due to the fact that the goods were not properly prepared for shipment, so that the lowest classification would apply. In four cases, where goods were lost in transit, settlement has been secured. The three remaining cases are yet in course of adjustment, including that of Hamilton Square grange, the latter having been most stubbornly contested at every point by the railroads involved.

Last spring the railroad fares were advanced on some of the roads in the southern part of the State, and your committee was empowered by the executive committee to take the matter up with the State Railroad Commission, and, through the State commission, with the Interstate Commerce Commission. But upon investigation the matter was found to be less serious than was alleged, and the State commission was not inclined to take the matter up, petition was not made. The matter was discontinued, however, upon the express promise by those in authority on several of the railroads that there would be no further advance in passenger rates last year. This matter will probably come up again the coming summer.

As stated at the opening of this report, the matter of fair transportation facilities and just rates is vital to the agricultural interests of the State and country.

Respectfully submitted,

E. R. Collins, *Chairman.*

On motion, the report of this committee was accepted and ordered to be spread on the minutes. A vote of thanks was extended to the committee by the board for its services, and, after a favorable discussion, the committee was continued for another year.

The next order of business was the report of the committee on fish and game laws. Mr. Charles Collins, chairman of that committee, announced that the committee was not yet ready to report.

President Voorhees then appointed Messrs. George W. F. Gaunt, C. D. B. Forman and Henry J. Irick as a committee to escort Governor J. Franklin Fort to the presence of the board.

FIRST DAY—AFTERNOON SESSION.

Vice President Cox presiding.

The Vice President—The board will now listen to the annual address of President Dr. Edward B. Voorhees.

President Voorhees' Address

The year just past has, in many respects, so far as farming is concerned, been the most notable in the history of this country. Conditions have existed and still exist which are of serious moment, and which should receive immediate and earnest attention. These have been properly understood only by those engaged in investigations concerning the welfare of the farms and farmers, although a point has been reached where the necessity of action is recognized by those chief in authority in our Union, as well as in our various States. I refer to the use of the natural resources of State and nation as they exist in our lands, our forests, our mines and our rivers.

A brief quotation from my address of last year will show that the necessity for concerted action in some form was anticipated, and that the call to such action was likely to come from some leader in the near future. I called attention to the fact that "only in recent years had the President of the United States and the Governors of the various States, in their inaugurals and messages, considered it necessary to give more than passing notice to the agricultural interests of the country and of the State. Nowadays it is the exception, rather than the rule, when these officials do not make extended reference to the farmer and his work, and recommend that such laws shall be enacted as will help to promote this basic industry. So, too, men of affairs, captains of industry, and those who give careful study to economic conditions, recognize the importance to the country and State of a progressive agricultural practice, one that shall be conservative of the country's capital stock of fertility, and the influence of such practice upon the future prosperity and happiness of all the people."

The implied greater activity is a fact. The leader is President Theodore Roosevelt, who in May last invited the Governors of all

the States, the leading scientists of the country, as well as those connected with the great industrial interests, to come to Washington to counsel together concerning those great problems of the use of our resources, and which have so close and important a relation to the welfare, not only of the industries themselves, but to that of the whole people.

As a result of that conference a national commission on the conservation of our natural resources was appointed, this national commission to be assisted by State conservation commissions in making an inventory of our resources, and to report at a later conference, and then to provide as far as possible for future work which shall have for its object the adoption of plans that shall most economically utilize our national capital.

The second conference was held in Washington on December 8th, when reports were made and an inventory of our resources was presented. This inventory shows that, notwithstanding wasteful and extravagant methods of use, we still possess large values, although we are not, as a whole, doing as much as we know how to do; in fact, doing very little, in the first place, to improve our lands and forests, and, in the second place, to encourage, by proper attention, those recuperative powers which they are able to exercise. That is, in the case of these, our most important resources, we have not taken recognition of the power which lies in the hands of man, not only to utilize that which we already have to the fullest advantage, but we have not taken such measures as would enable the lands and the forests to renew themselves.

In this connection I desire to call attention to a significant statement made by the president in his address—a statement which was, in my judgment, one of the most important utterances of the conference, and which, if the suggestion contained in it shall have its full fruition in the minds of Governors and legislators, it will mean more for the logical development and conservation of our soils, forests, mines and streams than any other one thing that can possibly be done. He said virtually, although I am not quoting his exact words:

"The time has come in this country when the political leaders, those who make the laws in the various States and in the United States, must recognize the work and heed the advice of our scientific men, and must act upon their advice in matters of legislation

which has to do with the conservation and upbuilding of our soils and forests, as well as for their proper conservation."

He did not say in so many words, but implied that when the head of a department, as, for example, the State forester, should advise the Governor and Legislature that there should be provided by the Legislature a definite sum annually, in order to prevent forest fires; to thoroughly equip the State with fire wardens; to purchase State reserves, and to properly administer and develop the forest areas, it was a manifest duty for the State to provide these amounts, because the forester, knowing the conditions of the forest and the importance of forestry as a part of the development of other natural resources of the State, is merely asking that which would return to the citizens of the State many-fold, not only in dollars and cents, but in future comfort and security. He has no personal interest in asking for funds beyond those which are necessary for the proper conservation and development of the forest areas.

The same would be true if the president of this board should, after mature judgment, after full conference with those specially qualified to advise, and after twenty-five years' experience in the State, and after honestly and laboriously studying all phases of agriculture, should present to the Legislature a report stating that in order that our waste lands may be developed, our present farming lands improved, and our agricultural interests properly conserved, that there should be appropriated annually, a definite sum for agricultural education, for the Agricultural Experiment Station, for demonstration work and farmers' institute work through the State Board of Agriculture. If, I say, the president's timely and most sensible and patriotic suggestion is followed, the Legislature should at once, and without quibble, make these appropriations for the development and conservation of our natural resources as they exist in our forests and lands, and which would redound to the benefit of the whole people.

The present attitude of many State governments, and of the national government as well, toward these questions seems to be one of mere expenditure of dollars and cents, and the appropriation committees do not ask why or wherefore, nor take pains to get an intelligent conception of the present and ultimate good to be derived, but are rather satisfied if the demands can be reduced. This is a narrow-minded, unpatriotic and time-serving

attitude. It has not been popular politically to recognize matters which, to those who have not given careful attention to them, seem of rather minor importance. The time has now come, and only after much has been wasted that can never be recovered.

The president also said: "It is because we have such an abundance of natural resources in our country that we have not given attention as we should to their conservation." This, however, he said, is not excusable any more than it is excusable for the father of a family who, because he has an abundance, wastes it in riotous living, leaving his own to suffer because of such wasteful expenditure. We have no right to waste our resources and leave the residues for those that come after us. On this point, in order to show that this State is squarely on record, and that we have, as a board, presented this matter to our leaders in this State, I quote again briefly from my annual address of 1904:

"Because of the abundance of land, the practice prevails not of conservation and improvement by directing nature's laws, but of taking up more land, or of clearing it of timber, in order that more produce might be grown. The timber was not utilized as it might have been, since the primary purpose was to obtain the land upon which it grew. This system, which the individual farmer followed, which was practiced by farmers in the aggregate, has resulted in the destruction of our forests, in the diminution of the water-holding capacity of our soils, and in the loss of a very large portion of the fertility contained in them. It has not been proven that our destruction of forests, or the wasteful management of our lands, has resulted in materially changing the climate of our country, but certainly the changed conditions of soil, in so far as they concern its water-holding capacity, are such as to considerably modify the effect of our spring and winter rains. The floods which have recently been so devastating in their character in many parts of our country, and the periodical droughts so destructive in their nature, are due, in great measure at least, to the removal of our forests and to the depletion of the organic matter in our soils, rather than its absorption and conservation and its gradual movement toward the sea. This destructive system of farming is not confined to any special district, though it is especially noticeable in those sections of our country where single crops are the farmer's main source of income as, for example, cotton and tobacco in the south; corn in the middle west, and wheat in the northwest. These

systems of farming are very wasteful of soil fertility, because they do not provide for the building up of the soil, either in the organic matter or in its physical character. Even the ranges of the far Western States have been injured by destructive methods. The grasses have been destroyed, the water-holding capacity of the mountain sides decreased, and the available water for the irrigation of the drier plains below materially diminished. All of these methods, which have lessened the productivity of many of our soils, show but one side of the losses that are actually occurring; the side which perhaps is the least important, though it cannot be separated from the other, for the two combined must constitute what we understand by natural fertility.

"It is a fact, and facts are stubborn things and cannot be gainsaid, that the capital stock of any country, and therefore its present and prospective wealth, lies in its natural resources. In an agricultural country these resources are in its soil, and since the value of the soil or its sustained power to produce crops is measured by the content of nitrogen, phosphoric acid and potash, together with the conditions which make them available to plants, it follows that this capital stock of fertility in our soils, these, natural resources are reduced in proportion as these elements are permanently removed from them."

THE DEVELOPMENT OF WASTE LANDS.

This phase of the question, while probably the most important, does not take into consideration the further fact that in the whole country, and including our own State, there are large areas which possess many of the characteristics necessary for the production of profitable crops. It is quite as much the duty of both national and State governments to provide for their improvement and utilization as it is to provide for the prevention of unnecessary losses in cultivated soils. That this principle has been adopted by the United States government is shown by the valuable work now being conducted by the reclamation service, and of which we shall have abundant evidence in our evening lecture to-morrow. There are thousands of acres of land in our Eastern States, either too wet or too dry, too poor naturally, or badly located, which should receive prompt and intelligent attention if we are to follow

GATHERING CABBAGE, DEERFIELD, N. J.

up and make this method of improvement do for us what the conditions will permit. We have in our own State vast stretches of land that are now practically barren and worthless; frequent forest fires have destroyed their organic matter (the accumulation of many centuries); they scarcely hold enough water to provide for any vegetation. We have evidence from experiments already conducted that with little expenditure of money these lands are capable of rapid and permanent improvement, while at the same time producing crops that will more than pay for the labor involved. It is largely a matter of mineral fertilizers and the introduction of leguminous crops to supply nitrogen and humus, which will render these soils quite as productive as many of those which have been farmed for many years, with the further advantage that they are so located as to enable the producers to reach profitable markets.

THE NEED FOR DEMONSTRATION WORK.

A line along which this work may be carried on by the State is to broaden the field of work, both of the experiment station and of the State Board of Agriculture; this would enable them to do much in the way of developing these soil areas, and would not interfere with present functions.

In a broad sense, the agricultural experiment stations were established for the benefit of the farming industry, both immediate and prospective. The usefulness of such institutions was conceived by men who had made a study of the scientific principles involved in farming, and thus realized the advantages that would accrue to the farm and to farming as a business, and the improvement of waste lands, if the principles already established and confirmed were more generally understood and applied in practice. They also, indirectly at any rate, supported the view that many now have, that an experiment station could render its best service only when a knowledge of the principles and facts acquired were generally disseminated and applied in practice. These views, if correct, places the experiment station among educational institutions.

An experiment station to accomplish this double function or purpose must experiment as well as see to it that the information gained as a result of the experiments is used.

In other words, it was recognized that the greatest immediate usefulness of a station would be accomplished if it succeeded in improving the condition of farm practice in its own State. Its direct value is measured by the increase in the efficiency of the farmer, not only in utilizing the natural resources of his soil to the best advantage, but who in the process is enabled to secure a greater return, either in creature comfort, dignity or cash.

The station men are well aware of the existing conditions in the farming districts of the various States; for twenty years they have been publishing bulletins, which contain the data necessary to enable farmers and others to form an opinion of the conditions as they exist, and to apply in practice those methods that will build up and conserve fertility. We do not need further investigation in pure science to enable us to improve conditions, but rather interpreters and demonstrators. We know the conditions and the means for their remedy, but not all the farmers who are to be the active agents in the work of improvement are able from their reading of the bulletins to formulate plans which shall enable them to successfully accomplish the work. There should be more of what may be called "demonstration work." That is, work which shall show in the field how trustworthy are the principles which have been established, and which need no further investigation to prove their value in practice, and how these, if applied, will result in increasing the efficiency of the farmer's work.

This work should be in no sense experimental, as the farmer must not get his ideas confused concerning experiments and demonstrations. It is possible to establish a number of demonstration fields in different parts of the State without great expense being attached thereto, as in most instances farmers are only too glad to furnish their land and materials if they can have direction as to "how" to do it, and I think that the State could well afford the necessary expense of visiting these fields several times a year, or at least to give such time as may be necessary in planning the work.

These demonstration fields have the advantage over the demonstration fields on the experiment station farm in that they are managed entirely by practical men, and without expensive equipment or apparatus. In other words, it shows on the owner's farm what it is possible for him to do. He is therefore convinced that it is not a mere theory worked out in the laboratory, but theory

based on facts and principles of the most practical character. This work may be no better, and in one sense not as good as that at the experiment farm, but because it is stripped of all officialism, and conducted entirely under their own conditions, greater interest is aroused.

I do not wish to be understood as saying that this work should be in lieu of that already done, but rather that there should be such additional support given as will permit of the station exercising this educational function of the institutions. Whether it shall be accomplished by State aid or through national appropriation is a question that is not yet clear in my own mind, although, as I see it now, it seems that this work should be a State matter and be supported exclusively by the State, but directed by the experiment station or State Board of Agriculture. In this way it will not interfere with the development of the most important lines of work now carried on by these institutions, but rather broaden and strengthen them in all their various departments.

At the present stage no other kind of work in connection with the institute work and farmers' lectures will be of such immediate service to the farmers, who have not had full opportunity, and do not now have the opportunity, of obtaining that knowledge of fundamental principles which is essential for the improvement of our farms, our waste lands, and for the conservation of the resources of our soil.

TENANT FARMING NOT CONDUCIVE TO SOIL IMPROVEMENT.

In connection with this matter of conservation and improvement of our natural resources there exists, however, a very anomalous situation. Curiously enough from one standpoint, when the farmers have taken full advantage of improved methods of practice, and have reaped the benefits which are sure to follow, they soon acquire such a competency as to enable them to put out their farm and retire to the city. This is very noticeable in a number of counties in the State where as a whole the farm practice is very much above the average. The result is that, instead of the continuous and further development of the farms, and consequently the neighborhood, progress is stopped, and in many cases farms

begin to run down again because of the larger number of tenant farmers.

There can be no legitimate criticism of this action on the part of owners, except that the history of farming in various countries teaches that ownership of farms by those who direct the work on them does have a tendency to increase the productivity of the land. If the numerous tenant farmers were properly supported by the owners there would not be this tendency, which does exist, for the tenant farm to become gradually poorer.

As an illustration of the facts I may cite statistics obtained in an agricultural survey of one of the best agricultural counties of the State, where it was shown that 47.7 per cent. of the farms worked in that county were managed by tenants, and on these farms, as a whole, cover and green manure crops were not used, nor special attention given to soil amendments or improved cultivation.

One reason why tenant farming does not tend toward the improvement of the farm is because the owner does not recognize his responsibility in making a proper provision for the maintenance and continuous increase in fertility. That is, no special provision is made for giving the tenant farmer a proper interest in such improvement. He is not, on the whole, encouraged to grow cover crops, either cereals or legumes, which have a tendency to prevent losses of plant-food. Short-lease tenants are not given a rebate on added fertility, still unused, in the form of manures, fertilizers or lime. Ordinarily, therefore, the chief anxiety of the tenant is to get as large a share as possible of the active fertility during the period of his lease, and has no thought for those who come after. His position is practically the same as that of the people, as a whole, to the entire country, in that he is getting as much as possible now without considering those who come after.

It seems to me that a reform should be inaugurated in this respect, although I am not prepared at this time to make definite suggestions other than that the owners shall give the tenant farmer a chance to practice those methods which will result in the maintenance and improvement of the soil by guaranteeing him a proportionate share of the unused residue. This matter has been very carefully worked out in foreign countries, and while it is not possible to have a system that would be equitable under all circumstances, as to kind of cropping, character of soils, &c., it gives much

more encouragement to the tenant than present methods, and at the same time does not result in increasing materially the net expenditures of the owner, as he necessarily participates in such maintenance and improvement of fertility.

FERTILIZERS AND SOIL AMENDMENTS.

In this connection a word should be said concerning the use of commercial fertilizers and soil amendments. Our farmers, on the whole, are familiar with the fertilizer and manure question, yet because progress is being made, both in the discovery of new materials and in the more economical and profitable use of products not formerly so generally used, I sometimes fear they are not so familiar with the subject as to make them always sure of their position, and thus to retain in their practice products well known and whose value is well established, rather than to purchase the newer materials, either because they are recommended highly by those having special interests to serve, or for special purposes, which they do not take pains to inquire into.

Farmers know the value of animal bone and of superphosphates. They are also familiar with the fact that bone is likely to give up its phosphoric acid to plants much more quickly than the ground phosphate rocks of Florida, Tennessee and South Carolina, even when ground to the same degree of fineness. It is for this reason that farmers prefer to use the phosphates derived from bone rather than those derived from phosphate rock, even if in the latter the availability may be very largely increased. This general experience and this prejudice in favor of bone have their foundation in science; they know also that in the process of manufacture the insoluble phosphates in the various phosphate rocks are broken up and made soluble, not only becoming more available, but more easily distributed in the soil, thus making them a most valuable source of phosphoric acid for quick-growing crops. They seldom nowadays make the mistake of classifying all phosphates in one group, nevertheless there is a tendency on the part of owners of low-grade phosphates to take advantage of the experiments that have been made with the ground mineral phosphates as soil improvers or as carriers of phosphoric acid, and useful under well-defined conditions to encourage a much larger use of lower grade

phosphates without drawing proper attention to the particular methods for which they are adapted.

There is a wide field for the use of these products and for the sake of economy in the use of our natural resources they should be utilized. Still I desire to utter a word of warning to prospective buyers—they must remember that these materials are not, as a rule cheap except in the sense that they furnish phosphoric acid at a lower cost than regular supplies. Under conditions of soil or treatment which will enable the insoluble and unavailable phosphoric acid to become more rapidly available they are useful. The price per ton should not be the only guide in their purchase. Superphosphates and ground bone are suitable for most crops and returns will be obtained on most soils commensurate with the cost. On the other hand ground phosphates are suitable only for particular kinds of soil, for particular and special treatment, and for particular crops, and it is only by an understanding of these conditions that farmers can afford to substitute for them those that have a well-established value.

Another phase of this question, and one which is of the utmost importance, more particularly in soil building and improvement, is the use of lime. The lime question has an added importance nowadays in that we know more fully the various functions which lime performs, more especially in building up soils that have been depleted of their humus, or which, because of an original lack of lime, possess a poor physical character.

We must remember that in the purchase of lime we obtain at least three values, one or all of which may be important, and also that as a rule the value of the lime is based upon the content of actual lime supplied, and furthermore that such preparation as is alleged to have been made at considerable expense does not add to the content of actual lime. Hence, in the purchase of materials, the farmer should know first, whether the object of the purpose is to build up the soil in lime, or to obtain the result of the action of lime upon vegetable matter, or whether it shall be used merely to neutralize acidity or to improve physical character and make his purchases accordingly.

Caustic lime, or the ordinary burned lime, will meet the demands in practically all cases, although for light, sandy soils, where the object is to build up the soil in like, to correct possible acidity, and to supply lime, the mild or carbonate form is quite

as good, provided it is finely ground, although in one ton less lime is obtained than in the burned form, and it is a good principle to follow to buy that lime which will furnish the actual lime at the lowest cost. The prices that are charged for so-called "improved" or specially prepared limes are, as a rule, entirely too high, more especially since we have in the northern part of the State large deposits of "marl limes," and in other portions refuse limes which may be obtained at a relatively low cost.

THE DAIRY SITUATION.

As has already been pointed out our national capital consists, so far as our soils are concerned, of the essential fertilizer constituents in them, together with those conditions which make it possible for us to convert them into salable products. It has been argued, and with much reason, that in proportion as the farmer *dilutes* his salable products in these constituents, in that proportion is he preventing the depletion of his soils. Wherever it is possible, therefore, to convert the raw materials as grain, hay, &c., into a finished product as meat, milk and eggs, the minimum amounts of fertility are sold and at a maximum price.

Until recent years the economic relations have been such as to prove the practice a profitable one. Economic conditions, however, change and in the last few years the dairyman who exemplifies this principle finds that his business is not now as profitable as formerly; in fact, many are not making a profit, and the dominating factors are:

(1) The greater cost of purchased feeds.

(2) The increased cost necessary to meet present sanitary requirements.

In regard to the first point figures show that the cost of purchased feeds has increased from 50 to 100 per cent. in the past ten years, which, together with the greater cost of home-grown products, makes the cost of the ration nearly double what it was in 1900, without a corresponding increase in the price paid for milk. In regard to the second point the producer should not stand in the way of the proper preparation of his milk for market; that is, he should make it as clean as possible, and so far as our inquiries go farmers are ready to do this. They understand that

this is a business matter. On the other hand, however, the consumer is not ready to pay the added cost, notwithstanding that milk, even at 10 cents per quart, is one of the cheapest sources of animal food on the market. The attitude of the consumer is largely due to the fact that sanitary boards, health boards and others who have charge of food and health matters do not take pains to teach the consumers that extra cleanliness costs money, and that as a business proposition this cost should be added to the ordinary costs of production.

In order to study this question critically in connection with other studies of dairy cows, a herd of twenty-four cows, representing the best types of the four leading dairy breeds, has been under experiment for the past year at the college farm—these include eight Holsteins, eight Jerseys, five Gurnseys and 3 Ayrshires, and have now yearly records of milk from December 1st, 1907, to November 30th, 1908. The milk has been produced under the best methods of management, so far as care, feeding and cleanliness of production are concerned—the quality of the milk meets all the present requirements.

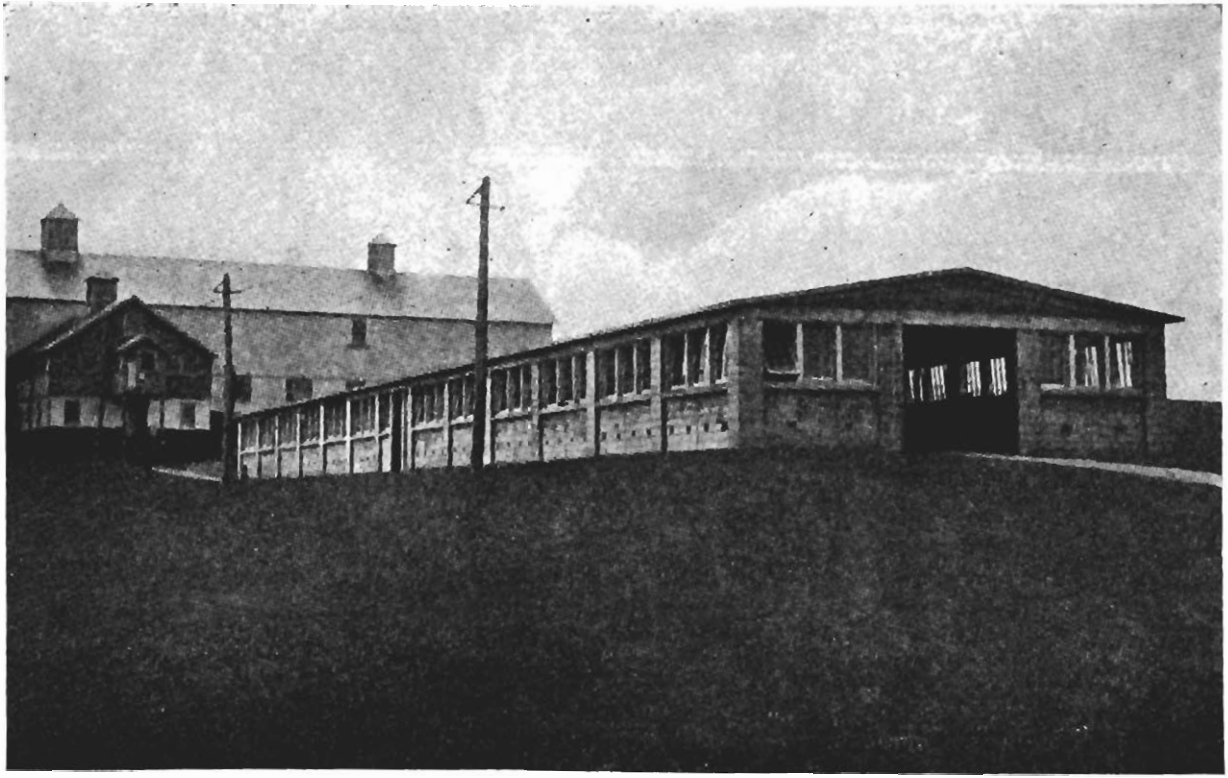
These records show that twenty-four cows produced in the twelve months 213,586.7 pounds of milk, or its equivalent, 97,975 quarts—an average of 8,901 pounds, or 4,083 quarts per cow per year, and containing an average of 4.24 per cent. fat. The weight of the cows ranged from about 900 to over 1,200 pounds, with an average of about 1,100 pounds per cow.

Records were also kept of the amount of feed and its cost, which showed that the daily ration consisted of:

Corn silage	35 lbs.
Dried beet pulp	4 "
Mixed grain ration	8 "
Hay	12 "

or its equivalent. The cost of this ration was 34.24 cents per day per cow, derived as follows:

$14	per	ton	for	hay.
5	"	"	"	silage.
24	"	"	"	dried beet pulp.
32	"	"	"	distillers' grains.
26	"	"	"	wheat bran.
35	"	"	"	linseed meal.



FAIRFIELD DAIRY BARN—EXTERIOR—ESSEX COUNTY, N. J.

The grain ration consisting of:

4 lbs. dried distillers' grains.
2 " wheat bran.
1 lb. linseed meal.

The cost of the ration, therefore, was $124.92 per cow, or in round numbers $3,000 for the herd.

In addition to the cost of the ration the other calculated expenses consisted of interest on capital, cost of labor, depreciation in value of stock and equipment, taxes, insurance and repairs, and are well within the limits of actual facts, making a total of $4,227.50:

Farm, fifty acres	$5,000 00
Dairy buildings	2,500 00
Tools and implements	1,000 00
Dairy apparatus	500 00
Horses, three at $250	750 00
Cows, twenty-four at $100	2,400 00
Bull	100 00
Total	$12,250 00
Labor of two men in barns and field	$1,000 00
One man with team	500 00
Depreciation of value in cattle	240 00
Depreciation of value in horses	75 00
Tools and implements	150 00
Taxes, insurance and repairs	150 00
One half the cost of feed	1,500 00
Interest on investment	612 50
Total	$4,227 50

A simple calculation shows that the cost of feed per quart of milk was 3.06 cents, and the total cost per quart was 4.31 cents. The milk was sold at the farm, after being cooled and put in cans, at 4.5 cents per quart. At this price the net return per cow was $7.59, plus the value of the manure and bob veals, provided the owner is allowed only laborer's wages and nothing for his expert knowledge or his responsibilities.

The price received for milk, however, varies in different parts of the State, ranging from three cents to five cents per quart, while the cost of feeds would not vary largely. I have, therefore, arranged the following table, which shows the net receipts, over and above the cost of feed, and total cost at these different prices:

Average Value of Annual Product Per Cow at	*Less Cost of Feed.*	*Less Total Cost of Production.*
3.0 $122 49	—$2 51 loss.	—$53 65 loss.
3.5 142 90	+17 90	— 33 24 "
4.0 163 32	+38 32	— 12 82 "
4.5 183 73	+58 73	+ 7 59
5.0 204 15	+79 15	+ 28 01

It is obvious from this table that, in order to meet present requirements, there is no profit in producing milk when it sells for four cents or less, and only a small profit at four and five-tenths cents and only a reasonable profit at five cents. It may be argued that in many districts the cost would be much less, because of less expensive rations or of cheap pastures. Experience shows, however, that wherever these costs are reduced, the yield is usually more than proportionately reduced. That this is the case is clearly shown by the fact that the average yield per cow is not far from 4,000 pounds, less than one-half that here recorded. The actual facts show also that even to maintain a 1,100-pound cow, without producing any milk at all, would require an equivalent of about twenty pounds of hay per day, which would be worth, if hay were used, $12 per ton, or $43.80.

Hence it would seem that in order that milk production under present requirements may be put on a profitable business basis, either the nutritive quality of the product must be reduced or the price must be increased to five cents or over. While it is not possible to calculate exactly what the relative cost of the lower grades of milk would be, it may be fairly assumed that the ratio would be somewhat in accordance with the reduction in the per cent. of fat. On the basis of this herd, the milk of which contained 4.24 per cent. fat, and the total cost of which was 4.31 cents per quart, or practically a cent for each per cent. of fat, it may be assumed for argument's sake, although it would undoubtedly be greater, that the cost of the lower grade milk would be in proportion. That is, with 4 per cent. fat, there would be (selling at 4.5 cents) a profit of $20.41 per cow; at 3.5 per cent. fat, a profit of $40.83; with 3 per cent. fat, a profit of $60.24 per cow.

It is evident, therefore, that while there is a possible profit in good dairying, it must be accomplished under present conditions only through the improvement both of the dairy cows and of the

FAIRFIELD DAIRY BARN—INTERIOR—ESSEX COUNTY, N. J.

dairymen—the dairy cow, both in respect to yield and in the kind of milk she produces to meet the market requirements, and the dairyman in order that he may understand the economic relations that exist in reference to the relation of the composition of milk to selling price. The chief point, however, is that the wholesale price is too low, and much might be said as to the dealer's relation to this matter. However, if the question of cost of production was better understood by consumers, and those who are considering only the consumers' side of the question, the matter would be more easily adjusted. I urge again that steps be taken to bring about a better understanding on the part of the producer, the dealer and the consumer. This is a question which directly affects invested capital, as well as the capital stock of fertility and its proper use.

I have but touched on a few of the factors which make for the forward movement of our State and country in agricultural lines. These and others which we shall discuss more in detail are well worthy of our serious thought and attention. This board has accomplished much of which it may well be proud, and which I shall not attempt to enumerate, as it is a matter of record and history that all may read. We are charged with a responsibility not only to farmers, but to the State as a whole, and I hope that in the future, "which we know not of," that we shall continue to be loyal to our interests, supporting them, defending them against jealous and ignorant foes, and if need be fight for them, for "he that is unmindful of his own is worse than an infidel."

On motion, President Voorhees' address was accepted and made a part of the record.

The roll of delegates was then called for the appointment of the committee on nominations. The following committee was named:

Atlantic county—Joseph Butterhof.
Bergen county—J. B. Strohsahl.
Burlington county—Charles Collins.
Camden county—M. C. Browning.
Cape May county—Ralph Schellinger.
Cumberland county—M. E. Diament.
Essex county—J. B. Ward.
Gloucester county—Edmund T. Ridgeway.

Hunterdon county—E. N. Strong.
Mercer county—L. W. Carman.
Middlesex county—R. F. P. Von Minden.
Monmouth county—C. B. D. Forman.
Morris county—Edgar C. Hopping.
Ocean county—C. M. Rorer.
Passaic county—John Ackerman.
Salem county—Richard Ware.
Somerset county—Bernard Myers.
Sussex county—Linus Clark.
Union county—E. R. Collins.
Warren county—J. E. Albertson.

Governor Fort then appeared and was received with applause. Introduced by President Voorhees, he spoke as follows:

GOVERNOR J. FRANKLIN FORT'S ADDRESS.

MR. PRESIDENT AND MEMBERS OF THE NEW JERSEY STATE BOARD OF AGRICULTURE—It is a little embarrassing for me to stand in this place, and I fear, before I get through, having been in this court-room so many times in another capacity in years gone by, that I may sentence some of you instead of speaking. (Laughter.)

The State of New Jersey is much interested in agriculture, and the presence of so large a representation of representative men in the agricultural industry of our State here at the State capitol to-day only evidences the truth of the statement which I have just made. The president rather jestingly referred to me as a farmer, but he is mistaken. Like many other pedagogues and professors, he is wrong. (Laughter.)

I know something of farming. I lived on a farm and worked upon a farm until I was twenty-one years old, and served a reasonable apprenticeship in that line. (Applause.)

There was a time about then—I apprehend I would have trouble now—when I could handle as much hay and bind as much grain and do as much plowing in the field and plant as much corn and plow it afterwards as any of the rest of you who may be here, but those days have gone, and with them has largely gone the old

method of farming. The old methods of farming which were pursued when I was a boy and learned what little I know about farming, I presume, are largely out of use in the day in which you are living, and have been replaced by the methods which you are now pursuing in farming—at least, many of the old methods should be out of use, in my judgment. (Applause.)

This State, I said, is interested in agriculture. The figures which I have had given me, and which no doubt have been presented to you to-day, indicate the truth of that statement in a remarkable way. One hundred and eighty-six millions of dollars in values of farm lands in our State, with 1,200,000 acres of land still unused and unoccupied for farming purposes in this State. The mere statement of that proposition, when you consider the area of New Jersey, is a remarkable statement, and when you add to it the fact that on these lands are $70,000,000 in value in buildings, and that the machinery and implements in New Jersey to-day are worth $10,000,000, and that the gross earnings of the farm lands last year was $58,000,000, you still strengthen the statement which I made that New Jersey is interested in agriculture.

Our position, fortunate as it is for us, makes it quite an important subject for us to consider. Of course, the kind of farming that I did as a boy is not the profitable kind to-day, with the possible exception of potatoes. I may not know very much about farming, but if I am wrong in that, you will correct me. You are growing more potatoes to-day than you did in the days when I was a farmer, even in the times just following the war, and almost during all the sixties and up to the early seventies. But the vegetables and the fruit, the milk and the poultry which is being produced and raised by our farmers was not so extensive when I was a young man on the farm.

I rather regret to see in the statement of the secretary that the increase has not been great in the output of milk in our State in the last year, and there are causes for it which I do not intend to go into.

But we are so situated in New Jersey, as I said, that we can do these things at a profit, while in the distant Dakotas and Ohio and elsewhere, certain parts of them at least, they are not so situated. Here we have right on our coast, on either side of us, across the Hudson and across the Delaware, 5,000,000 people to take the produce of New Jersey—a people who must either get them from

us or from the outlying portion of New York, or from the immediate portions of Pennsylvania lying next to that large city, and such a place for output does not exist anywhere, so near, in as small a space of ground as the State of New Jersey. Therefore our farmers have an opportunity to engage in this industry, for the raising of fruits and vegetables and milk and poultry, and I think we are coming on to the poultry problem now quite strong.

Some of you may have visited the poultry farm near Lakewood. I have had the very great privilege of going through it within the last year, and it is greatly increased now, and one incubator is being erected that will hatch at one time 15,000 chickens. If we are going to have many of these in New Jersey, I think we can sell all that we can raise. The modern American is the best feeder the world has ever known. He is making more money than anybody else, and he is the best buyer that anybody has ever known, and that is the reason why some people in our day and in our time are anxious to preserve our home market for home consumption in every way that we can.

The secretary of your board in his report, which he was good enough to let me have, said that you are not raising turkeys enough, although the price is good. I don't know whether he has been going around hunting turkeys or not, but I know perfectly well, although I am not a farmer, that when Thanksgiving comes I find that my turkey is twenty-eight cents per pound, and it would seem to be profitable to raise turkeys, if they would not die from some cause that we cannot account for.

We must meet that problem in New Jersey. There is no reason why we should not meet it. There is no reason why the young fowl should not grow to full strength and full size and bring a fair profit to the farmers of the State, and if we can eliminate the potato bug from the potato crop, and get more pay for our milk, and get protection for it under the law through the Board of Health, the farmers are certainly bound to be prosperous. They should be.

Here you have a State—there is nothing like it in the world. That seems exaggerated, and you think I say that because I am Governor. That is not so. When I was going around the State a year ago I was telling everybody what a magnificent State it was (applause) and what splendid people you all were, that there were no such people in the civilized world, and your intelligence

was far superior to anybody else's. I said all those things. Well, then I was running for Governor, but now I am not running for Governor, and you cannot get me out for two years, I repeat the statement notwithstanding. (Laughter and applause.)

In this State from yonder starting point at Newton and running down through the most magnificent hills that any State has—the Berkshires are not to be compared with our New Jersey hills—then down this agricultural belt, in counties like Monmouth, and Burlington and Middlesex; then down along the shore and through the pine region until you strike the Atlantic coast, which runs all along our eastern line—when you get through that you have a State that has more things in it that are resplendent and sure to produce prosperity than any other State in the Union, and I repeat it again. (Applause.)

Why should you not be prosperous? You not only have these cities on either side of you, of 5,000,000 people, but you have coming to your New Jersey coast, of 127 miles of seacoast unsurpassed anywhere—how many people? Two and a half millions of people will come to that coast every year within the next forty years. Now over a million and a half are coming to the New Jersey coast, and these people must be fed by the New Jersey farmers. All of them ought to be and will be.

So that, along this coast, we must have the truck farmer, and we must have the grain to care for what they may have to feed grain to; we must have all that goes to make them happy in order to help our seacoast along.

Now I have two other suggestions to make. You are interested, as farmers, in another thing. You may have splendid crops, you may raise all the animals that you will and all the fowls that you will, but if you cannot get them to market it is not of much value to you. What you need is quick transportation and reasonable transportation rates to carry them to market. (Applause.) That is the public carrier. Then the other thing that you need is what we largely have but what we can still improve, splendid highways over which you may transport them. Every man knows, who knows anything about this, that good roads add 60 per cent. of advantage to the farmer. I was down in North Carolina shooting this year a little while—I go every year. I cannot shoot much, but I just go down there to experiment. (Laughter.) I was down

in North Carolina and it took one hour for two of us with two trunks to get four miles from the station. Why? Because in certain places the wagon would go down almost to the hub, and at one place we had to get out, with less than one thousand pounds, and all hands had to help push the thing out of the mud. They can't cart a thousand pounds from that man's place to the railroad station, and he must go three times—four times—and take three times as long each trip, with the same load that you can take at one trip, and in half the time that it takes him. This is what I mean, you can carry 4,000 pounds on a good road without any trouble, with an ordinary team, and certain parts of the road you will trot without hurting your horses, and you can do three miles in less than half an hour; he will take a thousand pounds in the same time but three miles. That is the difference between good and poor roads. It is simply a saving of time as well as a saving of horse-flesh and everything that goes along with it. So what we need is better roads, better than we have, and we have the best roads outside of France, with the possible exception of Massachusetts.

Now we want to put our money on the roads; we want to get after our automobile friends just a little so that they will stay within the law. I am in favor of their paying a reasonable share, and yet I am in favor of letting them have every right in the highway which the law entitles them to.

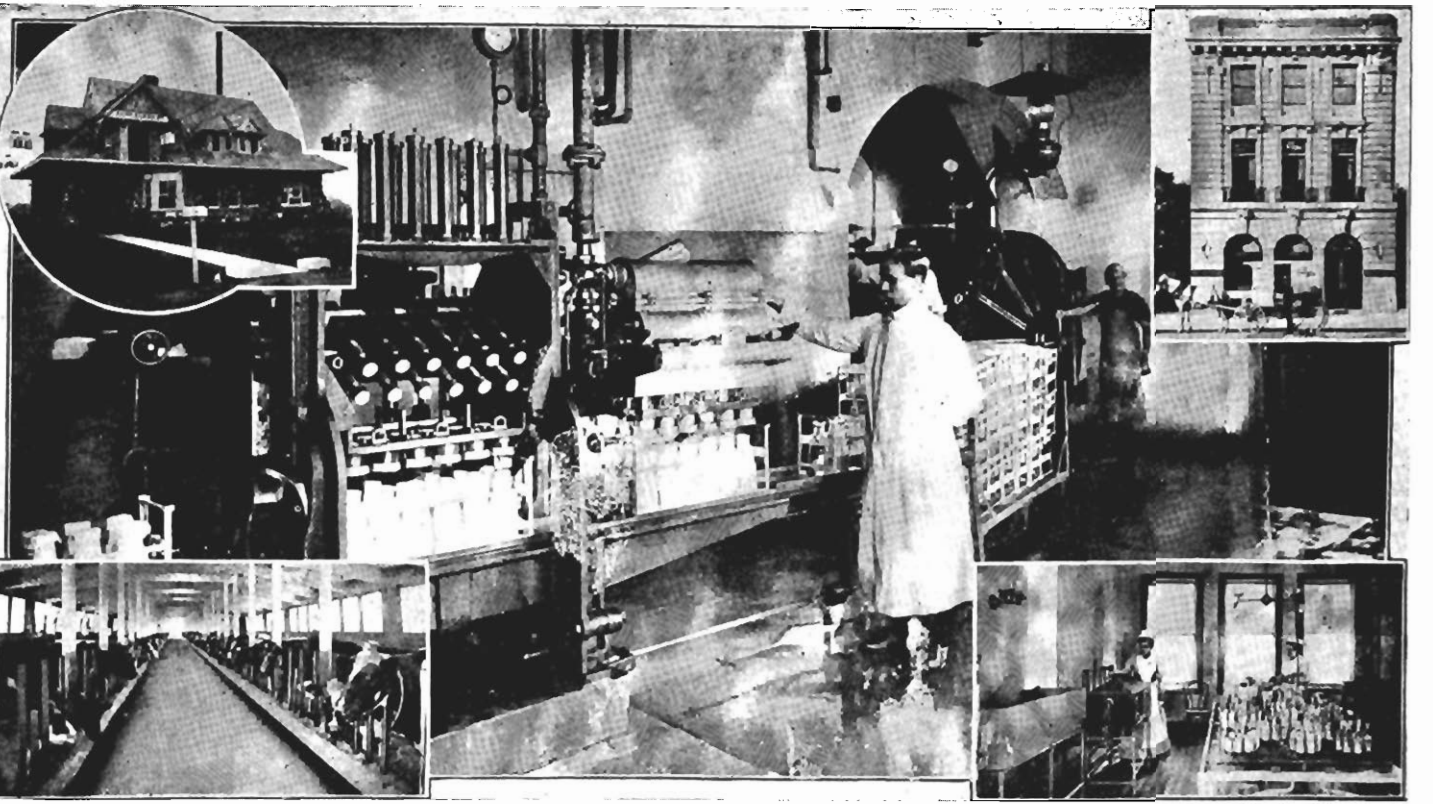
I did not know what I was going to say. I said to your committee this morning that I had not had time to prepare any address and since luncheon I have jotted down a few things to say to you which I have not followed very carefully.

I thank you for the privilege of coming here. I have already violated the good faith which the president expected me to keep when he said that I would talk but a few minutes. I have talked more than a few minutes. It is a pleasure to know you. I want you to know that you have a Governor in New Jersey who is a farmer's son, and who lived on a farm until he was a young man, and if his wife will let him, proposes to go on a farm very soon again. (Applause.)

A vote of thanks was extended to Governor Fort for his courtesy in addressing the board.

BOTTLING AND CAPPING MACHINE

DAIRY BUILDING



DAIRY BARN INTERIOR

LABORATORY

FAIRFIELD DAIRY, ESSEX COUNTY, N. J.

A paper was then read on "Soil Surveys, as Related to Geology," by Dr. Henry B. Kümmel, State geologist.

On motion, the paper was received, and the thanks of the board extended to Dr. Kümmel for his presentation of this phase of agricultural work.

The President—The next on the programme is the reading of the report of the Commission on Tuberculosis in Animals, by the secretary, Franklin Dye.

Report of Commission on Tuberculosis in Animals.

From the beginning of its work up to the present time the commission has worked on conservative lines. Its purpose has been to help the dairyman and farmer, possessing a tubercular herd, out of his undesirable condition with the least possible expense both to him and to the State, consistent with effective work. This has given satisfaction.

Physically suspicious animals have been tested with tuberculin and those responding appraised and removed according to law. Improvements in the stables, such as more light, better ventilation, cleanliness of stables and surroundings have invariably been suggested where such improvements were needed, and the great importance of restocking the herd with cows free of tuberculosis has been emphasized. Along these and other possible lines we are co-operating with the dairy division of the State Board of Health.

The work done, in connection with what cow owners have seen of the effects of the disease, is bearing fruit. There is a marked improvement throughout the State wherever the commission has been called to act.

Occasionally, however, and for the latter half of the past fiscal year, entire herds have been tested. This was done chiefly because milk dealers of Philadelphia and New York have demanded milk from tuberculin tested cows.

A number of such herds around Columbus and Mount Holly, supplying Philadelphia, were thus tested. Those cows were in good condition, somewhat above the average and were, for the most part, kept well housed, in stables clean, light and well venti-

lated—requirements such as anyone producing market milk should be willing to comply with.

But where unsanitary conditions prevail and disease has been allowed to enter and continue unchecked until one or more animals have died and the entire herd is under suspicion—in such cases there is but one course to follow—all must be tested, reacting animals removed, stables disinfected and improved, and a general new beginning made; even then it is not possible in every case to so cleanse and purify contaminated stables and surroundings that have been for years a propagating establishment of tuberculosis, that they will be safe to put healthy animals there with the expectation that they will continue immune. Some who have tried this have met with heavy loss.

There are four lines to follow: Improve or create new conditions, both as to stables and surroundings as suggested.

Have only healthy animals as far as that can be determined.

Keep the cows in good vigor *all the time* by feeding good sustaining foods.

Be watchful so as to detect any sign of disease in its early stage and so prevent its spreading to other members of the herd.

METHODS OF DEALING WITH BOVINE TUBERCULOSIS.

At the International Congress of Tuberculosis, in Washington, D. C., last September, which the president and secretary of this Commission attended by appointment, the whole question of human and bovine tuberculosis was discussed in the various sections, by the leading scientists of the world. We could attend only that section dealing with bovine tuberculosis. After all the papers were presented and the discussion of them summed up, the conclusion was that the tuberculin test is the only sure diagnostic agent at this time for the detection of this disease.

Tuberculin *properly prepared* and applied by a *competent* person is nearly infallible. Prof. Bang was there, and his method was discussed in his presence and the conclusion was that this method of trying to save condemned animals in order to further profit from them is not practicable for the general farmer. But where the owner has high bred and very valuable animals, and

desires to retain any that may have been condemned, for breeding purposes, if he has the needed buildings and other facilities, it may be followed. The inoculation of dairy animals with Bovo Vaccine to make them immune was discussed, but it was not considered to be sufficiently beyond the experimental stage to warrant its recommendation for use in general practice.

On the general question—The Economic Importance of Animal Tuberculosis—Dr. A. D. Melvin, chief of the Bureau of Animal Industry of the United States Department of Agriculture, in an address before the International Congress of Tuberculosis at Washington, September 29th, pointed out the heavy economic loss sustained by the live stock industry because of tuberculosis, and discussed measures for the control and eradication of this disease.

Dr. Melvin said, in part: "While the saving of human life affords the highest motive for combating tuberculosis, the prevention of financial loss is alone a sufficient reason for undertaking the eradication of the disease from farm animals.

"Statistics of the United States federal meat inspection for the fiscal year ending June 30th, 1908, covering 59,973,337 animals, or more than one-half of all those slaughtered for food in the country, show the following percentages of tuberculosis: Adult cattle, 0.961; calves, 0.026; hogs, 2.049; sheep and goats, 0. The proportion of tuberculosis is probably higher in animals slaughtered without inspection.

"Reports of tuberculin tests made in the fifteen years from 1893 to 1908 by federal, state and other officers with tuberculin prepared by the Bureau of Animal Industry, have been carefully analyzed and tabulated. Out of 400,000 cattle tested (mostly dairy cattle) there were 37,000 reactions, or 9.25 per cent.

"From these two classes of statistics it is concluded that on an average about 10 per cent. of the milk cows, 1 per cent. of other cattle, and 2 per cent. of the hogs in the United States are affected with tuberculosis, the average percentage for all the cattle being estimated at 3.5.

"The accuracy of the tuberculin test has been confirmed in a remarkable way by post-mortem examinations. Out of 23,869 reacting cattle slaughtered, lesions of tuberculosis were found in 23,585, a percentage of 98.81. Properly prepared tuberculin applied by a competent person is therefore shown to be a wonder-

fully reliable agent for diagnosing tuberculosis. In cases where the test appears to give unsatisfactory results this is usually due to the use of a poor quality of tuberculin or to ignorance or carelessness in applying it.

"The economic loss on account of tuberculosis in food-producing animals is heavy. The loss on animals in which tuberculosis is found in the federal meat inspection is estimated at $2,382,433 annually, and if the same conditions were applied to animals slaughtered without federal inspection the annual loss on all animals slaughtered for food in the United States would be increased to $4,102,433. The stock of animals on hand is also depreciated in value because of tuberculosis. Assuming that living tuberculous milk cows are annually depreciated to the extent of one-tenth of what the loss would be if they were slaughtered, other cattle one-third, and hogs one-half, the total annual depreciation amounts to $8,046,219. The annual loss from decrease in milk production is estimated at $1,150,000, and there also is some loss from impairment of breeding qualities, &c. Taking all these items into account the aggregate annual loss because of tuberculosis among farm animals in the United States is estimated at not less than $14,000,000.

"Such heavy financial losses make the eradication of tuberculosis from farm animals very desirable purely as an economic matter. As the disease is found principally among cattle and hogs, and as most of the infection in hogs is derived from cattle, the main effort should be directed against the disease in cattle. Among the measures proposed are the following: Live stock owners should be educated by means of official publications, the agricultural and general press, lectures at farmers' institutes, &c. Public authorities should make a systematic effort to determine to what extent and in what localities the disease exists, and should apply tuberculin test generally and systematically to cattle in sections where this seems desirable. Reacting animals should be slaughtered under competent veterinary inspection, so that the loss may be minimized by passing carcasses for food where the infection is so slight that this can safely be done; dangerous carcasses, of course, to be condemned. In the case of valuable breeding animals where slaughter would involve a great sacrifice, the Bang system of segregation may be used. A system of tagging

all cows sent to market is advocated, so that when animals are found tuberculous in the meat inspection they may be traced back to the place of origin, centers of infection located, and steps taken for eradication. The Bureau of Animal Industry is already co-operating with the authorities of some States in reporting and tracing the origin of tuberculous animals. Each State should require that all cattle brought in for breeding or dairy purposes shall have passed the tuberculin test.

"As the eradication of tuberculosis is largely a public health measure it is only reasonable that the persons whose cattle are slaughtered should be paid indemnity, at least in part. This is not only just but is absolutely essential if the co-operation of cattle owners is to be secured. Several States already have provisions of this character.

"The benefits to follow from the eradication of tuberculosis from farm animals are so great and so obvious that the necessary expenditures, even though they must be heavy, may be regarded as a highly profitable investment."

The commission suggest to all owners of dairy animals the great importance of *preventing* tuberculosis; co-operating with the State along the lines suggested above; cleansing the original herd; improving the buildings and surroundings, and purchasing only healthy animals; then work to *prevent* the recurrence of the disease. In this way the time will come when the work and expense of the State in this behalf may be reduced. Owners should not expect the State to compensate them against preventable loss.

On May last the commission, after consulting the Attorney-General as to the legality of such action, adopted the following rules:

RULES AND REGULATIONS FOR THE INSPECTION OF ANIMALS OF ESTABLISHED HERDS.

1. In the inspection of dairy cattle by the State Commission on Tuberculosis in Animals, only such animals will be tested with tuberculin as have, by a previous physical examination by a competent veterinarian, shown indications of disease, unless otherwise ordered in special cases by the commission, and all such animals so tested and responding to the test must be slaughtered.

RULES AND REGULATIONS FOR THE DISPOSAL OF SLAUGHTERED ANIMALS.

1. Animals slaughtered because of a reaction to tuberculin, and not condemned by the properly authorized meat inspector as being unfit for human food, may be sold for beef, and such sums as may be received for said animals are to be deducted from the appraised value made by the commission.

2. All animals condemned by both the tuberculin test and by the meat inspector as unfit for human food must be buried or sent to the rendering establishments.

3. In the case of imported animals, all of those condemned by the State Commission on Tuberculosis in Animals must be slaughtered, and the owner may dispose of them for beef, provided they are not condemned by a duly authorized meat inspector. If condemned, they are to be disposed of according to rule 2.

Wherever possible this ruling has been complied with, and it has resulted in a saving of several hundred dollars to this State already. It is the course pursued by other States and by the United States Bureau of Animal Industry, as stated above by Dr. Melvin.

The commission is guarding against the importation of tubercular cattle in all possible ways consistent with the law, and for this purpose has empowered certain veterinarians to act as its agents in detecting any who may be attempting to evade the law and compelling them to conform to its requirements.

The total number of animals examined up to October 31st, 1908, is 4,107. The number condemned and slaughtered, 583. The table herewith shows the counties visited and other items connected with the account of the treasurer:

Counties.	*Total Number Examined.*	*Total Number Condemned.*	*Total Sum Paid.*
Bergen	47	10	$268 50
Burlington	509	128	3,330 25
Camden	68	21	490 50
Cape May	25	7	126 50
Cumberland	221	44	957 50
Gloucester	173	32	638 25
Hunterdon	208	30	612 75
Mercer	144	34	796 50
Middlesex	42	24	622 00
Monmouth	182	24	673 50
Morris	351	50	1,182 75
Passaic	17	8	195 75
Salem	287	28	615 00
Somerset	167	34	795 75
Sussex	1,497	95	2,252 62
Union	47	7	153 00
Warren	122	11	258 00

Total appropriation, regular		$15,500 00
Total appropriation, supplemental		4,000 00
		$19,500 00
Total sum paid for cows	$13,969 12	
Expenses of inspection, veterinarians	1,726 08	
Expenses of commission	420 95	
Secretary, assistant and stenographer	2,966 00	
Stationery and blanks	64 60	
Tuberculin for imported cows	218 75	
Mailing cases for shipping tuberculin	4 50	
Ear tags for imported cows	100 00	
Postage	30 00	
		$19,500 00

Under the Importation law the records of the office show there were imported during the year 7,165 dairy animals for milk production and breeding purposes. We raise the question here, in connection with the preceding recommendation of preventing the introduction of this disease, whether it would not be far better to breed our dairy animals from stock whose qualities and performance we know, rather than purchasing animals of uncertain health, breeding and production from other States, besides keeping within our State the $350,000, more or less, that we are annually paying the breeders of other States and the cattle dealers.

On November 24th, 1908, the following order was issued by the commission:

"Owing to the outbreak of foot and mouth disease among farm stock in New York and Pennsylvania, and owing to the order of the Secretary of Agriculture, Hon. James Wilson (see B. A. I. Order 156), prohibiting the trailing or driving of cattle and other ruminants and swine from the States of Pennsylvania and New York, the permit recently given you to bring cattle into New Jersey from the States named is hereby revoked, as it would be unsafe, owing to the disease named and the possibility of infecting cattle and other stock of this State. When the Secretary of Agriculture revokes this order, and it is considered safe to have interstate commerce among cattle, permits will again be issued from this office as heretofore."

And also the following on November 25th, 1908:

"You are hereby informed that no permits will be granted by this department, for shipping or driving dairy animals from the States of New York, Pennsylvania and Michigan, into New Jersey, until the said States are declared free of foot and mouth disease and the quarantine removed by the Secretary of Agriculture, Hon. James Wilson, Bureau of Animal Industry, Washington, D. C."

Respectfully submitted,

FRANKLIN DYE, *Secretary.*

FAIRFIELD DAIRY—THE COWS' BATH—ESSEX COUNTY, N. J.

Infectious Diseases of Animals.

REPORTED BY THE STATE BOARD OF HEALTH.

To the State Board of Agriculture:

GENTLEMEN—In referring to the history of anthrax in this State it is interesting to note that no cases occurred in New Jersey during the year of 1907, and that there have been other years when the State has been free of the disease. During the present year ending October 31st, 1908, however, while there has been no epidemic of the disease there have been sporadic cases of anthrax in Cumberland, Gloucester, Salem and Sussex counties, showing that this affection has a tendency to recur, and that an epidemic is possible at any time. It is believed that a persistent method of vaccination with anthrax vaccine of cattle, in infected districts, in spring and early summer, for a period of years might eradicate the disease entirely. This course has been advised by the board with some degree of success. The expense, which must be borne by the owner, is trivial when compared with the loss which may be sustained if vaccination is not made use of.

BLACKLEG.

While no outbreak of blackleg has been previously reported in this State it is found on investigation that in Sussex county, for a term of ten or fifteen years, this disease has been destroying young cattle among the farmers, but it was mistaken for forage poisoning. It is estimated that possibly 400 head or more of cattle have died of this affection in that locality during this period. In one instance a farmer lost forty-eight head, leaving only two of his herd of cattle living. During this year twenty cases of this disease were discovered among the cattle in Sussex county, and the attention of Whitfield Gray, D.V.S., of Newton, New Jersey, was called to them. He concluded they were cases of blackleg, and he confirmed his diagnosis by sending specimens of the animals to the State Laboratory of Hygiene for examination. With the positive diagnosis established, the method of

vaccination was pursued with effective results, and if persisted in for a period of years it is believed the disease will be completely driven out.

CEREBRO SPINAL MENINGITIS.

For several years past, horses have been dying in and about the vicinity of Tuckerton, New Jersey, of a certain disease, the diagnosis of which seemed obscure and uncertain in character. During the past year this mysterious trouble has again manifested itself in this locality. Several veterinarians were employed to investigate and report to this board as to the character of the disease, with the result that one veterinarian reported that the cases were cerebro spinal meningitis. This diagnosis was verified by Dr. Leonard Pearson, of Philadelphia, who gave his opinion, however, only on a description of the symptoms as manifested. It is therefore most probable that this affection which has puzzled the people of this vicinity for years, and is causing the loss of scores of horses, is cerebro spinal meningitis, and will hereafter be treated as such.

GLANDERS.

During the year there have been five cases of glanders in Bergen county; fifty-seven in Essex county; one in Gloucester county; eleven in Hudson county; one in Hunterdon county; four in Mercer county; one in Monmouth county; three in Morris county; one in Passaic county; one in Somerset county and three in Union county, making a total of eighty-six cases. Of this number forty-six were in the city of Newark. This disease, it is acknowledged, has been usually brought into the State from across the Hudson or Delaware river, and unless greater vigilance is exercised to prevent unprincipled horse dealers from plying their trade between this State and the adjacent larger cities, it is likely that glanders will continue to prevail as an infectious disease among animals in this State.

Very respectfully,

BRUCE S. KEATOR,
Secretary.

Dr. John B. Smith, Sc.D., read an interesting paper on "Insects and their Relation to Man."

At this point a report was made by Charles Collins, chairman of the committee on fish and game laws.

At the conclusion of the report, President Voorhees said: You have heard this report and it seems to me something ought to be done. If it is a question of appointing a more fit committee we will appoint some sportsmen, so that we will have a committee that can intelligently take up the question with the Fish and Game Commission.

After a general discussion by the members the report was accepted and the committee continued.

The Secretary—There is another item on the program—the Live Stock Law and its Workings. Prof. Minkler, secretary of the commission, who was to have presented this subject, is sick and can't be here. If the president will give us some remarks on that question we will be glad to hear him.

President Voorhees—In view of the illness of Professor Minkler I will state that the law provides that the State shall purchase stallions of draught and coach type which will be at the service of breeders' associations that shall be formed in the different counties of the State. The object of this law, of course, is to improve the character of the horses in the State, as well as to increase the interest in and encourage the use of pure-bred animals.

The law does not limit the work to the matter of breeding horses or the purchasing of horses and distributing them through the State; it is also to serve as a bureau which shall distribute information and give advice in matters relating to the breeding of live stock of all kinds.

That is, while it is only authorized to purchase stallions, it is authorized to give advice and information along all lines of breeding as shall be of service to the State.

Of course the first object and the main object of the law is to introduce pure-bred stallions for the building up of the breeds of horses.

The law does not define specifically just how this work shall be done. It appoints a commission, and that commission is charged with making such rules and regulations as shall best carry out the purpose and spirit of the law.

Owing to the fact that the commission was not organized—and it is not due to any fault of the commission—until the latter part of August, it was not possible to make such rules and regulations as will be finally promulgated until after they have gotten the horses, because it was necessary almost at once to proceed—if we are going to begin business next year—to Europe to buy the horses. Three members of the commission went to Europe, and for two reasons—first, because they desired to obtain from the fountain head the breeds which are specifically adapted for draught purposes, and secondly, because the commission being charged with other duties than horse breeding, desired that they might have definite information concerning the methods that were used in breeding horses, cattle, sheep and swine.

The purchased stallions, according to the law, shall be distributed throughout the State with breeders' associations that shall be formed in the different counties. In other words, this is to be a co-operative affair, the State purchasing the horses and the persons who use them are to co-operate in providing for the care and management of these horses. In other words, it is not to be a free gift, but a partial gift, and the co-operation is to come from the farmers themselves.

While the rules and regulations are not yet finally adopted, I think I can safely say that it is the desire of the commission, and will be a rule of the commission, that wherever these breeders' associations are organized, and shall guarantee at least forty mares that shall conform to the type which shall be fixed by the commission, they shall have the service of the horse free of charge; but they are to assume the responsibility and care of the horse in such manner as the commission may require.

The question has arisen a number of times, How shall these organizations be formed? The commission has not established any definite rules as to the forming of the breeders' associations in the counties. It is only that they shall have such organization as will conform to the rules; that is, if we make a rule that the horse shall be cared for, they shall make such provisions in their organization as will take care of the horse.

In the second place, they shall make such rules as shall prevent an abuse of the privilege which they have under the law.

In other words, they shall make such provision as shall give the widest distribution of the services of the stallion to the farmers of

the counties; that is, that no one farmer having four or five mares shall breed all of those before others with only one shall have opportunity to breed, but that the number of mares shall be distributed as far as possible around the county that shall have use of the stallion. Then if there are not enough—that is, one horse apiece—then they may have a second and a third, the minimum being fixed at forty and the maximum the number that the horse can serve without injury.

That is, the commission will not recognize a county breeders' association unless they shall guarantee that there shall be at least forty mares of the type they shall fix.

It is not the object of the commission to rule out any good mares. The object in making that rule is that we shall not breed any mares that are not of the same general type of the horse. Some people seem to think that we are going to fix rules that they cannot comply with. That is not the object at all. The commission believes that unless some rules are adopted which will prevent the breeding of unsatisfactory type, the object of the law will be defeated. The purpose is to distribute the benefit as widely as possible, and only breed such mares of which the colts will be good ones; that is, as far as we can gather from a comparison of the type and the laws of breeding.

As these associations are organized in the various counties they shall have the privilege of requesting the use of the stallion; that is, they will have to make application, and in the order that the applications come in to the commission, in that order will the stallions be distributed. The commission reserves the right to distribute and send such horse as they think will be the best for that particular community; that is, the association cannot come to New Brunswick, where the horses are now located, and say we want this one or that one; they may get it or not. Those who will organize and apply first will have the first right to select, or at least the first right to request, and then the commission will select the horse which, in their judgment, will suit their conditions, and so on, until the animals are all distributed.

We have there now eleven stallions belonging to the State, all of them draught stallions, except one, which is a Hackney stallion.

There are eight Percherons and three Clydes. They are all good types. They are not the biggest horses. They are not the horses that bring the biggest prices over there, but they are horses of the

medium heavy type, which it seemed to the commission would be more valuable than those of the heaviest type. Those horses are nearly all two-year-old colts, and weigh from 1,400 to 1,800 pounds now.

This matter of organizing seems to worry a great many people. There is no fixed and set rule as to how this organization shall be made. My thought was that it could be arranged through the pomona granges, or the county boards of agriculture, or some organizations of that sort. But the commission, naturally, must retain control of these horses in every way; they must know what care they are receiving, and they must have such care as they shall say they shall have, and they must be handled in the manner in which the commission say they shall be handled. But there is no purpose on the part of the commission to do other than to promote horse breeding in this State.

Now one other thing in connection with the other functions of this Live Stock Commission. It is not only to promote the breeding of horses, but to promote the breeding of cattle, and hogs, and sheep, and it is to promote it by having some central place where the farmers of our State can get such information in reference to the distribution and location of good animals and their selection as will enable them easier to get pure-bred bulls and other male animals, as well as to get other advice concerning the matter of building up better live stock all along the line.

It seems to me that this feature of the work is a very important one; quite as important as the other, provided the farmers take advantage of it and get the expert opinion of the commission.

The active members of the commission consist of men whose judgment and knowledge and whose standing in the community are such as to enable you to have the fullest confidence in their integrity and their purpose to execute the law in a way that shall be helpful to all the farmers of the State. The commission, therefore, consists of Professor Minkler, who is the animal husbandman of the station; Dr. T. Earl Budd, the veterinarian, and Mr. Samuel S. Conover, representing the grange, and the Hon. E. T. Gill, representing the live stock interests of the State. That is, he is the live stock breeder, and myself, who serves ex-officio.

Adjourned until 7:30 P. M.

THIRD SESSION.

WEDNESDAY EVENING, January 13th, 1909.

Vice President Cox presided.

The Vice President—We will take up the subject: "Rambles in Brazil and Argentina," by Professor E. M. Baxter, of Mifflinburg, Pennsylvania.

Mr. Baxter gave a very interesting talk and illustrated his remarks with stereopticon views.

FOURTH SESSION.

THURSDAY, January 14th, 1909.

Vice President Cox presiding, called the meeting to order at 9:15, and prayer was offered by the Rev. Dr. Wight, Commissioner of Charities and Corrections.

The following resolutions were then presented:

RESOLUTION NO. 1.

Resolved, That the New Jersey State Board of Agriculture approve the provisions of H. R. 21,318, for preventing the manufacture, sale or transportation of adulterated or misbranded fungicides and insecticides, and urges upon the Senators and Representatives from New Jersey in Congress that they support said bill when it comes up for passage.

Referred to the committee on resolutions.

RESOLUTION NO. 2, BY J. M. DALRYMPLE.

WHEREAS, There has been introduced in the United States Senate a bill, No. 18,204, known as the "Davis Bill," to provide for agricultural and industrial instruction; therefore, be it

Resolved, That this State Board of Agriculture indorse this bill believing it to be beneficial to the farmers.

Referred to the committee on resolutions.

Resolution No. 3, of the Gloucester county board of agriculture, in relation to selling Irish potatoes in New Jersey at 180 pounds to the barrel, while in buying we receive only 165 pounds, was received and referred to the committee on resolutions.

The Secretary—The executive committee suggested in their report that a committee on deceased members of this board be appointed to bring in suitable resolutions. It strikes me that is a proper thing to do. I move that the president appoint a committee on deceased members.

Motion seconded and carried.

The Vice President—The committee will be appointed later. The time has arrived for taking up the consideration of the question "Co-operative Selling of Farm Products." The question will be discussed by Mr. W. H. Ingling and Mr. D. D. Denise. We will hear Mr. Ingling.

The Monmouth County Farmers' Exchange.

BY W. H. INGLING.

Mr. President and Gentlemen—The subject assigned to me is one of living interest to every farmer in the State of New Jersey. I shall not endeavor to persuade you to become an adherent to or an advocate of the principle of co-operation by a beautiful theory that will not bring results when you put it in practice, but rather will bring to your attention the plain practical operation of this principle; show you where and how it has been applied and the results that have been secured. The principles of co-operation are not new, but it remained for the latter years of the nineteenth century to bring them conspicuously to the attention of America. The intelligent farmer has been watching the growth of the application of this principle as it has been demonstrated in the different lines of industrial pursuits, the combinations going on in the iron, steel, tobacco and oil trades; the merging of railroad, steamship, telegraph and telephone lines; the consolidation of banks, insurance companies, department stores and many other kinds of business, all having one aim—to lower the cost of production and the cost of putting the product on the market. He has been watching these things so closely that now he is convinced that in applying the same principle to his business he will have the power to protect himself. He will become not only the producer but the distributer of his own products, and save the profits of the middlemen. Do

you believe he is in earnest about the matter? Go down in the Florida orange section and you will find the Orange Growers' Association; in Georgia, the Peach Growers' Union; in the melon districts of the South, the Melon or Cantaloupe Exchange; in California, the Fruit Growers' Association; in Colorado, the Vegetable Growers' and Shippers' Union; over in Long Island, the Long Island Potato Exchange; in Virginia, the Eastern Shore of Virginia Exchange, and down in old Monmouth you will find the Monmouth County Farmers' Exchange, with a charter so broad that we can take in the rest of the country. Now, do you believe the farmer is in earnest?

Monmouth county, as you are aware, is one of the largest producing sections for potatoes in the State. In the last fifteen years the yield has increased 100 per cent., until in 1907, which was its record year, its shipments amounted to over 600,000 barrels. Owing to the period of hot, dry weather in 1908, the yield was reduced, and estimated to have been only about 350,000 barrels.

The reason for the increased output since 1903 arises from two causes—increased acreage and a more intelligent and scientific way of farming.

The farmer has been educating himself by personal study of the science of farming and by the knowledge gained through practical experience directed by the influence of the State Board of Agriculture, farmers' institutes, local boards of agriculture—all institutions fostered by the State.

The marketing of the immense crops now raised in our county has been a great problem which until lately the farmer has left to others, although it has been of vital concern to himself. There has therefore grown up among us a great and lucrative business of putting the products of the farm on the market which heretofore has been entirely separate from the farmer, over which he had no control, and in which he had no interest. The local or resident buyers who have engaged in this business in our county are our neighbors and friends, and we have no word of censure for them. Possibly they have done the best they could for the farmer, after looking out for their own interest, which is natural. I should estimate that there are twenty-five buyers in our county, but the great bulk of the business was done by not more than five or six of them.

The farmer sold his goods to the local buyer at a price he fixed. This price was made by what the buyer could sell for, less his commission, and this from a business standpoint seems all right. The buyer sold to whoever he could, to what is called the track buyer, who is the traveling agent of some house in a distant city, or direct with dealers in any part of the country where he could find a market. Now these track buyers represent less than 10 per cent. of the produce dealers of the country. Therefore the other 90 per cent. or over must be reached in some other way. If the local buyer has only a small trade he never reaches very far, but sells to nearby dealers or track buyers. Frequently this means a low price, because usually it is the dealer who is distant from the base of supplies who can pay the best price, and that is what the farmer is seeking for. Therefore you will readily understand that under the old methods, in many instances, the price paid to the farmer was really fixed upon the lowest market. Always bear in mind that the track buyer's value to his employer increases as he forces down the prices.

We come to you to-day to bring to your attention what we think is a better way, a new method; the system of co-operation of which we have spoken is being adopted in the West and South, and is gradually spreading all over our country. A method that has proven very successful wherever honestly managed, and has brought to the farmers and fruit growers of our land increased prices at less cost of distribution than heretofore, and is also increasing the value of his farm at a rapid rate. A method that will cure most of the evils that have been in the way of the farmer and prevented him from realizing the price on his products that he ought to have.

This new method is for the farmer to distribute his own products through an exchange; an organization in which he has the say, which he controls, and which shall be managed for his benefit and for no one else.

This is what Monmouth county is doing. On March 3d, 1908, we were incorporated under the laws of New Jersey, to buy and sell anything and everything that the farmer uses or that anyone else can use; to do business anywhere in the State of New Jersey or any other State. In fact, it was made so broad that we are permitted to do all kinds of business anywhere in this country.

We now have over 400 members and our business is organized and conducted as follows: We have a board of twelve directors elected by the stockholders annually, one director from each loading station, of which we had twelve last year. These directors appoint the officers, president, vice president, general inspector, general manager, secretary, treasurer, auditing committee, local agents, and have general supervision over the entire business. We have the general office in the center of the town of Freehold. This office is connected with all our loading stations by telephone. We are also connected with the long distance telephone, as well as both the Western Union and Postal Telegraph companies. Our manager is thus in direct communication with all parts of the country, as well as with all our loading stations and inspectors.

The practical operation of our exchange is conducted by our manager at his desk in the general office.

The farmer brings his potatoes to the station and the inspector examines them to see if they are properly graded and directs their loading into the cars assigned to him. This same work is going on at each of the loading points, and in the early afternoon the agent telephones to the manager the number of cars he will probably have loaded by the shipping time, which occurs at most of the stations between 5 and 6 o'clock.

During the day, while every station has been busy loading, the manager in the general office has been busy placing the goods upon the best markets he could find, dependent upon no one, but seeking all, over the telephone or by telegraph, selling to one in this city, refusing another in that city because perhaps he could not or would not pay the price, basing his price on the market conditions in the several cities, which he must find out in some way so as to be in a position to quote intelligently. Having sold as many as will be loaded and entered them upon his sales slip, he is ready to give his shipping directions to the agents. In filling these orders he uses his judgment as to the number of cars he should send. Where five cars are ordered he might think it better to send three to-day and two to-morrow, or whatever seemed best to keep the price steady, for he must always keep in mind what is done to-day affects for good or ill what is to be done to-morrow.

It is a fact that in shipping potatoes to several different markets the prices will vary sometimes as much as from ten to twenty-five

cents per barrel. In the old method of distribution through middlemen the farmer naturally did not hear anything about those that brought the increased price, but in the exchange the average price is made up from all the prices paid, and that is credited to the farmer, thus giving him the benefit of the higher prices.

The cars having been shipped, the agents give the manager, over the 'phone, the number of cars and the quantity shipped to each consignee, and sends the bills of lading, where possible, so they will reach the office that night. These bills of lading and shipping accounts are turned over to the office force, who at once bill the goods out to the different customers, make drafts, attach bills of lading or otherwise, as the case may be. When the office closes at night all of these are in the post-office and are on the way to the consignee by the first mail in the morning.

The detailed reports from each agent are mailed to the general office each night and reach there the next morning. From these each farmer receives credit for the produce delivered, and when he wants his money he calls at the office or sends his receipts by mail, when checks are at once sent for the same.

The manager notifies each agent every morning the average price obtained the day before and the indications as to the prices for that day. General information concerning prices and market conditions is available through the agents or by inquiry of the general office at all times.

In addition to selling goods f. o. b. loading station, the exchange also sends produce of all kinds for its members to be sold on commission, which also is of great advantage to them. An arrangement has been made with the most reliable commission merchants in the nearby cities to act as our selling agents and sell our produce, they agreeing to give the exchange a rebate of three per cent. or five per cent. out of the commission charged. They send check for the goods sold direct to the farmer and rebate to the exchange when asked for by the treasurer. This goes into the profit and loss account as profit and helps increase the surplus. This is returned to the stockholders in the dividends, while the farmer gets the same net price he would if he sent the goods himself. In addition he has the discriminating judgment of the manager in seeing that his goods go to a market that is not already oversupplied.

The Vice President—Is there any member that wants to ask Mr. Ingling any question to get any further information upon this question that he has spoken upon so well?

A Member—How do you work it in regard to grading? In our section some farmers grade a much better quality than others.

Mr. Ingling—The arrangement is this way: If your potatoes are not good enough to grade with the potatoes of your neighbor as A No. 1, we will have to sell them on commission, and you will get just what they are worth in that way. That grading is a difficult problem, but we will manage it before we get through with it. It takes a little time to educate the people up to the fact that they are to be benefited if they raise good potatoes.

A Member—I am glad to hear those remarks about grading; it is one of the difficulties in our neighborhood. Some of the shippers have not been careful in grading their stock; some have shipped a mixed lot and were not satisfied with the returns. Everything has been put in, good, bad and indifferent.

Mr. Ingling—I don't think any part of the country has had more trouble than Monmouth county, but while we are not able to do much because so many farmers have poor stock, owing to bad weather conditions, we found our farmers willing to follow the lead if we only gave everybody a square deal in the matter.

Mr. Dalrymple—I gather from your remarks that you issue stock, how much a share?

Mr. Ingling—Five dollars per share; we are incorporated for $100,000. It is not all paid in.

A Member—What amount have you paid in?

Mr. Ingling—About $12,000.

A Member—Is that all represented in your investments, in your outfit?

Mr. Ingling—Oh, no.

A Member—What do you say your outfit is costing you?

Mr. Ingling—The outfit has cost us only about $1,500 or $1,800. We have a large number of sacks on hand to be used this next year. It is hard work to tell how many to buy for each station, but we have them and they are worth just as much for next year as they are this.

A Member—I want to get an idea of what it cost you to start the business.

Mr. Ingling—There are some things we have that you could get along without; one item, an adding machine, that is a very important feature and saves a great deal of time. Possibly an adding machine might save the services of one man. You can readily see in the number of packages we handle, the amount of adding that there is to be done and that will do it in a little while and do it accurately. That costs $400—and the typewriter—those are the two most important expenditures, but our office is equipped with the very best we could get. Our board of directors have peculiar views in that line, and they wanted only the best things. They were buying only once, and by buying the best we will have them for all time.

The Vice President—The next speaker is Mr. D. D. Denise, ex-president of the State Board of Agriculture, who needs no introduction.

Mr. Denise—After listening to Mr. Ingling's address, I don't see what there is for me to say relative to the Farmers' Exchange. I am simply a stockholder in the concern. I am not even one of the directors. The State Board of Agriculture and the farmers' institute and the short courses in agriculture and the experiment stations have been of great value to the farmers in regard to raising their crops, and all those gentlemen who have followed up those institute meetings, all the meetings of the station, &c., have certainly advanced agriculture.

We have tried to raise large and good crops, but we have stopped right there and let some other fellow take up the market end of our business and run it. We have let the buyers fix the price to suit themselves. I believe the farmer is capable of running his business from the time he plants the crop until he gets the money in his pocket, and yet there is no class of people in this country so hard to organize as the farmers. They seem to be afraid of organizing, and if we get them organized they are not all always loyal to their organization. I don't include all. There are lots of good men, plenty of them, but there are just enough who are disloyal to injure the whole organization.

I think the Monmouth County Farmers' Exchange has come to stay. We have plenty of good live men that are able to run it and keep it going, even if 25 per cent. of our men back out. I may be a little enthusiastic over this, but I think the time is not very far

away when pretty nearly everything that is grown on the farm that is sold by the carload will be sold through the exchange. That is our business, as our manager told you, and if we don't like the way he does business we can turn him out.

The dealers are looking after us all the time. They want our goods, and are writing to us and asking for them, and I believe the farmers of the State ought to be independent enough to set their price on their own goods, and not accept somebody else's price. That is what your exchange does. We tell these people what they can have our goods for, and if they don't want them they need not take them. We can send them to somebody else.

The farmers should be more independent. You remember the State Board of Agriculture, when we wanted to try to get this institution into the hands of the farmers, when I suggested putting in farmers, they said, "Farmers can't run this institution; they are not capable." But we don't always like to take a back seat; I don't, for one, any longer. (Applause.)

In regard to grading potatoes, I am very sorry to say that the farmers in our locality—and it is so all over the State of New Jersey—have been so careless in regard to grading their stock. Our greatest difficulty has been to get our potatoes graded. We mean to do business. We mean that they shall grade their potatoes up to a certain standard to be called No. 1. If they don't they will have to go to some other place.

I don't think it is just and fair for you and me to put up our goods right and put them in the same grade with the other fellow that don't pay any attention to that. It is not fair and honest, and we don't propose to submit to it. If you look at the stock that some farmers put on the market you will be astonished at the manner in which they are put up.

It has always been my aim to have my goods put up in first-class order, so that I could get first-class prices, and when we will all do that we will get better prices. Just leave 20 per cent. or 25 per cent. of your goods at home if they are not right and you will get more for the balance and build up a good reputation. I hate to hear it said that the farmer will put up bad goods, anyway. It is time that we turned the tide the other way, and I am satisfied that our exchange is going to do that with us. In regard to the railroads, we are pretty strong, and the railroads are looking after

us. Only a few weeks ago we had the general freight agent of the Pennsylvania railroad to see us, and he was willing to do what he possibly could to assist us in the shipping of our potatoes to those different markets far away from home. Whenever the railroad companies begin to look after you, you may make up your mind that they think there is something worth looking after.

It is quite an advantage to have the railroads come to you, for as a rule they generally ignore you. Why? Because you act alone, simply as an individual.

Another thing why an exchange is better. You know when you ship potatoes off to a distance you take considerable risk in getting them there. Perhaps the market has declined a little, and that man at the other end to whom they were sent says that potatoes have gone down, and he will write you that they are not quite up to his expectation. If you are alone you don't feel like fighting him, but if you have an exchange or some power behind you, he is not quite so likely to do that.

If you have any idea of organizing a Farmers' Exchange, which I have no doubt some of you will do, don't be afraid of putting your money in it; you will get as good interest there as anywhere else.

Another thing, after you get your organization be loyal to it, and support it even though it may be a little loss to you sometimes.

This exchange in Eastern Virginia did two and one-half million dollars' worth of business. They paid a dividend of ten per cent. on the stock, and put away a surplus of about $20,000. Their stock and their surplus together to-day is $111,000.

They have been in operation nine years; see what they have done. Go home, gentlemen, and start an exchange; run your own machine and don't depend on anybody else to do your business for you. (Applause.)

The Vice President—This is very interesting. We have been considering the selling of potatoes, and now we are going down to New England to get some suggestions as to how to grow better crops of potatoes. The subject is "Potato Culture—A Few Suggestions," by Professor Charles D. Woods, Director of the Maine Agricultural Experiment Station, Orono, Maine.

Potato Culture—A Few Suggestions.

GENTLEMEN—While potato growing is somewhat a matter of soil and climate, it is even more dependent upon the ability, knowledge and energy of the man who is trying to grow them. This fact was very clearly demonstrated in Aroostook county, Maine, in the season of 1907. Aroostook county is perhaps the richest agricultural county in the United States, and the potato is the money crop. Upwards of eleven million bushels of potatoes were shipped from the crop of 1906, besides all that went into starch. The shipments from the crop of 1907 was less than half that of the preceding year. And yet the good farmers had as large, and in some instances larger, crops than in 1906. The season of 1906 was favorable for a large crop, and everybody that planted potatoes succeeded in growing and harvesting a good crop. The season of 1907 was unfavorable, and only the good farmers had good crops. The men that thoroughly prepared the seed bed on well selected soil, planted only what they could properly care for, who used fertilizer liberally, cultivated all the season, and who sprayed early and often against insect and fungus enemies, and harvested as soon as the crop was ready, not only had a large yield per acre, but because of the high price of potatoes after the poorly-grown early ones were marketed, brought it about that with many Aroostook farmers the season of 1907 was the best for years. On the other hand, the farmers that planted illy adapted and slovenly prepared land, of larger acreage than they could well care for, who neglected to spray because the weather was not good for spray to adhere, who had so many acres he could not get them harvested before the unusually early freezing of the ground (over 11,000 acres of potatoes were frozen in Aroostook county, in 1907), found the year a disastrous one. In many instances the crop harvested was not sufficient to pay the fertilizer bills.

By practicing the methods of the *good* farmers of Aroostook county, many men in other parts of Maine are successful with potatoes as a money crop. There is no reason why men in other States may not grow the potato at fully as good a margin of profit as the farmer in Maine.

At the Annual Meeting of the Massachusetts State Board of Agriculture, in 1901, the writer, in answer to a question, said in substance: "If a Massachusetts farmer plants a few potatoes, there is not one man in twenty but will allow something else to crowd in and cause him to neglect his potatoes. The one great reason they grow better potatoes in Aroostook county than elsewhere in Maine is that it is the farmers' business to grow potatoes. He does not allow his stock or other farm duties to lead to the neglect of his potato crop. He makes it his first duty to take care of his field of potatoes, and the field will have from twenty to fifty or more acres in it. One man and a pair of horses work on twenty acres from spring until the fall, and the one man and pair of horses will care for the twenty acres, and he will not be taken off to do anything else. This is one of the reasons they grow potatoes better—because they are growing them for business. They are not thinking of the dairy cow or the breed of sheep; I wish they were, but they are not. They are thinking about growing potatoes. When I used to live in Connecticut, up and down the Connecticut valley were men that ate, drank and slept tobacco. And so there are men that eat, drink and sleep potatoes, down in Aroostook county, Maine."

The potato is so generally and extensively grown, we are so familiar with its qualities and the various methods of culture, that most farmers are very positive as to the best methods of growing this crop. During the past twenty-five years, hundreds of experiments have been made at experiment stations and by practical growers, and the results from experiments in propagation and culture are so conflicting that the careful student will be very slow in drawing conclusions. While he will be convinced that there are ideal ways of treatment under certain conditions, he will be equally convinced that under different conditions very different practice will be necessary to insure the best crop. In potato growing, as with most farm operations, the soil and atmosphere are such determining factors that there is no best way. Each farmer who would grow potatoes to the best advantage must be sufficiently intelligent to understand the conditions of the soil on his own farm. The methods of preparation of soil, of planting, cultivating and fertilizing the crop, depend largely on the character and condition of the soil and the season.

The successful growing of the potato crop demands careful and conscientious work from start to finish. There are many details which if neglected mean partial failure, and which must be complied with in order to insure the fullest success. It is not practicable in a short paper to hint at more than a very few factors which enter into successful potato growing.

Among the most important are the selection, the preparation of the soil, including application of fertilizer; the seed and the care of the crop during the growing season.

A soil to grow potatoes well must be in an excellent state of tilth, sufficiently mellow to make a good seed bed and place for the tubers to develop. Abundant plant-food must be supplied, and the land must be so situated that it will not suffer from excessive rain and be well adapted to stand drought. If not naturally well drained, it must be under drained. If it is not of good water-holding capacity, this must be secured by increasing the humus by green manuring or the use of liberal quantities of stable manure.

There is no farm crop that is more easily, speedily and greatly affected by the supply of moisture than is the potato. It has been found by experiment that it takes about 425 tons of water to grow a ton of dry matter of potatoes. A crop of 200 bushels per acre would therefore require approximately 650 tons of water, equivalent to a rainfall of nearly six inches. Because of its need for large water-supply, and its remarkable susceptibility to climatic conditions, it follows that the average potato yield is affected more by water-supply than by lack of plant-food. The selection of soil and methods of culture must be with this fact in view, if success is to be had. The liberal applications of fertilizers or the presence of large amounts of readily available plant-food will prove of but little value if the moisture supply is deficient. It is also true that too much water will check the growth as quickly and effectually as too little.

Too much attention to the fitting of the soil for the crop can hardly be given, for no amount of after tillage can overcome neglect in preparation. Deep and thorough plowing and harrowing, so as to make a perfect seed bed, not only establishes an earth mulch so as to prevent the loss of moisture of the spring rains, but it so fines the soil that the plant-food contained in it becomes accessible to the growing plant. The conservation of moisture by

frequent tillage is not understood or practiced as it should be. The old notion that potatoes should be hilled, and that tillage should cease as soon as the potato is in bloom, is wrong for most situations. Hilling is frequently practiced so as to keep the tubers from becoming exposed to the sun; that is not necessary if the soil was properly prepared. On hard, compact soil the potato will, because of less resistance of the soil, push out of the ground. This will not happen in deeply-worked land.

The proper preparation of a soil for the potato crop is a matter of years and not a single season. A soil, in order to do the best, must be in an excellent state of tilth and a high state of fertility. Such conditions can only be obtained by careful forethought and planning. Frequently soil is not plowed deeply enough. It is very common for people to speak of plowing seven, eight, or even nine, inches, but most men would be surprised if they were to apply a rule to see how much short of this depth the plow actually goes below the actual level of the field. Many men that think they are plowing seven or eight inches deep are only plowing five inches. If this shallow plowing has been practiced it is bad management to suddenly deepen the plowing, as this brings too much of the subsoil to the surface in a single plowing.

Good potato land may be handled in a three or four-year rotation—potatoes, grain, grass one or two years, and then potatoes again, in some such way as the following: Land which is used for potatoes should, immediately after harvesting of the crop, be treated to a liberal application of farm manure, if it can be obtained, and plowed with lap furrow. The plow can well run an inch deeper than it did the preceding year when the land was prepared for potatoes. In the spring the soil will have crumbled by the frosts, and should then be thoroughly worked by frequent harrowings with some such tool as a disc or spading harrow. It should then be smoothed with an Acme harrow, or some similar tool, and seeded to grain. If it is designed to grow only a single crop of grass, it is best at the time of seeding to sow clover with the grain. If, however, it is designed to remove two crops of grass, it can be seeded with a mixture of clover and timothy. The grain crop will be harvested the first year; the second season the crop will be chiefly timothy; the third it will be timothy and clover, and at the end of the two or three years, whichever plan is followed, there

will be in the field in the fall a good stand of second growth clover. This should not be cut or fed, but should be plowed under, and this is all the more important if the piece has not been treated with farm manure. This fall plowing should be with lap furrow, and the following spring it should be thoroughly worked with the disc and smoothing harrows in order to get ready for planting.

It may in many situations be desirable to follow the grass crop with corn, and then follow with potatoes. The same thorough preparation will be of advantage to the corn crop. The land for the corn should be liberally fertilized. Farm manure will be again used in this part in the rotation to advantage. The corn must be overfed in every way, so that the land will be in a higher state of fertility at the end than at the beginning of the season. If corn enters into the rotation, fall plowing should be again practiced, and the following spring the land should be thoroughly worked. The best possible seed bed should be prepared, so that the soil will be light and thoroughly pulverized to a depth of five or even six inches. In a soil thus prepared the planter will run easily.

THE POTATO NEEDS ABUNDANT PLANT-FOOD.

It is always profitable to fertilize a money crop liberally, and while a crop of 300 bushels of potatoes will remove from the soil about fifty-five pounds of nitrogen, twenty-five pounds of phosphoric acid and eighty-five pounds of potash, it is probably wise to furnish the phosphoric acid in considerable excess and the potash in fair excess. The plowed-under clover and the fertility which has been accumulated can be depended upon for part of the nitrogen. By many experiments it has been found that the potato plant thrives best in a soil abundantly supplied with all fertilizing elements. In the early stages of growth, nitrogen is particularly demanded, and hence a considerable part of the nitrogen should be in a readily available water-soluble form. This is necessary that it may be utilized by the plants early in the season. Later when the tubers are forming, there is special demand for phosphoric acid and potash.

SELECTION OF THE FERTILIZER.

In the selection of a fertilizer, a farmer cannot be guided by the name alone. There are all kinds of "potato" fertilizers upon the market—those carrying from 1 to 5 per cent. nitrogen, from 5 to 10 per cent. phosphoric acid and from 2 to 12 per cent. potash. In selecting the fertilizer something more than percentage composition must be taken into account.

At the present time a 4-6-10 fertilizer carrying 4 per cent. of ammonia, which is equivalent to 3.3 per cent. nitrogen, 6 per cent. available phosphoric acid and 10 per cent. potash is a popular fertilizer. Used at the rate of 1,500 pounds to the acre, such a fertilizer would supply about fifty pounds of nitrogen, ninety pounds available phosphoric acid and 150 pounds of potash. Obviously such a fertilizer when compared with the needs of the crop is out of balance. As the results of field experiments with potatoes, it is probable that the excess of phosphoric acid is valuable to the crop. There is no evidence, however, to show that the potato crop is benefited by such a great excess of potash. It would seem that if 1,500 pounds of a high-grade fertilizer is to be used that one carrying 6 or 7 per cent. of potash in place of the 10 would be better balanced.

THE FORM OF FERTILIZING INGREDIENTS.

In 1907 a high-grade potato fertilizer was used in large quantities on potatoes in Maine, which did not carry any nitrate nitrogen. There was quite a general complaint as regards failure with this particular fertilizer and much dissatisfaction, leading even to the threatening of law suits because of the short crops supposedly due to this fertilizer. Careful examination of this fertilizer showed that its constituents were all high grade, and that while it fell somewhat below its guaranteed analysis, it still was high-grade goods. The dissatisfaction and poor results from the use of this fertilizer were probably due to the absence of nitrate nitrogen. The grower in a climate where the growing season is short, or when he desires an early crop, must see to it that the fertilizer used, and

particularly on the money crop, carries a fair proportion of its nitrogen in the form of nitrate nitrogen. Fully a third of the nitrogen in a fertilizer carrying 3.3 per cent. nitrogen could with safety be in the form of nitrate. It would not do to have much more than that in the form of nitrate, because of the danger of loss from leaching out by heavy rains. From field experiments conducted by the Maine Experiment Station, it is not advisable to have much, particularly of dry mixed, bone tankage in the fertilizer, as it seems to stimulate the growth of the tops too late in the season. Where one can know relative to the source of the nitrogen, it is probably desirable to have about a third as nitrate nitrogen and the rest in the form of dried blood or high-grade tankage. Sulphate of ammonia is a good source of nitrogen, becoming available more quickly than tankage, but is not as immediately available as nitrate of soda. While it is water soluble, there is not nearly the danger of loss by leaching as there is with the nitrate. It matters little whether the phosphoric acid is from bone or from rock phosphate, but it is necessary that in any case it be acid-treated, so as to be in the available form. There seems to be no difficulty as to the form of phosphoric acid and its availability in any of the high-grade fertilizers usually offered. With certain crops sulphate of potash gives better results than does muriate, and there is more or less of a general opinion that sulphate of potash produces better quality of potatoes. There is, however, very little evidence to support this conclusion. Practically all the potash in Maine-sold fertilizers is in the form of muriate of sulphate, and it seems to make little difference which form of these two is used.

AMOUNT OF PLANT-FOOD PER ACRE.

Even on soil of high fertility it is found profitable to fertilize liberally. For a large crop the fertilizer should carry not less than fifty or sixty pounds of nitrogen, one-third of which should be in the form of nitrate, not less than sixty pounds of available phosphoric acid, and not less than 100 pounds of potash. About two-thirds of this can best be applied in the drill at time of planting, and the rest at first or second cultivation.

To many farmers this amount of plant-food for the potato will appear excessive, but it is found profitable in practice.

PLANTING AND CULTIVATION.

On the whole, medium-sized potatoes, cut into four pieces, seem to be the best adapted for seed. These are planted at a fair depth with either of the planters which are in more common use. Not more than 1,000 or 1,200 pounds of a fertilizer should be applied in the drill at the time of planting. The drills are from thirty-four to thirty-six inches apart, and the pieces are planted from twelve to fourteen or sixteen inches apart in the drill, according to whether it is a small or vigorous-growing variety. All through the growing season the field should be kept free from weeds. The exaggerated ridge culture which is so common in Aroostook county could be better replaced in New Jersey by a less pronounced ridge or as level culture as is practicable. Suitable potato land is naturally or artificially so well drained that it does not suffer from excessive moisture, and with the high-ridge culture there is danger even in a moderately dry season of the crop suffering for lack of moisture. The frequent running of the cultivator not merely keeps down the weeds, but it lets the air into the soil and prevents the excessive loss of moisture from evaporation, and in every way seems to be beneficial to the crop. This should be kept up until the vines pretty well cover the ground. If weeds are appearing in the drill these should be removed by hand.

HOW TO FIGHT THE POTATO ENEMIES.

By far the larger part of the enemies of the potato may readily be held in check by spraying with the more common insecticides and fungicides, and often, by a combination of materials, several enemies may be met with one application. The insect enemies can be met *after* they appear. The fungus diseases can be prevented, but the successful fight must be made *before* they appear. In some seasons there is comparatively little loss from the attacks of fungus diseases. In others the crop is a failure unless pre-

ventative measures are taken. No man can tell beforehand whether the season will be favorable to the growth of fungi or not. The moral is evident. Preventive measures must be taken with each crop.

INSECT ENEMIES.

The small black flea-beetle eats minute holes in the leaves, sometimes making them look like the cover of a pepper box. Poisons have little effect upon it, or upon the mature Colorado beetles. Bordeaux mixture is very distasteful to both of these insects, and if thoroughly applied is a most effective agent in holding them in check.

The larvæ or slugs of the Colorado potato beetle ("potato bug") can readily be killed by poisons. These poisons are best applied with water in the form of a fine spray, just *before* the eggs hatch. The smaller the slug the easier it is killed.

If applied as a fine spray before the plants are badly infested, one-half pound of Paris green or two pounds of arsenate of lead at each application will prove effective. Arsenate of soda is the cheapest poison, but it must always be applied with Bordeaux mixture, never alone. In case the slugs are abundant a second application may be necessary inside of two or three days. If the poisons are applied just before the eggs hatch, three applications at intervals of seven to ten days will usually be sufficient during the season. All three of the poisons can be applied with Bordeaux mixture. Arsenate of lead can be applied alone, and Paris green may be used without Bordeaux mixture on potatoes by the addition of from three to five pounds of unslaked lime to fifty gallons of spray.

FORMULAS FOR BEETLES AND SLUGS.

Formula A.

Paris green	½ pound.
Lime (unslaked)	3 pounds.
Water	50 gallons.

The standard remedy for the destruction of insects which eat the foliage or fruit. The lime is added to prevent the Paris green from burning the foliage. Slake the lime in a little water, make into a thin paste and strain. Wet up the Paris green with a little water, into a thin paste. Mix the lime and Paris green and add the remainder of the water.

Formula B.

Lead arsenate	2 pounds.
Water	50 gallons.

Arsenate of lead acts slower as a poison than Paris green, and for that account is not so effective for killing insects on rapidly-growing plants like potatoes. It can be kept suspended in the water better than Paris green. It does not burn the leaves and sticks to the foliage better than Paris green. Make a smooth, thin paste with the poison and a little water, and add the remainder of the water, and stir thoroughly.

The formula for arsenate of soda will be discussed with Bordeaux mixture.

FUNGUS DISEASES.

While there are several fungus diseases which attack the potato, the scab and the early and late blight are the most prevalent, and the ones most to be feared in Maine. As a general precautionary measure to guard against the introduction and spread of these and other diseases, all potato stalks, weeds and other litter should be raked up on the field and burned as soon as the crop is harvested. Only smooth disinfected seed should be used. All tubers which show any signs of decay should be rejected for planting as liable to spread disease.

POTATO SCAB.

Potato scab, which is too well known to need description, can be held in check by planting previously treated seed in clean land.

CAUSE OF SCAB.

Contrary to the opinion frequently expressed by practical growers, the cause of the potato scab is a specific organism, and is not due as a first cause to any character or condition of the soil. The amount of moisture, nature of the fertilizer used, the alkalinity or acidity of the soil may and do influence to a large degree the *amount* of scab present on a given crop, but if the germs of the disease are not in the soil, or introduced into it by means of infected seed tubers or from some other outside source, these factors alone are unable to produce the disease. Ashes, lime, stable manure and chip dirt are of themselves incapable of producing scab, but if the land or the seed is already infected their action upon the soil is such that favorable conditions are produced for the development of the scab fungus which manifests itself upon the crop. For this reason a belief that these materials themselves produce the disease is more or less held by practical growers.

Experiments have shown repeatedly that scab does not develop on new land unless it is infected from some outside agency. If clean seed is used and other precautions are taken a clean crop will result. If scabby seed is used a more or less scabby crop is almost sure to be produced. Because of the readiness with which the disease may thus be spread it follows that most of the infection of new areas comes from scab-infested seed. It is probable that scab germs are sometimes introduced into the soil by means of tools or manure and one case is recorded where soil plainly became infected by the water draining off from a potato field on higher ground.

CONDITIONS FAVORABLE TO SCAB.

Scab thrives best on an alkaline soil or in the presence of certain fertilizers or chemical substances which tend to promote alkalinity, while acid soils and the presence of certain other chemical salts are unfavorable to its development.

MANAGEMENT OF INFECTED SOILS.

It is not known how long the fungus will remain active in the soil without the presence of a susceptible crop. Various writers have reported a large amount of infection on land where no root crop has been grown for from five to seven years.

However, by rotation of crops, and proper attention to soil management and fertilization it is possible to materially decrease the amount of scab in an infected soil. Land which has produced a crop of badly-scabbed potatoes should at once be given over to other crops as corn, grains, grasses and clovers, for as long a time as possible. Wood ashes or lime should not be applied and such commercial fertilizers as are used should be selected, as far as possible, from the materials mentioned as not tending to increase scab. "Souring" the soil by green manuring or plowing under of a green crop such as clover should be resorted to, especially just before a crop of potatoes is again to be grown upon the soil.

MANAGEMENT OF CLEAN SOILS.

On clean soils we are not so restricted with regard to the nature of the fertilizers, except that the manure of animals which have been fed on uncooked scabby potatoes or in which the uncooked refuse or skins have been thrown, should not be applied.

For seed select tubers which are free from scab and disinfect by one of the methods to be described. While very satisfactory results have been obtained in the disinfection of badly-scabbed potatoes no method has been devised which will guarantee an absolutely clean crop from scabby seed. Untreated, healthy tubers having been in contact with diseased tubers are almost sure to carry sufficient scab germs to infect the soil. Treated potatoes may be cut and planted in the usual way, care being taken not to allow them to touch any box, bag or bin where scabby potatoes have been kept. Corrosive sublimate and formaldehyde (usually sold under the name of formalin) are so far the only agents found to be satisfactory for tuber disinfection. Treatment with formalin is safer than

corrosive sublimate and on this account is preferred. All tubers treated with corrosive sublimate should be planted to avoid danger from the poison on them.

METHODS OF DISINFECTION OF SEED POTATOES.

Soaking seed in a disinfecting solution.—Applicable where the acreage is small, but impracticable for the large grower or dealer.

Formalin solution.—Add one-half pint of commercial formalin to fifteen gallons of water, stir thoroughly, and soak uncut tubers two hours in this solution.

Corrosive sublimate solution.—In a wooden or earthen vessel (metal vessels cannot be used on account of the corrosive action of the chemical) dissolve two ounces of corrosive sublimate in two gallons of hot water, and then dilute to fifteen gallons with cold water. Place uncut tubers in a sack and soak one and one-half hours in this solution.

Either solution can be used repeatedly, fresh being added as fast as it is used up. Mr. Agee recommends, as a time saver, the use of barrels with a spigot at the bottom and placed on boxes. The barrels are filled with potatoes and the solution poured over. When the time of disinfection is passed the solution is drawn off and poured into other barrels, already filled, and the treated potatoes dumped out on the ground to dry. This should be done on a clean grass sod and not on plowed land or in any other place where the treated seed will be exposed to reinfection.

Exposure of dry seed to formaldehyde gas.—Applicable where large quantities up to carload lots are to be treated at one time.

Place seed tubers in bushel crates or shallow slat-work bins in a tight room. For each 1,000 cubic feet of space spread twenty-three ounces of potassium permanganate evenly over the bottom of a large, flaring pan or pail, placed in the middle of the room. Pour over this three pints of formalin. Close room at once and do not open for twenty-four to forty-eight hours.

The seed potatoes can be disinfected some little time before planting, provided they are not allowed to come in contact with undisinfected bags, barrels, bins, tools, etc., which have been used for untreated potatoes.

EARLY BLIGHT.

This disease (sometimes improperly called rust) seldom produces so much damage in any one year as does late blight. Nevertheless it is widespread, and very destructive in that it attacks and weakens the plant at a critical period, thus checking the development of the tubers. It is confined to the foliage and is not known to cause rot. Early blight first appears as small brown spots scattered over the older leaves. These slowly enlarge and frequently become somewhat angular in shape from the fact that they stop on reaching a leaf vein. There is usually a sharp boundary line between the healthy green of the leaf and the spot, although a badly-spotted leaf will have a decidedly yellow appearance over its entire surface. Close inspection of the early blight spots will usually show concentric lines or "target-board" markings. Early blight may occur alone or associated with late blight. It is most destructive in dry seasons or on light, dry soil. To control this disease, early, frequent and most thorough sprayings with Bordeaux mixture are necessary.

LATE BLIGHT OR ROT.

This disease is caused by a fungus which attacks both the foliage and the tubers. In Maine it most frequently becomes epidemic during the damp, muggy weather of August and September, with a daily mean temperature of from seventy-two degrees to seventy-four degrees F., although it may appear in July if conditions are favorable. It does little damage during hot, dry weather. Late blight may be well distributed over a field before it is noticed, except by a trained observer. As a rule it first appears on the lower and more shaded leaves which are hidden from view. Contrasted with early blight it is more of a leaf blotch rather than a spot disease. The diseased portions are brownish or blackish areas, the leaf green fading out as it approaches the spot which rapidly enlarges and becomes moist and ill smelling. The margins of the under sides of such spots show a delicate frost-like mildew if examined on a moist, cloudy day or in the early morning. This is the fruiting portion of the fungus, and on each spot are pro-

duced thousands of little fruiting bodies, each capable of causing another spot.

Under favorable conditions only four or five days are required from the time that a spore falls on a leaf, germinates and enters its tissues till a new spot bearing other spores is produced. This accounts for the sudden epidemic appearance of the disease on a field where a few days previously the plants were green and healthy. A comparatively few blighted leaves, well distributed, may be the means of infecting simultaneously a large proportion of the plants in the field. Minute quantities of copper sulphate are fatal to late blight spores, hence they are killed as fast as they fall on a leaf coated with Bordeaux mixture. If they once have time to germinate and get inside the leaf tissues, even though no disease is apparent to the eye, no amount of spraying can save the infected leaf.

The washing of late blight spores down into the soil is directly or indirectly the cause of much of the loss from rot of the tubers both in the field and in storage. The most common dry rot of the tuber in Maine is caused by this fungus. Moreover, so far as our present knowledge goes, the only method by which a growing field is first infected in the summer is from the use of seed tubers affected with dry rot.

Thorough spraying with Bordeaux mixture, beginning before the blight appears and keeping the foliage well coated till killed by frost or the crop is harvested, will reduce the losses from this disease to a minimum. No tubers showing dry rot should be planted.

LEAF DISEASES, ETC., RESEMBLING BLIGHT.

Arsenical Poisoning.—This is often mistaken for early blight, but the spots are not so sharply marked on the under side and are of a lighter color. The individual spots are usually much larger. A flea beetle puncture is almost invariably found in the center of one of these spots while this is by no means the rule with the early blight spots. These are caused by the improper use of Paris green or other arsenic compounds in killing bugs. These poisons should always be used with lime or in Bordeaux mixture.

Tip-burn and Sun-scald.—The former is also frequently mistaken for early blight but it does not show the characteristic spots.

The tips and margins of the leaves turn yellow, and later die, roll up and become brown. Anything which tends to lower the water content of the plant, as lack of cultivation in hot, dry weather, may bring about this condition. The weakening of the leaves from the attacks of flea-beetles and early blight predisposes the plants to tip-burn. Well sprayed plants suffer less from this trouble than those which are unsprayed. Sun-scald grades off into tip-burn in appearance and no sharp line can be drawn between the two with regard to differential characters. This is the direct result of weather conditions, namely, several moist, warm days when the plants are growing rapidly, followed by a few bright sunny days especially if accompanied by a drying wind.

FUSARIUM DRY ROT.

This disease is common over a considerable portion of the United States and probably does more or less damage in this State. It is variously known as dry end-rot, dry rot, stem rot, etc. The above-ground symptoms are a slow change of color or yellowing, dwarfing, more or less rolling or curling of the leaves and, finally, a wilt of the foliage and falling down of the stem. The stems in early stages of the disease do not show evidence of being affected. Below ground the roots become weakened and brittle and diseased plants are easily pulled up. The diseased roots may, in some cases, become covered with a white, pink, or even reddish growth. The first symptoms of disease in the tuber are nearly always at the stem end in the form of a brownish or blackened ring a short distance below the surface. At this stage the tuber externally appears perfectly sound and healthy. Later there is a general discoloration of the flesh along with a decided shrinkage of the tubers. The skin becomes wrinkled around the stem end, the tuber becomes very light and often nearly as hard as wood, having a decidedly characteristic musty odor. Potatoes infected with this disease may appear perfectly sound when placed in storage but come out as described above. Spraying will not prevent this disease.

FORMULAS FOR BLIGHTS—BORDEAUX MIXTURE.

Formula C.

Copper sulphate	5 pounds.
Fresh lime (unslaked)	5 pounds.
Water	50 gallons.

Formula D.

Copper sulphate	5 pounds.
Hydrated lime (prepared or ground lime)	6–7 pounds.
Water	50 gallons.

HOW TO PREPARE BORDEAUX MIXTURE.

The copper sulphate is dissolved and the lime slaked in separate vessels. A wooden or earthen vessel must be used for copper sulphate as it corrodes iron. Each solution should then be diluted with half the water and then the cold, dilute sulphate and milk of lime solution quickly united and thoroughly mixed. Never pour concentrated solutions together. If unpracticable to pour the two dilute solutions into the sprayer or mixing tank simultaneously, the dilute copper sulphate solution should be first placed in the tank and the dilute milk of lime solution quickly added with constant stirring.

Best results are obtained if care is taken to add the water slowly to the lime while slaking, but it should not be allowed to become dry. The milk of lime must be strained and this is best done while still hot. A brass wire strainer of about thirty meshes to the inch (No. 50) or a piece of cheesecloth backed by common window screen may be used. The best type of strainer can be made by nailing together four one-inch boards about seven or eight inches wide and twelve or fifteen inches long, making a box open at both ends. One end of the box is then cut off at a considerable angle leaving one side shorter than the other. No. 50 brass wire strainer is tacked on to this end. Two cleats are nailed to the other end of the box long enough to more than reach across the top of the barrel. When placed on top of a barrel with the wire bottom down all the solid particles from the solution are washed to the lower side of the screen, thus avoiding clogging the whole surface.

The most convenient method of preparing Bordeaux mixture is to make stock solutions. For this purpose suspend 100 pounds of copper sulphate in a bag near the top of a fifty-gallon barrel and fill with water. This should dissolve over night. In another fifty-gallon barrel slake 100 pounds of stone lime, dilute and strain and make up to fifty gallons. A gallon of each solution *well stirred* will be equivalent to two pounds of copper sulphate or lime, as the case may be. For a fifty-gallon tank of mixture the stock solutions should be thoroughly stirred and then two and one-half gallons of each dipped out, diluted and mixed as described above. For a 100-gallon tank five gallons of each stock solution is used and each diluted to fifty gallons before mixing. Some prefer to use fifty pounds of each material for fifty gallons of stock solution. In this case double the quantities of stock solution are required to make a given amount of mixture.

Bordeaux mixture, according to Formula D, is prepared in exactly the same manner as is Formula C, except that slaking the lime and straining the resulting solution is dispensed with. The required amount of lime is weighed out, wet up with water, diluted, and then thoroughly stirred. Stock solutions of hydrated lime can also be used.

Prepared lime is somewhat more expensive than stone lime, but the labor in preparing the mixture is proportionately lessened by its use. Tests by the Station have shown that a reliable Bordeaux mixture can be made from hydrated lime, but it is recommended that the materials be fresh and not kept over from year to year. No experiments have been made to determine the relative adhesive qualities of Bordeaux mixture made from prepared lime with that made from stone lime. Hydrated lime is not air-slaked lime. The latter should never be used in making Bordeaux mixture.

It is conceivable that a low-grade hydrated lime, carrying a large per cent. of air-slaked or carbonated lime might be placed on the market by some manufacturers. The hydrated lime known as the "Pine-cone Brand," prepared by the Rockland-Rockport Lime Co., Rockland, Maine, has been found to be satisfactory.

Much of the labor of the Bordeaux making can be avoided, especially where running water is available, by building an elevated platform higher than the top of the spray tank. On this place two barrels for the stock solutions and two for the diluted solu-

tions. These latter should have a piece of hose three or four feet long connected with the bottom (or open by means of faucets into a common conductor to the spray cart). When not in use the hose is elevated and fastened to the top of the cask. When ready to fill, back the spray cart up to the platform, and quickly lower and insert the hose from each barrel of the dilute solution into the top of the tank on the cart. Thus the cart is quickly loaded and a satisfactory mixture obtained. Where running water is not available the platform can be placed over a stream or well, and a cheap iron pump placed thereon, delivering above the top of the barrels and connected by means of a pipe with the water-supply below.

All materials should be carefully weighed and measured. The proportions of the ingredients should not be varied materially. If it is desired to use more copper sulphate to a given acreage, increase the number of nozzles to the row or go twice over the rows in opposite directions.

COMBINED FORMULAS FOR BUGS AND BLIGHTS.

Make a smooth paste of the poisons and a little water, add to the Bordeaux mixture, and stir thoroughly. Apply at once.

Formula E.

Paris green	½ pound.
Bordeaux mixture	50 gallons.

Formula F.

Lead arsenate or disparene	2 pounds.
Bordeaux mixture	50 gallons.

Formula G.

Arsenate of soda, stock solution	1 quart.
Bordeaux mixture	50 gallons.

Arsenate of soda stock solution is prepared as follows: Place two pounds of white arsenic and eight pounds of sal soda in two gallons of water. Boil until dissolved, add water to make up to original volume. Store in well-stoppered bottles or jugs, with a

poison label on them. This is a much cheaper poison than Paris green, to use with Bordeaux, and it remains in suspension better, but it is not safe to use it alone with lime. White arsenic costs less per pound than Paris green and will go twice as far in that two gallons of arsenate of soda stock solution will do as much execution as four pounds of Paris green.

THE APPARATUS.

The necessary apparatus consists of a force pump, hose, nozzles, a barrel holding the spraying mixture, and a wagon for carrying all.

The Pump.—The pump should be powerful enough to develop a pressure of at least sixty pounds to the square inch and large enough to easily supply a strong, mist-like spray when the maximum number of nozzles are used, and should have as an accessory a good agitator. The small bucket pumps and knapsack sprayers do very well for a few plants in the kitchen garden, but for field work they are unsatisfactory. All parts of the pump that are subject to wear should be made of brass and should be carefully adjusted. The pump and all other apparatus should be thoroughly washed every time after using.

The Hose.—In case an automatic sprayer is not used, two pieces of one-half-inch hose, fifteen to twenty-five feet long, are needed, with a nozzle on the end of each. Here one man works the pump and drives the horse while two others handle the hose. One opening from the pump can be closed and one hose disconnected if desired.

The Nozzle.—There are many good nozzles, but the best tried at the Experiment Station is the Vermorel. The Vermorel throws a finer spray than the others, and is the best for potatoes. It is easily clogged unless the spraying mixture is carefully strained through cheesecloth or a fine wire screen before using.

The Barrel.—A kerosene barrel, holding about fifty gallons, is a convenient tank. It can be placed upon the side or stood on end, but the first position is preferable. A small opening should be made in which to place the pump, and another, larger one, through which to fill the tank and stir the mixture.

The Wagon.—Any low wagon, or even dump-cart, will answer the purpose. For convenience in turning a two-wheeled cart is to be preferred.

Automatic Sprayers.—In large fields automatic sprayers which will cover four to six rows at once may be used with satisfactory results. Such a machine consists essentially of a barrel, containing an agitator for keeping the liquid stirred, mounted upon a two-wheeled cart, a force pump (which may be a hand pump, but preferably one driven by a sprocket chain in the rear), with nozzles which can be set to any width of rows. The nozzles should be so arranged and be of sufficient number to thoroughly cover every leaf at each spraying. Two nozzles to the row should always be used except possibly when the plants are very small, while three nozzles may be necessary late in the season. Where double nozzles are used they should be farther apart than is commonly the case, and, if possible, admit of some adjustment as to direction. It should be possible to raise the line of nozzles, as the plants grow to such an extent that each time the Bordeaux is applied the outer margins of the spray cones extend just beyond the foliage of the row, thus giving uniform protection to all leaves.

The pump should be a powerful one. The intake to the pump should be protected by a wire strainer to prevent clogging the nozzles. The agitator must be efficient. Inefficient agitators and weak force pumps are things to be avoided in the outfit and are responsible for many failures. A hand pump is all right if vigorously worked. After ten consecutive hours' work on a spray cart, the desirability of a power pump is readily understood, and after one day's work with a one-horse power pump, the advantages of a four-rowed or six-rowed, two-horse, mechanical sprayer are appreciated.

WHEN TO SPRAY AND HOW TO SPRAY.

Begin when the tops are six or eight inches high and spray every ten days (every week if the weather is very cloudy and rainy) until the last of August or the first of September, or later if necessary. In any event spraying must be begun some days before the average observer will detect blight on the leaves, and the foliage should be kept well coated with Bordeaux mixture up to the time

the crop is harvested or the tops are killed by frost. Do not stop for rainy weather, this is just the time when late blight spores are formed in profusion and when infection most easily takes place. It is possible for a spraying just before a rain, even though it is largely washed off, to do more actual good than any other during the season. Moreover properly prepared Bordeaux mixture, if thoroughly applied, will withstand severe washing if it once thoroughly dries on the leaves. The best results are obtained when the mixture is forcibly applied in the form of a fine mist, *not* in coarse drops sprinkled over the foliage.

As is described elsewhere the nozzles should be so arranged and of sufficient number and adjustments as to cover the entire row at each application. Do not limit the amount applied per acre to an arbitrary number of gallons, but use enough at each application to thoroughly coat the foliage whether it requires fifty, 100 or 150 gallons per acre.

The directions for fighting the common insect and fungus enemies may be summed up as follows:

A. For Scab.—Immerse tubers one and one-half hours in solution of corrosive sublimate or two hours in formalin (see page 91) or disinfect with formaldehyde gas.

B. For Insects.—Spray with a poison alone (Formulas A or B, pages 87, 88). If flea beetles are numerous or there is danger from blight use combined Formulas E, F or G (page 97).

C. For Blight.—Begin to spray when the tops are six or eight inches high and spray thoroughly every ten days, every week if necessary. If insects are plentiful use combined Formulas E, F or G. After danger of insects is passed use Formula C or D (page 95).

Usually six and sometimes four sprayings are sufficient to protect against late blight, but the leaves should show a coating of Bordeaux from the time spraying begins till the crop is harvested or the tops killed by frost. One thorough spraying in rainy weather, before late blight has gained a foothold, may be the most effective application of the season. If early blight is prevalent five or six *very thorough* sprayings, beginning early in the season, are necessary to insure sufficient protection.

A vote of thanks was given Prof. Woods for his valuable paper.

AFTER RECESS.

A resolution by Mr. Charles Collins that the executive committee be and they are hereby made the legislative committee of this board, was seconded and carried.

Mr. Butterhof, chairman, on behalf of the committee on nominations, made the following report: We unanimously nominate and recommend the election of the following officers for the coming year:

For president, Dr. E. B. Voorhees.

For vice president, John T. Cox.

For treasurer, Walter Heritage.

Executive committee, George E. DeCamp, John M. Lippincott and A. J. Rider.

Your committee also recommends that a vote of thanks of the board be extended to the board of officers and the executive committee for their painstaking and effective work during the past year.

Moved and seconded that the report be adopted, and that George Gillingham be requested to cast the ballot for the board. Carried.

Mr. Gillingham then cast the ballot for the gentlemen above stated, who were declared elected.

THE SUMMER SCHOOL.

Dr. Voorhees—It has been suggested that inasmuch as we have annually now a summer school for teachers in the rural districts, located at Cape May, that the representative of the board of education having that matter in charge should make a brief report for the past year. If he is ready to make that report we are ready to hear it now.

Mr. Sensor—Mr. Chairman and Ladies and Gentlemen, I will only take a few minutes of your time to call attention to the work of the Cape May Summer School. The State Board of Education, in a series of resolutions passed about a year ago, decided that there should be more practical work in our public schools, particularly in the work in the rural schools, and they felt that the teachers must have better training than they had had along the

line of work needed in the country school. To carry out that plan they established a summer school, and I present a brief outline of some of the work that was accomplished in that school as follows:

Three general courses were given to the teachers in attendance, who came mainly from country schools, sixteen counties of the State being represented.

Nature Study and Elementary Agriculture under the direction of Prof. H. O. Sampson from the Agricultural Department at Washington, D. C.

Home Economics, including practical instruction in cooking and sewing.

Elementary and Advanced Manual Training, including methods of instruction in hand work from the kindergarten through the high school, laying in this way a broad foundation upon which to carry on the work of industrial education and develop vocational and technical schools. About one hundred pupils, composed of superintendents, supervising principals and teachers, availed themselves of the advantages offered by the school. The prospects for a large attendance the coming year are good.

President Voorhees—This seems to be a matter of very great importance. This whole question of agricultural education has been before this board for fifteen or twenty years, and we find the real difficulty is that we haven't the teachers who are competent to instruct along those lines. This seems to be a move in the right direction—that is, that it shall come first through the education of the teachers, and in order to do that we must have, as we have not had in the past so cordially as in the present, the co-operation of the State Board of Education.

This move began a year ago last summer, and the second year was, as you have already heard, a great success, in the sense that a large number of teachers were there and good instruction was given and actual work done. It is a question with us whether this work will be continued and enlarged. It does seem to me that it is along the right lines.

Secretary Dye—I had the pleasure of attending the Cape May summer school one day last summer, and I was highly pleased with what I saw there. The teaching was exceptionally practical, and the students—and there were several county school superintendents among them—were deeply interested, and it was very evident

that good work was being done. My thought was that if these teachers and superintendents could duplicate this teaching in the home school they would be doing a good thing. But this work is all in the formative period as yet. Let's work along and we will get there after awhile, as experience shows the way.

The following resolution was then submitted and unanimously adopted:

Resolved, That this Board heartily indorses the work of the State Board of Education in establishing a summer school for teaching teachers along the line of elementary education in economics, and especially to commend the work done at Cape May last summer.

FRIDAY, January 15th, 10 A. M.

The session was opened with prayer by Rev. D. R. Foster.

The President—As a committee to prepare resolutions on the death of members, I appoint John M. Lippincott, Richard Lloyd and John Ackerman.

UNFINISHED BUSINESS.

Dr. Ward—I desire to introduce a resolution at this time.

Resolved, That the members of the State Board deem it inexpedient to make any change in the automobile speed limit at this time.

Resolution seconded and adopted.

Mr. Rider offered a resolution favoring such interstate legislation as will facilitate the passage of automobilists from one State to another, without unreasonable delay.

The resolution was referred to the committee on resolutions.

Two addresses were then made on asparagus production, one by C. C. Hulsart on producing "White Grass," and by H. W. Ridgway on the production of "Green Grass."

Asparagus Culture—White Grass.

BY C. C. HULSART, MATAWAN, MONMOUTH COUNTY, N. J.

The cultivation of asparagus is not, by any means new, in fact it is one of the oldest vegetables known. It was produced and used as an article of food more than 2,000 years ago by the Romans. It inhabits most of the countries of Europe and part of Africa, as well as most every State in this country. In the early history of the plant, the young shoots were gathered and dried for the future food supply. When wanted for use, they were put to soak for a time prior to cooking, and it is said that this made a very palatable dish.

As early as the seventeenth century, asparagus was grown in this country. With a vegetable so old, one known in this country almost ever since the landing of the pilgrims on the rocky shores at Plymouth, one would think there was little room for anything to be said on the cultivation of this most popular and most delicious of vegetables, and yet when we go back thirty, forty or more years and follow down the line, we see great improvements.

The varieties in cultivation two or more decades ago produced shoots that were mere straws in comparison to the size of the shoot that is produced at the present time, on a well planted and a well cared for bed.

Where an acre of this vegetable was cultivated thirty years ago, at least twenty acres are planted to-day, and with this enormous increase in acreage, the demand for this vegetable has increased in an equal, if not a greater ratio, hence it is not only a popular but a profitable crop to grow.

The net receipts from an acre of well-grown asparagus to-day is greater, most seasons, than it was twenty or thirty years ago.

In trying to outline a method for others to be guided by is a task difficult to perform, because in but few vegetables do the conditions of soil, locality, mode of cultivation and other circumstances affect the quality, size and appearance as much as in asparagus.

It is not the intention of this paper to lay down any iron-clad rules for the production of this crop, but to give in plain language the methods used by the most successful growers in my section.

One of the first essentials to success is good, strong, pure seed. To obtain this seed the grower must either gather it himself or have it done for him by some responsible party, who has access to a field of asparagus of the right variety that is producing a good yield and a good quality of grass, and been well fed and well cared for. Go in the field in late fall, after the berries are fully ripe and beginning to soften, and cut the stalks close to the ground, selecting such plants that have but few stalks to the plant and few berries to the stalk for this purpose, avoiding plants with many stalks to the plant, also those plants that are heavy seed bearers, because where plants are heavy seed bearers they are lighter crop producers and produce smaller shoots. After the selection and cutting is finished, gather and take to some building that has a good floor and whip the berries from the straw, rake out the straw, put the berries in some water-tight receptacle and mash them with some flat-ended piece of wood, to make the berry burst; do this thoroughly, pour on a few pails of water, and leave them a few days to ferment, stirring them once or twice daily to make the seeds separate from the pomace. When sufficient fermentation is present, add more water to thin the mass down, skim or pour off the pomace from the top, keep adding water and pouring off until the seeds are clean, allowing all seeds that do not sink readily to run off with the water, strain and dry; when dry run through a fanning-mill, with bottom screen with mesh just large enough to allow all small seeds to go through. The mill should be turned at just sufficient speed to blow out all light seeds and not the heavy ones. Reject all tailings and screenings. By this method a very large percentage of the weak and imperfect seed are eliminated. Sack and store the seeds in a dry, cool, airy place; avoid storing them where it is warm, as it tends to harden the shell and reduce germinating power.

In selecting a site for sowing asparagus seed, it will be very advantageous, both in time and money, to have it sufficiently close to the building, that poultry can roam at will over the seedbed, for the reason that they will take care of the bug problem that causes so much damage to young asparagus, without the grower giving it any concern.

It is good farming to have a plot of ground that has been liberally manured, cleanly cultivated for a couple of years prior to planting asparagus seed upon it. It would be advantageous, too, if the soil selected is of a medium light loam, but in that we must not be too critical; if we have not the ideal soil we must use what we have. The asparagus plant is one that will adapt itself to almost any soil, very heavy clay that is liable to bake excepted.

Prior to plowing the ground, cover it with a coating of yard or stable manure at the rate of a dozen loads per acre; plow under, harrow and mark off in rows as for potatoes; open furrows with an ordinary one-horse turning plow, to get a broad, flat-bottomed row. In these furrows scatter a good potato fertilizer at the rate of one-half ton per acre; stir and cover by throwing two shallow furrows, one on each side; rake off, to make a flat top, and remove all lumps and stones. In these light ridges sow the asparagus seed thinly, not more than three seeds to the inch; two would be better where it is known that the seeds are of a high germinating power; cover about one inch deep and roll. The asparagus seed is one that takes three or more weeks to germinate, hence we must guard against the soil drying out before it appears above ground. If the rows become foul with grass and weeds, even though the young plants have not yet appeared, the rows must be cleaned. The young plant cannot and will not thrive in close neighbors with weeds and grass. This must be borne in mind the entire season, and the hoe and the hand weeder brought into requisition whenever necessary.

Cultivation should begin as soon as possible after the plants appear, and kept up at sufficient intervals to keep the ground loose, free from weeds, and in a good growing condition all through the season. When the young plants are about four inches tall, side dress with nitrate of soda at the rate of about 100 pounds to the acre; repeat this about every four weeks until three applications have been applied, increasing the quantity with each application twenty-five pounds. This insures a strong, rapid, continuous growth.

During the latter cultivations a small amount of soil should be worked toward the row, leaving the center between each row about four inches lower than the row itself; this answers a twofold purpose; it allows the water to shed from the rows in winter, and

leaves sufficient soil over the young roots to protect them from freezing.

If a row of young asparagus plants is left without this slight hilling, and the roots very near the surface, and hard freezing weather occurs, many will be frozen. Such plants are utterly worthless to plant, although the eyes may be alive.

It may seem that what has been outlined here in the way of applications of manures, fertilizers, and the various side dressings of nitrate of soda, is entirely in excess of the requirements of the plant, but my object is to grow a plant that at one year of age is a better and stronger plant, and more able to establish itself after being transferred to the field, grow faster, produce a crop sooner, and that of a better quality, than the average plant grown, many of which have to be grown two years to attain the same size.

My judgment is, and I find the same to be verified by actual experiment, that a one-year-old asparagus plant is the only one for the commercial grower to consider for the following reasons: First, there is less mutilation of roots in digging from the nursery row; second, there are less fully developed eyes.

If one examines a two-year-old plant he will find that it is impossible to get that plant out of the nursery row without leaving fully one-half of the root system behind, and at the same time he will also find that most all two-year-old plants have twice the number of developed eyes that a one-year-old plant has. When this two-year-old plant is planted in the field many of these eyes start to grow at once, causing an unnatural demand on a root system one-half of which has recently been amputated. This causes an unnatural condition, a condition that is rarely if ever overcome.

ASPARAGUS CULTURE.

Having given our method up to the time of going to the field, next in order would be the selection of a site for the permanent bed. Many think, or seem to think, that a light sandy soil is the only place to plant asparagus, but my observation has been, and my conclusions are, that a good rich loam with not too compact a sub-soil, with a water table three or more feet below the surface, free from stones, and fairly level, is the ideal soil in which to plant asparagus. Such soils, if properly handled for a year or

two prior to planting asparagus, will yield a better crop, a better quality of grass, and at less expense for manures and fertilizers, than any other kind of a soil that I know of. Nevertheless fields of asparagus are planted and being grown, and at more or less of a profit too, on almost all soils except stony, gravely, or heavy clays.

In selecting the field for the future asparagus bed it should be done at least a year or two prior to the setting of the plants, and such crops grown upon it as require liberal manuring and clean cultivation. When the time arrives for preparing for the new bed, and the grower intends growing white or bleached grass, the best method I have found for preparing the field is to mark it out in rows five and one-half or six feet apart, as carefully and straight as possible. Then, with a team and a good turning plow, strike a back furrow over each one of the previous furrows made, leaving a dead or clean-up furrow in the center between each of the first furrows made. Harrow these narrow-back furrows with a disc or cutaway harrow until sufficient pulverizing is done. Follow this by cleaning out with plow each dead furrow by going twice, once in each direction, being careful that they are made straight and of a uniform distance apart. In these furrows set the young plants eighteen or twenty inches distance from each other.

Among the earlier growers of asparagus in my section it was customary to set the plants at a much greater distance apart—two feet was considered close, and many beds were set with plants three feet distant in the row, but as time advanced growers began shortening that distance little by little, and it was soon discovered that by a closer setting of plants a full crop could be harvested a year, and sometimes two, sooner than where a wide setting was practiced.

The question is sometimes asked, Do not the plants crowd each other more quickly in close setting? My answer is, Yes, if a bed is expected to last twenty years or a lifetime. I feel that this close planting, as many term it, being indicative of quick results and heavy yields from the second year on, is a better-paying proposition than the long wait in the outset under wide planting.

An asparagus bed set in this manner will last, under proper care, feeding and management, a dozen or more years, and pay a good profit all the while.

To return to the main question, the object in preparing a field as described elsewhere is to get it in such shape as not to have a steep bank immediately each side of the young plants to cave in or wash in with every heavy rain.

The method I have described gives a more gradual slope, easier access for cultivation with either horse or hoe, and less danger of filling the row too quickly. Another object in this method is it insures getting the young plants seven or eight inches below the surface uniformly and without difficulty.

In setting young asparagus plants the grower should see to it that not more than two inches of soil is drawn over each crown, and also see that the setter steps one foot each side of every plant when passing. This firming with the feet is important, and should not be overlooked. That is all that is necessary until growth begins to appear, when an application of a good fertilizer (a high-grade, 4, 8, and 10) applied in the row at the rate of 600 to 800 pounds to the acre, according to the natural fertility of the soil. Do not use animal manure in the row, either under or over young set plants, because, first, if under, the plants do not start as well as when set on a solid surface; second, if on top, after the plants are set there is danger of mice getting in under the manure and destroying many of the young plants. If the grower feels that his field to be set with asparagus needs manure, a better plan is to broadcast the whole surface before plowing is done and use the fertilizer named above, in the row.

As soon as weeds and foul growth begin to appear, cultivation should be given and done as carefully as possible. The man doing this work should have a threefold thought in his mind. First, the mellowing of the soil to let in air and sunlight, to invigorate the young plants, thus causing an early, rapid growth. Second, to so do his work as to kill all weeds that is possible, thus lessening hand labor. Third, not to allow too much soil to be worked toward the young plants, because if this is done while the plants are yet young and weak from the recent transplanting, and heavy rains occur, many plants will be smothered and die, leaving an imperfect stand.

If the object of the planter is to grow green grass, then the preparation of the field for the young plants is entirely different. The rows need not be quite so far apart, the furrows need not be so deep, hence plowing the field and preparing it in the ordinary way

as for other crops is the usual method practiced, using, of course, a good deep plow furrow in which to set the plants.

Bugs.—As soon as the first warm days appear, the grower should be on the lookout for the asparagus beetle. If this pest is left at its will it will be only a very short time when they will have done sufficient damage to nearly or quite ruin the bed. To keep these insects in check, spraying with Paris green in some form is usually employed. Some use it dry, applied with a gun, when the dew is on the plant; others use it in a liquid spray. If used in this form I prefer to have lime mixed with it, because it takes less poison and sticks better.

It should be the aim of the grower to do all in his power to induce a strong and rapid growth all through the season. To this end frequent cultivation is necessary. A light side dressing or two of nitrate of soda along the sides of the rows and worked in by cultivation is a great help, both in encouraging a strong growth of tops and helping to ward off attacks of disease, commonly known as the rust.

It has been my privilege the past season to watch a number of beds of asparagus and in practically every instance where late applications of nitrate of soda were made the rust did not appear nearly as soon as where no soda was used after the cutting season. If the planter so desires, a row of vegetables may be planted the first season between each row of the young asparagus, such as carrots, turnips, parsnips, or anything of a low-growing nature. (Vine crops, like melons, &c., should be avoided.) Such a crop in many instances will pay the whole cost of plants, planting, manuring and care the first season.

I believe it is better not to plant any crop between the rows the second season, because by this time the root system is so much developed that it will need the whole surroundings to supply it with moisture and food.

During the early fall of the first season after setting a young asparagus bed, it should have a heavy manuring. The best way to do this, in my judgment, is to take a good size turning plow and plow a furrow away from each side of the row of plants and as deep as possible without disturbing the roots. Spread the manure in these furrows at the rate of twelve to fourteen tons per acre. When the manuring is completed cover it by turning

a furrow over on top of it. This method of manuring has a tendency to keep the root system well down below the surface where it belongs.

It is practically agreed by most good asparagus growers in this section that surface applications of manure tend toward bringing the root system to the surface, a condition which is sure to cause damage in cultivation. All future applications of manure should be applied in a broad, open furrow down the center, between each asparagus row.

When a young asparagus bed is one year old some growers cut what shoots appear for about two weeks, but I believe a full crop will be harvested sooner if no cutting at all is done at this time and all shoots allowed to grow for another season, provided the grower is on the alert for the asparagus beetle and prevents it from destroying these first early shoots.

When it is two years planted, and has had proper care and nourishment from the beginning, four or five weeks' cutting may be expected. From this time on there should be an annual application of from 1,300 to 1,500 pounds of fertilizer applied per acre. My method of doing this is to apply acid phosphate, three parts, muriate of potash, one part, mixed together, and drilled on at the first working in the spring. This may be applied at the rate of 1,000 or 1,200 pounds per acre. This I supplement with 200 to 250 pounds of nitrate of soda at the end of the cutting season. Where the planter is growing green grass this may be profitably divided in two applications, the first one applied early in the cutting season.

Cultivation should be done weekly all through the cutting season, because first, it opens up the soil, thus warming it, and conserving moisture that is essential to a heavy crop; second, it will be found that after every cultivation the shoots come larger; third, it keeps the bed free from weeds. After the cutting season is over the bed should be immediately leveled and thoroughly cleaned, and all shoots should be induced to grow that appear, and sufficient cultivation kept up to keep the bed free from weeds and grass, because at this season the weather is likely to be more or less dry, and the plants will need all the moisture available so they can make a strong, healthy growth. This growth is essential to insure a full crop the following year.

Harvesting the Crop.—This is done every other day until the weather is so warm that every day cuttings are made necessary. Where bleached or white grass is being harvested, a long, especially-made knife is used. Some growers use a concave blade, while others prefer a knife with a fish-tail point. This knife, in the hand of the cutter, is thrust down in the row, which has been previously ridged, the young shoot is severed from the crown about six inches below the surface. Nothing being cut until it is about two inches or a little more above the top of the row. The cutters laying each handful on the row as it is gathered, placing that gathered from two rows together on one. The cut grass is gathered by someone following with a two-wheeled cart. This cart has the shafts arranged the same as a one-horse sleigh, so that the horse walks nearly in front of one wheel. As a load is gathered it is taken to the packing shed, where it is washed, graded, bunched, and stood in troughs containing half an inch of water, and left there till packing time, when the bunches are taken from the troughs, again washed, each grade packed by itself in packages holding from one and one-half to two dozen each, and shipped to the markets of New York City and Brooklyn and sold the following morning by commission men, prices ranging according to the supply and quality of grass all the way from $5 per dozen down to $1 at certain seasons of the year.

The yearly cutting from a mature bed of asparagus should be about 2,000 three-pound bunches.

The grower of asparagus who hopes to gather the largest harvest from his acres must remember that the asparagus crop is not one that will thrive and produce the article now demanded by critical buyers unless the proper variety, a strong, healthy plant, set in well-prepared soil, highly fed, thoroughly cultivated, kept free from weeds and grass, harvested at the right time, put up in proper shape, and in a neat and attractive manner; all these and many more little details go to make up successful asparagus production.

Asparagus Culture—Green Grass.

BY H. W. RIDGWAY, SWEDESBORO, GLOUCESTER COUNTY, N. J.

Mr. Hulsart told you that asparagus has been cultivated as a field crop for thirty or forty years, and it is so, but he didn't tell you that while asparagus is being cultivated as a field crop from the Atlantic to the Pacific, and from Boston to Florida, and in California, where it is grown by thousands of acres, it is in New Jersey where asparagus has reached its greatest development.

Of all the garden vegetables, asparagus is the earliest. It appears at a season when the appetite craves something of this character. The highly flavored "green" grass with its extreme delicacy, renders it one of the most desirable vegetables to be found on the market, and the demand for the larger grades far exceeds the supply.

It has only been within the last few years that you heard anything about green asparagus. Why? Because I suppose it was not grown. Now we hear a great deal of it. The market demands it. People tell us what a delicious vegetable it is over the woody substance that they formerly had eaten. I am speaking of South Jersey asparagus, because nearly all of the "green" asparagus is grown in the vicinity of Philadelphia and Boston. The rest of the Union grow the "white" asparagus and New York is its principal market.

We have recently started, and almost without exception to cut green grass; we thought it was the most profitable. I am viewing this as Mr. Hulsart viewed it, from the dollar and cents standpoint. We raise the green grass because it is demanded. The demand has increased many times over what it was formerly. The consumer requires it, asks for it, and if it is popular with the consumer it is generally profitable to the producer. Often we find a man who says that he don't raise it because it is not more profitable. He argues that it takes less white grass to make a bunch than it does of the green grass, even if the green grass sells at a higher price.

If you will look at that jar (shows jar), you will see that as soon as the top reaches the surface of the land that it becomes materially smaller, it is hardly one-half of what it is down in the ground. You can easily see that the man that cuts green grass is cutting a smaller stalk than if he cut the same stalk as white grass. Therefore the man who grows white grass should get a great many more bunches per acre than the green grass grower. Necessity is the mother of invention, and in South Jersey we had to resort to some variety which would make up that deficiency in the number of bunches which the white grass growers got the advantage of.

That brings us up to the first point of our subject, which is variety.

Mr. Hulsart said that you must have the proper variety, and I agree with him.

Notwithstanding the fact that asparagus beds have been greatly extended in the last few years, yet the demand is still greater than the supply, and especially so is this the case with the larger grades of "green grass." Therefore I have placed *variety* first, because it is of the most importance to the prospective asparagus grower. I believe variety is the keystone of the whole structure and the keynote to the whole argument. You want the proper variety. It makes no difference if you have the best land in the country and have all the fertilizer that the land will assimilate, and the best implements and the most skillful labor, and have not variety, "it profiteth you nothing;" you are handicapped and cannot compete with your neighbor who has the proper variety and probably does not attend to his business half so well as you do.

It was formerly thought that all asparagus was alike, and it only wanted manure and cultivation in sufficient quantities to improve the size and the crop. While this is true to a certain extent, it will not make a small variety grow large any more than you can change the breed of a horse or cow by feeding.

Variety is the principal thing, but in making our selection of variety let us not put too much dependence on the name. It may be misleading, owing to the fact that many growers are not acquainted with the varieties and accept the *name given them*, without questioning its authenticity.

There is only one specie and several varieties; one-half of the names that we hear are not varieties. The grass so named has been caused by methods of cultivation, highly-manured land, and climatic conditions, and differ from each other only by a single characteristic which will rapidly disappear when grown under climatic and soil conditions different from that in which they originated.

I do not undertake to say that asparagus has not been improved by the *proper* selection of seed from superior roots, and I would say save the seed from the male plant and not from the female plant. There are two kinds, a male and female—I will touch on that a little later.

Let me repeat, do not put too much dependence upon a name in selecting the variety. It is the characteristics, and not names, that should guide us in making the selection. Give them careful consideration and investigation. Asparagus is not a crop that you can change in a year if you get a bad kind, like tomatoes, melons, &c.

You want, first of all, a *large size,* because it sells for a better price, and it costs no more to grow it. Second, you want a good *cropper,* one that will produce at least as many bunches per acre as the smaller kinds. Third, you want a kind that will resist disease. Some varieties resist disease much better than others.

With these characteristics in any variety you can enter the asparagus-growing industry, whether white or green, without fear or favor.

The large size is in greater demand; it sells for a higher price, and places you beyond the competition of the lower grades. There is no comparison between the profits of an ideal variety and those of a common kind. In getting the large kind do not overlook the other two characteristics; they are very important. You may get a large size and have a poor cropper, and you may get both the crop and the size, and soon fall a victim of disease—the rust—the asparagus grower's greatest enemy. No plant, no animal, can properly produce that which is required of it if it is sickly. It will seldom prove as profitable as expected, and will be a disappointment to the grower.

PROCURING PLANTS.

The asparagus grower has two methods by which he may secure plants, (1) by buying or saving the seed by which to grow them himself, (2) to buy plants that have been grown by someone else. While the second method seems to be the quickest, it is not always the best way to start a bed, owing to the difficulty in procuring the proper sized plants of a variety just described. Buying of nurserymen cannot be recommended, because the buyer usually can know nothing of the previous history of those plants, and nurserymen seldom use the care that is necessary in saving the seed from which their stock is grown to produce an ideal kind. The plants thus purchased too often represent an indiscriminate lot of seedlings of various sizes and ages. Remembering that only experts are able to tell the different sorts from each other, and that it is not an easy matter to tell a large one-year-old plant from a small and stunted two-year-old one, which is a very undesirable plant to set out, and should be thrown away.

Plant only large, strong, one-year-old plants, and if you do not grow them yourself, buy them of some reliable grower who has a bed of some reputation and is growing plants for his *own use*. Good plants of this description are always worth good money and poor plants are dear at any price. If satisfactory plants cannot be found it is better to wait until they can be or buy seed from some reliable grower who has an ideal variety. It is much cheaper to grow your own plants if many are to be used. One pound of seed will grow from 3,000 to 8,000 plants if properly cared for. By growing one's own plants there is an opportunity to grow more than you need so that you can select only the best for your own use. The rest can readily be sold to persons who do not want the trouble of raising their own plants and are willing to buy your "leavings." These people are to be found in every community.

Asparagus is pre-eminently a crop in which the principle of *selection* should always be applied—selection of the best *variety*, selection of good seed plants, selection of best seeds, and finally the selection of the best *plants*. It might be stated that you are not always sure of reproducing the desirable characteristics of a bed, no matter how good a one it is, owing often to the ignorance or the carelessness of the person gathering the seed.

It must be remembered that the asparagus plant is dioecious, that is, male and female, and it is the female that produces the *most* seed, while the male plant is said to grow the largest stalks. A careful selection should be made of the seed-bearing stalks possessing the characteristics desired, and the seed should remain on the stalk until fully developed before being gathered.

The planting of the seed has been so fully described by Mr. Hulsart that it is useless to repeat it here. The use of nitrate of soda in growing plants from seed is not practiced in our section; it is not top that we want for planting, it is root and eye. Better give the land some preparation a year previous and use some commercial fertilizer when sowing the seed and more later in the season if needed. Too much fertilizer used when the seed is sown will prevent a good "come up."

Seed properly sown and given the proper attention will grow plants large enough to set out the following spring.

SELECTION OF PLANTS.

If growers fully appreciated how important it is to select their plants in order to get the best results they would always grow many more plants than they need. This selection is of the utmost importance if we strive toward ideal conditions.

Select a good, strong "crown," with few but well-developed buds or eyes, having plenty of roots. A "crown" with many eyes should be thrown aside, because it will produce too many stalks, and they are apt to be too small. There is about so much energy, about so much plant food, used to the "crown," and if it sends up five or six stalks they will be very much larger than if this same "crown" sent up fifteen stalks.

Many people measure the quality of asparagus plants by the length of the root. This is a mistake. It is better to have a well developed crown of three or four eyes, with roots six inches long, than to have plants whose roots are a yard long, with an undeveloped crown of many eyes.

If it were possible to select and set nothing but male plants it would greatly increase the value of the bed, both in size of stalk and its productiveness, because male plants produce little or no seed, but larger stalks and more of them. But who can select them when in root form?

SELECTION OF SOIL.

After all the other selections have been made the selection of soil comes next. The growing of green grass can be carried on successfully in a greater variety of soils than the growth of white grass. In South Jersey and in Eastern Pennsylvania there is a great deal of asparagus grown on almost heavy land, but a sandy loam is preferable. It should slope gently towards the southeast, so that the sun may shine on it all day and so that it may be protected from cold west and northwest winds. Also it will not "blow" so badly if the land is very sandy. It is better to slope gently so that heavy rains will wash it. The land should not contain "basins" where the water will pond after rains. It should be free from trees, bushes, trash of all kinds, and hedges along the fences, and not next to a woods. It was formerly thought it was necessary to have a woods as a wind "break" to protect the bed. You had better rely on the slope of the land for your protection, because the trees absorb moisture from the land and thus rob the asparagus and it also affords a refuge for the insects.

Asparagus will accommodate itself to almost any kind of soil, and a bad selection of land may be partly counteracted by good preparation. You are all farmers and it is needless to tell you what good preparation means, except perhaps to say, do not be afraid to apply manure or fertilizer the year previous and to keep the selected land free from grass or weeds which the manure will bring if not thoroughly cultivated throughout the season. This will save you a great deal of trouble during the first year. The first year is the critical time for all growers and especially the beginner, who knows little of the dangers that beset him.

PLANTING.

The planting has been fully described by Mr. Hulsart. While we do not always take that much pains in setting plants for "green grass," we heartily recommend it to the beginner.

The question of distance between the rows and between the plants in the row is one that each grower must decide for himself,

according to his purpose and his needs, whether white grass or green grass, white grass needing more room between the rows owing to the necessity of "ridging." Green grass needs less room than the white grass owing to the comparatively flat cultivation. Some varieties need more room than others. The distance generally adopted by most of the large green growers in South Jersey is about five feet between the rows and two and one-half feet in the row. This allows ample room for cultivating when the tops are full grown and for cultivating both ways while the plants are young and during the latter part of the first year, when cultivating means so much.

For green grass many think that you do not have to set the plant as deep as you do for white grass. That is so, but the most successful green grass growers now set deeper than formerly, which is from six inches to eight inches below the natural level, the distance depending upon the nature of the soil, whether "heavy" or "light." We have found that deeper planting tends to increase the size of the stalk and lengthens the life of a bed. Also it will not break out in top in extremely warm weather as soon as the shallower planted beds, consequently there is less waste. On the other hand the shallow beds cut heavy earlier in the spring than the deeper beds but, owing to the competition that we are now meeting from the south, this earliness does not count for as much as formerly.

CULTIVATION.

Cultivation should receive especial care from the start. Cultivate all the time during the whole season, especially with young beds; do not let them get overrun with grass and weeds. There is nothing that will smother out young asparagus like being overrun with "crab" grass during the first year, when the sprouts are small and delicate.

In order to harvest a good crop we must have a good "stand," with but few missing hills. Young beds need careful attention and close watching, or the bugs, along with the grass, will cause a great many plants to die. A loss of one plant in five or six means a great deal in after years. It takes just as much labor and fertilizer to maintain a bed badly missing as it does one with a perfect "stand." It means a loss of at least one-fifth of your net

receipts *every* year. What business man could stand a loss of twenty per cent. every year?

After the first year asparagus should be of such a size that it will take care of itself, so far as being overrun with grass, and will stand more neglect than when younger, but the owner can never afford to neglect it at any time. We should not only cultivate to keep the grass and weeds down, but we should cultivate to hold the moisture. Holding the moisture is, in a sense, indirect irrigation. The larger the top, the larger the root system is correspondingly, and the greater need of moisture; therefore, cultivate while you are cutting and after you are done cutting, remembering that *this* summer growth is storing up strength for the next year's crop.

One of the best implements suitable for all purposes, with the green grass grower, is the Johnson Continental Disk Cultivator. It is a riding cultivator, with high wheels, and containing three eighteen-inch disks on each side; these can be reversed or set at any angle and at any depth, and it will do the work as set. It prevents this "gouging" into the "root bed" so common with the ordinary one-horse cultivator in the hands of a careless person.

After the cultivation has been ended for the year and the growing season over, and the asparagus tops commence to turn yellow after a heavy frost, then this summer growth should be cut down and *burned*. Many growers let the tops stand all winter, but this should not be done. We refer you to all works and bulletins on asparagus culture. These tops should be cut and burned while that part of top nearest the ground is still green; the reason for this we will mention when treating of diseases.

After the tops have been removed and burned and the land cleaned up so that it will afford no sheltering places for insects and diseases, many of our growers broadcast the land with stable manure as a protection against the winds and rains during the winter, where the soil is sandy and at the same time adding fertility to the soil which will be ready to meet the demands of the plants in the early spring.

Also an improvement is produced in the mechanical condition of the soil by the use of manure upon beds, by the addition of humus; sandy soils are made more binding and its ability to take up and retain moisture is thereby increased, while on the other hand, cold, heavy soils are made warmer and more porous. The asparagus grower must never lose sight of the moisture question.

The amount of manure used varies according to the required fertility of the land, from ten to fifteen tons per acre. In addition to the stable manure used, nearly all growers use commercial fertilizers in the spring as soon as it can be applied and the beds worked; the quantity depending whether stable manure was used in the fall and upon the age of the bed and the fertility of the soil. About one ton per acre is a fair average. Some apply the whole of it at one time, while others use the same amount in two applications, one early in the spring and the other in June, at the end of the cutting season. It is always applied broadcast. It might be stated here that many growers do not use any stable manure at any time, relying entirely upon commercial fertilizers. It matters not what method of fertilizing you adopt, you must remember that asparagus is a gross feeder, and to be successful you must fertilize heavily.

CUTTING AND MARKETING.

From well-grown, one-year-old plants, properly set in good rich soil, and properly cultivated, a light crop can be cut the following spring or at one year old. Many growers believe it does not do as much harm to the growing bed to cut it a few days as it does to let it grow up and bear seed to be blown over and torn up by the cultivator or eaten up by the bugs. The length of this cutting should be determined by the growth of the *grass*. While it keeps coming as free as the weather permits, we do not believe that the cutting is impairing its vitality, but as soon as you notice a falling off, when weather conditions should make it otherwise, stop at once. This rule will hold good in young beds of any age.

The length of the asparagus season was formerly from six to seven weeks, according to the date of the beginning; now it has lengthened to nine weeks and sometimes ten weeks, owing no doubt to the increased demand during the latter part of June. Many growers of green grass have successfully increased their crop and lengthened the cutting season, within the last few years, without impairing the longevity of their beds. This, no doubt, has been accomplished by improved methods of cultivation; by improved varieties and by increased fertilizing. It is not recommended that beds be cut the whole season of nine weeks until they are at least four years old.

In cutting green grass, the stalk is cut when it is from four inches to six inches above the surface and from three to four inches below the surface, according to the nature of the soil. The sandier the soil the deeper you cut, in order to find the necessary resistance from the land that will hold the stalk stiff enough to enable the asparagus knife to make a clean cut. At the beginning of the season the spears are cut long enough to measure eight inches in length, when bunched and trimmed for market, but after a few cuttings the weather grows warmer and the length increases to the nine and ten inch bunch. Most of the growers of green grass make three sizes, "extra fancy," primes and culls. Those having young beds should have but few culls; the older the bed the greater proportion of culls to the total product. This, however, differs with the different varieties, as well as does the *amount* of the total product.

During the cutting season the green grass grower keeps a low, broad ridge over the row of his older beds to enable him to have some depth of earth above the crowns to shield them from injury in cutting, otherwise the crowns would soon be at the surface and grow nothing but cull grass. This low ridge must be cultivated and renewed from time to time as it settles or is beaten down by the rains. A good way is to cut short grass on a Saturday and then put the ridger or cultivator on to renew the ridges, which will hold the grass over Sunday without cutting, and after another short cutting on Monday, put on a light weeder to make the low, broad ridge again. Many follow this method to avoid cutting on Sundays. In warm weather asparagus should be cut every day, and cut clean, or there will be loss in stalks that get too much top; especially is this the case on a Monday where the cutting has not been done on the preceding Sunday. To many growers the loss of a few bunches on a warm Sunday is nothing compared to a *day of rest*.

The cutting is mostly done with the ordinary chisel-shaped asparagus knife. The "fish-tailed" knife, while it works easier than the other, nips many spears with its sharp points before they appear at the surface, and causes them to die or become unfit for market.

The cutting of the asparagus, which is the most laborious work of the industry, is now mostly done by Italians, who contract by

the bunch or by the day, and they have proven very satisfactory after they are once taught to cut your way.

As before stated, nearly all of the green grass is grown near Philadelphia or Boston; therefore you would expect to find the best market for it in those cities. The asparagus rust has destroyed nearly 50 per cent. of the acreage near Boston, and that city now depends on South Jersey for its supply of green asparagus, and our growers find it one of our best markets, the price often starting at $10 per dozen bunches for the "extras." Some of our growers ship their best grades to Boston the entire season. Boston is a poor market for the poor grades of grass, and owing to the heavy transportation charges, it is not profitable. Boston will not use "white" grass at any price. During cool weather, when the asparagus is growing very slowly, and the grass is short and rather whitish, it is more profitable for the green grass grower to divert his shipments to New York or Philadelphia if he insists on cutting every day. Philadelphia will use some white grass, but the market is using less and less each year. Nearly all the rest of the Union grow and use white grass, with New York as its principal market. New York is using more and more of green grass each year, and pay a higher price for it than for the same grade of white grass.

The green grass growers of South Jersey use the asparagus crate for shipping, which holds two dozen bunches. These bunches are stood on the base end on damp moss, and will carry and keep fresh in moderate weather for several days.

This mode of packing and shipping grass is used even to our nearby market, Philadelphia. Growers believe it pays, because the dealers in the cities, who depend on New York or Philadelphia for their supplies of asparagus, will pay a better price for a package which they can re-ship to their homes and know that it will arrive in good condition. In other words, it extends our market and maintains the price by making it possible to ship it to interior cities which were out of reach before the use of the crate and the moss.

At the beginning you were told that green asparagus sold for a higher price per bunch than white. You were also told that the white grass grower should produce more bunches per acre than the green grass grower, and the reason was given, and it would seem at first thought that it was about as profitable to raise one as the

other. Now, if the green grass grower can produce as many bunches per acre per year, and get a higher price per bunch, then the advantage, from the dollar and cents standpoint, is in favor of the "green grass." It has been stated here to-day that 2,000 bunches of white grass per acre is a very good yield, but some green grass growers produce as much as 3,000 bunches per acre, 2,500 being a conservative average yield for some. This has been accomplished by selection, varieties, plants, &c., in order to get the same size in green grass that the white grass grower got by cutting under the ground. Again, some of the green grass growers believe a great many white grass stalks are destroyed in cutting, and being under the surface and out of sight, it is not known that they ever grow, while in cutting green grass, the cutting is done so near the surface that it takes less skill, and consequently less damage is done to the growing sprouts that are out of sight, and the harvesting of more bunches is the result, other conditions being equal.

Growers of white grass will no doubt agree that the reason just given is one of the causes why they do not get the crop that we do, and that this difference in crop is not entirely caused by our improved methods of cultivation or the improved varieties that we are now growing.

In the successful growing of asparagus, even after you have the proper variety and the crop, there is another thing about it in which many fail, that is, the proper *sorting* and *packing*. Many a good bed of asparagus has failed to bring the proper returns because its owner did not know how to properly sort and bunch his product to the best advantage and ship it in a proper condition. Grass carelessly packed for shipment, and packed in all *kinds* of packages, when sent to distant markets, often entails a serious loss in price, which sometimes amounts to all the profits.

Remember that the *yield* per acre and the *price* per bunch have a decided effect upon the profit and loss account. Without it we cannot be successful.

INSECTS.

Asparagus growers, like the growers of all other plants, have insects to fight. There are two kinds, the common asparagus bug and the twelve-spotted beetle. Of later years we have seen more of the last-named bug, and it is becoming very numerous and

does about the same damage that the common bug does. Both kinds do much damage to the growing spears of asparagus in the spring, often eating the tips or heads off, thereby making it unmarketable for the green grass grower. This fact makes many grow the white grass, which is cut before the bugs have a chance to damage it. In order to cut green grass these bugs must be kept down, either by picking off or by poison on hills left for that purpose, or by allowing chickens to roam over the beds. Chickens are very fond of these bugs and to those who have their beds so situated it is the easiest and best way to get rid of them. Where chickens cannot be used a good way is to leave hills at certain distances for the bugs to eat and keep them poisoned. Unless something is done to check the ravages of these bugs the green grass grower would soon lose all of his profits.

These bugs are very susceptible to sudden changes of the weather, and it often occurs that a sudden shower of cold rain, during a hot day, will kill off most of the bugs for that season, so far as the damage to cutting grass is concerned. Owing to this damage by the bugs the green grass grower must cut every day and cut clean, leaving nothing to grow up but those hills left for poison. The beds must be free from trash, clods of earth, or stones, or anything that these bugs can hide behind or under during the cool weather of the cutting season. The more things found in the beds for these bugs to shield themselves under the longer you will be bothered with them. These bugs are said to pass the winter in beetle state under any convenient shelter, such as fences, bark of cedar trees, &c., and for this reason it is very important on account of the bugs, as well as the rust, that the beds be cleared and all brush and trash of every kind be burned. This should be done as early in the fall as the season will permit. It is on account of this shelter for the bugs that it is not recommended to set an asparagus bed near a woods or where there are hedges along the fences. In the use of poison on the tops, the powder form, used clear or mixed with flour, sticks much better, even without a dew, than the spray does. The asparagus stalk, when young and green, is of a greasy nature and the spray gathers in drops and falls off. Of course, better and more effective work can be done with dry poison if dusted while a heavy dew is on the plants or tops.

The asparagus growers have not been able to exterminate the

asparagus bugs, but, like the potato bugs, they can be held in check if every grower would do his share of the work. This is of more importance to the green grass grower than to those who cut white grass. These bugs are found in greater numbers and do more damage on sandy soils than on heavy soils, and unless those growers cutting green grass pay more attention to keeping these beetles in check they will put them out of business, just the same as they have the growers on Long Island, North Jersey, and the South, where they say they are compelled to cut white grass owing to these bugs. The damage done by eating the marketable spears of asparagus in the early spring is not the only damage done by them. The injury done to growing young plants is greater than it appears, owing to the roots being weakened by having their tops devoured.

Few growers at present pay much attention to the beetles after the cutting season. They allow them to ravage the tops and multiply by millions. This is a mistake. The defoliation of the tops hinders the root and bud development necessary for another year's crop, and, if continued, saps its vitality and renders the bed a fit subject for that disease, the rust, which usually appears shortly after the bugs have reached their height.

THE RUST.

The rust is the asparagus grower's greatest enemy, for which there seems to be no known remedy. Old and young plants are affected alike. Some varieties resist the attacks of the rust much better than others. Among these are the Palmetto and the French Argenteuil. Some European writers claim that the Yellow Burgundy is almost rustproof, but this variety is not known in this part of the country by that name, if it is grown at all.

This disease is more serious during a drought and in dry situations, and is influenced to some extent as to the time of its appearance by weather conditions. The earlier in the season it appears the more injurious the disease is likely to be that year, and it is often two or three years after a severe attack before the plants entirely recover. Cutting, careful gathering and immediate burning of all asparagus brush as soon in the fall as the season will permit are duties that every asparagus grower owes to himself and to every other grower.

The growers of California provided a fund to investigate the asparagus rust, and in connection with the agricultural experiment station have been working on the subject for several years. The bulletins issued by them are probably the best authority that we have in this country on this disease, and should not only be read, but studied, by our growers if we hope to hold this dread disease in check, remembering that no remedy for its extermination has yet been found.

For the benefit of those who have not read the bulletins referred to, allow me to quote briefly from that part which refers to the *control* of the *rust*.

* "Thoroughness of cultivation in asparagus growing, including broadly all the operations of growing the crop, is of the greatest importance in handling the rust problem. This does not apply to any one method, treatment or application, but means that in general, in any State, and under any conditions, the careful, thorough cultivator has been least injured by the rust. So much is this true that the statement is freely made by the best growers in every Eastern section where the disease has flourished for a number of years, and practically exterminated all asparagus beds (of some varieties) in existence prior to 1896, that the rust has been a blessing in disguise, and that their profits on asparagus, even with a greatly diminished production, are greater than ever before. The difficulties which beset the growing of the crop have put a premium on the product and the careful attention necessary to produce it. Poor and indifferent growers have been forced out of the business, the best-taken-care-of fields have survived the longest, and their owners, by taking advantage of every opportunity to resist the destructive pest, have more than made up the direct loss.

"Clean cultivation and good care of the crop in every respect must be the *basis* of any *rust treatment*. Too often we see the asparagus fields, after cutting has ceased, abandoned to weeds, suffering for water, untouched by the cultivator, and utterly neglected just at a time when the disease makes its attack and when the plant needs every possible advantage which can be given it.

"The matter of burning the tops in the fall should be in general practice. Cutting and burning the rusty tops in summer, early enough to force a new growth, was first tried in the East, but as

* Cal. Exp. Station Bulletin 165, Ralph E. Smith.

the second growth rusts as badly as the first, more harm than good is sure to result. At the end of the season it is better to cut the stalks while the stems are still *green at the bottom,* as when perfectly dead from rust they (the stalks) decay down into the ground and eat out the crowns more rapidly. (See Figs. 29 and 30, on page 43.) Other details of ordinary matters of cultivation most favorable to producing good growth of top will suggest themselves to the practical asparagus grower, the aim here being to bring out more especially the adaptation of cultural practices to the life history of the fungus and hinder its development by such practical means.

"The grower who is looking for a *rust remedy* which will produce good asparagus without thorough cultivation and hard work will find little satisfaction in the results of this investigation."

With these words from the highest authority on the rust problem, we have covered the most important parts of the subject assigned us.

Now, we probably had better review just a little bit. To summarize, the first thing with asparagus is to get the proper variety; a kind that is of large size, is a good cropper, and resists rust.

The next is the selection of roots. Do not be imposed upon by nurserymen, because they cannot guarantee the varieties, and cannot furnish the proper sized roots. Get good large one-year-old roots, if possible. If they are not available get the seed and grow your own roots. Do not be induced to plant roots grown by anybody else other than a successful grower who is growing plants for his own use. And I would not sow seed unless I saved them myself from an asparagus bed of some reputation, or they were saved from such a bed by someone in whom I had every confidence and who thoroughly understood the business. I do not know whether I have made this as clear and as emphatic as I should. I cannot make it too strong.

Here lies the key to success—carefulness and judgment to start; then fertilizer and cultivation.

Select a sandy soil of fair fertility, sloping toward the southeast, with a clay sub-soil, free from stone and roots of trees, rubbish of all kinds, and hedges along the fences.

Plant two and one-half by five feet. In the growing of green grass we do not have to keep our rows as far apart as those who have to ridge for the white grass. I think it is almost the stand-

ard distance in our county, two and one-half by five, the rows five feet apart. We plant from six to eight inches deep. You may say that is pretty deep for green grass. So it is, but we have found that the deeper the grass is planted the stronger it grows and the larger it grows, and the longer we can keep it. If you notice, when your beds get older and get shallower, it runs out to top quickly, and if you have the crowns well down in the earth this is not the case.

We recommend from six to eight inches below the natural level, but the depth and distance will vary according to the variety planted, the variety of the land, and the kind you want to produce, whether white or green. Some varieties spread much faster than others. We do not believe in crowding. Give plenty of room for cultivation when the tops are large. Cultivation is the only thing recommended to check the rust. There is no known remedy for it. Cultivate all the time up until the first of September, and that is probably the best remedy known. Having plenty of room there is less liability of attacks from insects and diseases, and the roots have more room to grow out and gives the fertilizer a better chance to do its work, and there is less liability of it suffering from drought.

It is almost impossible to give any hard and fast rule that will work everywhere. Conditions vary so greatly. I believe everybody can successfully grow asparagus if they thoroughly understand the first principle of its culture and its nature as a plant. It is like everything else, its profitableness is governed in a great measure by the careful and intelligent attention which it receives.

In conclusion it is almost unnecessary for me to call your attention to the fact that the New Jersey farmer, with the competition he meets from the South, by reason of its earliness, and from the West, by reason of its productiveness, he is only permitted to live on the face of the earth by the grace of God, and if he expects to get rich he must bring every motion to an exactness, every method to a science, and his only salvation may be in the cultivation of asparagus, because nature has given him the soil and the climate, and by his location he has got the greatest markets of the nation within the reach of his hand.

A motion was made and carried that a vote of thanks be given Messrs. Ridgway and Hulsart for these excellent papers.

Alfalfa Production and Silo Building.

Mr. Joseph E. Wing, of Mechanicsburg, Ohio, delivered an interesting address on "Alfalfa Production and Silo Building."

He said in part: I am going to start right in with alfalfa and tell what little I know about it. Some of you men who haven't faith in the farm—but those men are not here—to them I will say, "it is because you never rubbed the mud of it on you." I believed in the field when I began to work with it, the water ran away, and the land began to get dry, and then one day I stood there and dreamed a dream. I watched it get dry, and I said: "Old field, I made part of you dry; some day I will make all of you dry; some day, old field, I will make you rich and cover you with clover and grass and alfalfa; and some day, old field, I will make a home grow out of you for that sweetheart of mine." And I looked at my watch—five o'clock—time to see my sweetheart, and I took off my overalls and went across the fields to see her, and I was as happy as a king.

I brought home that year four bags of alfalfa seed. Father said, "Where do you want to sow so much seed?" I said, "In this old corn field." "No," he said, "that's too much for one trial; I'll let you have that potato patch, there you can put it." That potato patch had just one-third of an acre. Father had turned the farm over to me, but that is the way fathers usually turn it over.

That potato patch happened to be a good place, however, because it was underlaid with limestone gravel, and the cattle had stood there a good deal; it happened to be part of an old orchard, and the alfalfa grew there very well in that first one-third of an acre. I had a trail beaten to it, going back and forth watching it grow. How beautifully it grew. "Some day," I dreamed, "I will cover the whole farm with alfalfa."

Well, we didn't get so very much hay the first year, but we got good encouragement, and so the next year I sowed three acres more, and this taught me a lesson that I needed to know. The land sloped down to the creek and then came over a dry gravelly place, and then sloped way back to a flat place that was poor and cold, and down near the creek where the water was only about a

foot from the top of the ground, or eighteen inches, there the alfalfa soon died out. And on the dry land where the land was rich and dry and full of lime, it grew fine, and I noted that back where it was poor and wet it didn't grow. Then I scratched my head again. I said, "I see I've got something to do; I will drain this wet land, and I will enrich this poor land." Most farms need manure, and ours needed it especially, and I started in to get it. You need manure to make alfalfa grow, and I had started in with the determination to make an alfalfa farm of ours. I was not thinking then about money, I was planning to make alfalfa grow.

I borrowed a little money, borrowed $200, to get married on—the best investment I ever made. (Laughter.)

I was determined to make an alfalfa farm of ours, a little spot of alfalfa in the world, but where was I going to get the manure. At the village, a mile and a half away, they had manure to sell, at twenty-five cents a load, and as soon as I got my corn harvested I made myself one of Mr. Terry's wagon boxes, seven feet wide across the top, and I took one good team of horses and went after manure, and I sometimes put three or four loads of manure on at one time, and came home in spite of the sarcastic remarks of the man who asked me why I left his corn crib or anything else movable. (Laughter.)

And I used to be very happy coming home on that big load of manure, thinking of the old field, and when I had spread that load one spot would be just as good as Utah. Yet I found some curious things happening as I stood on those loads of manure, some things which I don't believe Professor Voorhees can explain, and this is one of them: This road went down past our farm and went into the part of the country where farms are wide and rich, wealthy men lived, and where they had beautiful homes and lived in a nice way, a way in which I had never been rich enough to live. And they had beautiful girls down there, and those girls had been to college, and read good books, and some even had been to Europe. I knew some of those girls and liked them and they liked me (laughter) when I had my good clothes on, but, friends, I used to meet them when I was standing on that load of manure. That didn't make any difference to me at first. I remember the first time it happened. This girl had black hair and rosy cheeks

and bright eyes. She came driving her nice horse and shining carriage, and I stood on the load of manure. I hadn't seen her for a week or two, and I thought, "Now, I will turn out so as to give her a chance to pass me when she came close enough, and when she sees me I will give her my nicest bow and a smile," and when she came within two or three rods there seemed to go out from that load of manure some sort of an emanation that struck that poor girl with blindness; she could not see me at all and drove right on by me. (Laughter.)

At first I could not believe it possible that that had happened, but she had really gone. Then when she was gone I talked to her—oh, what good things you can say when the other fellow is gone. I remember what I said. "Young woman," I said, "you have been to college; you have read good books, and I have never had time; you have even traveled in Europe; is it possible that you are still so ignorant that you don't know the virtue and value and beauty, too, contained in a load of manure? Is it nothing to you that this load of manure that to you smells vile, but to me smells of clover blooms; that I will spread this on that poor, thin grass, and some day I will cover that land with beautiful clover and corn; yes, and with alfalfa, too; yes, young woman, some day out of that old field I will grow a home for some other girl, a little better than you are, too." (Laughter.)

And friends, it all came true, all came true, because the old field that I had enriched after I had made it dry was richer than ever I thought it would be, and the crops were better than I ever thought would grow out of that old field, and the home that grew out of the soil was better than I ever thought I would have, and the sweetheart is my wife now, and she is sweeter as a wife than she was as a sweetheart.

And I am telling you some of these stories, not for you old men, but for some of these boys (laughter), because I want to say to the boys, "Give me the boy who dreams; oh, the boy who dreams, he is the boy who will get along. Let him dream, and then get behind his muscle and push, and the dreams will come true." But I want to hurry on and tell you about alfalfa.

I presently discovered that hauling manure from town, while a help, would not solve the problem till we had reformed our practices. We were selling our crops, selling timothy hay and wheat.

I said, "If I make this farm good I must feed on the land what we grow on the land. What do I want to feed? I have got to feed a baby of some sort, now what sort will I feed? Then I said, "Why, here is the lamb; I can put him in the barn and keep the manure there and have more manure." So I bought that year 200 little lambs, and bought something to feed them with—didn't have enough good lamb hay on the farm. And I fed them every feed that winter with my own hands. Do you know, I never had as good luck as with the first 200? A greenhorn for luck, but it was not luck, it was carefulness. They weighed fifty-five pounds when they went in in October, and they weighed 108½ when they came out in May, and when I sold them, besides having a big pile of manure, I had a clear profit of $115.

Then I dreamed another dream out on the sunny side of the barn. I said, "Some day I will feed a thousand lambs on this farm." But I told this to no one, not even my wife. Every one would have laughed, for we had bought part of the feed for that 200. But I put the manure on the hill and raised more alfalfa and put more hay in the barn, and the next year I fed 300 lambs, and then 350, and then 400, and then 500, and then 600, and then 700 and then 1,000, and there are about 1,600 on the farm to-day, sheep and lambs, and to-day I could feed on that farm with alfalfa grown there and the corn that grows after the alfalfa more than 2,000, and have corn and hay left over in the spring. The farm has done that. That is why, friends, I believe in alfalfa. The farm is a little bigger than it was then; there are 320 instead of 200 acres now. The alfalfa has put the line fences back a little. There was a debt on that farm once, and the alfalfa took the debt off; it built us a new home. One old lame darkey and my father did all the work on that farm, and now we work six married men the year around, and two brothers live on the farm, and each has his own home, and the alfalfa has done the whole thing. Last year we broke up ninety acres of alfalfa sod. It had gotten a little old, and the roots hadn't all survived. Part of the land had been in alfalfa eight years and some six. Well, we planted corn there. The soil after alfalfa is so loose it don't get hard. We had high hopes, and we planted that ninety acres to corn. Of course, we tilled the corn well and tried to make it do its best, and it made almost 9,000 bushels of shelled corn. Fifty acres in one block on

the land we had worked on for some years before. We put a little more tilling in and more phosphate on the alfalfa at various times to help it grow, and the fifty acres amounted to a little more than 5,000 bushels of shelled corn, which I think was pretty good for an old farm in Ohio, and instead of producing $800 a year income, it produces nearer now to $8,000. That is what alfalfa has done. Do you wonder I believe in it and tell people about it?

What are the principal difficulties in the growing of alfalfa? Everywhere I go I find men growing it, but more men who are failing to grow it, and I have met men who have tried and tried, and can't make it grow.

What are the essential things in growing alfalfa? They are very few. It is just as easy to grow alfalfa successfully as it is to get your wife or sweetheart in love with you, and it depends exactly upon the same principles. You have got to do some essential things. They are little things, and easy, but they have got to be done at the right time and in the right way. I have had experience in both of these lines.

First, the water has got to be gotten out of the soil. You don't want any water nearer than three feet from the top of the ground. Dig post-holes over the field and watch them during wet times, and if you don't find water, that is all right. Down in Maryland, where I have been, I found men growing alfalfa where there was water near the surface, but it was not as good, and would not last so long. We lay our tile drains three or four feet deep, and close together enough to drain the land well. Alfalfa wants dry land. That is the first thing. What next?

The next thing is land with lots of carbonate of lime. That is the foundation stone of alfalfa growing, and I have never seen any place where there is plenty of carbonate of lime where they have any difficulty, and in Utah and Montana and Colorado, where it grows so easily, the land has in it from 1 to 5 per cent. of carbonate of lime. How much is 1 per cent. of carbonate of lime in the top foot of soil? There are about 2,000 tons of soil in the top foot of an acre. One per cent. means twenty tons to the acre, and 5 per cent. would mean 100 tons. That is the amount naturally found in the soils that grow alfalfa like weeds.

I don't know how much carbonate of lime there is in our own soil. I have never had it analyzed. On certain hills of those fields

I can sit on the ground and fill my pockets with limestone pebbles that were put there by the glaciers, and those hills never grow old, and the alfalfa on those hills is always good. It would last twenty, thirty or forty years. But on the lowlands, where lime is not so abundant in the soil, the alfalfa don't last so long. Right to-day we are putting on a lot of carbonate of lime on certain fields where the visible lime-supply is down about two feet below the top soil. We find it pays to put on more carbonate of lime.

First, then, drainage, and next, carbonate of lime. In Maryland yesterday a gentleman who is growing alfalfa there successfully by the aid of lime, asked me, "How much lime shall I put on the soil for alfalfa?" He said, "I am going to put on stone lime, burned lime." I said, "I would put on at least two tons." "Oh, heavens," he said, "two tons to the acre, that would ruin any land in Maryland." I figured it out. There are 2,000 tons of soil in an acre, the top foot, roughly speaking, and two tons would be one in 1,000, one pound in 1,000 pounds. If I gave you two tons of soil and then gave you burned lime, and I said, "Sweeten that two tons of soil," why, you would not put in less than two pounds to the ton of soil; there is no danger in that. I like the carbonate of lime, the ground limestone, better than burned lime, and I have had wonderful results with it. It has been my good fortune to help a good many people grow alfalfa. Near Philadelphia a gentleman had tried unsuccessfully, with a good deal of patience, to grow alfalfa for some years. I had led him or misled him in his efforts. I finally wrote him, "What is your well water, hard or soft?" "Beautifully soft," he said, and then I said, "You want eight tons of carbonate of lime to the acre." He balked, and I had to figure out on a piece of paper how well it would pay him. I said, "If you think eight tons to the acre is too much, then put 100 pounds to the square rod and try it with that," and he finally agreed to do this. I didn't get any more word from him for two years, and I finally wrote him and said, "I've got a bill against you for $25, but the bill will be receipted, without any remittance, if you will tell me how your alfalfa came out." "Well," he said, "Mr. Wing, I didn't write to you any more because I didn't have any more trouble." He said, "I didn't put on as much lime as you told me, either; I only put on six tons to the acre, and the first year I got four tons of hay to the acre, and this year I am going

to get eight." I don't think he did get eight tons, but, anyway, you see how enthusiastic he was.

A gentleman wrote me from California. He said, "I want to know about the soil of Virginia for alfalfa culture?" I replied, "Alfalfa culture is possible in Virginia, but you had better see the land first." So he came down to Virginia and bought some land for the purpose of cultivating alfalfa. This man is very wealthy, and lives near Los Angeles. He never lived in the East, always lived in the West, and is a man of great affairs. He owned a lot of land in San Diego county, I think, that he had no water for, so he went to buy water for it. They said, "Yes, Mr. Jack—that's his name—you can have water for this land, but we will ask you $40,000." He said, "That is pretty big, but I am willing to pay you that; is that all?" "No," they said; "we want $800 a year for the maintaining of the ditches." He said, "I won't do that," so he hasn't got the water yet.

Then he said, "Here they ask me $40,000 to water this little piece of land, only 1,000 acres, and then they want $800 a year for water. What is the matter with those Eastern fellows? We are an irrigating country, why haven't they got a very great advantage over us, for God makes it rain for them. I have a notion to investigate and see why they haven't got us beat to death; and they are close to the market." Then he went to Virginia and bought 1,700 acres on the Rappahannock river. Part of this was the place where President Madison was born—of course, that might never happen again. (Laughter.)

Then he bought the land, went to Washington to get the advice of some experts there. He found a man named Schmitz, who is a thoroughly good man, and he said, "Mr. Schmitz, I have some land that is on the Rappahannock river; will alfalfa grow there?" "Yes," he said, "it will grow very well." "I am coming here from the West, and I want to grow some alfalfa; will you help me?" He said, "Certainly; how much do you want to sow?" He said, "I want to sow 1,000 acres." The man fell over backwards. He recovered himself, and he said, "My dear Mr. Jack, don't do that; let me beg of you." "Why not," he asked. Said the man, "Your failure will just be so colossal that you will set back the alfalfa growth forty years." Said Mr. Jack, "I don't understand; you tell me it will grow, and then you tell me not to sow it; in the

first place, I don't want to sow 1,000 acres at the start; I want to sow a 150-acre field now; I want you to help me sow that; you tell me it will grow." "Yes, but mind you, that land must have lime." "Lime? That is what Wing told me; how much?" "For your 150 acres you ought to have 400 tons of lime." "All right, what next?" "Next, you have got to have bone; you ought to put on that land 600 pounds of bone to the acre." "All right." "The next thing you've got to have is some humus." "What is that; we don't have that in California." "Humus is vegetable matter, and you are so far from manure, I guess you will have to grow it." "Well, how?" "If you really mean business, you put on your lime and sow that land with crimson clover, and put some of your bone on the crimson clover; next summer turn under the crimson clover and work the land down well and sow the alfalfa alone, with inoculation." He did this, and succeeded. Why? That is the way of the Californian. He is used to doing things, and likes to do things, and out of 150 acres he got just 150 acres of splendid alfalfa. Mr. Jack had to be shown—he was not from Missouri—but still he had to be shown. He didn't know about lime and all these things being necessary, so he left a strip of thirty feet wide without any lime. He said, "This bone, too; I want to know whether that is necessary." So he left another strip without any bone. Now, where he didn't put any lime he got no alfalfa—nothing but weeds and grass, but where he didn't put any bone, but had put the lime, he got a pretty good stand; it was a healthy baby, but he hadn't fed it, and where he didn't put any bone or lime either, he got nothing, and then he believed that his land needed both bone and lime.

Last year he sowed 160 acres more alfalfa, and is going on until he has 1,000 acres. He cut about 400 tons of salable alfalfa hay, and he is going to get for it about $15 per ton.

Another curious feature—I am only telling stories, and I am sorry the stenographer is taking it all down—another curious feature about Jack—I saw him last fall, and I had been studying him—I am always studying men, and women, too—and I said, "Mr. Jack, I want to ask you a question." "All right." "I would like to know why you are doing all this thing." "Why, Mr. Wing, is it so remarkable that I should be doing this thing?" I said, "I have been thinking it over; you and your associates own over a

million acres in California and old Mexico." "Yes." "And they are awfully rich lands." He said, "Yes." "Then you have all this string of other businesses under your charge." "Yes," he said. I said, "Do you need any more money?" "No, I don't know as I do." "Why are you doing this thing, then; you have got plenty of cares in California." He said, "No, I haven't any cares; I have a way of launching a business and selecting a good man, and I trust that man, and it does not make any more care; all my enterprises are in the hands of men that I trust, and I get along all right. You want to know why I am doing this? I don't know; I guess it is partly because a man gets into the habit of doing things, and I like to get out and do things; I told you how I got to wondering if God hadn't done more for the Eastern fellow than the Western, and then I saw that the Virginia people, while they were so fine and courteous, and many highly educated, yet they were so discouraged, and the boys were leaving the farms and going to town, and I just happened to think, 'Here, Jack, why don't you put down here 1,000 acres of alfalfa, and let them look at that, and see if that would not give them some new courage,' and I am doing that, and I am getting more fun out of this thing than anything else I have ever done in my life."

I ought to give you some practical talk on alfalfa culture, and I will tell you why I haven't—because I think Professor Voorhees here has done more for alfalfa culture than any other man that ever lived in the East, and he knows more about it than I do. (Applause.)

He knows more about it than I do, and you make no mistake when you write him. Every man of you can grow alfalfa. A man said the other day in Connecticut, "Wing, why all this strenuousness? If I can grow red clover and grow it easily, and can't grow alfalfa, why should I try to grow it?" I said, "Man, can't you see that as long as you can't grow alfalfa, that there is something the matter with your soil, and don't you know if alfalfa will grow there, anything else will grow there, except, possibly, wheat—the soil might be too rich for that. If a man has once got the land conquered then anything else will grow."

Just a word about inoculation. Everything has to be inoculated, I am trying to inoculate you with the alfalfa germ. A great deal of the failure comes from not having the alfalfa germ in the soil,

and a great deal of the failure has come because we have bought the germ from the factory that is supposed to make them. I don't suppose these germ factories are run by the Germans; if there had been German employes in this germ factory there would have been no trouble, but they were not, and even in Washington the germs don't work up the right way. To inoculate alfalfa is to get soil from an alfalfa field. Get it at night if you can't get it any other way. (Laughter.)

And you don't need so much soil as we used to think. Professor Voorhees, I am teaching them this: Sow 100 pounds of soil mixed with twenty pounds of seed. Germs are very small things; 100 pounds of soil to twenty of seed will inoculate an acre of ground just as well, provided you get the right soil. Don't dig it too deep, not more than eight inches, and if you take it from a neighbor's field, for goodness sake, take back some good soil and put in its place.

I presume that you heard that the fall seeding is safer than spring seeding; with me spring seeding is best. If you would like to know, I will tell you how we sow alfalfa on Woodland farm.

First, the land is limed, unless it has plenty of lime already in it, then much manure is put on the ground, and the land is planted with corn. We cultivate it so thoroughly that there are no weeds or grass, and that is one reason why we get 100 bushels to the acre. It is good seed—if I had two or three days to talk about seed corn, I could give you something about that. Then the corn is kept clean; there is no fox-tail grass in it. Fox-tail grass can be eradicated very easily, for the reason that the seed does not lay in the ground. Pigeon grass you call it. If it is kept clean, next year you don't find any pigeon grass. We keep this clean in order to get better alfalfa. We plow that ground in the fall and winter. It is being plowed now, and plowed just as deep as we can go, if we plow it for alfalfa; I would not plow so deep for other crops. If I can I throw up two inches of soil that has never been thrown up before, then we work the ground down to fairly good seed bed, in the middle of April and we sow alfalfa. Mind you, on our farm we don't have to inoculate any more by the use of alfalfa soil; we have the alfalfa bacteria all over the farm. We used about twenty pounds to the acre, and at the same time on our soil we always sow a bushel or two bushel of beardless

spring barley; that is to discourage the weeds and while inoculation is taking place. Then we leave the ground perfectly smooth with a plank drag so that a mower can run over it. We cut that barley for hay while it is just coming into head, before it gets any grain in it. If it should lodge I cut it next day or it will smother out the alfalfa. The alfalfa comes up and we cut a crop of hay off of it in August, and then we cut no more that year. We leave the last growth, a foot tall, stand to protect the roots. One thing I must not forget, and that is a most essential thing, the time to cut alfalfa. Many fields of alfalfa have been ruined, all over the country, just because men didn't know when to cut it; they killed it by cutting at the wrong time. When we are ready to cut it, we get down, first, on our knees in the alfalfa field, and I am always willing to get down on my knees in an alfalfa field—that is serious, you just feel overwhelmed with gratitude toward Almighty God for what He has done for you. Merely the beauty of it, and the richness of it to feed the animals. I get on my knees and I part the stems and I look to see whether there are little shoots that are coming down by the crowns to make new growth, and if they are there then it is ready to cut. If there are no new shoots, don't cut it. If you were to cut it before those shoots come out you would certainly stunt it and might kill it. As soon as the shoots come then it wants to be cut and made into hay.

I am put down here for a talk on silo building. There is only one way to do it. It should be made of concrete, with walls four to five inches thick, as high as you want it, and they should be always coated carefully inside with hot pitch.

Sometimes I am asked whether alfalfa will grow in sandy land. It will, but it requires more carbonate of lime. A man will get a good stand of alfalfa that will look very nice and the next year it all dies. What do you think killed it? Every alfalfa root sends out a little emanation; that is poison to the plant, but if their is plenty of lime in the soil that counteracts it, but if it is deficient in lime sometimes a whole field will go.

On motion, a vote of thanks was extended to Mr. Wing for his interesting and valuable address.

Milk Production in Its Relation to the Producer and the Consumer.

Mr. Harry B. Winters, of Smithboro, New York, read an interesting paper on the subject of "Milk Production in its Relation to the Producer and Consumer." Mr. Winters said:

The rapid growth of New York City makes it necessary for the milk dealers in that city to reach further and further into the country for its supply. Some New York dealers are buying cream in Ohio to-day. An increase in the death rate among children caused by poor milk, made it necessary for the physicians in New York City to take some steps in order to improve the quality of milk. Therefore, the milk commissions of the medical societies of the county of New York and of the county of Kings were organized, and, in fact, a large number of medical societies scattered throughout the country now have milk commissions. These bodies of men have done splendid work, and much credit is also due to such clean milk pioneers as H. B. Gurler, Stephen Francisco and the Walker-Gordon laboratories.

If you are producing milk going into New York City you need not be surprised, and you probably have had this happen, to see an inspector from the New York Board of Health come into your place, ask the privilege of looking around, a privilege which I understand you are not compelled to grant, but if you do not co-operate with them they have the power to shut your milk out of the city of New York.

Now let's look for a few minutes what these men require and demand. In the first place they say, "We must have milk from clean cows." Probably most of the men in this room can remember, not very long ago, in driving along the road seeing cows so dirty that the manure formed in patches on their flanks, these patches often becoming so heavy that they came off, taking the hair with them, many times causing a flow of blood. No matter whether we are guilty or not of this sort of thing, all know that good milk, clean milk, cannot come from that kind of a cow.

They are demanding well-lighted stables, stables where you can see the dirt, if it exists, in every corner. How different from that type of barn where it was necessary to grope your way even in

the daytime, where there wasn't a single pane of glass. They are also demanding good ventilation. To my mind the King system is the best we have found. I regard the large King shafts, built as near like a chimney as possible, except the fireproof construction is not necessary, as almost essential. These ventilators should run from about eighteen inches of the floor and above the peak of the roof. Perhaps it is best to run say, a two by four post in each corner up above the solid woodwork and put a cap on the top, leaving a clear passageway for the air. It is of the utmost importance that these ventilators should be perfectly tight. For intakes, the muslin curtain is good, but they must be kept clean. There is no doubt, however, that the King intake is an excellent one.

The board of health recommends cement floors. I believe that they are the most economical and easiest to keep clean. It has been claimed that they are cold, but my experience is that they are as warm as the room they are in. We are now required to keep the manure away from our barns so that the cows cannot get into it. I believe this is just and fair.

I remember attending an auction sale on a beautiful farm which had just been sold for a large price. It was impossible to get around this barnyard and see the cattle without rubber boots on, and there were places that you couldn't go with rubber boots on. Cattle wallow through this manure and it is impossible to make good clean milk under such circumstances.

Tight and clean ceilings are necessary. I believe that a smooth surface ceiling saves enough labor to pay the cost. It is an economical proposition, and it will cost you more money in ten years' time to properly clean and whitewash a ceiling where the beams are left exposed than it will to go to the first greater cost and put in a proper ceiling. We are required to whitewash twice a year. I believe it would be even better to paint and wash down frequently. Our experience is that whitewash scales off easily and is not very durable. In our milk room we discontinued using whitewash and began with cold water paints, but we are now using Aridos, which has the appearance of enamel, withstands moisture, and is giving splendid satisfaction.

They say we must have a milk room which must be used for milk only and kept scrupulously clean. The certified producers are also required to have a sterilizer, and up-to-date apparatus for handling milk quickly and to the best advantage.

Clean milkers are absolutely necessary, men with better ideas of cleanliness and better pay. They must be free from disease.

Cool the milk quickly and use plenty of ice. Grade your barnyards, and after they are graded I like to see a top dressing of cinders. They are not heavy to draw and wear well. Gravel may be just as good, but it is heavier, and I think requires more labor.

I like a moderate use of disinfectants in stables, both the wet and dry forms. I prefer the tar bi-products. Keep down the germs. There are some places where the dry disinfectant is better than the wet. Sawdust or shavings seem to be about as good bedding as we have found; they carry very little dust and are giving good satisfaction. Dust is one of the great enemies of clean milk. We must sprinkle our stables long enough before milking to settle all the dust possible. Dry disinfectant is very good for lice on cattle; they can be very easily kept down by this dry powder, and in your calf pen, where you don't want moisture, where you want everything as dry as you can get it, dry disinfectant is to be recommended.

I have sometimes thought that if we could turn jets of steam into our stables it would be an excellent idea to settle dust. The bacteria which sours milk and causes so much trouble is largely carried in these fine particles of dust, and they get into this milk so easily, and there is nothing alarming about the looks of them, which makes them all the more dangerous.

Feed everything after milking. You must feed silage after milking, because if you don't it will cause an odor in your milk. In our work we don't believe that we can feed safely for the best possible results more than thirty pounds of silage a day. You need to use a great deal of care. Hay must be fed after milking; perhaps it is not so important to feed the grain, but if you are working for a very high class product, I think you could improve it a little by feeding the grain after the milking.

The small top pail is to be recommended. I know of no other way that will increase the quality and cleanliness of milk at so little cost as the small top pail; it is all nonsense to think that they are difficult to use. The man who claims he cannot milk into a small top pail will generally be able to send a stream of milk into a cat's mouth every time. (Laughter.)

A damp towel carried in your pocket is also an excellent idea for wiping off the cow just before you start to milk. I like the

individual towels better than the roller towel. If you use the roller type you are very sure to have some man in the stable who will wash himself on the towel instead of in the wash bowl, and that fellow will never own it; he will always lay it on somebody else. Individual responsibility in a dairy barn is to be worked for every time, so that you can place the fault just where it belongs. The individual towel, the numbering of milk suits, and the numbering of the coats and caps, &c., will tell you in a year or so the man that is careless and the man that is careful, and every man can tell which is his coat and towel.

Change your strainer often. Remember you cannot get clean milk with a dirty strainer. Mr. Stewart, who has made such a remarkable record, changes his strainer for every cow, and if that strainer shows any dirt the milk from that cow is discarded. Mr. Stewart is getting fourteen cents for his milk and can afford to do many things I cannot. We get seven and a half, but we change our strainer for every forty quarts.

You are required to get your milk from a healthy cow; that is reasonable, and I think adds to your own profit. Milk from gargety animals, and milk carrying pus, is dangerous, certainly more dangerous than most of us realize.

Then we come to that great problem, tuberculosis. I will have to admit that after five or six years' experience with this problem that on the whole we are satisfied. I firmly believe that our herd is worth more money to-day than it would have been if we hadn't used the tuberculin test, and we have had some sad experiences, selling bulls worth $500 for $44 for beef.

It sometimes shakes our faith, but after you get gradually satisfied, after feeling that your herd is becoming freer from disease all the time, you feel better, and I sometimes believe that you can see the results in the milk-pail.

So, as a farmer without scientific training, with no feeling other than gratitude for what the scientific man has done for me, I will stand before you and say I believe the tuberculin test is a good thing for the farmer. Taking all the cattle that have been condemned from our farm and putting them into one bunch, those cattle as a herd would not produce a profit of any great degree. Although there is one once in awhile you would not want to sell for less than $200 or $300, yet those are the exceptions. As a general rule, the tuberculous animal is on the ragged edge between profit and loss.

Now, the question is, Is this standard unreasonable? This standard of the New York Board of Health and the standard set by the average medical commission? I say, from a standpoint of clean milk, No, a thousand times no. From the standpoint of present prices, I say, Yes, a thousand times yes.

I believe that if those rules were enforced the milk would not be any too good, but those rules never could be enforced with the present price of milk—never in the world.

I can take you to a farm which was bought for $16,500. The buildings are practically in ruins. The barnyard is largely a pond. There are no glass windows in these stables. The hay is put on poles over the cows. Tuberculous cattle have been purchased in that herd with the knowledge that they were tuberculous. The owner won't improve. The tenant cannot improve. This milk has been taken to the creamery and mixed with good milk, and if you bought the milk from that creamery there was no way of knowing whether it came from this farm or not. Milk produced on this kind of a farm never ought to be sold, and I am glad to say its owner has been forced to make some improvements, but even today I believe that the milk from that farm is dangerous food. No wonder the board of health send their inspectors into the country, but what encouragement had the owner? What could the tenant do when he was simply struggling for an existence?

Milk during the past year has netted the farmer three cents a quart for the year in New York State. I don't believe that milk can be produced at a profit under the rules that I have tried to lay down to you for less than four cents per quart during the six summer months and five cents per quart during the six winter months. From what I know about the conditions of the retail milk business in New York, it seems to me that it would be better for the farmer if milk were retailed for eight cents for the six summer months and ten cents for the six winter months. Ordinary market milk can be produced cheaper in the summer time than it can in the winter time. The production of certified milk is a little different. The demand is not so good in the summer time, and the cost of production is not changed to any extent, so to certified producers I believe the same price should be maintained the year around. I believe most of the certified milk is bringing seven and one-half cents wholesale and retailing for fifteen cents.

It seems to me that on carefully run farms there is a fair

margin at this price, but I am convinced that there are plenty of places where it costs more than seven and one-half cents to produce a quart of certified milk.

I hope the public becomes more interested in this problem and knows what good milk is. They certainly do not know. If the public would realize, if the man with his small child would realize, and see some of these places that I have tried to describe to you, places where these bad conditions exist, they certainly would be more careful in the purchase of their milk, and not be frightened when the dealer asks them a little more money.

But the price is not all. Economic production must be studied. Home grown fodders, such as silage and hay, should receive a great deal of attention. Corn silage is our cheapest dairy feed; clover hay and mixed grasses come next.

We raise corn and we put that corn in the silo when it is matured, and at the time when it makes the best, sweetest possible ensilage; we want to feed that the year around except practically a month or so. There is not over a month or so with us when we can depend upon the pasture.

Now in some years we find it necessary to empty the silo practically the day we turn to grass. What shall we do; how shall we carry these cows over the month of August and early September? The best method we have found is to cut clover hay with a mower, throw it on the hay rack with a hay ladder, and one man pitching to the cutter and one man in the silo. This makes moist ensilage and will carry the cattle during this bad season with a good flow of milk. But on a breeding farm we want the clover hay for the calves and young cattle, and we hate to spare so much, so we have put a little timothy hay in the silo, but here you must proceed with caution. Timothy hay does not carry the water that clover does, so you will have to stop putting in the silo at noon-time, as it gets too dry in the afternoon. Leave the fodder cutter here after you get about enough to carry you through. If you have some rainy weather come on and you get wet hay you can put that wet hay into the silo and feed it out to advantage.

You can put sunflowers into the silo and with pretty good results. We are not doing it now because they grow very large and they are hard on the corn harvester and hard on the men, heavy to handle, and cause a good deal of hand work. But if you want a large amount of forage on a small piece of ground sunflowers will help you do it.

Next to the silo I like hay for the dairy cow, and this hay problem is one worthy of a great deal of attention. I know in our case we haven't been paying half enough attention to the growing of grass. Of course, we like clover hay first, and the first place for our manure is on the clover seeding. Sometimes in a wet fall it is pretty hard to get it on this new seeding, but you can do it. We don't think there is any place on our farm where we can get so much value out of a load of manure as we can in this way.

And remember, too, when you get a large growth of clover in a field, that you are probably making it richer than it was before, and this is not true in growing timothy, and it is not true in growing corn. You take a large crop of corn off a piece of ground and you take away a great deal of the fertility.

Next to the clover we like mixed hay. Our mixture now is eight quarts of timothy, six quarts of clover and two quarts of alsike. The alsike makes a better cow food than the timothy and it keeps the timothy from growing too coarse.

Next to the clover seeding we like manure on the mixed hay meadows. Years ago the manure all went on the corn ground. Now we like to top dress the new seeding and the meadows first, and then if we have got any to spare it goes on the corn crop; but we find we can raise good corn if we plow under good sod and cultivate and harrow thoroughly.

Next to the silo and the grass comes the grain, and that is one of the problems for the dairy farmer. The best rule we have ever found is a pound of grain for three pounds of milk. Our practice is to follow out this rule absolutely, and the herdsmen in order to vary from that rule, must come in the office and get a special permit.

Cows giving nine pounds milk daily, get only three pounds grain daily. Cows giving sixty pounds milk daily, get twenty pounds grain daily, if she will eat it. As a rule the cow with large milk capacity has a large capacity for grain.

But in feeding this large amount of grain it is necessary, we think, to proceed with some caution. We are using bran, gluten, oil meal, cottonseed meal, hominy and dried distillers' grains. Gluten is a good food, reasonable in price. Oil meal is worth the money. It is a very safe food, and I would not want to go without it. Cottonseed meal, we think, we have to proceed with a great deal of caution, and as a rule don't like to put more than one pound in ten of our ration.

Hominy is safe, but is a little high in price. If you are feeding high, hominy is very good.

Dried distillers' grains is a good cheap food, and I think if there are men here who are not using dried distillers' grains they can increase their flow and profits by doing so.

I would milk a fresh cow more than twice a day. You will find that your udder difficulties will disappear with frequent milking. That is one of the reasons we started this practice, because we found from time to time that some of the most valuable animals were losing a quarter now and then, so we began to milk more than twice a day. I would not necessarily advise you to use our practice, which is four times daily.

There are a hundred head of cattle on our dairy farm, and we keep a night watchman. If you milk four times, two of those milkings come at the regular milking time. The day men take care of the milk in the daytime and the night watchman does it at night-time, but I thoroughly believe that the average farmer can well afford to milk his large milkers the first thing before breakfast, milk them at noontime and milk them after supper. I think it is a good thing. You will be surprised how great a profit you can get from those fresh animals which are giving large flows of milk.

No matter how well you treat your cow, you will sometimes find, and too frequently, I am afraid, some cows that don't make you any money. I believe the cow that gives eighty-five pounds of milk a week makes no money. No matter how many you have, you can't make a profit on that type. I wish every man in this room would weigh the milk from his cows and put every cow that gives less than eighty-five pounds of milk in a week on a list by itself. Find out how long before it freshens, how much it will cost you to take them to the time they will freshen, and how much they are worth when they are fresh. If they are worth the price, keep them, but remember that there is no profit in a 4,000 pounds per year cow. In the weeding out process, move slowly and with good judgment. Remember that if you sell one every week, you will sell fifty-two in a year; better to sell one at a time, and be sure that one is unprofitable. It is possible to move with too great haste here, and discover that good cows are hard to find.

There is a little trick here that we use with our help that can be used along this cow line. We try to employ all good men, but

sometimes (I suppose we all have the same experience), things don't move along just right. There is a lack of interest. What shall we do? Shall we scold them? Shall we lose our temper? Shall we go out and say something that we will regret afterwards? I have done it and have been sorry about it, but here is the way we do: We pick out the man that seems to have the least interest, the man who is doing the poorest work, and we call him in and say most anything that we can to get rid of him pleasantly and let him go. If that does not correct the difficulty and get the results we want, we pick out the next poorest, one we can let go easiest, shows the least interest, and we let him go the next Saturday. In two or three weeks your gang of men begin to wonder who is going next Saturday night, and it makes a great difference.

It is very often that fifteen interested men will do more work than seventeen that are a little bit disinterested. While you hate to let those men go, there is no sorrow on my part to sell a poor cow. It is perfectly possible to give fifteen cows more care and get more milk out of them than it is out of a herd of seventeen.

Eighty-five pounds of milk a week pays a cow's expenses. Remember that a quart of milk from the poor cows which you are producing at a loss, is taking the place in the market of a quart of milk from the good cows which pay you a profit. If all unprofitable cows in the New York territory were killed, the price of milk would go up, but the cost of production would go down.

Milk at four cents per quart, the cow giving 100 pounds per week, her hay and ensilage ought to be worth seventy cents. If you feed her one pound of grain for three pounds of milk, the grain is worth fifty cents; the labor ought to be worth fifty cents, giving a total cost of $1.70; you sell that milk for $1.88 and you get a profit of eighteen cents. That milk costs you $1.70 per hundred to produce.

Now, let us take the 200-pound cow. Her milk is worth $3.76; hay and ensilage, seventy cents; you feed this cow twice as much grain, or one dollar; labor fifty cents, total cost $2.20. That milk costs you, to produce, $1.10 per 100 pounds, against the milk from the 100-pound cow $1.70, and your profit is $1.56 per week. In other words, one 200-pound cow pays you 8.6 times the profit of the 100-pound cow.

Now let's look at the 300-pound-per-week cow. The milk is worth $5.64, hay and silage 70 cents, grain $1.50, labor 50 cents,

total $2.70; it costs you 90 cents per hundred to make milk from that 300-pound cow, and you get a profit of $2.94 per week, or one of these cows pays you as much profit as 16.3 cows giving only 100 pounds per week.

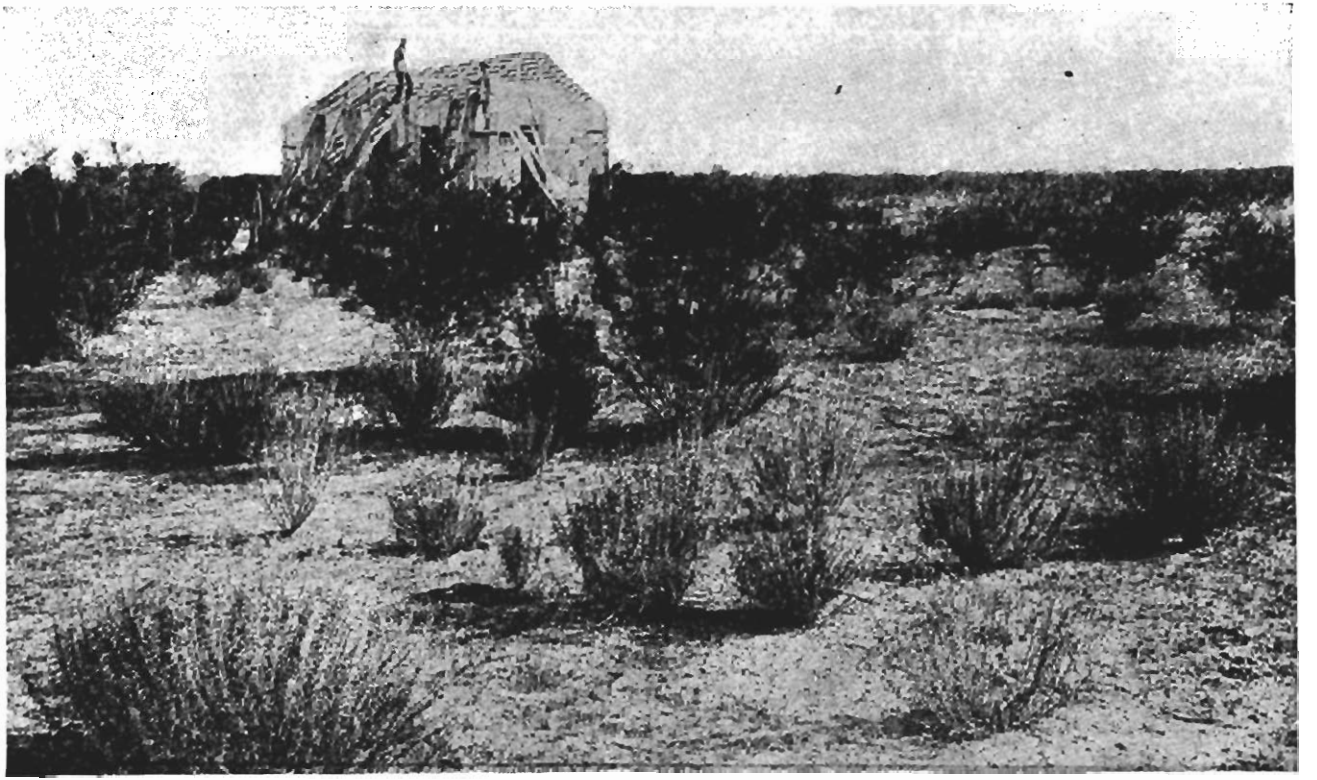
This poor cow problem brings to my mind a neighbor back on the hill. He came into the office one day and wanted to sell a cow. I went to his farm with spring balance scales and these were the conditions I found: Fourteen cows—four of them went dry in the fall; this was about the first of July. To me that means that these four cows had just about eaten their heads off. If he had given them away in the fall he would be worth just as much money. Four more cows were giving so little milk that it didn't pay for the labor of driving to and from pasture and milking. Four cows were just about paying a decent price for pasture and labor. If he had a hundred of this kind and had to face a pay-roll he couldn't make any money. Two cows out of fourteen were gaining him a profit. This man was back three miles from the railroad, had eleven children, every one of them working that was old enough to do anything. Undoubtedly he thought that farming didn't pay. I have no doubt that this family was living on potatoes and buckwheat cakes. But contrast this, if you will, with seventeen cows that gave $650.22 worth of milk in the month of November. This will tend to illustrate the depth a poor cow can drag you into.

Well, I have given you some poor pictures, I believe, of the dairy business. I believe in its possibilities, and I would like to hang over the desk of every dealer in New Jersey that little motto:

"Good, better, best,
Never let it rest,
Until the good is better,
And your better best."

Mr. Valancey E. Fuller, of New York, spoke on the subject of milk production and the present market demands. His address was illustrated with stereopticon views showing how to produce clean, pure milk. A vote of thanks was extended to Messrs. Winters and Fuller for their addresses.

Then took recess until 8 P. M.



BUILDING HOMES ON THE DESERT IN ANTICIPATION OF THE OPENING OF THE GOVERNMENT WORKS

EVENING SESSION.

The evening session was held in the auditorium of the State Normal School by arrangement with Dr. J. M. Green, principal.

Music was furnished by the orchestra and the Philomela Club of the State Schools.

Vice President J. M. Cox called the meeting to order and introduced the Hon. C. J. Blanchard, statistician in the United States Reclamation Service at Washington, D. C., who delivered a very instructive and entertaining lecture on "Millions for Moisture." He spoke of the great work being done by the United States government.

MR. BLANCHARD—I have had the pleasure of going around with the President's Commission on Country Life, and I had an opportunity of attending meetings in all parts of the country. I think they overlooked New Jersey, and in so doing they made a mistake. They had very interesting meetings—such meetings as you are having here—where they had discussions.

I have become very much interested in the farmers' meetings, and my work is with farmers almost altogether. I am not in the engineer corps; I am in the home-seeking bureau, and I meet farmers who are seeking homes in the West.

On the trips with this Country Life Commission work I was impressed with one great thing, and that was that President Roosevelt had really touched a live wire. They were out as messengers from the President, and asking what they wanted. The farmers have their tale of woe, and they told the commission their troubles right off the bat.

One of the principal things that was touched on was the absolute necessity of reform in the rural schools, school life everywhere in the United States. There is no question, rural school life is tending away from the farm. There is nothing taught in the rural schools in the United States, without any exception, that has in it the spirit of the farm.

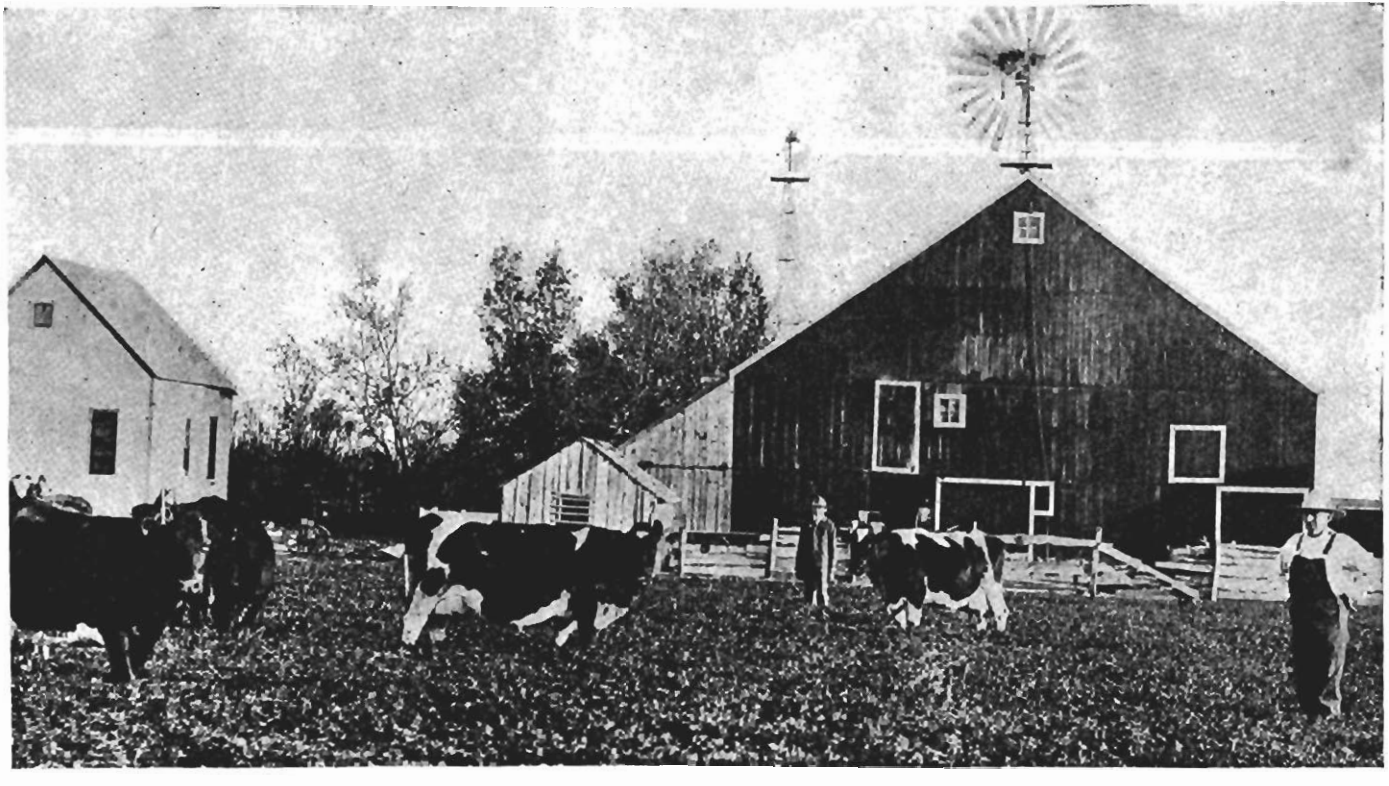
I went to the district school when I was a boy, and I know we had a city girl as a teacher, and we all loved her because she was so much better than we country louts, and all her teaching was of the grandeur and the luxury and the delights of the city, and naturally when we went back home we viewed everything with disgust.

As I grew older I went away from the farm very young, and I regret it, because I can see beauty in the farm now that I never dreamed of, freedom, and money, too, such as you don't see in the city. The country may have lost a good farmer, I don't know, but I don't think the city gained very much.

One of the things we touched on—we got that all over the country—was that the mother and father on the farm, if they had a particularly bright boy, they pushed him through all the high courses and concluded to make a lawyer, a doctor or a minister out of him, but the plodder, the fellow that really didn't amount to anything, oh, well, he will make a farmer.

I have been for the last years in touch with the most wideawake farmers in the world, because I travel over the United States, and I believe that because of conditions demanding wideawake farmers, the irrigating farmers are most wideawake and alert. On those small farms, as a rule, he has got to make every inch of it count. He has got a crop coming on all the time. He is not a general farmer, with a lot of wheat and a little stock, but he has practically something of everything growing on the farm. I have with me some new pictures brought back from this Western trip. They are all colored to life. They are not just photographs, but some splendidly colored pictures and some moving pictures. They will give you an idea of what is going on in the West. It is the work of our government. It is not for one individual. It is for farmers who cannot find homes in this great section of the East. I want to show what the government is doing on the public lands—lands that belong to every citizen. If you want to go out there and use your homestead right, you can get a farm there. You have a personal interest in this work. I am, of course, very much interested in it, as I have been with the work since its initiation, and especially because my work brings me in personal contact with the fellow that is digging the ditch. I am not bothered with the question whether the engineers who are government engineers can build the dams and great big structures of all kinds—I know that; but I want to see this new fellow that comes out and makes his home there, and I want to show you what they are doing in that line.

The address was magnificently illustrated with colored stereopticon views.



A HOME REALIZED—AFTER IRRIGATION

FRIDAY, JANUARY 15TH, 1909—MORNING SESSION.

Mr. Lippincott, chairman of the special committee to draft resolutions on the death of members of the board, reported the following:

WHEREAS, It hath pleased an all-wise Providence to remove from us by death, during the past year, Emmor Roberts and Dr. E. H. Phillips, both of whom have, for many years, been prominent, active members of this Board; therefore,

Resolved, That we desire to place on record our high appreciation of their services to this State Board, and the many positions of trust and honor they filled in their communities and the State; they were men of strong character, arduous students in the line of progressive agriculture, advocating whatever would aid in making agriculture a more intelligent and profitable occupation.

Resolved, That we will ever cherish their memory and recommend their traits of character so marked in their lives as worthy of our imitation, and especially for the consideration of those who may follow us in the work of this Board.

JOHN M. LIPPINCOTT,
RICHARD LLOYD,
JOHN ACKERMAN,
Committee.

These resolutions were unanimously adopted.

RESOLUTIONS.

Mr. Crane, the chairman of the committee on resolutions, reported as follows:

Resolved, That the New Jersey State Board of Agriculture approves the provisions of H. R. 21,318, for preventing the manufacture, sale or transportation of adulterated or misbranded fungicides and insecticides, and urges upon the Senators and Representatives from New Jersey in Congress that they support said bill when it comes up for passage.

The committee reported the resolution favorably, and recommend its adoption. Adopted.

Also the following:

Resolved, That the Executive Committee be and are hereby made the Legislative Committee of this Board.

The committee recommends its adoption. Adopted.

Also the following: At a meeting of the Gloucester County Board of Agriculture, held December 7th, 1908, the following resolution was adopted:

WHEREAS, The prevailing custom of selling Irish potatoes in New Jersey is 180 pounds to the barrel, while in buying we receive only 165 pounds; therefore be it

Resolved, That this County Board of Agriculture present a resolution to our State Board of Agriculture urging an enactment of a law making 165 pounds the standard weight for a barrel of Irish potatoes in New Jersey.

(Signed) LEWIS M. MORGAN, President.

The committee favor the adoption of the resolution. Adopted.

Also the following:

WHEREAS, There has been introduced into the United States Senate a bill, No. 18,240, known as the "Davis Bill," to provide for agricultural and industrial instruction; therefore be it

Resolved, That this State Board of Agriculture indorse this bill, believing it to be beneficial to the farmers.

The committee favor its adoption. Adopted.

Also the following:

WHEREAS, The street railroads operating in the State are capable of furnishing a cheap and easily accessible means of transportation for farm products in many parts of the State, but are unable to do so through the operation of laws now in effect; therefore be it

Resolved, That we request the repeal of Chapter 144, Laws of 1896, entitled "An act relating to the carrying of freight or express matter by companies owning, leasing or operating street railways," approved March 30th, 1896, and the supplements and amendments thereto.

The Chairman—We approve the resolution, and recommend its adoption.

On the recommendation of the committee the resolution was adopted.

The committee also reported the following:

WHEREAS, As there are many discriminations and incongruities in the express and freight rates throughout the State, with no apparent authority to compel revision and adjustment; therefore be it

Resolved, That we consider it for the best interests of agricultural industries that the State Board of Railroad Commissioners be given rate adjusting powers, applying to all common carriers, similar to those of the Interstate Commerce Commission.

The committee recommended its adoption. The resolution was adopted.

The Chairman—In reference to the resolution offered by Mr. Rider, and referred this morning to this committee, in conference with Mr. Smith and Mr. Rider, we have a substitute:

WHEREAS, The automobile has become a common vehicle for interstate as well as local travel; and

WHEREAS, The present system of local or State license of such vehicles is obstructive of interstate traffic and a serious inconvenience to users of this means of transportation; therefore,

Resolved, This Board recommends that such legislation be enacted, either by Congress or by the respective State Legislatures, or both, that will offer the greatest possible facilities to interstate travelers compatible with the rights and interests of the States and the citizens thereof in which the traveler resides and through which he passes.

The Chairman—If any further information is needed Mr. Rider can give it. We report the resolution favorably.

Mr. Rider—This resolution was suggested in this way: There are a great many people who pass through here as tourists, &c., and meet with delays in getting permission. How that proposition should be solved I am not prepared to answer, but there should be a way of meeting it. I do not think this can interfere with any right of any person or State, but if a conference could be held between the different States and some arrangement could be made, it would facilitate travel; it would be well for the country at large and for our State, and particularly because lots of people want to come into this State.

The resolution was adopted.

On motion, the resolutions requiring legislative action were referred to the executive committee.

The board then adjourned *sine die*.

FRANKLIN DYE,
Secretary.

Report of the State Entomologist.

JOHN B. SMITH, SC.D.

Under the law the State entomologist is primarily charged with the work of nursery inspection and giving certificates to those found entitled. On request of any fruit grower he is also required to inspect orchards and make recommendations or give information. As bearing upon both of these requirements, injurious insects introduced into other States and not yet found in New Jersey have been kept under observation, and on the other hand, the matter of introducing beneficial species has been closely and continuously considered.

That the fruit growers of the State might have within our own State a reliable supply of all such trees and plants as they may desire, a very close watch has been kept on all our nurseries, large and small. These nurseries tend now to specialize, and divide about as follows:

First, those growing peach trees only. These are mostly in the more northern parts of the State, and most of them grow for local distribution only. There has been a tendency in the past among these nurserymen to avoid the requirements of the law and to sell, among their neighbors at least, in defiance of it. The disastrous results of such dealing have, however, become apparent to those purchasers who have received infested stock, and they have learned that the regulations adopted were primarily for their benefit, and not merely restrictions on the nurseryman. As a consequence fruit growers are demanding better and clean stock, and nurserymen find it to their advantage to comply with the directions of the entomologist. The work this year shows less infestation than at any time in the recent past, and a fine stock of good, clean peach trees ready for sale and in good demand. The few peach nurseries that have an out-of-State trade must of necessity comply strictly with our requirements to entitle themselves to a certificate that will admit their stock into other States, and all of these are now in excellent condition.

Second, those growing shade and ornamentals only. These are greater in number and are increasing. The demand for shade trees is growing constantly, as cities, towns and villages, either through shade tree commissions or volunteer associations, become interested, and in the smaller towns, villages and city suburbs hedges and shrubbery are in constant demand. At least ten million privet plants are now growing in our nurseries, and that is only one of the varieties that does exceptionally well in our State. A very large percentage of our ornamentals goes into interstate traffic and the nurseries are, on the whole, in excellent condition. Some of these are also large importers from foreign countries and in these an especially close watch is kept for introduced pests.

Third, those growing miscellaneous fruit and other stock. There are only a few nurseries of this character in the State at present and less than half a dozen that ship outside of our boundaries. All these nurseries are now in satisfactory condition and such stock as is grown on their own grounds may be considered practically safe.

Fourth, strawberry growers. Inspection and certificates for trade within the State are not required by our law and there is no restriction, nor need of any within our own limits, to dealing in these plants. But in some States in which the strawberry root-louse is an important factor it is demanded that plants shipped into them shall be accompanied by a certificate stating their freedom from that pest. It is for only those growers that ship into foreign States that inspections are made and certificates issued.

Fifth, dealers. These are mostly florists that add a trade in trees and shrubs to their lines and buy from all available sources. In such cases dealers' certificates are issued after ascertaining that the sources from which stock is purchased are satisfactory and that the nurseries supplying the material have been inspected and certified.

The fact that all nurserymen are dealers to some extent and that some States make fumigation requirements so general that, strictly construed, would make necessary the fumigation of stock already so treated where it was grown, necessitated some arrangement with the authorities of those States, and these were successfully made, notably with Pennsylvania, where at Harrisburg the

commissioner of agriculture, the State zoölogist and the chief inspector were all extremely courteous and obliging.

Altogether the nursery condition in the State may be considered as healthy and satisfactory for all reasonable demands.

The following is a list of the nurseries thus far certificated for 1908-09, with a statement of the character of the certificate given:

No. 1. Bobbink & Atkins, Rutherford (limited to herbaceous, greenhouse and ornamental stock).
" 2. J. T. Lovett, Little Silver (general).
" 3. J. H. O'Hagan, Little Silver (general).
" 4. James McColgan, Red Bank (general).
" 5. George A Steele, Eatontown (general).
" 6. Charles Bird, Arlington (general).
" 7. Peter Henderson & Co., Jersey City (general.
" 8. T. E. Steele, Palmyra (general).
" 9. The Julius Roehrs Co., Rutherford (general).
" 10. Bobbink & Atkins, Rutherford (general).
" 11. Red Towers Nursery, Hackensack (general).
" 12. K. E. de Waal Malefyt, Ridgewood (general).
" 13. Frank Lenz, Irvington (general).
" 14. Fred. Menzie, Irvington (general).
" 15. Henry E. Burr, East Orange (general).
" 16. W. A. Manda, Inc., South Orange (general).
" 17. Joseph H. Black, Son & Co., Hightstown (general).
" 18. Charles Black, Hightstown (general).
" 19. William Henry Maule, Hightstown (dealer).
" 20. Carlman Ribsam, Trenton (general).
" 21. F. & F. Nurseries, Springfield (general).
" 22. Elizabeth Nursery Co., Elizabeth (general).
" 23. Hiram T. Jones, Elizabeth (general).
" 24. Willard H. Rogers, Mount Holly (general).
" 25. Charles B. Horner & Son, Mount Holly (general).
" 26. A. W. Wadley, Bound Brook (general).
" 27. William Rose, Red Bank (general).
" 28. North Jersey Nursery Co., Newark (dealer).
" 29. J. C. Williams, Montclair (dealer).
" 30. S. T. Hillman, West Cape May (dealer).
" 31. Arthur J. Collins, Moorestown (dealer).
" 32. I. D. Cole, Rutherford (dealer).
" 33. C. A. Baird, Baird (dealer).
" 34. Hartung Bros., Jersey City (dealer).
" 35. Charles L. Stanley, Plainfield (dealer).
" 36. John B. Lauhoff, East Rutherford (dealer).
" 37. K. Herman Stoye, Eatontown (dealer).
" 38. A. S. Wallace, Montclair (dealer).
" 39. William W. Lukens, Princeton (dealer).
" 40. Henry A. Dreer, Inc., Riverton (general).
" 41. C. W. Iford, Little Silver (dealer).
" 42. James L. Hall, Farmingdale (dealer).

No. 43. J. Murray Bassett, Hammonton (general).
" 44. Edwin Allen & Son, New Brunswick (general).
" 45. Michael N. Borgo, Vineland (dealer).
" 46. Michael N. Borgo, Vineland (limited to dewberry and blackberry).
" 47. M. H. Kruschka, Asbury Park (limited to ornamentals).
" 48. John Moore, Little Silver (limited to ornamentals).
" 49. Charles A. Bennett, Robbinsville (general).
" 50. John Casazza, Vineland (limited to small fruits).
" 51. Arthur J. Collins, Moorestown (general; replaces No. 31).
" 52. Charles Momm, Irvington (general).
" 53. Samuel Brant, Madison (limited to peach).
" 54. Alvah L. Reynolds, Madison (limited to shade and ornamentals).
" 55. S. H. Paulmier, Madison (limited to shade trees).
" 56. H. C. Steinhoff, West Norwood (limited to shade and ornamentals).
" 57. Herman Conrow, Moorestown (limited to strawberries).
" 58. William F. Bassett, Hammonton (general).
" 59. J. H. Lindsley, White House (limited to peach).
" 60. James H. Vliet, Gladstone (limited to peach).
" 61. Isaac Hildabrant, New Germantown (limited to peach).
" 62. Samuel Wilson, Lebanon (limited to peach).
" 63. J. E. Kuhns, Cliffwood (limited to strawberries).
" 64. Ellsworth Pedrick, Bridgeton (limited to strawberries).
" 65. S. B. Stevens & Son, Bridgeton (limited to strawberries).
" 66. J. T. Garrison & Sons, Bridgeton (limited to strawberries).
" 67. J. F. Randolph, East Rutherford (dealer).
" 68. Samuel C. DeCou, Moorestown (general).
" 69. Stanton B. Cole, Bridgeton (general).
" 70. Samuel E. Blair, Nutley (general).
" 71. W. G. Eisele, West End (general).
" 72. W. M. Simanton, Asbury (general).
" 73. George A. Shultz, Jamesburg (limited to peach).
" 74. J. E. Heritage, Marlton (limited to strawberries).
" 75. N. P. Creely, Burlington (limited to strawberries).
" 76. T. C. Kevitt, Athenia (limited to strawberries).
" 77. George H. Peterson, Fair Lawn (general).
" 78. W. S. Pullen & Co., Hopewell (general).
" 79. Theo. A. Ball, Westfield (general).
" 80. W. H. Forristel, Plainfield (general).
" 81. Jos. J. Ayars, Williamstown (dealer).
" 82. William H. Morgan, Westmont (dealer).
" 83. R. D. Cole, Bridgeton (general).
" 84. John McCleary, Sewell (general).
" 85. Warren Shinn, Woodstown (general).
" 86. William B. Ellis, Vineland (limited to small fruits).
" 87. Stumpp & Walter, Dumont (general).
" 88. Ralston Bros., Allenhurst (general).
" 89. David V. Higgins, Ringoes (limited to peach).
" 90. Mansfield Eick, Bissel (limited to peach).
" 91. H. J. Shoemaker, Bridgeton (dealer).

Orchard inspections have increased in number and are even more requested by horticulturists, who note conditions that they do not understand. Of course the San José scale furnishes the reason for most of these calls, but the tendency is to call for advice and suggestions in other cases as well, and to depend upon the recommendations made. No detailed record of the number of orchards examined has been kept, but they have been in all parts of the State.

One of the important matters to the farmer and fruit growers is the purity and uniform strength of the insecticides and fungicides that he uses, and this has led to the enactment of the Paris Green law in our State, and to other broader laws in other States, but none of them covered the ground satisfactorily, and an act drawn along the lines of the Pure Food law was introduced into Congress at the last session. It met with opposition from the manufacturers, and, in consequence, meetings were held in New York City, in June, in Baltimore, in November and in New York again, in December, at which manufacturers, chemists, the United States Department of Agriculture and a committee from the Association of Economic Entomologists were represented. At all these meetings the writer attended and took part, and an act was finally agreed upon that was satisfactory to all the interests represented. This bill is known as H. B. No. 21,318 and is respectfully urged for endorsement upon this board.

During the last days of December, 1908, the Association of Horticultural Inspectors met at Baltimore and discussed many practical points in the inspection of nurseries, the method of controlling pests found in them and the use and abuse of certificates. This meeting was also attended by the writer, as were the meetings of the Association of American Economic Entomologists, which met at the same time and discussed other problems relating to the control of injurious insects.

An extremely important matter is the watch kept on the spread of the gypsy and brown-tail moths, through visits made each year to the infested areas in Massachusetts, and the danger of their introduction has materially increased. The natural line of spread for both species is to the north and east, and only a few colonies have extended into Rhode Island and Connecticut. But the

timbered areas of New Hampshire and Maine have now been invaded, and from these States much wood and lumber is shipped to the south and west. Already one large shipment intended for New Jersey has been found to contain many hundred egg masses of the gypsy moth, and but for the fortunate examination of the lumber in piles, the infestation might have been established at several points in our State as it was distributed.

This brings the danger much closer than it ever has been, and it is the intention of the writer to visit the infested areas in New Hampshire and Maine during the season of 1909 to ascertain just what precautions can be taken to obviate danger from this source. It need hardly be emphasized that the introduction of the species into this State would be a calamity before which the San José scale pales into insignificance, and which would cause a loss of as many millions as the scale has caused thousands.

During the entire year Mr. Edgar L. Dickerson has acted as assistant, and to him has fallen most of the active inspection work as well as some of the incidental investigations. Miss A. E. Meske has been continued in her position as clerk and has as in the past filled it acceptably.

Soil Surveys as Related to Geology.

BY DR. HENRY B. KUMMEL, STATE GEOLOGIST.

"Of all the sinful wasters of man's inheritance on earth," said the late Professor Shaler, "and all are in this regard sinners, the very worst are the people of America." This is not a popular phrase, but the calm judgment of a careful observer. It is borne out by many facts. Man's existence upon the earth is conditioned, nay even dependent, upon the natural resources of the earth. The sum of these resources is simple and fixed. "From the sea, the mine, the forest and the soil must be gathered everything that can sustain the life of man. So far as we can now see man's continued existence upon the earth is determined by the wealth which he can obtain from these." The sea furnishes less than five per cent. of the food supply and there is evidence that this draft is more than the annual increase. The forests of the country are fast disappearing. We are now using annually 500 feet board measure of timber per capita as against an average of sixty feet for all Europe. We are consuming our forests three or four times as rapidly as they are reproduced. In New Jersey we use ten times as much timber annually as we raise. Since 1870 forest fires in the country at large have each year destroyed an average of fifty lives and $50,000,000 worth of timber. In one year fire destroys enough timber to supply the whole nation for three months. Owing to wasteful methods of logging, milling and marketing, only 320 feet of lumber are used for every thousand that stood in the forests. How long can this excessive use and excessive waste continue before our forests are gone? A few years ago we talked about our inexhaustible forests. Now the more intelligent observers in these lines see a timber famine only a few years off.

Our mineral resources are far from being inexhaustible. Once consumed they can never be replaced. In the earth they have only a potential value. Mined and utilized they form the basis of our commercial development and prosperity. Ample coal and abundant iron are essential to our manufacturing supremacy. They must be used to be of value, but so far are they from being in-

exhaustible, that every effort should be made, both in mining and in use, to prevent the enormous waste which is almost without exception at present the accompaniment of their utilization, for long before the end of the present century, with our present increasing consumption, neither iron nor coal will be available on anything like the present favorable terms, unless the progress of invention makes radical changes in present practice.

We turn now to the soil—the remaining resource of man upon the earth. No longer can we say that "Uncle Sam has land enough to give us all a farm." It is true that in 1906 there were 792 million acres of unappropriated public land in the United States, but omitting the lands of Alaska as being of little value for general agriculture for climatic reasons, and subtracting the arid and semi-arid lands incapable of irrigation, there is not much over 100 million acres left, and 21 million acres were disposed of in 1907. How long will the remainder last?

But the pre-emption of our public domain is not a source of great anxiety, although no longer is there a farm awaiting every would-be home seeker. The more important problem before the nation is the depreciation in the productivity of our soil.

Deterioration of the soil occurs in two ways—soil waste and soil exhaustion.

In the last analysis the soils are the result of the decay and disintegration of rock. The atmosphere and water, heat and cold, sunshine and frost, aided by plants and animals, have wrought together to bring about this change. Through thousands, nay rather through millions, of years these agents of nature have been at work upon the face of the earth. The present soil covering is the result of these long processes. The slow decay of the rock, inconceivably slow as we measure time, has formed the soil of today. One foot in 10,000 years is probably as rapid an estimate as facts will warrant, although climate, character of the rock, and slope of the surface may in special cases cause wide departures from this figure. I shall not enter into any detailed discussion of the various steps in the process of soil formation, nor any analysis of the work of the agents employed. I wish merely to emphasize the fact that all our soils have originated by the weathering of the rocks; that this process is extremely slow, and that the present soil is the result of the action and reaction of delicately adjusted conditions during thousands, or even millions, of years.

Along with soil formation goes soil removal. That soils are blown by the wind and washed away by the rain are facts of everyday knowledge. That at certain seasons of the year our rivers are charged with sediment is a matter of common observation. That one billion tons or more of valuable soil material is annually swept away in our rivers is perhaps not so clearly understood. That thousands of acres in the East and South have been made unfit for tillage through soil waste may not be known to all. To-day as you ride through certain sections of our country you may see everywhere land gullied by torrential rains, red and yellow clay banks exposed where once were fertile fields, and agriculture reduced because its main support has been washed away. Our own State is not exempt. On many hillsides in our northern counties the fields are gashed by narrow gullies, or the soil is yearly becoming thinner and rock exposures more numerous. It is not too much to say that almost without exception soil waste on all except very gentle slopes is much more rapid than soil formation. The present thickness of the soil is the measure of the degree to which soil removal during thousands and tens of thousands of years has lagged behind soil formation. But no surplus, however large, can stand continual drafts upon it without exhaustion. It is only a question of time when many more square miles of farm land will be rendered valueless by soil wash unless methods of agriculture in certain regions are radically changed. A tree, cut down, may be reproduced within the lifetime of an individual. A soil once destroyed cannot be renewed even within the lifetime of a nation.

As yet soil waste, at least in its worst phases, is localized although sufficiently widespread to demand consideration. No farmer who farms for the future as well as for the present, who desires to hand down to his son a better farm than he received, can afford to overlook this danger. Since the evil is caused chiefly by the water which runs off the surface instead of entering the ground, the remedy lies in changing, so far as may be, the proportion of run-off and run-in. The preservation or cultivation of timber and pasture on steep slopes, methods of husbandry and cultivation of crops which increase the porosity of the soil, all these will decrease the run-off and increase the absorption. In some instances contour cultivation will be necessary. I cannot discuss exhaustively

the remedies. I only emphasize the growing need of thought and care in this matter.

Far more ruinous than soil waste, because universal and continuing in its effects, is soil exhaustion. Facts are not wanting to show that it is creeping over the land from the oldest regions to the newest. Some of these facts have been recently summarized by James J. Hill in an address at Washington as follows:

"Many of us can remember when New York was the great wheat-producing State of the Union. The average yield of wheat per acre in New York for the last ten years was about 18 bushels. For the first five years of that ten-year period it was 18.4 bushels, and for the last five, 17.4 bushels. In the farther West, Kansas takes high rank as a wheat producer. Its average yield per acre for the last ten years was 14.16 bushels. For the first five of those years it was 15.14, and for the last five 13.18. Up in the Northwest Minnesota wheat has made a name all over the world. Her average yield per acre for the same ten years was 12.96 bushels. For the first five years it was 13.12 and for the last five 12.8. We perceive here the working of a uniform law, independent of location, soil or climate. It is the law of a diminishing return due to soil destruction. Apply this to the country at large and it reduces agriculture to the condition of a bank whose depositors are steadily drawing out more money than they put in. Our soil, once the envy of every other country, the attraction which draws millions of immigrants across the seas, gave an average yield for the whole United States during the ten years beginning with 1896 of 13.5 bushels of wheat per acre. Austria and Hungary each produced over 17 bushels per acre, France 19.8, Germany 27.6, and the United Kingdom 32.2 bushels per acre. For the same decade our average yield of oats was less than 30 bushels, while Germany produced 46 and Great Britain 42. For barley the figures are 25 against 33 and 34.6; for rye, 15.4 against 24 for Germany and 26 for Ireland. In the United Kingdom, Belgium, The Netherlands and Denmark, a yield of more than 30 bushels of wheat per acre has been the average for the past five years."

In these lines, in no important country in the world except Russia, is agriculture at so low an ebb as in our own. Secretary Dye told you this morning that the value of farm crops last year in New Jersey was over $57,000,000, an average of almost exactly

$20 per acre of farm land. For the whole United States it was only $11.84 per acre during the last census year.

These facts all point to one conclusion. As a nation we are robbing the soil in an effort to get the largest cash return from each acre in the shortest possible time and with the least possible labor. In all parts of the country, with isolated exceptions, the system of tillage has been to select the crop which would bring in most money at the current market rate, to plant that year after year, and to move on to new fields as soon as the old farm rebelled by lowering the quality and quantity of its return. But there are no longer any new farms to move to, or at least only a very few. The agricultural colleges and societies have for years been urging diversification of industry and rotation of crops. But take the country as a whole, to what extent has this advice been accepted by the average farmer?

But I wish to direct your attention to another feature of this problem. The great question before the American people to-day is not how to grow good crops for the next year or even the next generation alone, but how to maintain *permanently* the fertility of American soils. Here we touch upon the question of plant-food supplies and their limitations. I am aware that from a certain high authority the doctrine has gone forth "that practically all soils contain sufficient plant food for good yields—that this supply will be indefinitely maintained, and that it is not necessary ever at any time to introduce fertilizing material into any soil for the purpose of increasing the amount of plant food in that soil." I believe, however, that this doctrine has not received the assent of the majority of soil experts in the experiment stations of the country, and that in our own State Dr. Voorhees and his associates dissent most emphatically from this conclusion.

That plants must have food goes without saying. That their food supply is derived in part from the air, in part from the soil, is admitted by all. That the mineral foods exist in the different soils in varying amounts and are utilized by different crops in varying degrees is, I think, not questioned by anyone. Some, as lime, are abundant in the soil or can readily be supplied from vast resources of raw material. Of these there is no fear that the supply will ever fail. The amount of others in the soil is much less. Not only so, but the supply of raw material, by which the diminishing amount in the soil can be replenished, is by no

means great. Of these scarcer substances, nitrogen and phosphorus are, I believe, the two most important. Of the former there is in the atmosphere an enormous supply which, although not available in its free condition, yet by bacterial agencies in connection with certain crops, as clover, peas and other legumes, becomes fixed in the soil in compounds available for plant food. But with phosphorus the case is different. Its amount in all soils is comparatively small. As the result of hundreds of analyses of soils and crops in Illinois we know that the average common prairie soils of that State contain about 2,000 pounds of total phosphorus per acre per foot. It is also known that one hundred such crops as are now raised annually upon their richest and best fertilized lands, remove from the soil about 2,000 pounds of phosphorus. A thousand years of such crops would require every pound of phosphorus contained in the soil to a depth of ten feet, even if it were possible for the plants to obtain it from that depth. In Wisconsin careful studies indicate that fields which have been cropped for fifty years have already lost one-third of their phosphorus as compared to the original soil. Beds of phosphate rock found in South Carolina, Georgia, Florida, Tennessee and in some of our western States, afford our only known reserves of this most important element. The deposits of South Carolina, first exploited in 1867, have been nearly exhausted. The United States produces annually more of this material than all the rest of the world combined and over fifty per cent. of that produced goes, not to our own farms, but abroad. The best estimates as to the reserves of phosphate rock in this country point to the conclusion that they are sufficient to last for only fifty years. Recently the newspapers recorded the formation of the Franco-American Consolidated Phosphate Company, and the acquisition by it of a large part of the richest areas of Tennessee phosphate lands. What is the purpose of this purchase? Manifestly, it is to ship our phosphates abroad. So important is the conservation of these deposits to the future agricultural prosperity of our country that one of the foremost geologists of the world recently put himself on record to the effect that "the continued export of phosphate rock from the United States means agricultural suicide." So important has the President regarded this question that by executive order all public lands in the West supposed to contain deposits of phosphate rock have been withdrawn for settlement

pending their examination by the National Geological Survey, that such lands as contain these deposits may be retained by the government in its own possession, or be disposed of only under such restrictions in regard to mining this valuable resource as future conditions may demand.

In the early days of the State Geological Survey much attention was given to the soils of the State and the use of fertilizers. Many of the annual reports of Dr. Cook, then State geologist, discussed this question. In particular the reports for 1879 and 1880 gave many chemical analyses of various soil types. The improvement of agricultural methods was always close to his heart and the older members of this board know better than I to what extent his labors in this direction bore fruit.

For thirty years, however, the work of the survey has been upon other lines. Since that early day accurate maps of the State on a large scale have been constructed. The various rock formations have been studied more in detail and their boundaries determined. The superficial mantle of rock debris, forming the soil and sub-soil, has been studied, classified and mapped from the genetic standpoint. Some of these maps have been published, others soon will be. All this work will afford a splendid preliminary basis for a rational and comprehensive study of the soils from an economic and agricultural standpoint. In the meantime the methods of soil analysis and soil study have progressed. Soil experts know better now than they did what facts are essential; what are non-essential in a soil survey. We are in a better position now than ever before to undertake a systematic and detailed examination of our soils. Such a study is about to be made jointly by the State Agricultural Experiment Station and by the Geological Survey. It will include a chemical examination to determine the chemical composition of the soils and sub-soils and the amounts of plant food present; a mechanical examination to determine the mechanical condition of the soil, its fineness or coarseness; its porosity or imperviousness, etc. It will also include an agricultural examination to determine the nature and quantity of crops now produced, and all will be based upon the topographic and geological investigations of the past forty years.

Such a survey cannot be completed in one year nor in five. Its rate of progress will depend, first, upon the amount of money available; second, upon the men available. I anticipate that it

will be easier to obtain the necessary money than the men capable of making such a survey as it should be made. I do not believe either obstacle will prove insurmountable. In fact, I am able to announce that the beginning of this survey will not be contingent, as are so many worthy objects, upon legislative enactment. Ultimately it may be necessary to ask the Legislature for increased appropriations for this work; for the present, at least, the regular appropriations are sufficient.

The detailed knowledge regarding our soils which such a survey will give should be of great and lasting benefit in their intelligent treatment, to the end that our children's children and their children after them shall not reproach us for our ignorant and sinful waste of their inheritance.

Report of the New Jersey State Grange.

BY GEORGE W. F. GAUNT, MASTER.

It is a pleasure to report that the State grange is in a prosperous condition. It has added more new members, and its influence has been felt more in every line of grange work in the past year than any other year in the history of the organization.

The conservative position that has been taken by the State grange in the past eight years has been appreciated by its membership and the farmers and all classes of people in the State, and we are glad to report that in every line of work we are a prosperous organization. Its influence for good in every way has been more manifest. Other industries and other classes of people are asking the grange, "What position are you going to take in this or that matter?" which shows that the organization is looked upon as the spokesman for agricultural interests.

Co-operating as we are with the State board and the federated agricultural societies, there have been rapid strides made in the past year, and our farmers are beginning to realize the importance of co-operation through the grange, and in many other ways it has been able to demonstrate its usefulness.

As to agricultural education, the grange is working hand in hand with this State board, as you know, and we will continue to do so in the future.

Officers of the State Grange of New Jersey, P. of H., 1909

Master—GEORGE W. F. GAUNT.....Mullica Hill, Gloucester county
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Mannington	George Hamilton, Salem, Salem Co.	Leon A. Crispin, Woodstown, Salem Co.	Almeta Patrick, Salem, Salem Co.
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:erfield.....	Howard Padgett, Deerfield St., Cumberland Co.....	Wm. H. Van Lier, Deerfield St., Cumberland Co...	Alexis E. Woolman, Elmer R. D. 2, Salem Co.
:ntre Grove.....	Elwood Zimmerman, Millville, Cumberland Co....	Furman Taylor, Millville R. D. 1, Cumberland Co....	W. H. Taylor, Millville R. D. 1, Cumberland Co.
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berty	G. C. McDowell, Wickatunk, Monmouth Co.	S. B. Wells, Marlboro, Monmouth Co.	J. L. Ely, Holmdel, Monmouth Co.
rgeantsville	Frank V. D. Fisher, Stockton R. D. 2, Hunterdon Co	Miss Dora Lambert, Sergeantsville, Hunterdon Co.	N. B. Rittenhouse, Sergeantsville, Hunterdon Co.
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rris	A. L. Leimann, Hanover, Morris Co.	Wm. A. Howell, Florham Park, Morris Co.	G. M. Tuttle, Whippany R. F. D., Morris Co.
ngwood	E. B. Huffman, Barbertown, Hunterdon Co.	A. J. Hawk, Barbertown, Hunterdon Co.	Mrs. Kate Thatcher, Barbertown, Hunterdon Co.
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seland	Sherwood S. Campbell, Roseland, Essex Co.	Witsel R. DeCamp, Roseland, Essex Co.	Mrs. Elwood S. Campbell, Roseland, Essex Co.
rren	Frank Housel, Broadway, Warren Co.	Mae Oberly, Broadway, Warren Co.	Henry J. Beers, Stewartsville, Warren Co.
ckleton	Clarence B. Heritage, Mickleton, Gloucester Co.	Walter Heritage, Swedesboro, Gloucester Co.	Laura Wiley, Mickleton, Gloucester Co.
rffville	Benj. F. James, Pitman, Gloucester Co.	Walton H. Chew, Sewell R. D. 1, Gloucester Co.	Eli K. Gant, Sewell R. D. 1, Gloucester Co.

SUBORDINATE GRANGES—(Continued).

GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
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ıshington	Samuel Bowman, Washington R. D. 1, Warren Co.	Mrs. Jos. Bodine, Washington R. D. 1, Warren Co.	Melville Rush, Washington R. D. 1, Warren Co.
k Grove	Jos. E. Hampton, Pittstown R. D. 1, Hunterdon Co.	Andrew R. Allen, Pittstown R. D. 1, Hunterdon Co.	Frank E. Burd, Flemington R. D. 1, Hunterdon Co.
ring Mills	M. W. Angell, Milford, Hunterdon Co.	Mary E. Wolfe, Milford, Hunterdon Co.	Mrs. L. L. McCullough, Bloomsbury, Hunterdon Co.
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ıra	Sheppard Murphy, Monroeville, Gloucester Co.	Phebe Guest, Aura, Gloucester Co.	Ella Murphy, Monroeville, Gloucester Co.
oss Keys	Jacob Harper, Cross Keys, Gloucester Co.	Jos. H. Evans, Sewell R. D. 3, Gloucester Co.	Stella Hurff, Cross Keys, Gloucester Co.
and View	Wm. Y. Holt, Flemington, Hunterdon Co.	Thos. Hampton, Croton, Hunterdon Co.	Mrs. Augusta Higgins, Flemington, Hunterdon Co.
verside	J. Spencer Dilts, Three Bridges, Hunterdon Co.	W. W. Foster, Three Bridges, Hunterdon Co.	Jane Dalley, Three Bridges, Hunterdon Co.
elaware	Nelly S. Albertson, Delaware, Warren Co.	John H. Albertson, Delaware, Warren Co.	Mrs. Lizzie Hartung, Delaware, Warren Co.
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pe May	Joseph Camp, Pierces, Cape May Co.	Edward Tuttle, Dias Creek, Cape May Co.	A. T. D. Howell, Dias Creek, Cape May Co.
rgen	Arthur Lozier, Ridgewood, Bergen Co.	Mrs. C. C. Basley, Maywood, Bergen Co.	Chas. C. Basley, Maywood, Bergen Co.
anklin	B. K. Lawlin, Midland Park R. D. 1, Bergen Co.	Mrs. M. L. H. Pikaart, Midland Park R. D. 1, Bergen Co.	Mrs. A. G. Smith, Wyckoff, Bergen Co.
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ld Spring	Frank E. Bate, Fishing Creek, Cape May Co.	Jacob G. Corson, Rio Grande, Cape May Co.	Mrs. Belle Mathews, Cold Spring, Cape May Co.
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SUBORDINATE GRANGES—(Continued).

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msey	John P. Foster, Allendale R. D. 1, Bergen Co.....	Emma Van Wagenen, Ramsey, Bergen Co.....	Margaret Wilson, Allendale R. D. 1, Bergen Co.
ncoln	C. H. DeVoe, Westwood, Bergen Co.....	John F. Bomm, R. D. 2, Bergen Co.....	James H. Ackerson, Westwood, Bergen Co.
. View..... . .	Geo. A. Dickerson, Beemerville, Sussex Co.....	Grace E. Clark, Beemerville, Sussex Co.....	Arthur M. Bowman, Beemerville, Sussex Co.
rlin	R. H. Jaggard, West Berlin, Camden Co.....	X. F. Ottiger, Berlin, Camden Co.....	Nancy K. Kramer, Berlin R. D. 1, Camden Co.
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skack.....	Edwin M. Lyman, Park Ridge, Bergen Co	F. C. Pillington, Woodcliffe Lake, Bergen Co.....	I. E. Mabie, Westwood R. D. 2, Bergen Co.
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laware Valley,	Ira C. Stoll, Layton, Sussex Co.....	Katherine A. Stoll, Layton, Sussex Co.....	C. A. Dalrymple, Layton, Sussex Co.
ddle River	E. P. Jaeger, Waldrick, Bergen Co.....	J. Fred. Koopman, Waldrick, Bergen Co.....	J. G. Roberts, Hohokus, Bergen Co.
ayne Township	John Ackerman, Paterson R. D. 2, Passaic Co.....	H. M. Berdan, Paterson R. D. 1, Passaic Co.....	Miss Lottie Kamp, Paterson R. D. 1, Passaic Co.
g Harbor.....	Carl Schismer, Egg Harbor City, Atlantic Co.....	J. L. Purzner, Egg Harbor City, Atlantic Co.....	Henry Pfeiffer, Cologne, Atlantic Co.
ightstown	Thomas Gaunt, Jobstown R. D. 1, Burlington Co...	A. C. Buck, Jacobstown, Burlington Co.....	Mrs. A. S. Champion, Jobstown R. D. 1, Burlington Co.
nton	John V. Painter, Lebanon R. D., Hunterdon Co....	J. B. Anderson, Lebanon R. D., Hunterdon Co.....	Mrs. J. Ross Schomp, Stanton, Hunterdon Co.
rth Arlington,	Fred'k A. Koch, Arlington, Bergen Co.....	Effie G. Millar, Kearney Ave., Arlington, Bergen Co..	Celia J. Brandenburg, North Arlington, Bergen Co.
rlington	De Forrest Frazier, Dobbins, Burlington Co.....	Hannah E. Shedaker, Burlington, Burlington Co...	Anna J. Sulton, Burlington, Burlington Co.
lltown	Geo. Redshaw, Jr., New Brunswick R. D. 3, Middlesex Co.....	Frank H. Smith, Box 18, South River, Middlesex Co	Mrs. Earl J. Owen, New Brunswick, Middlesex Co.

SUBORDINATE GRANGES—(Continued).

GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
New Market	B. De Witt Giles, New Market, Middlesex Co.	F. O. Nelson, New Market, Middlesex Co.	Miss Mattie Giles, New Market, Middlesex Co.
Raritan Valley	A. G. Van Nest, South Branch, Somerset Co.	Mrs. C. S. Phillips, South Branch, Somerset Co.	Jacob D. Quick, South Branch, Somerset Co.
Union	Ralph C. Wilson, Leesburg, Cumberland Co.	Mrs. Laura H. Smith, Leesburg, Cumberland Co.	Herbert J. Smith, Leesburg, Cumberland Co.
Fairlawn	Albert J. Ackerman, Ridgewood R. D. 2, Bergen Co	Wm. H. Cadmus, Fairlawn, Bergen Co.	Mrs. Dr. Ellis, Ridgewood R. D. 2, Bergen Co.
Raritan	Wm. R. Brower, Port Monmouth, Monmouth Co.	Harry Damack, Keyport R. D. 2, Monmouth Co.	James S. Hendrickson, Keyport R. D. 1, Monmouth Co.
Farmingdale	———— Hulsart, Farmingdale R. D. 2, Monmouth Co.	Clara Palmer, Farmingdale R. D. 1, Monmouth Co.	Miss Mattie Craig, Farmingdale, Monmouth Co.
Lafayette	Brice B. Stanton, Lafayette, Sussex Co.	Anna Everett, Lafayette, Sussex Co.	Mrs. C. V. Runion, Lafayette, Sussex Co.
White House	Walter H. Opie, White House R. D. 2, Hunterdon Co	Ethel M. Burdette, White House, Hunterdon Co.	Martin Messler, Whitehouse R. D. 1, Hunterdon Co.
Frankford	J. E. Dickerson, Branchville, Sussex Co.	E. R. Shay, Branchville, Sussex Co.	Mrs. Fanny E. Bale, Augusta, Sussex Co.
Shrewsbury	J. C. Richdale, Phalanx, Monmouth Co.	F. A. Bloodgood, Lincroft, Monmouth Co.	A. O. Morford, Red Bank, Monmouth Co.
South Seaville	Geo. Sayre, Clermont, Cape May Co.	Eli Towsend, Clermont, Cape May Co.	L. T. Swain, Swainton, Cape May Co.
Titusville	J. Warren Fleming, Titusville, Mercer Co.	Jos. K. Leigh, Lambertville, Hunterdon Co.	Mary F. Titus, Titusville, Mercer Co.
Hardyston	Alex. Walt, Hamburg, Sussex Co.	Minnie F. Little, Hamburg, Sussex Co.	James M. Kimble, Hamburg, Sussex Co.
Farmers' Enterprise	John Roy, Newton R. D. 2, Sussex Co.	Chas. M. Crawen, Newton R. D. 2, Sussex Co.	Mrs. Laura Stickels, Blair, Sussex Co.
Blue Anchor	Benj. Barrett, Blue Anchor, Camden Co.	Frank W. Platt, Blue Anchor, Camden Co.	Wm. H. Marvin, Cedar Brook, Camden Co.
Palermo	J. Edward Bauer, Breesley's Point, Cape May Co.	Jesse T. Young, Beesley's Point, Cape May Co.	Sarah Young, Palermo, Cape May Co.
Glendola	Geo. E. Rogers, Belmar R. D. 2, Monmouth Co.	Edgar C. White, Belmar R. D. 1, Monmouth Co.	Annie E. Low, Asbury Park R. D. 2, Monmouth Co.

SUBORDINATE GRANGES—(Continued).

GRANGES.	MASTERS AND ADDRESSES.	SECRETARIES AND ADDRESSES.	LECTURERS AND ADDRESSES.
Millstone Valley,	Geo. B. Randolph, Bound Brook R. D. 2, Somerset Co	E. M. Davis, Millstone, Box 31, Somerset Co.	Mrs. John G. Voorhees, Blackwell's Mills, Somerset Co.
Lawrenceville	Wm. M. Hendrickson, Lawrenceville, Mercer Co.	Chas. H. Smith, Trenton R. D. 4, Mercer Co.	Mrs. Frank Applegate, Princeton, Mercer Co.
Washington Valley	H. D. Opdyke, Martinsville, Somerset Co.	Lincoln Wallace, Martinsville, Somerset Co.	Wm. F. Wary, Martinsville, Somerset Co.
Salem	Richard Ware, Salem, Salem Co.	Anna Reeves, Salem, Salem Co.	Mrs. Mary Waddington, Salem, Salem Co.
Anchor	John W. Jamison, Cassville, Ocean Co.	C. M. Rorer, Cassville, Ocean Co.	Ella N. Jamison, Cassville, Ocean Co.
Pleasantville	B. Frank Martin, Pleasantville, Atlantic Co.	W. L. Turpin, Pleasantville, Atlantic Co.	Mrs. Winfield Adams, Pleasantville, Atlantic Co.
Pompton Valley	A. J. H. Lockwood, Pompton Lakes, Passaic Co.	James I. Ackerman, Pompton Lakes, Passaic Co.	H. L. Wells, Pompton Lakes, Passaic Co.
Swartswood Lake	Chas. E. Hendershot, Swartswood, Sussex Co.	Geo. G. Hill, Swartswood, Sussex Co.	J. M. Robinson, Swartswood, Sussex Co.
Stillwater	John W. Earl, Stillwater, Sussex Co.	Wm. C. Earl, Stillwater, Sussex Co.	O. Van Horn, Stillwater, Sussex Co.
Tranquillity	Elmer E. Cooper, Tranquillity, Sussex Co.	Clarence Cook, Newton R. D. 1, Sussex Co.	Peter M. Martin, Tranquillity, Sussex Co.
Clayton	Thomas C. Wilson, Franklinville, Gloucester Co.	Mrs. Lizzie Shute, Clayton, Gloucester Co.	Mrs. Martha Nelson, Clayton, Gloucester Co.
Pedricktown	Albert Sailor, Pedricktown, Salem Co.	Harry S. Hortman, Pedricktown, Salem Co.	Sarah Risner, Pedricktown, Salem Co.
Pennsgrove	Wm. F. Sailor, Pennsgrove, Salem Co.	James B. Summerville, Pennsgrove, Salem Co.	Mrs. James Summerville, Pennsgrove, Salem Co.
Westville	Theodore Fleetwood, Westville, Gloucester Co.	Sam'l H. Hewitt, Westville, Gloucester Co.	Lavina Headley, Westville, Gloucester Co.
Pequackenonk	Henry Islieb, Paterson R. D. 2, Passaic Co.	Sam'l R. Thompson, Paterson R. D. 2, Passaic Co.	Mrs. Sam'l R. Thompson, Paterson R. D. 2, Passaic Co.
Plainsboro	H. W. Jeffers, Plainsboro, Middlesex Co.	Robert J. Keppel, Monmouth Junction, Middlesex Co.	Mrs. H. W. Jeffers, Plainsboro, Middlesex Co.

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	80	25	$0 80									
Bergen	105			110			110			120		
Burlington	100	40	75	100	30	$ 00	100	18	$0 65		40	$0 60
Camden	110	45	70	100	20	1 05	100	14	95			
Cape May												
Cumberland	110	50	70	90	18	90				80	30	65
Essex												
Gloucester	110	40	68	100	18	1 00	100	10	75			
Hunterdon	150	50	80	80	14	1 00	80	14	80	120	30	50
Mercer	125	45	75	100	22	1 00	100	18	78	120	40	60
Middlesex	110	30	68	90	16	95	90	15	75	95	30	52
Monmouth	100	60	70	85	20	1 00	85	18	75			
Morris	110	40	80	75	20	1 10	100	25	75	100	33	
Ocean	120		60				100		72			
Passaic												
Salem	150	60	70	100	18	1 00						
Somerset	115	30	80	100	17	98	100	20	68	100	35	60
Sussex	115	50	95	80	18	1 10	85	16	80	105	30	63
Union	85	50	75				100	20	85			
Warren	90	35	60	85	18	1 00	85	17	75	90	40	65

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				150	2½	$16 00	55	25	$3 00	200	60	$2 00
Bergen	95			110		20 00	50		2 50			
Burlington				110		12 00	80		2 50	110		
Camden				120	2½	13 00	90	60	2 00	100	85	2 25
Cape May												
Cumberland				102	1½	14 00	65	25	2 50	120	65	2 25
Essex												
Gloucester				125	2	13 00	100	35	2 50	150	80	2 00
Hunterdon	100	25	$0 70	100	1½	10 00	60	25	1 60			
Mercer	90	20	75	125	2	14 00	75	30	2 25	100	38 bbls. / 125	2 00
Middlesex				110	1½	12 00	60	20	2 25	25	20	2 50
Monmouth				100	2	15 00	60	60	1 75	100		
Morris	100	25		110	1½	18 00	50					
Ocean	75			100		13 00	60		2 50	100		2 10
Passaic												
Salem				125	1¾	14 00	75	30	2 50	115	55	2 00
Somerset	80	25	80	110	1½	12 00	100	30	2 40	125	35	2 00
Sussex	75	18	90	150	1¾	16 00	50		3 00			
Union				100	1¼	18 00						
Warren	75	22	85	95	1½	13 00	60	20	1 00			

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				200	40	$1 50	250	100	$0 75	125	3,000	$0 03
Bergen	45		$3 50	80		3 00	98		1 50	100		02½
Burlington	50			75		1 25	100			75		05
Camden				100	100	1 00	100	250	60	90	5,000	02
Cape May												
Cumberland	60	25	2 75	95	65	90	105	175	85	150		
Essex												
Gloucester	40		2 00	100		1 00	35			100		
Hunterdon	60		1 20	80		1 00			1 00			
Mercer	25	15	2 75	75	40	1 25	25	75	1 25	100	300	05
Middlesex	25	20	3 00	25	10	1 00	75		80			
Monmouth	40			85						100		
Morris				100		1 50	115	150		25		
Ocean	20		3 00	100		50	100		90			
Passaic												
Salem												
Somerset	50		1 00	100		1 25	90		60	80		03
Sussex	75		1 50									
Union				100	200	1 00	75	200	90			
Warren	25		2 25	70		1 50	25		1 25			

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 10			100	$0 15			100	100
Bergen	100	10					120	12	90	$0 14	125	12	100	100	125	125
Burlington		07		$6 00		$6 00		07		22		18	100		100	
Camden	100	07					100	08	100	24	100	16	100	100	100	100
Cape May																
Cumberland	90	07	100				80	08	100	24	100	17	100	75		
Essex																
Gloucester	100	07	100	5 00		6 00		08		30		20	100	100	100	100
Hunterdon	100	08					100	07	80	18	100	11				
Mercer	90	07½	75	5 00		5 00	90	07	70	18	100	15	100	100	90	95
Middlesex	95	07½	100	5 00	100	5 00	90	07½	100	25	110	16	100	100	100	100
Monmouth	100	07½	100	6 00	100	6 00	100	07	100	25	100	16	90	100	90	100
Morris	100	08						07			100	16	100	110	100	110
Ocean	100	07			100	5 00	100	07			100	18	100	110		
Passaic																
Salem	100	06					90	08	80		90	15	90		100	
Somerset	100	06	75	5 00	80	5 50	100	06½	70	25	110	15	100	110	100	110
Sussex	100	07½	100		100		100	09	110	23	100	12	100	100	100	100
Union	70	08									100	14	90	80	100	85
Warren	90	07½	90	5 00	70	4 50	90	07½	50	20	100	12	100	90	75	80

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	$50 00
Bergen	110	$150 00	110	$200 00	80	60 00
Burlington		165 00		165 00		45 00
Camden	100	175 00	100	200 00	100	50 00
Cape May						
Cumberland	100	175 00	100	160 00	100	45 00
Essex						
Gloucester	100	150 00	100	200 00	100	60 00
Hunterdon	100	180 00			100	50 00
Mercer	95	175 00	100	200 00	90	45 00
Middlesex	100	150 00	100	160 00	75	40 00
Monmouth	100	240 00	100	250 00	100	45 00
Morris	100	100 00			100	45 00
Ocean	100	175 00			95	40 00
Passaic						
Salem	100	150 00	100	140 00	100	55 00
Somerset	100	150 00	100	125 00	115	40 00
Sussex	100	140 00			95	55 00
Union	100	160 00			80	40 00
Warren	90	175 00	75	150 00	75	55 00

Reports of County Boards of Agriculture.

ATLANTIC COUNTY.

OFFICERS FOR 1909.

President, JOSEPH BUTTERHOF.....Egg Harbor City
Vice President, A. J. RIDER.....Hammonton
Secretary, VALENTINE P. HOFFMAN.....Egg Harbor City
Treasurer, WILLIAM LIEPE.....Cologne

The season of 1908 in many respects was a repetition of the previous year, being also very backward, so that a number of crops showed quite a diminution in yield and quality compared with the previous year; amongst which were corn, white potatoes, apples, raspberries and blackberries, cabbages, tomatoes and cranberries. An increased yield was shown in hay, sweet potatoes, pears, peaches, grapes and strawberries.

The grape rot which for the past few years had been less prevalent, has enlivened again the hopes of the vintner, and in consequence many abandoned vineyards have been renewed, and new areas have been planted, as it has been or is demonstrated that with the grape rot under proper control, it is a well-paying and lasting crop, with commensurate prices for desirable varieties.

Where in former years our wine manufacturers could obtain hereabouts all the grapes needed for manufacture, since the prevalence of the rot they were forced to obtain their main supply from outside sources, but it seems that for the last two years this loss is being retrieved again. The magnitude of the wine industry in Egg Harbor City and vicinity may be judged that in some years as high as 100,000 gallons of wine were manufactured, and that there are at present wine vaults here, containing from 25,000 to 100,000 gallons of wine.

The soil of Atlantic county is especially adapted for the growth of fruit, berries, sweet potatoes and truck farming, and that is the

reason why—with the exception of corn—the sowing and raising of all other cereals is steadily decreasing. The expansion of the good-roads system has been particularly instrumental in increasing the area of truck farms.

Spinal meningitis amongst horses was quite prevalent about September 1st, but with the appearance of frosts, about October 12th, it disappeared again. Swine disease also made its appearance in some neighborhoods.

Two farmers' institutes were held in this county. The first at Hammonton, on December 4th, 1908, and the second at Egg Harbor City, on March 4th, 1909. At the first institute the topics discussed were: "Connecting Knowledge with Practice," "The Production of Melons for Market," "Co-operative Selling of Farm Produce; the Freehold Plan," "Care and Management of Poultry," "Exhausted Soils," "Something Every Horse Owner Should Know," "The Importance of Spraying, and Suggestions from Experience," "Fruit Production, with Special Reference to Peaches."

At the second institute the topics were: "What are You Farming For," "Melon Culture," "The Makeup of a Fertilizer," "Controlling the San José Scale and Other Insects Injurious to Vegetation," "Peach Culture," "The Advantages of Pure Bred Poultry on the Farm."

VALENTINE P. HOFFMAN, Secretary.

BERGEN COUNTY.

OFFICERS FOR 1909.

President, C. C. BASLEY.....Maywood
Vice President, WILLIAM BRANDENBURG, JR.....North Arlington
Secretary, GEORGE P. F. MILLAR.....North Arlington
Treasurer, FRED. V. STROHSAHL.....Park Ridge

DELEGATES TO STATE BOARD.

JOHN F. BOMM, two years.....Westwood
FRED. V. STROHSAHL, one year.....Park Ridge

The board held five meetings during the year. The first, a quarterly meeting held in Hackensack, was well attended, and besides the regular routine of business, a great deal of good was done by the members giving their experience.

The second, held with an institute at Woodcliff, was well attended. The State, through Secretary Dye, furnished speakers on "Market Gardening," "Fruit Production," "The Horse," and "The Management of Poultry."

The field meeting was held at the farm of Millar Brothers, but being stormy, very few attended, so the real object of the meeting was lost.

The fall institute was held in Spring Valley. Those who attended kept the speakers busy answering questions. The subjects discussed were "Bee Keeping," "Potato Growing," "Poultry," "Agricultural Education in the Rural Schools," and "Care of the Horse."

Our farmers have received a great deal of good from our board meetings. The finances of the Bergen board, under the guiding hand of ex-President John Bomm, have been put on a sound footing. Mr. Bomm has retired until further needed.

GEORGE P. F. MILLAR, *Secretary.*

BURLINGTON COUNTY.

OFFICERS FOR 1909.

President, LEVI DUDLEY.....Moorestown
Vice President, HULINGS COLES.....
Secretary, H. H. ALBERTSON.....Burlington

The climatic condition of the spring of 1908 was cold and late, which interfered with the fruit crop. The frost injured the apple, peach and pear blossoms to a great extent.

It seems to be impossible of late years to have an apple crop in this section of the country, with the scale and blight to contend with. Unless some remedy is discovered, all of our orchards will be destroyed. At the present time many show the effect of these

pests, and many farmers who have orchards are digging them up and selling the butts. I fear in a very short time an apple orchard will be a curiosity, and those who are able to find a remedy to destroy the blight and the scale will be well rewarded for their effort. It is sad to see many of the old orchards, which produced such delicious fruit, destroyed and dug up.

The peach in the forepart of the season promised a good yield, though later much of the fruit dropped off, and that which remained on the trees was of an inferior quality.

Strawberries also suffered with the late frost in the spring, consequently the crop was not a large one, although the fruit sold well and the growers realized a fair profit.

White potatoes, not more than one-half a crop, though the price was very satisfactory, and a profitable one to those who had potatoes to sell. Had it not been that an unusually large acreage was planted in potatoes, the demand could not have been supplied in this vicinity.

Sweet potatoes gave the largest crop for several years, and of an excellent quality on account of the dry weather, although prices were low.

Rye, about an average yield, and good prices were received both for the rye and straw.

Wheat was an average crop and prices good.

Tomatoes gave a fair yield, and fair prices prevailed throughout the year.

Field corn was a good crop, the season being favorable for a profitable yield, and most desirable weather for harvesting the same.

Hay was the largest yield we have had for several years, with lots of pasture during the season.

Cantaloupes were about two-thirds of a crop, at fair prices.

Watermelons were a great yield and of excellent quality, although the price was low.

Cranberries have many conditions and enemies to contend with. Climatic conditions have interfered with an average yield, and the insect has destroyed many bogs of berries. The hot weather in the forepart of July burned the blossoms on the vines, and the grasshoppers and katydids destroyed the matured fruit, consequently the yield is not more than a third of a crop.

Hogs, sheep and calves sold at very satisfactory prices, though

not so high as to warrant the extravagant prices consumers are compelled to pay for meats of all kinds.

Turkeys are scarce and high, as usual.

The farmers have been able to get all the help they desired to properly till their land, at reasonable wages.

On the whole, the products of the farm have sold well, with a good yield of most all kind of crops, excepting fruits, and it has been a profitable season to them.

H. H. ALBERTSON, *Secretary.*

CAMDEN COUNTY.

OFFICERS FOR 1909.

President, E. FRANK BREWER.....Blackwood
Vice President, A. H. HURFF.....Berlin
Secretary and Treasurer, DANIEL W. HORNER.....Merchantville

REPORT BY THE SECRETARY.

The twenty-fifth annual meeting of the Camden County Board of Agriculture was held at Blackwood, December 12th, 1908. President Martin Schubert welcomed the gathering. To make our meetings popular and to get expressions from all parts of the county, it has been our policy to elect a large number of directors from different sections of the county, who meet some time prior to our annual meeting to formulate a program, thereby giving the people, both men and women, in all parts of the county an opportunity to state their grievances and suggest remedies for same.

Topics discussed at the board meeting were: "Some Experiences and Observations on a 3,000-mile Trip," "A Larger Measure of Political Rights to Women," "Has the Acquisition of the Kieffer Pear Been Followed by Satisfactory Results From a Financial Standpoint?" "Spraying For Blight and Fungous Diseases," "Healthful Conditions of Our Homes," "How Should the Home and School Help the Country Child?" "Local Markets at Railroad Stations," "Questions of the Commission on Country Life."

CROP YIELDS, &C.

While the results from our labor were not all that we had hoped for the past year, the feeling is quite general that the shoe that pinches severely is on the other fellow's foot. Just at present the high cost of living, of food, and the great probability that it will so continue for some time, has convinced the farmers in this section that about all he needs is something to sell, hence we expect a large acreage to be planted the coming spring. Our horse-proud men and breeders are availing themselves of the opportunity to improve their stock, an imported Percheron belonging to the State having been secured by our county.

CUMBERLAND COUNTY.

OFFICERS FOR 1909.

President, WALTON E. DAVIS.....Shiloh
Vice President, ANDREW MILLER.....Shiloh
Secretary and Treasurer, CHARLES H. DUNSAFE.....Cedarville

The Cumberland county board of agriculture held its annual meeting February 19th, 1909, in Bridgeton. The treasurer made his annual report, which was accepted, and the above officers were elected for the ensuing year.

Mr. Robert Peacock gave a very interesting report of the annual meeting of the State Board of Agriculture. Mr. Arthur Seabrook read an instructive paper on co-operation in buying seed potatoes; irrigation of lands, &c.

Mr. G. A. Mitchell, of Vineland, gave an outline of the work of the Farmers' Demonstration Society. In his many good remarks he said that it had been demonstrated that alfalfa could be grown to a certainty and with good profit to the farmer who would make his land rich with manure and plenty of lime. It would also pay to sow one hundred pounds of nitrate of soda on grass land for hay.

Dr. John B. Smith gave an address full of instruction and valu-

able information to an appreciative audience. He touched upon economic entomology and destroying breeding places of mosquitoes by drainage. This was illustrated by stereopticon views. They showed low meadows with miles of ditches, with machines at work cutting drains, thereby redeeming and bringing into value these sunken meadows that formerly were breeding places for mosquitoes, of which there are forty different kinds.

The lecture was an educational one; it demonstrated the fact that drainage not only destroys the breeding places of the mosquitoes, but the sanitary conditions are improved thereby. Let the good work go on, and it surely will if the funds are forthcoming to defray expenses incurred; we can't get something that is valuable or beneficial without money. Dr. Smith answered many questions concerning the strawberry weevil and the onion maggot.

Some very good remarks were made by Mr. E. L. Bolles on seed corn, with statistics to confirm the importance of selecting seed. The past year has not been as prosperous to farmers of this county as the year 1907. Farmers are hoping and expecting a prosperous year, 1909, and are making great preparations for the coming season. Growing white potatoes is carried on in a wholesale way, many farmers buying fertilizers in carloads to be used on them. The acreage will be increased about one-third, which means for a farmer to have from ten acres to one hundred and fifty.

CHARLES H. DUNSAFE, *Secretary.*

ESSEX COUNTY.

OFFICERS FOR 1909.

President, DR. JOS. B. WARD.....Elizabeth and Lyons avenues, Newark
Vice President, AUSTIN E. HEDDEN.....Verona
Secretary, JUSTUS W. DOBBINS.....Verona
Treasurer, GEORGE E. DE CAMP.....Roseland

During the past year we have held five meetings. A regular programme was provided, consisting of papers on appropriate sub-

jects, topics for discussion, reports from delegates to the agricultural and horticultural societies and other matters of interest to the members.

We have added new members, and our county board is doing good work.

The most successful farmers' institute held in Essex county was that of November 30th.

The meetings were well attended by an appreciative audience.

The subjects selected by our State secretary were of special interest to farmers of this locality, making the institute of practical value.

The question box was of special interest. One of our members attended the Peninsula Horticulture Society, at Salisbury, Maryland, last January, and made an interesting report of the proceedings of that meeting.

The course of lectures given by the Farmers' Club, American Institute, New York City, was attended by some of our members and reports made to this board which added interest to our meetings.

A car of fertilizer was purchased through a committee appointed by the board.

A cold, wet spring, followed by a very dry summer and fall, interfered with some crops, most noticeably on potatoes.

As the potatoes were mostly planted during the cold weather in May, much of the seed rotted in the ground.

Corn planting was delayed, but owing to late fall all ripened.

Drought struck the potatoes as they were setting and later the blight; in some cases the planter did not get back his seed.

The average for the county this year is thirty bushels.

Corn, very good crop, 100 per cent.

Apples, very poor.

Garden truck, good.

Prices, satisfactory.

With the exception of potatoes and apples, crops have been better than 1907.

At this writing many streams are low and wells dry, owing to dry summer and fall.

JUSTUS W. DOBBINS, *Secretary.*

GLOUCESTER COUNTY.

OFFICERS FOR 1909.

President, EDMUND T. RIDGWAY.....Mullica Hill
Vice President, JAMES C. WHITE.....Sewell
Treasurer, WILLIAM M. BORDEN.....Mickleton
Secretary, JOHN TONKIN.....Glassboro

Four very interesting and instructive meetings have been held and with an average attendance of ninety-four. The subjects discussed were: "Should Young Men Run Largely into Debt to Farm Extensively?" "Do Housewives Have Their Share of Labor-Saving Utensils?" "The Reason Why Clover Sod is Best for Corn, and Does it Pay to Thin Corn While Growing?" "The Proper Time to Cut Grass for Hay and Best Method of Curing," "Application of Kainit to Asparagus," "Stand Taken by Press on Agricultural Affairs," "Interest Taken by Farmers in Public Affairs," "Means of Getting Better Returns for Products of this Community," "Education of Our Children." Several other minor subjects were discussed.

A two-day farmers' institute was held at Mullica Hill, November 18th and 19th. The attendance was large, the subjects up-to-date, the addresses and discussions practical and helpful.

JOHN TONKIN, *Secretary.*

HUNTERDON COUNTY.

OFFICERS FOR 1909.

President, JAMES LANE.....Readington
Vice President, H. F. BODINE.....Flemington, R. D. 2
Secretary, WILLIAM W. CASE.....Frenchtown, R. D. 1
Treasurer, F. J. TOMLINSON.....Pittstown, R. D. 1

The board held two meetings during the year. The August meeting at Stanton was largely attended. Addresses were made

by the secretary and J. H. M. Cook. The secretary spoke on the subject of agricultural botany and our dependence for fruit pollination on insects. He believed the so-called "June drop" of the peach is solely due to lack of cross pollination, a condition easily remedied by locating large apiaries of honey bees in every fruit section. Mr. Cook spoke on the natural history of the bee and matters pertaining to the apiary in general.

The November meeting at Flemington was a business meeting, with discussions on foul seeds in general and dodder in particular. The county delegate to the State board, Mr. F. J. Tomlinson, was instructed to secure action of the State board favoring a law against marketing clover seed from dodder-infested fields The horse nettle has also been reported from portions of the county.

There seems to be decided upper tendency in farm values. In Croton vicinity many farms have been purchased by Jews and Italians, with a view to permanent location. In some of the country schools in that locality more than half the enrollment is composed of these two nationalities. Outside of these purchases, changes in land values have not been great.

Horses remain high and large numbers are imported from the West, selling above two hundred dollars for number one animals. Dairy cattle are also high, and hogs are being neglected; pork at six to seven cents being produced at a loss with mill feeds $35 per ton. Some dairymen who are selling their milk at the shipping stations have practically banished the hog from the farm. Sheep are scarce.

Fruits of all kinds were below average in both yield and price, splendid Kieffer pears bringing but ten cents per basket, while the consumer in the city at the same time was paying ten cents for four of them. Apples ranged from $1 to $1.50 per barrel, practically all being spotted with scale. The San José scale did much damage during the season, probably more than in any two previous seasons; dead apple orchards appear in every direction. Cherries and Kieffer pears so far seem to be immune.

There is but one way for central New Jersey to regain her standing as a fruit grower, especially peaches, that is the organization of fruit companies with capital enough to plant orchards on a large scale, and be thoroughly equipped from the start to fight all pests of blight or scale that may appear. With the present persistency of the scale it is practically impossible for the individual farmer to master the situation. Land suitable for peach

cultivation can be had in many parts of the county at nominal prices, and could be made to yield returns with the best fruit lands of California. Tent caterpillars have been very scarce the past season; neither the brown-tail nor gypsy moth have been found.

Although dairy feeds have advanced the price of milk, it is about the same as last year. The reports of C. R. Peterman's two creameries have been kindly furnished and, with that of Locktown, form a valuable record of prices paid from year to year. Mr. Peterman received at his Cherryville creamery, for the year ending October 1st, 1908, 1,057,469 pounds of milk, and at Oak Grove, 908,942 pounds, a very slight falling off compared with last year, and an average price of thirty and one-fourth cents per pound for butter fat, compared with thirty-one and one-sixth last report. Locktown also shows a slight decrease with prices practically same as last year.

George H. Scott has converted his butter creamery at Baptistown into a condensing factory, the first in this county, and is thus enabled to pay higher prices for milk and yet successfully compete with the shipping stations, some of which are becoming so exacting regarding sanitation, &c., as to drive many out of the business or to patronize the butter creameries, as the expenses of ice and improved stables, &c., is not counterbalanced by a sufficient advance in price of product, as one dairyman tersely put it when he said, "They want certified milk at the lowest prices paid wholesale on the general market for common milk."

Report of Locktown Creamery for the Year ending October 31st, 1908, as taken from the Books, by Walter S. Bloom, foreman:

	No. Lbs. Milk Received.	No. Lbs. Butter Made.	Butter Sold for—	Skim Milk Sold for—	Average Test of all Milk Received.	Price Paid per Lb. for Butter Fat.
November, 1907	101,529	4,873	$1,781 35	$63 37	4.34	$0 36
December, 1907	90,402	5,204	1,691 96	54 27	4.47	38
January, 1908	103,310	5,150	1,768 40	58 16	4.28	40
February, 1908	101,213	5,250	1,906 21	51 80	4.23	41
March, 1908	110,299	5,617	1,801 35	60 00	4.07	37
April, 1908	114,702	5,451	1,739 91	64 05	3.96	35
May, 1908	148,323	6,865	1,868 31	80 53	3.98	30
June, 1908	171,558	8,708	2,323 63	91 09	3.95	30
July, 1908	141,323	6,865	1,671 43	99 31	4.00	31
August, 1908	142,309	6,777	1,793 96	89 98	4.06	30
September, 1908	145,085	7,286	1,987 77	85 10	4.12	31
October, 1908	126,950	6,264	1,892 11	78 10	4.20	33
Total	1,497,003	74,310	$22,226 31	$875 76	.....	.....
Average					4.138+	34½

POULTRY.

The price of eggs has not advanced with the price of feeds. This, with the depredations of poultry thieves—who annually steal thousands of chickens in the western half of the county—is causing many to reduce their efforts in poultry and egg production. The thieves as yet have not been brought to justice.

Eggs are about the same in price as four years ago, the books of a poultry man of Kingwood township showing sales of thousands of dozens at an average price of slightly under twenty and one-half cents a dozen.

So far alfalfa has not been a success. Of all the trial plots seeded in 1907 we know of but one that proved even a reasonable success. The trial acre seeded by myself all perished, although a magnificent stand during March and April. Inoculation seemed to make no difference. Perhaps the abnormally wet season, both fall and winter, in a general way was responsible for much of the unfavorable results. We hope that experimental planting will continue until success is finally attained, as merchant feeds at present are so high as to greatly curtail profits in dairying.

Notwithstanding the very unfavorable conditions for wheat and rye at the time of and after seeding during the fall of 1907, many of the fields that failed of germination during autumn developed growth in spring, in some instances producing full crops, with a net result of a three-fourths normal crop of both these cereals. Oats, a medium yield, of good quality. Corn was a banner crop, many yields of seventy-five to eighty bushels of shelled corn per acre being reported; the county average is very close to fifty bushels, shelled, per acre, and practically all of superb quality. Buckwheat also yielded well, and the early crop disposed of at ninety cents per bushel, the price later dropping to sixty to seventy cents, the yield averaging twenty-five bushels per acre. The yield of all hay was close to one and one-half tons per acre, and quality good. Prices: Wheat, $1; rye, eighty cents; corn (new), sixty-five cents; hay, prime timothy, $12. Good crops of clover seed were harvested on many fields.

Conditions for seeding this fall were ideal, but the experience of last year led many to seed too early, which resulted in much overgrowth and symptoms of damage by the Hessian fly.

There was a large acreage of tomatoes in Quakertown vicinity, but a short crop and relatively high prices, especially of the late crop.

The honey crop of the county is again normal, the yield during the season just closed aggregating fully fifteen tons, of fine quality. Average yields of as high as 100 pounds of extracted honey per colony were realized, the season being far more favorable to the production of extracted than comb honey. Foul brood, both American and European, are still in evidence, but are being pretty generally held in check, although the necessity of a foul brood law becomes more apparent every day. Apiaries generally increased largely, and went into winter quarters in splendid shape and heavy with stores. Honey prices, however, are considerably lower than one year ago. WILLIAM W. CASE, *Secretary.*

MERCER COUNTY.

OFFICERS FOR 1909.

President, J. T. ALLINSON.....Yardville
Vice President, FERDINAND A. BLACKWELL.....Pennington, R. F. D.
Treasurer, I. J. BLACKWELL.....Titusville
Secretary, FRANKLIN DYE.....Trenton

DELEGATES TO STATE BOARD.

J. M. DALRYMPLE, two years.....Hopewell
JOHN V. GREEN, one year.....Trenton

At the annual meeting in Trenton, March 26th, the officers named were elected, and instructive addresses on agricultural matters were made by several of the members. The retiring president, John V. Green, spoke of the progress made in agriculture during the past twenty-four years since this board was organized; that we have accomplished a great deal, yet much more is to be done. We must secure parcel post, postal savings banks, &c. Continuing, he said:

"An up-to-date farmer, with his neat buildings, surrounded by plenty of fruit, vegetables, &c., and with land that by scientific handling is made to produce a good income—that man is to be envied by other people, and the city people are beginning to recognize the fact, and more and more each year are reaching out for farms and homes in the country.

"Our State Board of Agriculture, with the system of institutes it has inaugurated, is doing a grand work in educating the farmer to the possibilities of his calling. Our experiment station, too, is helping in the good work, and with the short courses in agriculture, farmers' sons are taught scientifically, and the life upon the farm presents a different aspect to them than it did to farmers' sons twenty-five years ago.

"Our little Mercer county brotherhood has held together all these years, and no doubt valuable information has been derived from its meetings, but just think what might have been accomplished, and what still greater good would be given the agricultural industry of this county, if the 1,500 or more farmers located within its boundary would avail themselves of these meetings. It seems strange to me that, with the privileges we enjoy of being located here in the centre of the State and so near the State capitol, so many farmers cannot see the advantage of taking a day off about three times a year and meet with us. They don't realize what they lose in not attending these meetings. Why, the subject of seed corn that was so ably lectured on at the last meeting of the State board was worth going miles to hear, and of incalculable benefit in dollars and cents if practiced by all who heard it."

An address was made on "Asparagus Production," on "Poultry and Egg Production," and on "The Farmer as a Citizen."

A field meeting of the board was held on the farm of D. C. McGalliard, July 31st, which was much enjoyed by the 150 people present. Farmers and their wives spent a profitable afternoon inspecting the farm, orchards and garden of Brother McGalliard. Short addresses were made on "Advantages of Rural Life," "Improvement of Farm Homes," "Improvement in the Knowledge and Practice of Agriculture," &c., after which a lunch was served. Those present pronounced this meeting a success, and requested a similar meeting for next fall.

The Hopewell Valley Canning Company reports 100 acres of tomatoes planted; 679 tons delivered to the factory, at $9 per ton, aggregating $6,111 paid the farmers. The largest yield per acre

was grown on the farm of J. M. Dalrymple—thirteen tons and 170 pounds. Two hundred and forty-six thousand cans of tomatoes were put up, and most of them sold as "futures." Sum paid for wages and salaries was $4,050, 109 men and women being employed. This enterprise is considered to be a profitable one for that community.

The agricultural interests of the county are going forward. Farmers avail themselves of the advantages of organization, and of the advancements made from time to time in scientific research and improved methods of handling soils, crops, stock, &c.

Good home markets exist in the county, in which the products of the farms find a ready sale, the producer himself being the middleman. Transportation facilities, too, are unexcelled on the Pennsylvania railroad on the east and the Reading on the west, both of which connect with New York City and Philadelphia.

The farming lands of the county are varied in their composition and adaptability to the various crops, and anyone desiring to follow a special line of agricultural work may find a soil suited to his purpose in Mercer county. Here, too, exceptional educational facilities abound in Trenton, Princeton, Hightstown and Pennington, all of which are accessible by railroad and trolley.

There are 1,573 farms, averaging eighty-two acres, in the county, with an average value per acre of $70.

The crops of 1908 are about as follows:

Crop.	*Acreage.*	*Bushels Per Acre.*	*Total Bushels.*	*Price.*	*Total Value.*
Corn	2,200	45	99,000	$0 75	$74,250
Wheat	1,200	22	26,400	1 00	26,400
Rye	4,000	18	72,000	78	56,160
Oats	10,000	40	400,000	60	240,000
Hay	23,000	2 tons.	46,000	14 00	644,000
White Potatoes..	1,800	90 bush.	162,000	75	121,500
Sweet Potatoes..	200	125 "	25,000	66	16,500
					$1,178,810
Miscellaneous vegetables and fruits at $30 per farm					452,190
Milk of 13,756 cows at $36 per cow					495,116
Poultry, eggs, veal calves, pork, &c., at $100 per farm					157,300
					$2,283,416

FRANKLIN DYE, *Secretary.*

MIDDLESEX COUNTY.

OFFICERS FOR 1909.

President, B. DEWITT GILES.....New Market
Vice President, GEORGE W. MOUNT.....Monmouth Junction
Secretary and Treasurer, LEWIS D. WALKER, JR...New Brunswick, R. F. D. 1

The board has held three interesting and instructive meetings during the past year, and if more farmers would attend they would increase the usefulness of the meetings.

The first was held on February 15th; the day was very stormy, but a good number attended. We were addressed by Professor E. B. Voorhees, Mr. E. R. Collins, of Westfield, and Professor Billings, of the College Farm.

At the meeting in May, Mr. Loomis, of the Experiment Station, addressed us on the subject of "Lime." Mr. Minkler spoke on "The Farmers' Horse." We also had the pleasure of listening to a short talk by Mr. J. C. Beaver, of the United States Department of Agriculture.

The annual meeting was held on November 21st, when the officers and directors were elected for the coming year and the crop and stock report of the county was prepared.

Most of the crops have been good the past season, potatoes being among the poorest. Much of the seed was of the inferior quality, and the drought cut the crop short. Prices have ranged high all the fall. Hay is much lower than last year, and many complain that it is weighing very light. A good crop of corn was harvested.

The price of pork has dropped so that there is small profit in feeding pigs corn at seventy cents per bushel, and mill feeds at $30 to $34 per ton. Many are going out of the milk business on account of the high prices of feed and the exactions of the health boards. Winter grain never looked better at the beginning of winter. Farm help has been more plentiful the past season, but the factories are reopening and there is a prospect for it to be scarce next season. LEWIS D. WALKER, JR., *Secretary.*

MONMOUTH COUNTY.

OFFICERS FOR 1909.

President, D. HOWARD JONES.....Freehold, R. F. D. No. 2
Vice President, H. L. LEHR.....Keyport, R. F. D. No. 1
Secretary, D. AUGUSTUS VANDERVEER.....Freehold
Treasurer, WILLIAM M. MOREAU.....Freehold, R. F. D. No. 4

The board held two meetings during the year. On February 29th, at the court house, Freehold, when the reports of the delegates to the State Boards of Agriculture and State Horticulture Society were read. Professor F. C. Minkler gave a talk on "Corn." Other topics discussed were: "Alfalfa," "Parcel Post for Rural Routes" and "Postal Savings Banks." The second meeting held was the annual meeting on November 21st, for the election of officers, collection of dues and to hear reports of the county directors pertaining to the conditions of agriculture in the county. The various horticulture societies and granges in the county are doing well since our last report. The Monmouth County Farmers' Exchange, located in Freehold, has been organized for the sale of the potato crop, asparagus, &c., and the purchase of seed potatoes, fertilizer, &c. There are over 400 members. They marketed, the past season, 400,000 barrels of potatoes, about two-thirds of the crop grown here. They purchased for seed 14,000 barrels for next season's planting. They returned to the members an average price for the season $1.75 per barrel. The amount of business done by the exchange was over $400,000. There are many farmers from Long Island buying farms in the county from $100 to $200 per acre, with improved buildings.

I enclose a report of C. C. Hulsart, one of our directors from the trucking section of the county, from Matawan and Raritan townships; the conditions there were not so good.

DIRECTOR'S REPORT TO COUNTY BOARD.

The season of 1908 has been one of severe trials for the farmer, truck grower and all agriculturists in general. In the outset climatic conditions were fair, in fact spring opened at least two weeks

ahead of 1907; farm work was begun and progressed rapidly under fair weather conditions. Crops were planted on time and came through the ground fairly good and grew normally until the dry weather came and with it excessive heat. For a time, even though our soil was parched and dry, crops stood up nobly, particularly where proper preparation of the soil had been made and thorough cultivation kept up, showing the value of the dust mulch, particularly on our sandy soils. But the end was not yet. About the time we thought we had had all our crops and patience could stand, and hoped every day for rain, but instead of rain we had one of the worst weeks of heat, I believe, that ever visited us. In my locality the mercury ranged from ninety-five degrees to ninety-eight degrees in the shade. This was a little more than many crops could stand, hence our harvest was curtailed. In some instances one-half, in others a lesser percentage, while a few came through nearly or quite normal.

Our first crop is asparagus. This produced above 1907, but market was lower, hence net returns were only normal or a little below in many cases. The tomato crop, one of our heavy-moneyed crops, was in most instances badly hurt, harvesting only 50 per cent. of crop and that 50 per cent. not of first class size and quality. The market was also in bad shape a good deal of the time, thus cutting our gross receipts down materially.

Sweet corn for market was badly hurt, in many places, by the intense heat; was also badly infested with worms, curtailing its selling value.

Small fruits. Strawberries were badly hurt by drought, causing a short crop and many small berries after first pickings. Red raspberries produced better; vines came through the winter in fine shape and set well, but the harvest came during the drought and intense heat, which cut down the yield to that of 1907. The market being lower, receipts were less.

The cantaloupes, of which but few are grown, was one of the best crops that I produced the past season. Crop was not over large, but sold fairly well throughout the season, netting about $2.50.

Apples almost a failure; there were a few early varieties, but practically no winter fruit. Kieffer pears produced fair on some

orchards, while others scarcely any. The fruit was less cloudy and sold from $1 to $1.50 per barrel.

On the whole the season of 1908 has been one of disappointment to most, if not all, the truck farmers in my section.

D. AUGUSTUS VANDERVEER, *Secretary.*

MORRIS COUNTY.

OFFICERS FOR 1909.

President, GEORGE E. FELCH.....Florham Park
Secretary and Treasurer, WILLIAM F. ELY.....Madison

DELEGATES TO STATE BOARD.

WILLIAM E. JAMES, two years.....
EDGAR C. HOPPING, one year.....Madison

At the annual meeting of the Morris county board of agriculture, held December 19th, 1908, the officers were elected.

The past year no general meeting of the board has been held in Morristown, but the board passed a resolution, if a desire would be expressed by the farmers or others in the county, that a meeting should be held in Morristown, to have any discussions that would be of interest regarding the scale, elm beetle or any matters pertaining to the interest of the people. Those interested in having this meeting called will kindly notify the secretary, W. F. Ely, Madison.

The past year has seen many of our finest apple trees ruined by the scale. The apple crop was a failure, in general; very few apples and those small, wormy and worthless even where the trees were sprayed. Some plums were extra fine, also pears.

The potatoes in many fields were not worth digging; from some cause did not set, and what did, of no size.

Corn was extra good in many fields and others a poor yield.

Hay, as a general thing, better than common, cut and cured in fine condition.

WILLIAM F. ELY, *Secretary.*

OCEAN COUNTY.

OFFICERS FOR 1909.

President, C. MILTON RORER.....Cassville
Vice President, PATRICK DAVITT.....Tom's River
Secretary, R. C. GRAHAM.....Holmeson
Treasurer, H. R. WILLS.....Tom's River

The Ocean county board of agriculture is still progressing, although handicapped by such a wide territory, making it difficult to get the members all out at every meeting, but we have some lively discussions by eminent speakers on different topics concerning the different soils which our county contains and how to manage them to get the best results.

The past year's climatic conditions were unfavorable to all crops that matured late, except strawberries, which gave a fair crop and price. White potatoes were almost a failure, while the other crops did remarkably well, considering the dry weather. The cranberry crop was the smallest in years, but high in price.

Lumber and charcoal are the leading industries of Ocean county. Farming has not had the attention it would if we had better railroad facilities. Our taxes are not improved by the new tax commission. It adds extra expense, and is not as satisfactory as the old commissioners of appeals. We have good roads for carting and fine weather for work, and there is lots of it being accomplished. Winter crops look better than expected, and stock is in good shape, and no sickness reported.

Our farmers are going into the new year with renewed vigor and determination to maintain their place among the tillers of the soil. There has been very little game in this section, and it is becoming scarcer every year, for some reason which cannot be accounted for, and the same may be said of the honey bee. The fruit growers feel the effects of the absence of the little fellow when it comes to pollinizing small fruit, such as strawberries, cranberries, huckleberries, and other bloom to which he carries the pollen.

R. C. GRAHAM, *Secretary.*

PASSAIC COUNTY.

OFFICERS FOR 1909.

President, D. F. DUNCAN.....Paterson, R. F. D. No. 1
Vice President, IRA A. MITCHELL.....Paterson, R. F. D. No. 1
Secretary, AARON LAAUWE.....Paterson, R. F. D. No. 1
Treasurer, F. T. TORBET.....Paterson, R. F. D. No. 1

DELEGATES TO STATE BOARD.

JOHN ACKERMAN, two years.....Paterson, R. F. D. No. 1
IRA A. MITCHELL, one year.....Paterson, R. F. D. No. 1

The county board held two meetings during the year, one on February 27th, when the delegates to the State board rendered their report. The next meeting was held on December 16th, when officers for 1909 were elected and the president made an address which brought out quite a discussion on dairying, which was of profit to many of us.

CROP CONDITION.

The hay crop was fine, the best in years, with good prices, prime timothy selling at $20 per ton. Wheat and rye very good. Apples a complete failure. Potatoes, half a crop, with good prices. Dairying has about held its own. Price for milk at the door, three and one-half cents to four and one-half cents; selling in Paterson city from seven to nine cents retail.

AARON LAAUWE, *Secretary.*

SOMERSET COUNTY.

OFFICERS FOR 1909.

President, A. A. CORTELYOU.....Somerville
Vice President, BERNARD MEYER.....Finderne
Secretary and Treasurer, ARTHUR P. SUTPHIN.....Somerville

DELEGATE TO STATE BOARD.

BERNARD MEYER, two years.....Finderne

The farmers of Somerset county have reason to be grateful for the bountiful crops of hay and corn, and for the fair prices they have been able to obtain for their products for 1908.

Many farmers have discontinued the production of milk on account of the high price of feed and the low price of milk. The farmer should produce milk and be able to sell it at a fair paying price, but he will not be able to do so as long as the prices are fixed by the milk trust, which is a combination, and should be met with the organized milk producers, who should refuse to sell unless a reasonable profit obtains.

Farm prices have advanced considerably in Somerset county during the past year, especially farms along the county roads, of which this county has, with State aid, built eighty-two miles, and that without increasing the county debt or bonding the county.

Three meetings of the county board have been held, all of which were well attended and instructive.

The annual address of President A. A. Cortelyou applies so well to the conditions and future prospects of the farms of Somerset county that I give extracts from it. He said:

"Those who have been engaged in agriculture in this section during the past few years, have not had so many discouragements to meet as those who were thus engaged a decade ago. We have not been afflicted with any severe droughts, and have, in the main, been enabled to raise good crops, and the prices for them have been fairly remunerative. This section of our State, because of its proximity to the large cities lying on our eastern border, is being

rapidly sought after by those who desire suburban homes. The markets that are afforded by the rapid increase of our nearby cities, which are growing with great rapidity, will increase in value as the years go by, and will be a large factor in securing the permanency of good prices for the products that we raise. Strange as it may seem, the prevailing prices for farm lands in this State are, and have been for some little time, very much lower than the prices for farm lands in some of the western States, where the soil is not materially different in fertility from our own, and where the advantages of the markets and of prices are not nearly so good as ours.

"Our State, at the present time, is offering excellent facilities to everyone who will avail himself of them; for improvement in any line connected with agricultural work to which they wish to devote themselves, and the general tendency is to do more and more toward encouraging agriculturists in their work. Perhaps many of you have noticed a report published within the past few days that the Governor of Illinois, who is extensively engaged in stock raising on his farm, has availed himself of the opportunity offered by that State of attending the short course in agriculture so that he may be the better qualified to judge stock. His example might well be followed by most of us to our profit, but even if we have not the time at our disposal to follow his example, we can, through the meetings of this association, by our attendance and by taking an active part in the meetings, increase the value of the meetings not only to ourselves, but also to all others with whom we come in touch therein."

John R. Foster, of Hunterdon county, made an excellent address on "Cows and Milk," in which he declared that milk could not be produced at the existing prices at a profit. Equipment and other features of production have advanced 100 per cent. in twenty-five years, he said, and the price of milk has not materially advanced. The dairyman sells for an average of four cents a quart and the average cost of production, everything considered, is nearer four and a half cents than four cents.

ARTHUR P. SUTPHIN, *Secretary.*

UNION COUNTY.

OFFICERS FOR 1909.

President, E. R. COLLINS.....Westfield
Vice President, G. E. LUDLOW.....Cranford
Secretary, C. H. BREWER.....Rahway
Treasurer, OGDEN WOODRUFF.....Elizabeth

The annual meeting was held December 5th, and reports show a record of twelve regular meetings and one special meeting held during the year, also an increase in membership of nine new members. The leading subjects for discussion at the meetings were: "The Production of Hay," "The Milk Question," "Agricultural Education," "The Tax Question," "Caring for Stock," &c. Fruit crops throughout the county, with the exception of peaches, pears and grapes, were light, the apple crop being a failure. Strawberries half a crop, and other small fruits very scarce. Excessive wet weather during the month of May caused much damage to many crops, notably potatoes, rotting much of the seed before it started growth, and this together with drought at time of setting tubers, caused about a complete failure of the potato crop, many planters not getting their seed back.

Hay and grain crops turned out well, notably corn, which, though many fields were planted late, matured a fine crop of large, well-developed ears of sound quality. Frost held off well, and most garden and truck crops had a chance to mature good crops. Early cabbage, tomatoes, sweet corn, peppers, &c., yielded well, but late crops, owing to the dry weather during fall months, did not amount to much. Demand and prices have been good and help more plentiful than in the past. Live stock and poultry have about held their own during the year, being in good condition, with a lively demand for fresh eggs and chickens. Returning to the work of the board during the winter season, our January 2d meeting created much interest and brought out some good points in the production of hay. Mr. F. E. Woodruff, of Cranford, said he started his hay crop by seeding upon ground after a crop of potatoes had been taken off. He considered this

an ideal method, but it must be done early enough in the season so that the grass could get a good start before winter set in. He also recommended an annual dressing of commercial fertilizer. Mr. W. J. Thompson, of Rahway, said he considered nitrate of soda a paying investment in the production of a good crop of hay, and recommended it for use as a top dressing in the spring. Others advised barnyard manure as a top dressing, applied after cutting or during winter for the best results. At a special meeting, January 30th, in Plainfield, Mr. E. P. Beebe spoke on "Fruit and Shade Trees," which was interesting and instructive. Mr. Beebe is a pioneer in the nursery business and is well versed in the care and handling of fruits and ornamentals. T. A. Ball spoke on the best remedies and their use in combating insects, scale, &c.

February 20th the milk question was taken up and thoroughly discussed from the standpoint of the various interests. This meeting was largely attended and devoted entirely to the milk business. The wholesale producer, the retailer and the boards of health of the larger cities in the county were represented. The retailers showed that their source of supply in the county was rapidly diminishing, and that they were constantly going farther into the interior of the State to get sufficient milk to meet the demand, and what they secured was of inferior quality as compared with the county production, and that there was no stability as to price or delivery. The milk from out the county was usually forty-eight hours old before delivered to the customer. The age of milk, together with the fact that the consumer did not, in many instances, know how to properly care for it after it was delivered, was responsible for many complaints against the quality of the milk. The representatives of the boards of health took the ground that their boards stand between the producer and retailer and the consumer, their province being to see that the milk was produced under proper sanitary conditions, was properly handled and delivered to the customer pure, free from all contagion, and in proper condition to be used as food. The call for proper sanitary conditions in the stables regarding cleanliness and air space for the cattle, care in milking to prevent contamination of the milk, and care in handling for delivery to consumer. The work of their various boards is at times hampered through lack of funds, and could not, except in the case of the city of Rahway, trace all of the

milk sold in the cities to the source of supply in the surrounding counties, to ascertain if it was produced under the same conditions required of the local producers. The work of investigating the outside supply is being done by the Elizabeth board, and when they find that the conditions are not the same as required of local producers, the sale of that milk will be prohibited in the city. In Rahway all the milk sold is produced within a short distance of the city, is of good quality and satisfactory to the board, with no complaints from the producer concerning the ordinances of the board. On behalf of the producer it was contended that owing to increased cost of labor, increase in the cost of feeds, and the additional expense entailed by compliance with the rules of the boards of health, it was not possible to produce milk as cheaply as heretofore, and they have been compelled to advance the price to the retailer. This very naturally sent the retailer to look for a cheaper source of supply, which has resulted in bringing into the county milk gathered haphazard from the farms of the interior counties that in summer sold for as low as ninety cents a can of forty quarts, and in winter goes to $1.60, or stops entirely. The result is that prices are fluctuating, and while the expenditures of the producer are increased and certain, his returns are uncertain, for he must regulate his price according to the price of the vagabond milk from the interior, or be left with his product on his hands; that if all the milk offered was produced under the same conditions it would cost the same everywhere in the State, and then the cost of transportation would work as a just protection to the local producer, who could take care of himself. Those who had been in the business and given it up explained that the conditions as set forth by the producers were their reasons for retiring. They could not produce sanitary, high-grade milk in competition with the vagabond milk, so went into a more stable line of business. All agreed on the following points: That the nearer milk is produced to the consumer the better its condition when it reaches the consumer; the retailer can handle, with better satisfaction to himself and customer, milk that is not transported on the railroad; that standard regulations governing the production of milk all over the State will be for the benefit of all concerned; that the regulations of the boards of health are beneficial and necessary, and that there are no objections to them as they stand at present, provided that they are applied to all alike, the occasional producer as well as the

steady producer; that by requiring a rigid compliance with their ordinances by the local producer, while they allow to come into competition with them milk over which they exercise no supervision as to the conditions under which it is produced, they are surely driving the local producer out of business, thereby forcing the retailer to handle an inferior product, which in turn must be supplied to the consumer. It was also suggested that the boards of health take some means of instructing the consumer in the proper care of milk after it has been delivered.

The regular meetings of the board held March 19th and April 2d, were entirely devoted to the tax question. A representative of the county board for the equalization of taxes being present and a lively discussion followed. The following resolution was offered by Mr. C. T. Woodruff: *"Resolved,* That farm lands should be taxed as farm lands and the buildings taxed separately; the local community to make the rates and the assessors make the valuation." At the second meeting a number of assessors from the different townships of the county were present, and after careful consideration of the facts as presented, it was the decided opinion that farm lands were assessed too high. Much interest was taken in these two meetings, being largely attended; however, there is much room for discussing this great question of taxation, and the board may take it up again. The past year has shown increased vigor in the work taken up by the board, Mr. Collins, our president, having an eye on the agricultural conditions wherever the farmer is concerned, as well as an outline of what should be done along the lines of agricultural education in the schools. This work, it is hoped, can be taken up the coming year, and with the co-operation of the boards of education throughout the county, some very interesting results obtained.

Numerous other topics are slated for nearly every meeting during the season. If every farmer throughout the county would take an interest in the work of the board, attend the meetings and enter into the discussions, he would not only be greatly benefited himself, but at the same time help in placing the agricultural power of the land where it should be—a power in upholding the rights of the farmer.

C. H. Brewer, *Secretary.*

WARREN COUNTY.

OFFICERS FOR 1909.

President, SAMUEL REED.....Mount Hermon
Vice President, NICODEMUS WARNE.....Broadway
Secretary, WM. EUGENE OBERLY.....Asbury
Treasurer, JOHN ALBERTSON.....Delaware

The board has held three meetings in the year 1908.

At the June meeting there was a discussion by the members which was of special interest. Our August meeting was held at Broadway, Grange Hall. After the regular business of the board Secretary Dye addressed the meeting on the subject of "Practical Farming," and gave a complete account of scientific methods, also dairying, and a statistical statement of the number of acres of farm land and their yield in Warren county, which was of special interest to the farmers. By following his methods any man of ordinary ability could not help but be successful. The address was appreciated.

The next meeting was held in November, at Delaware. Professor K. C. Davis, from the State Agricultural School, New Brunswick, addressed the meeting, stating there are three courses—first, general course; second, dairy farming; third, fruit growing. Stated there are a large number of young people who were unable to take an extended course of study, but whose earning capacity would be much increased by some special training. Short courses are planned so the young men will become better farmers and more skillful stockmen; the isolation, drudgery and hermit life of farmers are rapidly becoming things of the past. There is a demand for young men who are up-to-date in the best methods of managing farms and dairies. The instruction is practical and immediately useful.

W. EUGENE OBERLY, *Secretary.*

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