DR. EDWARD B. VOORHEES.
President New Jersey State Board of Agriculture.
Elected in 1901.

STATE OF NEW JERSEY.

# Thirtieth Annual Report

OF THE

# State Board of Agriculture.

1902.

Printed by Order of the Legislature.

TRENTON, N. J.:
THE JOHN L. MURPHY PUBLISHING CO., PRINTERS.
1903.

*To the Hon. Franklin Murphy, 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 1902.

FRANKLIN DYE,
*Secretary.*

Dated Trenton, November 25th, 1902.

THIRTIETH ANNUAL MEETING

OF THE

# New Jersey State Board of Agriculture,

HELD IN THE

*STATE HOUSE, TRENTON, N. J.,*

**Wednesday, Thursday and Friday,**

**JANUARY 14th, 15th and 16th, 1903.**

# STATE BOARD OF AGRICULTURE.

## OFFICERS AND EXECUTIVE COMMITTEE FOR 1903.

### PRESIDENT.

EDWARD B. VOORHEES.....New Brunswick.

### VICE-PRESIDENT.

JOHN T. COX.....Readington.

### TREASURER.

WALTER HERITAGE.....Swedesboro.

### SECRETARY.

FRANKLIN DYE.....Trenton.

H. V. M. DENNIS.....Freehold.
WILLIAM H. ROGERS.....Plainfield.
JOHN M. LIPPINCOTT.....Moorestown.

### STATE CHEMIST.

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

### STATE ENTOMOLOGIST.

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

MISS JESSIE V. RUE, STENOGRAPHER OF THE BOARD.

# BOARD OF DIRECTORS

# New Jersey State Board of Agriculture.

## 1903.

Term of office, one year, dating from January 1st, 1903, to December 31st, 1903, for all except County Board Directors.

### CLASS A.

| | |
|---|---|
| EMMOR ROBERTS | Geological Survey. |
| EPHRAIM T. GILL | Board of Visitors, Agricultural College. |
| CYRUS B. CRANE | Board of Visitors, Agricultural College. |
| E. B. VOORHEES | Director of Experiment Station, 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.

| | |
|---|---|
| GEORGE E. DECAMP | State Horticultural Society. |
| D. AUG. VANDERVEER | State Horticultural Society. |
| AARON ENGLE | Burlington County Pomona Grange. |
| CHARLES E. BRYER | Centre District Pomona Grange. |
| JAMES C. WHTE | Gloucester County Pomona Grange. |
| H. F. BODINE | Hunterdon County Pomona Grange. |
| CLARK FLITCRAFT | Salem County Pomona Grange. |
| NICODEMS WARNE | Warren County Pomona Grange. |
| A. J. RIDER | American Cranberry Growers' Association. |
| JOSEPH EVANS | American Cranberry Growers' Association. |

## OTHER ASSOCIATIONS.

| | |
|---|---|
| George W. Campbell..... | Princeton Agricultural Association. |
| William S. Schenck..... | Princeton Agricultural Association. |
| Uriah Borton ..... | Mt. Laurel Farmers' Club. |
| Dr. G. F. Harker..... | Veterinary Medical Association of New Jersey. |
| Dr. George W. Pope..... | Veterinary Medical Association of New Jersey. |
| J. H. M. Cook..... | New Jersey Bee Keepers' Association. |

## BOARD OF DIRECTORS.

| NAME. | ADDRESS. | TERM. | COUNTY. |
|---|---|---|---|
| V. P. Hofmann..... | Egg Harbor City.... | 2 years.... | Atlantic. |
| L. H. Parkhurst..... | Hammonton..... | 1 year .... | " |
| Abram C. Holdrum..... | Westwood..... | 2 years.... | Bergen. |
| John F. Bomm..... | Westwood..... | 1 year .... | " |
| Isaac Collins ..... | Moorestown ..... | 2 years.... | Burlington. |
| George L. Gillingham..... | Moorestown ..... | 1 year .... | " |
| J. Frank Brewer..... | Blackwood ..... | 2 years.... | Camden. |
| R. Cooper Morgan..... | Blackwood ..... | 1 year .... | " |
| E. H. Phillips..... | Cape May City..... | 2 years.... | Cape May. |
| Joseph W. Pincus..... | Woodbine ..... | 1 year .... | " |
| A. H. Wilson ..... | Vineland ..... | 2 years.... | Cumberland. |
| W. S. Bonham ..... | Shiloh ..... | 1 year .... | " |
| Isaac S. Crane..... | Chatham..... | 2 years.... | Essex. |
| F. C. Gobel..... | Verona ..... | 1 year .... | " |
| Frank Kirby ..... | Harrisonville ..... | 2 years.... | Gloucester. |
| Theodore Brown ..... | Swedesboro..... | 1 year .... | " |
| E. M. Heath..... | Locktown ..... | 2 years.... | Hunterdon. |
| James Lane ..... | Readington..... | 1 year .... | " |
| John M. Dalrymple ..... | Hopewell ..... | 2 years.... | Mercer. |
| Sam'l B. Ketcham..... | Pennington..... | 1 year .... | " |
| R. F. P. Von Minden..... | New Market..... | 2 years.... | Middlesex. |
| Wm. Fitz Randolph..... | New Market..... | 1 year .... | " |
| C. C. Hulsart..... | Matawan ..... | 2 years.... | Monmouth. |
| E. A. Sexsmith..... | Wall..... | 1 year .... | " |
| William A. Littell..... | Whippany ..... | 2 years.... | Morris. |
| W. B. Lindsley..... | New Vernon ..... | 1 year .... | " |
| Chas. R. Graham..... | Red Valley..... | 2 years.... | Ocean. |
| Chas. M. Rorer..... | Cassville..... | 1 year .... | " |
| Edgar C. Moore..... | Woodstown ..... | 2 years.... | Salem. |
| Samuel Flitcraft ..... | Woodstown ..... | 1 year .... | " |
| Geo. B. Randolph..... | Weston..... | 2 years.... | Somerset. |
| Henry S. Van Nuys, Jr..... | Millstone ..... | 1 year .... | " |
| Thomas C. Roe..... | Augusta ..... | 2 years.... | Sussex. |
| B. K. Jones..... | Beaver Run..... | 1 year .... | " |
| F. E. Woodruff..... | Cranford..... | 2 years.... | Union. |
| Ogden Woodruff ..... | Elizabeth ..... | 1 year .... | " |
| Samuel Read ..... | Mount Hermon..... | 2 years.... | Warren. |
| Henry Pursell ..... | Delaware ..... | 1 year .... | " |

The Committee on Credentials report that we find all the agricultural organizations represented that are entitled to representation, and we believe, with two exceptions, they are all fully represented by two delegates. The exceptions are Morris County Pomona Grange and Atlantic County Board of Agriculture.

M. D. DICKINSON, *Chairman.*

HON. JOEL PARKER.

First President New Jersey State Board of Agriculture.

Elected in 1872.

THIRTIETH ANNUAL MEETING

OF THE

# New Jersey State Board of Agriculture.

TRENTON, N. J., January 14th, 1903.

The thirtieth annual meeting of the New Jersey State Board of Agriculture was called to order by Dr. E. B. Voorhees, President of the Board, in the Assembly Chamber, State House, at 10:30 A. M.

The meeting was opened with prayer by the Rev. John B. Thompson, D.D., of Reading.

The roll was then called and the representatives present answered to their names.

President Voorhees then inquired whether there were any delegates present whose names had not been called.

Two delegates from the Princeton Farmers' Club, Mr. George W. Campbell and Mr. Michael Hoagland, being regularly sent as delegates to this meeting, were, on motion, received.

President Voorhees—The next matter is presenting order of business.

Secretary Dye—Mr. President, the order of business is in the hands of the members, and at this time I do not know of any changes that will be made necessary owing to non-attendance of any of the speakers. I think it is ready for adoption subject to such changes as may be made necessary. I would so move. The order of business was adopted.

## ORDER OF BUSINESS.

### WEDNESDAY.

10:30 A. M.—12:30 P. M.

Prayer.
Calling Roll of Delegates.
Presenting Order of Business.
Minutes of Last Meeting.
Announcing of Committees appointed.
On Credentials.
On Resolutions.

11:00 A. M.

Reading of Executive Committee's Report.
Report of State Grange.
GEORGE W. F. GAUNT, W. M.
Report of Secretary of State Board.

12:00 M.

Report of Treasurer.
Introduction of other Business.

### *Second Session.*

2:30—5:30 P. M.

Report of Committee on Credentials.
Appointment of a Committee, consisting of one member from each county duly represented, to nominate Officers for the ensuing year (the members present from each county naming their members of this Committee).
Committee will report when ready.

3:00 P. M.

Annual Address of PRESIDENT DR. EDWARD B. VOORHEES, New Brunswick, N. J.

4:00 P. M.

"Profit in the Sheep Business, and How to Get it."
By FRANK D. WARD, Batavia, New York.

### *Third Session.*

7:15 P. M.

"Pleasure and Profit in Honey Production." Illustrated with colored stereopticon views.
By D. EVERITT LYON, Ph.D., Belmar, N. J.

8:00 P. M.

"Culture, Pruning and Marketing the Peach." Illustrated by stereopticon views.
By J. H. HALE, the Champion Peach Grower, South Glastonbury, Conn.

*Fourth Session.*

THURSDAY.

9:30 A. M.—12:30 P. M.

Prayer.

Unfinished and New Business.

10:15 A. M.

"Soils—Their Requirements and Improvements."

By H. J. WHEELER, Ph.D., Director Rhode Island College of Agriculture and Mechanic Arts, Kingston, R. I.

11:15 A. M.

"Advances in Scientific Agriculture and its Use by the Farmer."

By DR. W. H. JORDAN, Director New York Agricultural Experiment Station, Geneva, N. Y.

12:15 P. M.

Report of Commission on Bovine Tuberculosis.

*Fifth Session.*

2:30 P. M.—5:30 P. M.

"How Can the East Compete with the West in Dairying?"

By JOSEPH L. HILLS, Director University of Vermont and State Agricultural College, Burlington, Vt.

3:45 P. M.

"Conformation of the Dairy Cow—How to Select Her."

By HENRY VAN DRESER, Cobleskill, N. Y.

*Sixth Session.*

8:00 P. M.

"Venezuela, and the Mighty Oronoco." Superbly illustrated.

By COL. GEORGE NOX MCCAIN, Washington, D. C.

NOTE.—This lecture will be given in the Auditorium of the State Normal School, and will be profusely illustrated with stereopticon views.

*Seventh Session.*

FRIDAY.

9:30 A. M.—12:30 P. M.

Prayer.

Unfinished Business.

10:00 A. M.

* "Natural Laws Governing the Horse and Kindergarten Work with Colts—How to Estimate His True Value."

By DR. J. C. CURRYER, Assistant Superintendent Farmers' Institutes, St. Paul, Minn.

11:30 A. M.

Report of State Entomologist.

DR. JOHN B. SMITH, New Brunswick, N. J.

12:00 M.

Closing the Business of the Board.

---

* Dr. Curryer being detained, Henry Van Dreser, Esq., Cobleskill, N. Y., addressed the Board, by request, on "Poultry and Egg Production."

President Voorhees—The next matter is the reading of the minutes of the last meeting.

Mr. Denise—I move you, Mr. President, that the reading of the minutes of the last meeting be dispensed with. Carried.

The President then announced the appointment of the following committees:

On Credentials—Mr. M. D. Dickinson, of Salem county; Mr. Nicodemus Warne, of Warren county; Mr. D. A. Vanderveer, of Monmouth county.

On Resolutions—Mr. George E. DeCamp, of Essex county; Mr. J. M. Dalrymple, of Mercer county; Mr. William Fitz Randolph, of Middlesex county.

On Officers' Reports—Mr. George W. F. Gaunt, of Burlington county; Mr. George L. Gillingham, of Burlington county; Mr. H. F. Bodine, of Hunterdon county.

On Treasurer's Accounts—Mr. H. V. M. Dennis, of Monmouth county; Mr. L. H. Parkhurst, of Atlantic county; Mr. W. H. Rogers, of Somerset county.

President Voorhees—The next item is the reading of the Executive Committee's report, to be presented by the Secretary of the Board.

## Report of the Executive Committee.

Your Executive Committee have held five meetings during the past year for the transaction of business connected with the interests of the Board.

At the March meeting matters connected with the editing and illustrating the Annual Report were considered.

A resolution was adopted requesting the Governor to appoint one representative of the agricultural interests on the State Commission in charge of the State's exhibits at St. Louis Exposition.

Action was taken as to subjects and speakers for this annual meeting.

A resolution was sent to Senators Kean and Dryden requesting them to support the (Grout) McCleary Oleo bill.

Professor Voorhees submitted for consideration of the members the need there is for some central agency qualified to furnish reliable information concerning farms for sale in New Jersey to inquirers who are seeking homes and farms, and requested the members to devise a feasible plan, if possible.

At the June meeting appropriations were made to the State Horticultural Society and to the County Boards, as per Treasurer's report.

Mr. E. L. Dickerson was employed for the summer months as assistant to Professor Smith in the entomological field work, and insect commissioners were appointed for Monmouth and Hunterdon counties.

President Voorhees was appointed to represent the Board in the American Association of Farmers' Institute Workers at its meeting in Washington, D. C., June 24th to 26th.

At this meeting, also, the question of taking a dairy census of two leading dairy sections of the State was considered.

The committee was of the opinion that the funds at its disposal would warrant the undertaking, and the Secretary was authorized to proceed with such investigation as seemed possible.

At the September meeting President Voorhees reported his attendance at the Institute Workers' Convention and made a brief report of its deliberations. The President was requested

to incorporate his views as to the usefulness of this meeting in his annual address.

Messrs. Heritage and Rogers were appointed by the President, in accord with the action of the committee, delegates to the Farmers' National Congress to be held in Macon, Ga., October 7th to 10th.

Secretary was appointed delegate to the State Sanitary Association meeting October 24th and 25th.

Secretary was authorized to call on the county secretaries for a comprehensive report as to the products exported from the several counties and, generally, to give a comprehensive statement of their industries.

Professor Smith was authorized to use a portion of his appropriation for the purchase of jars for the preservation of specimens.

Secretary reported that the dairy census had been taken up in Salem and Mercer counties by Messrs. J. M. Dalrymple and Clark Petit.

At the October (27) meeting Messrs. Heritage and Rogers made verbal report of their attendance at the Farmers' National Congress, stating a written report would be presented at next meeting of the committee.

Secretary reported his attendance at the State Sanitary Association meeting, and that it was well attended. With other subjects treated, that of tuberculosis was ably presented by Dr. S. A. Knopf, of New York City. He did not agree with Dr. Koch that bovine tuberculosis is not communicable to the human.

He complimented the cattle inspection work, as carried on in New Jersey, and urged us to keep right on in this good work.

As to county locations for healing consumptives, he did not think there is much in that; but the best, the ideal condition for the patient, is sunlight and pure air wherever it can be had.

At this meeting the committee made up the balance of expenditures for the fiscal year ending October 31st, covering the accounts of the State Board and also those of the State Entomologist under Chapter 104, Laws of 1898. The items were embodied in bills and presented to the State Comptroller.

At the meeting of the committee, January 13th, 1903, report of the delegates to Farmers' Congress was received. The Institute work to date was presented, committees were appointed for this annual meeting, and the several reports reviewed.

With this annual meeting is concluded the work of another year. The farmers of the State have been generally prosperous, and we believe it would be to their advantage to make this fact known.

Farming in New Jersey is far in advance of what it has been. The farmer's intellectuality is broader, his work is done more in accordance with the laws and requirements of the business, his profits are increasing, his home is improved, and his family are sharing with the people of city and town many of the literary and social advantages of the present time. It is for the farmers themselves to take and maintain their places in society, business, education and legislation, for which they are so well qualified by experience and environment.

Your committee hopes that this thirtieth anniversary and annual meeting may be, not only a fitting close to the work and experience of the past, but also the beginning of better, more intelligent and more successful work by the farmers of the State for the future years.

We ask the members of this Board, but especially the Directors, to take a studious interest in questions connected with the development of a higher and more profitable agriculture, to co-operate with the Executive Committee in devising efficient methods of helping the farmers of the State in every reasonable way, and to take an active part in securing attendance at the Farmers' Institutes and participation in the questions presented for consideration.

We would remind the members that our State law encourages the formation of County Boards of Agriculture auxiliary to this Board. Through and by these Boards and the Pomona Granges, delegates are annually elected to represent the several counties in this State organization.

The County Boards should receive a more general co-operation and support than is now the case in some of them. They afford a fitting opportunity throughout the year for discussing questions connected with local agriculture, home and neighborhood improvement and other matters of interest to the farmers.

If each of the twenty agricultural counties of the State had a live County Board with only one hundred active members each, these two thousand farmers would be able to influence local and

State legislation, as they cannot in an unorganized condition. Two thousand is a small portion of the thirty-four thousand six hundred and fifty farmers in the State. It is to their discredit and, we believe, disadvantage that our farmers do not avail themselves of these Boards and the Institutes provided for them by the State, more than they now do. Let this new year witness a general effort to build up our local organizations, both in numbers and usefulness.

During the year the reaper—death—has been active. Some of our members have received the fatal blow. We suggest a committee be appointed to formulate a fitting resolution for action by the Board on the death of Brother J. B. Rogers and any other members of the Board deceased during the past year.

Gentlemen, our program of subjects and speakers for this thirtieth anniversary is before you. We trust you will find each address valuable and the discussion following profitable. Let it be the endeavor of each member to keep the work of this Board strictly within the lines prescribed by the law under which it exists. By so doing, the Board will be more and more a benefit to the agricultural interests of the State, will receive further legislative and executive approval, and share the respect of those engaged in other professions and callings.

President Voorhees—Gentlemen, you have heard read the report of the Executive Committee. What is your pleasure in the matter?

The report, on motion, was adopted as read and referred to the Committee on Officers' Reports.

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

(Mr. Gaunt then read the report of the State Grange, which see.)

The report was, on motion, received and referred to the Executive Committee, for publication in the minutes.

President Voorhees—The next matter is the report of the Secretary of the State Board, Mr. Dye.

Secretary Dye—Mr. President, I would preface my report by saying that this report is prepared first for the Governor the last of October, and there are some things which may seem like

repetitions to the Board, which it seemed necessary to state to the Governor.

The first part of this would apply particularly to this thirtieth anniversary.

(Secretary Dye then read his report, which see.)

President Voorhees—Gentlemen, this very valuable and comprehensive report is now before you. What is your pleasure?

A Member—I move that it be adopted and referred to the Committee on Officers' Reports. Carried.

President Voorhees—We will now hear the report of the Treasurer, Mr. William R. Lippincott. In the absence of the Treasurer, Mr. Heritage will read his report as per request, Mr. Lippincott being unavoidably detained.

(Mr. Heritage then read the report, which was accepted and referred to the Committee on Treasurer's Accounts.)

REPORT OF WM. R. LIPPINCOTT, TREASURER, FOR THE FISCAL YEAR ENDING OCTOBER 31ST, 1902.

*Dr.*

| | |
|---|---|
| Total amount received from Comptroller during the year..... | $4,365 83 |

*Cr.*

| 1902. | | | |
|---|---|---|---|
| Jan. 16. | By Delegates' expenses to Annual Meeting.... | $353 34 | |
| | Speakers and expenses..... | 272 04 | |
| | Executive Committee and Speakers' bills at Trenton House ..... | 62 91 | |
| | Stenographer at Annual Meeting..... | 111 70 | |
| | Lantern Service—Janitor and Chairs..... | 32 00 | |
| June 25. | Appropriation to County Boards Agriculture, | 665 00 | |
| | Appropriation to State Horticultural Society, | 300 00 | |
| Sept. 20. | Stoll & Co.—Bill for new typewriter..... | 32 50 | |
| | Postal Cards, Stamps and Packing Reports.. | 19 75 | |
| | Express Companies' bills, transportation... | 250 00 | |
| | Treasurer's Salary ..... | 100 00 | |
| | Executive Committee's expenses for the year, | 377 20 | |
| Oct. 29. | Expense of Dairy Census to date..... | 52 65 | |
| | Expense Institutes for the year..... | 1,736 74 | |
| | | | $4,365 83 |

President Voorhees—We are now ready for the introduction of new business.

Mr. Vanderveer—I have a resolution to present from the State Horticultural Society.

*Resolved*, That the State Board of Agriculture be requested to co-operate with this Association in securing proper legislation for the protection of the fruit industry in this State.

This resolution was passed at the last session last week in reference to the San Jose scale.

President Voorhees—That is rather indefinite. It will be referred to the Committee on Resolutions.

Mr. Denise—Mr. President, I think the idea of that resolution at the horticultural meeting was that they wanted to get some amendments to the present insect law. The State Entomologist thinks that the present law is not quite satisfactory and wanted to try to get the law amended so that he will have a little more power. The intention was to present that resolution to this Board and have it co-operate with the horticulturists in trying to have the bill, when prepared, passed. I think it is the duty of every agriculturalist and every horticulturist to do what he can to get laws for the benefit of the farmer. Our present law is in such shape that it does not amount to anything because it cannot be enforced. And when you cannot enforce a law it is not worth anything to us. For instance, if you have a neighbor alongside of you and he is unwilling to use any means whatever to destroy the scale, you must submit to it. I have a case of that kind down in my own neighborhood, so I am speaking from experience.

President Voorhees—I may say, for the benefit of the Committee on Resolutions, that the Entomologist presented the matter to me, and such suggestions as it seemed to me wise I have incorporated in the President's address, which will be presented this afternoon. It seems to me that this Board ought to act intelligently on this. If it is referred to the committee they are of course at liberty to get such information as is extant concerning the matter. I will now call for the report of the American Cranberry Association, by Mr. A. J. Rider.

# Report of the American Cranberry Growers' Association.

BY A. J. RIDER, SECRETARY.

The season of 1902 has not been a happy one for New Jersey cranberry growers. A killing frost on the 28th of May destroyed three-fourths of the New Jersey crop, while other cranberry growing sections, east and west, escaped. Had the misfortune fallen upon all alike, the loss to growers would have been trifling, as the law of supply and demand usually transfers these casualties to the consumer. Having little to sell, other sections reaped the financial harvest.

However, New Jersey cranberry growers are not discouraged at the loss of one crop, for they are accustomed to reverses.

It will be of interest to members of this Board and to Jerseymen generally to know that, notwithstanding the obstacles which seem to have been more numerous than in other localities, New Jersey is forging to the front in this industry, and I believe it is only a question of time when she will lead all other sections. We have more undeveloped cranberry lands with natural water-supply than all others put together. This fact has recently come to the knowledge of eastern growers, and they have lately secured options on large tracts of undeveloped cranberry lands in New Jersey. Whether it is for the purpose of development or retirement remains to be seen.

Persons who are familiar with market reports and marketing—in fact, householders generally—get an impression that New Jersey is seriously handicapped on account of the prominence given to Cape Cod cranberries, both in quotations and by retail fruiterers. A little enlightenment on this subject will not be out of place and will help lovers of this fruit to a higher appreciation of New Jersey products.

And first, permit me to say that the term Cape Cod, as applied to cranberries of a high grade and uniform color, has come to mean, not the locality where the fruit is grown, but the variety of fruit. The eastern growers having been first to separate and name the various varieties, which, by the way, are as distinct as the different kinds of apples, cherries, strawberries, &c., led to the practice of calling such Cape Cods. For the last fifteen

years New Jersey cultivators have been planting these selected varieties, and, as a matter of fact, the leading varieties, known as Early Blacks, Howes, Mathews, Centennials, Macfarlans, &c., are grown to greatest perfection in our own State. I am told, by probably the largest handler of both New Jersey and Cape Cod cranberries in the country, that he was able, during the last season, to realize from 50 cents to $1 per barrel more for the same varieties grown in New Jersey than those grown on Cape Cod. When the public shall have become educated to this fact Jersey cranberries will mean something more than "mixed varieties," as at present, and will move from the tail to the head of the list in market quotations. New Jersey growers should help on the cause of public education by making New Jersey conspicuous on their packages and not failing to specify the variety of fruit.

Referring to the obstacles that have been encountered by New Jersey growers, the rot or scald has been the most formidable, and all efforts to overcome the disease have been unavailing. Some twenty-five years ago the attention of the Department of Agriculture at Washington was directed to it, and a specialist was sent out to investigate the matter, but nothing came of it. He did not succeed in discovering the cause, hence remedies proposed proved futile. It remained for Dr. Halstead, of our Experiment Station, to discover that the disease was caused by a fungus which he found present in both vine and fruit. In order to attack this fungus it was necessary to study its habits, for which work the officers of the State Experiment Station did not feel that they had the necessary time and means at their disposal. With the assistance of President Voorhees, the Department at Washington was again induced to take up the matter, and a specialist was designated, who has entered upon the work; and it is hoped that his efforts will open a way to reach and overcome a disease that has caused losses to growers during the last twenty-five years that would figure into the hundreds of thousands of dollars, and delayed the period when New Jersey is to take her place at the head in this industry.

A revision of the Standard Measure law of New Jersey has been suggested to make our standard barrel conform to that of Massachusetts and to contain 100 quarts instead of three crates, as at present, and the co-operation of this Board will be appreciated in securing such legislation.

HON. WILLIAM A. NEWELL.

Second President New Jersey State Board of Agriculture.

Elected in 1875.

## AFTERNOON SESSION.

January 14th.

The meeting was called to order by the President.

Mr. Roberts—At the call of the delegates this morning, the name of the delegate from the Mount Laurel Farmers' Club was not called. I would propose that the gentleman here from that club be entered as a delegate and his name enrolled.

The motion was seconded and carried.

President Voorhees—We will now have the report of the Committee on Credentials.

Mr. Dickinson—Mr. President, the Committee on Credentials begs leave to announce that so far as the names have been called, there are but two organizations that are not represented that are entitled to representation. Cape May and Atlantic counties have not answered to their names.

Delegates from Cape May and Atlanitc counties were found to be present, and the report was amended so as to include those counties.

President Voorhees—It has been the custom of this Board of Agriculture, in its annual meetings heretofore, to invite the Governor of the State to meet with us, and I understand that he is in the city to-day, and unless there is some objection, which I am sure there will not be, I shall appoint a committee to ask the Governor to visit the Board and give us a greeting.

I appoint as that committee Mr. D. D. Denise and Mr. Charles Collins, to wait upon the Governor and escort him to the meeting.

The next matter in the order of business is the appointment of a committee consisting of one member from each county, which committee will nominate the names of officers for the ensuing year, the members present from each county nominating members to this committee. That order of business is now before you, and if the delegates will nominate their members of the committee the Secretary will take the names.

The roll of counties was then called by the Secretary and the following-named gentlemen were placed on the Nominating Committee:

Atlantic County, L. H. Parkhurst.
Bergen County, Abraham C. Holdrum.
Burlington County, Charles Collins.
Camden County, R. C. Morgan.
Cape May County, Dr. E. H. Phillips.
Cumberland County, W. S. Bonham.
Essex County, Cyrus B. Crane.
Gloucester County, G. W. F. Gaunt.
Hunterdon County, H. F. Bodine.
Mercer County, John M. Dalrymple.
Middlesex County, William Fitz Randolph.
Monmouth County, E. A. Sexsmith.
Morris County, W. B. Lindsley.
Ocean County, C. M. Rorer.
Salem County, Edgar C. Moore.
Somerset County, H. S. Van Nuys, Jr.
Sussex County, Thomas C. Roe.
Union County, F. E. Woodruff.
Warren County, Henry Pursell.

President Voorhees—The committee will report when ready.

Mr. Dennis then presented the report of the Committee on Treasurer's Accounts, as follows:

The Committee appointed to audit the Treasurer's accounts report that they have examined all the accounts of the Treasurer and compared his vouchers with the same and find them correct.

H. V. M. DENNIS, *Chairman.*

The report was, on motion, accepted.

President Voorhees then delivered his annual address, which see.

The President's address was, on motion, accepted and referred to the Committee on Officers' Reports.

Secretary Dye—Mr. President and gentlemen, the hour has not yet arrived for the next address, and having the time, it seems to me we might take up a question or two for discussion. With all due deference to the Committee on Officers' Reports, and in connection with this report, I would like the farmers here who have been thinking on this subject to give us some of their views on the question of agricultural education. How may we best secure

the teaching of the principles of agriculture in the schools of our State? I submit that question, sir, for discussion now.

Mr. Rider—Mr. President, I have had a good deal of experience in schools.

I began to go to school when I was three years old, and at the age of sixteen I had advanced so far in the three R's as to branch out in addition to the three R's. I passed through algebra, geometry, physiology, philosophy, astronomy and some other onomys, and I don't remember in all my experience during those school years to have seen anything on agriculture, or anything that would have prepared me particularly beyond the three first branches for the special work that I have selected. And I have often thought that if I could have had placed in my hands in school, instead of the text-books on physiology and astronomy and geology, one little book called "Principles on Plant Culture," by Professor Goff, of the University of Wisconsin, I could have learned what would have been vastly more valuable to me, and would have set my mind to investigating on lines which would be more in keeping with my present pursuits and employment.

Hence this matter of education in the public schools in the line of agriculture I think is a most appropriate one. I was very glad, indeed, to hear our President's suggestion, and I am in thorough sympathy with it. I believe the reason why so many boys drift from the country and are looking for places among the professions and in the stores and other employments is because there is nothing in the curriculum of the study in the public schools where farmers' boys attend that helps them to understand the principles of agriculture beyond the elements which they all get in reading, writing and arithmetic. Beyond that it is all preparation for the professions. It is not preparation for being a farmer. It is not preparation for any successful and skillful farming and to undertsand their business. I believe thoroughly that we should inaugurate a system, and have it adopted in our different schools, that will give the farmer an equal chance with the professional man, and in that way we will raise the farmer to a higher level.

I believe our President has struck the keynote which ought to be felt throughout our whole State.

I believe some Western States have called meetings and are giving more attention to it, as is indicated in the University of Wisconsin, where they are giving so much attention to the matter

of agriculture that they have written text-books on the subject, and those text-books are being used in the different schools. So they ought to be here.

One other matter mentioned of interest to everybody is the subject of labor. That seems to be a problem that is very difficult to master and understand. How are we going to get over it. In a conversation at the dinner table to-day I suggested how we got over that trouble in my business, and the gentlemen who were at the table with me suggested that might be the remedy for us.

I employ from thirty-five to three hundred Italians in my particular business in which I am engaged, at different times in the year; sometimes I only have a dozen or twenty, and other times I have a hundred. We find it would be impossible to hire one or even a hundred men except you know how to do it. The Italians are very clannish, and they are peculiar people in that respect. They are good workers, hard workers and live on very little and save money. But you cannot hire them individually; they must be sent, or taken out, by a padrone.

There are padrones who do that business and deliver men just as they deliver any other commodity. You can engage them there in that way from five to fifty or a hundred people to do your work. You can engage men, boys or women, or all, and they will supply you with whatever help you need, and they generally do good work.

We find them very effective and very satisfactory to take care of.

If you will go to the large cities like New York or Philadelphia and secure the services of a padrone, which you will very easily find if you inquire among the Italian people, they will tell you where to find a padrone, and that padrone will furnish you with any quantity of help you want; they can easily find you good people who will do farm work or whatever you wish done.

I think this may help solve the labor problem to the farmers of New Jersey.

Mr. Roberts—I would like to ask the gentleman if he ever found any Italians able to drive teams?

Mr. Rider—Twenty-five years ago I had a little Italian who drove a team for me. Sometimes, when he began, he put the harness on wrong end first, and he did not always get the head of

the horse toward the wagon, but he finally learned and he became a good man with a horse. They are a little akward, particularly at the beginning. But you must not hire Italians to chop wood. They would rather hire somebody else to chop wood while they do some other kind of work.

Secretary Dye—Mr. President, resuming the subject of agricultural education in our schools, one suggestion has been made to me by a County Superintendent, that we should establish county schools, and in those county schools have the principles of agriculture taught; that we can hardly expect much to be done in our local district schools. That may be a wise suggestion and a solution of this question. A difficulty suggested is that at present we have few if any teachers who can teach the principles of agriculture in our common schools. The trouble seems to be that in the schools where teachers are prepared for their work they are not taught the principles of agriculture.

Mr. Rider—Mr. President, if I may be permitted a further remark, I think the district schools where they come in contact with the farmer boys are the places to teach the principles of plant culture and agriculture, because the county schools are generally patronized by boys looking for the professions; they produce no farmer boys boys as a rule.

Mr. Fitz Randolph—This question of teaching agriculture in the public schools has been in my mind for some time, and year after year more duties are put on the teachers, but the matter of agriculture has been left out.

I am very glad to have this matter brought to our attention at this time, but just the best way to bring this about is something I cannot see just now. The work by Dr. Voorhees, "The First Principles of Agriculture," has been in the hands of a number of argiculturists throughout the State. But, of course, the teachers do not know much about teaching in that line.

They will have to take a course in that in some institution before they are capable of instructing the pupils, but I believe it has got to come; I believe we are entitled to it; it should be taught.

Mr. Campbell—We were speaking just now about establishing county high schools for country children, and it seems to me that is what we most need. When our children graduate from the country schools they are fitted for nothing at all, and then we send them to the city to get a further education. I know that from

experience. That seems to be one of the most needed things in our public institutions of instruction here—to have a country high school. The thing is how to get it. If we can get that we will be one step in advance of our common schools, and those who care to take the argicultural course can do so, and perhaps more of them will know argiculture better, for a great many of them know nothing at all about it, and look at it as slave work. The reason is because they go to work a little too soon and a little too hard.

I would like very much to see a high school in our section, because we do not know what to do with our children after they have graduated from our district schools; in these schools they get so far and then they are reviewing, and the consequence is the most of them are sent to the cities for further instruction.

Mr. Roberts—Mr. President, I have given this matter some thought. We have maintained, at the expense of the State, an excellent school—the State Normal School. Now, if we can in some way have the principles of plant life, and some botany and some idea of cultivation—something like the principles of agriculture—put in proper form for that purpose, so that our own school teachers will be fitted to teach the children something in that line—I wonder whether that would not be the most feasible way for the State to meet the question.

Dr. Phillips—Mr. President, we have in our place a high school. We begin with the kindergarten, and our children are taught plant study right from the beginning. Out of the kindergarten they go into the first primary, and the teacher in the first primary room has plants in each window. That is the start. The plants are growing in the room and she teaches nature study—the growth of the plants from the beginning—to those little children, and they are very much interested in it. But I am sorry to say that after they get out of the primary and go into the higher branches such teaching is not carried on, and I have been thinking about the matter myself and wondering how to get over it. This discussion has brought the matter to me afresh, and I shall go home and advocate that the study be continued right on.

We have botany in our schools, we have nature study, plants are exhibited, and the growth of the plants is exhibited to the smaller children and to the larger children———

(Governor Murphy was here escorted into the room amid applause, and the talk of Mr. Phillips was interrupted. The Gov-

ernor being escorted to the platform, the President asked the speaker to suspend his remarks for the time being and introduced the Governor.)

President Voorhees—Gentlemen, it gives me very great pleasure to introduce to the Board his Excellency Governor Franklin Murphy, who will, I am sure, be pleased to speak to us a few moments on the important subject of farming. (Applause.)

Governor Murphy—Mr. President and gentlemen, I am very glad to be here, since at least by my coming I can fulfill one of the objects of my presence, and that is, I can let you see me. When your committee came to ask me to come and say a word to you, I said I had no word to say. I knew nothing about farming, and I felt as though it would be perhaps unwise for me to take your time. But they said that some of you would like to see me, and see what kind of a looking man I was, and I at least could go there and show myself.

Well, now, all that goes with the office of Governor. The Governor must be willing to do that. And, I think that it is an entirely proper desire for the people of the State to wish to see their Governor and perhaps measure him and form their opinion by his appearance what sort of a man he is.

It is a little more important, and it counts for more, I think, when he first comes into office than it does after he has been in office a year, as I have, and has done some things which enable you to judge him by what he has done rather than by what he looks like.

But I must not take your time. I can say this to you, that the two happiest years of my life were those two boyhood years that I spent on the farm, and I look forward, one of these days, when I get older and get rich enough, to go back on the farm (Applause.) If I can only save up money enough to buy a small farm somewhere, I would like to go back on the farm of my early days. I fancy there is no life that brings out the true qualities of manhood as the farmer's life. Because I think there is no life which makes a man as independent as the life of a farmer. If he pleases he may depend almost wholly on himself for his livelihood, and that makes him independent of the world, and no man, I think, makes so good a citizen as the independent citizen. No man does more for the State than the independent voter in the State. (Applause.)

Now, that may savor of politics, and it does a little, but it is Republican and Democratic politics alike, and it is good for both sides. (Applause.)

I went one day last summer to New Brunswick, and I had my eyes opened there to what the State farm and Dr. Voorhees are doing for the farmers of this State; and I have never forgotten that visit and never will, because it is bringing to an occupation which needs it, the advantage of scientific discovery and of intelligent, successful work.

There is but one criticism that I think might be made on the farmer's life, and that is that its necessities are such that he does not give as much time to schooling as some of us who follow the trades, the merchant and the manufacturer and others who live in the cities. The boyhood of urban life devotes more time to schooling than the farmer does. He is born on the farm; he is taught as a boy to do chores, and when he is grown, and sometimes before he is grown, he is required to do a man's work. This I do not think is wise, because I don't think there is anything pays a larger dividend than education.

But whether wisely or unwisely, we have come to accept the fact of a certain well-recognized condition, and that condition is that the farmer does not have as much opportunity to attend school as the average city boy has.

And so I was greatly impressed with the work that is being done in New Brunswick, because that work, properly availed of by the farmers of the State, puts in possession of every one of them the best possible way of doing the things which a farmer does, whether it is keeping a cow or a horse or a pig, or raising chickens, or raising crops; and I want to say to you now that my faith in the value of that State Farm is such that I think it ought to be, perhaps, enlarged; at any rate it should be managed to its last possible benefit in the interest of the farmer of the State of New Jersey. And, so far as I am concerned, I will be very glad to aid you in any way that you desire or that I can to increase the usefulness of that farm to the farmers of the State.

Now, that is quite a speech on farming, and as far as I think I ought to go. (Applause.)

(The Governor then excused himself and retired from the meeting.)

President Voorhees—Mr. Phillips, you may resume your observations.

Dr. Phillips—I did not have anything more to say on that subject, only that this sort of education started with us by instructing the little children; they are interested in this subject, and will go about it gladly, apparently, if it is only put in their way. Now, let us carry on that study on that same line all the way through.

President Voorhees—Are there any other remarks on that subject?

Mr. Rogers—Mr. President, it is for us to work with our County Board to put these matters in the school. It should be brought to the particular attention of the State Superintendent, Mr. Baxter. I know that Mr. Baxter is personally very greatly interested in this subject. I think if it is brought before him and brought before our County Boards, and we insist that the Trustees put that in their studies, it may lead to bringing that subject in our schools.

Mr. Hulsart—Mr. President, Dr. Phillips has stated almost the exact conditions that exist in our town. I have been a member of the Board of Education for a number of years, and visited our school occasionally; they start there in the kindergarten with plant life; but education on plant life and growth does not continue as the scholar goes on in the school and assumes the higher studies. I hope all the conditions around the State of New Jersey are not the same.

Some years ago our school Principal handed to me a little book. I looked at it, and it was the "First Principles of Agriculture," edited by our President. He said it was handed to him in New York. He asked, "Is it any good? Take it home and see what you think about it." I said to our Principal, "I guess it is all right." And I afterwards asked him to advise introducing it in the public schools. "Man, dear," he said, "I could not find a scholar in the school who would take such a thing. They are all reckoning that education will fit them so that they will not have to work. We have over four hundred scholars in the school, and there is not one who wants to study farming." I am sorry to say that I have a boy at home now who would not go into the agricultural college; he is trying to make a civil engineer.

Secretary Dye—I think it is unfortunate, as Mr. Hulsart says; the young man is afraid he will have to work in the agri-

cultural profession. The idea of farmers having to work! Who ever heard of such a thing? Where and how are our young men going to get their living but by work? That is the trouble. The boys think if they can get away from the farm and the country and into some other profession, they are going to live like gentlemen of leisure. We want to disabuse the young men's minds of any such thought. Success means work in any profession.

We have got the two extremes together now, Mr. President. Mr. Rider has suggested that the first principles be taught in the common schools, and Mr. Hulsart and Dr. Phillips say it has been tried with them, and we have the proposition seconded that we have the county school. But if the scholar grows away from the study I don't know what we will do. I don't think they will, however, if it is kept up and the instruction is of a kind that it ought to be. About introducing this matter into the County Boards of Education—that is the answer Dr. Green gave your committee some years ago, when we asked the State Board of Education to take the question up and have such books introduced into the schools. He said the proper place to go was to the County Superintendent in order to have those studies introduced into the schools. Perhaps we might begin that way.

Mr. Roberts—Mr. President, our Governor spoke to us, and he spoke to us right, on these lines of education, and I think the Governor is "off." He tells us about the happy life he had in his two years on the farm, but that the farmer boy had not the opportunity for education that the boys in the city do or that the boys in mercantile trades of other kinds have.

I think our Governor is mistaken. My own judgment and observation are that the farmers' boys are as studious and as well taught as those of any other calling, and that they have better opportunities than even most other boys.

I was a small boy not so very long ago, and they sent me to the city, where I visited a very large school and was put with a very large class of boys of my own age and over. I expected I would be a little fellow there. But they put me in the first class, and I became more and more of the opinion that they were not as well along as the boys I left in our own country school. I have had opportunities for observation and I feel sure of just that thing—

I believe the farmer boys are better educated and more generally informed than the boys of the town. (Applause.)

I saw an advertisement not very long ago on reading the paper which spoke of some potash composition that was made in Germany and that some man used it in this country, and I felt I would like to try it. I was in Philadelphia and stepped into a wholesale druggist and asked them about it—if they knew anything about it. They never heard of such a thing and did not know anything about it. I went into another wholesale drug-house and I asked the question and the man replied, "Now, young man, do you know what potash is? It is the residuum that is retained from ashes. It is not a mineral at all; that is not taken out of the earth. There is no such thing as you call for." I went on until I got to a wholesale house on Front street and I happened to meet the proprietor of the establishment and I asked him about it. "Yes," he said, "there is such a thing; it is mined in Germany. There has never been any sold in this market." "Well, I have been told that there is some in this country; I think it came from Baltimore," I said. "There has none ever been here." "Where can I get any information about it?" "Well, I don't know," he said; "Professor Field possibly might tell you something about it; he is professor up in the high school."

I applied to the phosphate men; could they tell me? "No;" they said they would tell me what they knew, and that was not much.

They said, "Well, you see, the only way for you to get any information on that is to go among the farmers; they are better up on that kind of thing, that general information, than anybody else." (Applause.)

Mr. Rider—Mr. President, Dr. Phillips has voiced my sentiment exactly, and the very fact that plant culture can be made interesting in kindergarten work is evidence that it ought to be made interesting further on, and I think if you pursue the same methods with the child as it gets older—follows it up in the higher classes—he will like it and get along with it. In our schools now our boys and girls are taught to use the plane and the saw and some of the mechanical pursuits, but not a word about the use of potash, what the different soils are and the phosphates and their action upon plants, which they might be taught in our public schools as a good many other things are taught, and it would be

valuable to them and perhaps make them more interested in farming.

President Voorhees—There is no question in my mind that agricultural principles could be taught to our children. I have evidence of it every day, of the ability of a child's mind to grasp those principles. They are so simple. There is no danger of overcrowding it at all. It is only a question of doing it. Experience has taught us that the way to do a thing is to do it. Now, if the farmers are ready for this sort of thing it will be done all right; there is no question about it. They are not ready, the teachers are not ready, the schools are not ready. When the time comes I think there will be no difficulty about it.

Mr. Roberts—Where can we get a better start than to introduce it in our Normal School?

The President—That is it. A few years ago a committee of this Board met with a committee of the Board of Education, and the matter was presented in the light of the experience of the Board of Agriculture, and upon the recommendation of this committee the work was in part taken up by the Normal School, so that the teachers certainly have a knowledge of the sciences that are connected with it. The chief difficulty is that they have not got the instruction in reference to the application of the science to the practice. That is a matter which, it seems to me, can be very easily arranged by the system that is in vogue in some States of having summer schools of teachers where they shall be interested in just such topics. That is, they have learned, perhaps, chemistry and botany and zoology and other sciences involved, geology, &c.; then they are taken over this summer course at the Agricultural College or elsewhere and taught how to teach the relation of those individual sciences to farming and agriculture. Now, it is possible to be done; it provides teachers for the work; it is being successfully done in certain States. As I said before, if we are ready to have it done we can have it done here.

The time has now arrived for the next order of business, which is an address by Frank D. Ward, of Batavia, New York, upon "Profit in the Sheep Business and How to Get It." I take very great pleasure in introducing Mr. Ward. (See address.)

A vote of thanks was given the speaker for his valuable address.

Chairman Cox—Are there any committees ready to report?

Mr. Parkhurst—I would like to ask, Mr. Chairman, that the Committee on Nomination of Officers remain and have a short session after this meeting adjourns. They will please meet in the room in the rear of this chamber.

Mr. Gaunt—The Committee on Officers' Reports begs leave to make the following report:

Your Committee has examined the reports referred to it and would recommend the address of the President as a whole, with the recommendation that this Board take some definite action at this session upon the following recommendations made in the reports:

*First.* That the law be so amended as to broaden the work and increase the power of the Tuberculosis Commission; also, that it shall include all contagious diseases of cattle.

*Second.* That the law relative to injurious insects be amended in such a way as to protect all alike, and that the inspection shall be made so thorough, and at the State's expense, that the horticulturists of our State will be as near absolute protection from those diseases as possible.

*Third.* Your Committee recommends that the Executive Committee be empowered to broaden the institute work, as suggested by the President's address, which, however, cannot be done unless increased appropriations are made.

*Fourth.* The recommendation of the President that a central agency be established to furnish information to prospective buyers of farms in our State is, we think, worthy of commendation and should receive the attention of this Board.

In conclusion we strongly recommend that this Board direct its legislative committee to endeavor to have such laws passed at our present legislature that will bring about the above results.

Signed by the Committee,

GEO. W. F. GAUNT,
GEO. L. GILLINGHAM,
H. F. BODINE.

The report of the committee was adopted.

The Board then took a recess until 7:15 P. M.

---

## EVENING SESSION.

TRENTON, N. J., January 14th, 1903.

The meeting was called to order by President Voorhees, who said: The first topic on our program this evening is by Mr. D. Everitt Lyon, Ph.D., of Belmar, N. J., on the "Pleasure and Profit in Honey Production," which will be illustrated by colored stereopticon views.

I take pleasure in presenting Mr. Lyon.

Mr. Lyon then addressed the Board on the subject named. (See address.)

President Voorhees—We will now take up the "Culture, Pruning and Marketing of the Peach," by J. H. Hale, of South Glastonbury, Connecticut.

Mr. Hale and his work are both well known to this audience, and I take great pleasure in presenting him.

Mr. Hale then delivered his address, which was profusely illustrated. (See address.)

A rising vote of thanks was given Messrs. Lyon and Hale for their valuable and entertaining addresses.

The Board then took a recess until Thursday morning at 9:30 o'clock.

---

## THURSDAY'S SESSION.

TRENTON, January 15th, 1903.

The meeting was called to order by President Voorhees and opened with prayer by the Rev. W. Strother Jones, D.D., of Trenton.

Secretary Dye—Mr. President, here is a letter from the Secretary of the New Jersey Veterinary Medical Association, dated January 14th, Athenia, 1903, directed to myself as Secretary of this Board, as follows:

"At a recent meeting of the State Veterinary Medical Association it was unanimously voted that we apply for membership in the State Board of Agriculture. As Association Secretary I hereby make formal application for membership on behalf of the Association. Our President, Dr. William Herbert Lowe, instructs me to say that in case we are received as a member of the Board he will appoint as delegates Drs. G. F. Harker, of Trenton, and George W. Pope, of Athenia."

Mr. President, this comes as a request and application from the Veterinary Association of this State to be received as a member of this Association.

President Voorhees—It is necessary to have a motion that these gentlemen be accepted as delegates from that Association before they can be received. Does anyone make that motion?

Mr. Gillingham—I move, sir, that the request be granted and the delegates accepted.

Motion was seconded and carried.

Secretary Dye—Mr. President, the Executive Committee has called attention to the fact that one of our members, and there may be others, has passed away during the past year, and they suggested to the Board that they have a committee appointed on the death of Brother Rogers and any others. I move that a committee be appointed to prepare resolutions on the death of Brother Rogers and any other deceased members that may be brought to their attention. (Carried.)

President Voorhees—I will name the committee later.

Is there any other unfinished business, or new business, or resolutions?

Mr. Pancoast—Mr. President, I offer the following resolution:

WHEREAS, Bribery at the polls is prevalent and threatens to convert republican institutions into a plutocracy;

*Resolved*, That the State Board of Agriculture requests the Legislature to submit to popular vote a law which will secure elections practically free from bribery.

President Voorhees—Gentlemen, you have heard this resolution. What is your pleasure?

Mr. Denise—I move that it be referred to the Committee on Resolutions. (Carried.)

Mr. Pancoast—Mr. President, I also offer the following resolution:

WHEREAS, Under the present practice of publishing in the proceedings of the State Board of Agriculture only such resolutions as are adopted by the Board, the farmers of the State who cannot attend its sessions are deprived of their just rights and of a full and accurate account of what it does and of what it expects to do;

WHEREAS, Such mutilation of the reports prevents adequate agitation of desirable reforms in favor of the farmers of the State, is contrary to usual parliamentary practice and lessens, vitally, interest in the proceedings of the State Board;

*Resolved*, That the Executive Committee be instructed to incorporate in its annual report all resolutions presented to the Board and its action thereon, unless the Board itself otherwise directs.

THOMAS T. KINNEY, Esq.
Third President New Jersey State Board of Agriculture.
Elected in 1878.

Mr. Denise—I move that it take the course of the previous resolution. (Carried.)

Mr. Morgan—Mr. President, I offer the following resolution:

WHEREAS, The law prohibiting loose hay and straw from being ferried across the Delaware river works a great injustice and loss to the New Jersey farmers: be it

*Resolved*, That the State Board instruct its Executive Committee to endeavor to have the law amended or repealed.

President Voorhees—This resolution will be referred to the Committee on Resolutions.

Mr. Brown—Mr. President, I offer the following resolution:

*Resolved*, That a Legislative Committee be appointed from the Executive Committee and that they be instructed to do all in their power to have laws enacted by our present Legislature which will bring about the suggestions made by the Committee on Officers' Reports.

The resolution being seconded, Mr. Brown said: My object in making this resolution is, I want to make it the business of some one to see that those recommendations made by our officers of this Board are brought to the attention of the Legislature and pushed.

The resolution was adopted.

Mr. Dickinson, Chairman Committee on Credentials, then made his final report. (See list of Directors, page 9.)

The report was accepted.

President Voorhees—The next matter in the order of business is "Soils, Their Requirements and Improvements," by H. J. Wheeler, Ph.D., Director of the Agricultural Experiment Station of the Rhode Island College of Agriculture and Mechanic Arts, Kingston, R. I. I take very great pleasure in introducing Dr. Wheeler to this audience of farmers, who will address us on something that will be of very great importance for consideration and discussion.

Dr. Wheeler—Mr. President and gentlemen, it gives me great pleasure to come to New Jersey. We hear much of your State in Rhode Island, for New Jersey is far-famed on account of its vicious mosquitoes and intelligent, able farmers; both of which are said to prey upon the citizens of New York City. I cer-

tainly hope, whether this is true of the mosquitoes or not, that you will continue to do so, because it is your rightful privilege.

In regard to Rhode Island, it is said that Governor Kimbell's private secretary suspected recently that our State was perhaps larger in land area than Delaware, so he took the map, and, after much measuring, found that Delaware was, nevertheless, the larger. Thereupon, he is said to have sought out the Chief Executive and expressed his regret, but the Governor is reported to have taken the matter more philosophically, for he is credited with saying it was all right, and that it was good to be Governor of the State known as the smallest in the Union rather than to be Governor of the next to the smallest, which is celebrated for nothing.

I am therefore very glad to come here as the representative of a State that has at least some ground for recognition.

Dr. Wheeler then presented his paper. (Which see with also the discussion following.)

President Voorhees then announced the Committee on Resolutions, concerning deceased members, as follows: Dr. J. B. Ward, S. B. Ketcham and I. S. Crane.

The next order of business is a paper, "Advances in Scientific Agriculture and Its Use by the Farmer," by Dr. W. H. Jordan, Director of the New York Agricultural Experiment Station, Geneva, N. Y.

Dr. Jordan then addressed the Board. (See paper.)

Mr. Cox—Mr. President, before we take a recess I would like to present the following resolution and ask its immediate adoption:

WHEREAS, The Pure Food bill, H. R. 3109 (Report No. 2364), "For preventing the adulteration, misbranding and imitation of foods, beverages, candies, drugs and condiments in the District of Columbia and the territories, and for regulating interstate traffic therein, and for other purposes," now before the United States Senate, which has passed the House of Representatives, has received the continuous support of the farmers of the country, the New Jersey State Board of Agriculture, now in session, reaffirms its desire to have this bill become a law, and hereby requests the honorable Senators from New Jersey to give it their support.

I move the adoption of this resolution and that a copy of it be forwarded to our Senators.

This motion was duly seconded and carried.

The Board then took a recess to 2:30 P. M.

## AFTERNOON SESSION.

January 15th, 1903.

The meeting was called to order by President Voorhees, who said: Dr. Wheeler wished me to announce that any of the delegates present or others who would like to have any of his bulletins on the use of nitrate of soda or the use of lime, he would be very glad to supply them as long as they last if they will apply to him at the Experiment Station, at Kingston, Rhode Island.

The first matter on the order of business for this afternoon is the report of the Commission on Bovine Tuberculosis. This report will be read by Secretary Dye.

The Secretary then read the report of the Commission. (See report.)

Mr. Charles Howell Cook, Treasurer, then read his report. (Which see.)

These reports were, on motion, accepted and referred to the Committee on Officers' Reports.

Mr. Parkhurst, Chairman of the Committee on Nomination of Officers, then reported as follows: We would respectfully report in favor of the election of the following-named gentlemen, to serve the Board for the ensuing year.

For President, Professor Edward B. Voorhees.

For Vice-President, John T. Cox.

For Treasurer, Walter Heritage.

Members of Executive Committee, William H. Rogers, H. V. M. Dennis, John M. Lippincott.

Your committee considered that the office of Secretary was not vacant.

Secetary Dye—Gentlemen, you have heard the report of the Committee on Nominations. What is your pleasure?

Mr. D. D. Denise—I move that the report be accepted and adopted.

This motion was seconded.

Secretary Dye—All who are in favor of the adoption of this report, which carries with it the nomination and election of the gentlemen named for the offices of the Board for the ensuing year, will please vote aye.

The motion was unanimously carried.

Secretary Dye—It is a vote. Mr. President, you are re-elected for another term. Permit me to congratulate you. May we have a few remarks from the President?

President Voorhees—I desire to express to the Board of Agriculture my appreciation of the confidence they have reposed in me in re-electing me to the presidency of this Board.

I wish to pledge myself, as I have in the past, to do the best that I know for the interests of agriculture in this State in all directions. You, who have known me for some years, know that the first thing in my estimation is the interests of the farmers of this State, of whom I am one, and I pledge to you my best endeavors in your behalf, and I thank you most heartily for the confidence that you have reposed in me. (Applause.)

I think it is in order for the Vice President-elect to make a short address.

Mr. Cox—Mr. President and gentlemen, I want to assure you, my friends, one and all, that I appreciate this compliment which you have again paid to me in selecting me as your Vice President. Of course, it is understood, thoroughly well understood, that the Vice President of this organization has but very light labors to perform. Unless in case of the sickness or inability of the President to preside, the Vice President has but very little to do, but I want to assure you that I shall endeavor to do my part, and whether in the position of Vice President or occupying temporarily the chair of the Board, I shall use my best endeavors to carry out the wishes of this Board, believing, as I have always believed, that the officials of this Board are only your servants, and they best perform their duties when they serve you most faithfully. (Applause.) And now, Mr. President, I think fair treatment demands that something be heard from the other officers who have been elected. We have, I believe, elected just recently a new Treasurer, and then there are some members of the Executive Committee.

President Voorhees—The new Treasurer is called for. Will he present himself?

Treasurer Heritage—Mr. Chairman, I am not going to make a speech, but I assure you I realize the importance of this office, and I thank the members of this Board for the compliment that

they have paid me in placing me as Treasurer of this Board, and I assure you that I will perform the duties pertaining to the office to the best of my ability and the books will always be open to you for your inspection. (Applause.)

President Voorhees—The new member of the Executive Committee is called for, Mr. John M. Lippincott.

Mr. Lippincott—Mr. President and gentlemen of the Board, we are living in the age of organization and incorporation. I believe that the benefits to be derived from our farmers' organizations will be best carried out by the intellectual and rational investigation of the subjects bearing upon our calling.

In thanking you for the honor you have visited on me in electing me as the colt of the Executive Committee, my desire is that I may be guided in all my acts so as to merit the confidence you have reposed in me. I thank you for the honor. (Applause.)

President Voorhees—The next matter in the order of business is a paper by Joseph L. Hills, Director of the Experiment Station of the University of Vermont and State Agricultural College, Burlington, Vt., on the subject "How Can the East Compete with the West in Dairying?"

Perhaps it is not well known to the farmers of New Jersey that Mr. Hills was at one time assistant chemist at the New Jersey Experiment Station. He is quite familiar with our conditions here and in the East. I take very great pleasure in introducing Mr. Hills to a New Jersey audience. I am sure you will hear something that will be well worth carrying with you.

Mr. Hills—Mr. President and members of the State Board, ladies and gentlemen, I am always glad to come back to New Jersey, because, as your President has just told you, I spent two years of my young manhood here. And then, moreover, and far better than that, some fourteen years ago I transplanted a young lady from the banks of the Raritan to the shores of Lake Champlain. She loves the mountain scenery of her adopted State, but is always glad, as I am, to get back again where she can see the red earth of New Jersey.

Mr. Hills then delivered his address. (Which see.)

President Voorhees—We will now proceed to the discussion of the "Confirmation of the Dairy Cow, and How to Select Her," by Mr. Henry Van Dreser, of Cobleskill, N. Y.

Mr. Van Dreser has been doing very efficient and excellent work in our interest at our Farmers' Institutes, and I am sure you will be pleased to have him dilate upon this very important question. I take great pleasure in introducing Mr. Van Dreser. (Applause.) (See address.)

A vote of thanks was then presented to the speakers of the afternoon.

The Board then took recess until the evening session.

---

## EVENING SESSION.

January 15th.

The meetng was held in the auditorium of the State Normal School and was called to order by President Voorhees at eight o'clock, who said: The State Board of Agriculture extends a hearty greeting to the schools that are represented here. In the past we have gone to Europe and Porto Rico; at this meeting we are going to travel in Venezuela, and we are particularly fortunate in having with us a staff correspondent of the Philadelphia *Press,* Colonel George Nox McCain, who has spent three months in that country during the time of the boundary trouble, and the pictures he will show you and the remarks he will make are what he has himself seen, and I am sure you will all be very much delighted by the travels we shall have placed before us this evening.

I take great pleasure in introducing Colonel George Nox McCain. (Applause.)

Colonel McCain—One thousand miles, as the seagull flies, to the southeast from the farthest Florida Key, over the battle-fields of Cuba, across the black republic of Hayti and up over the sunlit waters of the Carribean sea, where they curl and toss above the sunken treasures of old barbaric kings, lies the land where it is always summer. A land whose towering trees were the first to beckon a welcome to Columbus to the continent he was to gain and lose.

A Spanish dependency, whose people were the first to blaze a pathway of freedom in the light of the southern cross, by the efforts of Emanuel Bolivar, the liberator of Venezuela.

Mr. President, in view of the international complications affecting this land to the southward, and our interest in those compli-

cations, I deem it a special honor to act as the guide of this brilliant and intelligent assemblage through a land so rich in beauty and so stained in blood, a land whose mighty rivers are bearing a golden flood to distant lands, and whose old cities, the oldest on the hemisphere, crouching in the shadow of her internal hills, as though dreading a time long since dead and gone, stretching their wide arms to the sea.

Columbus discovered Venezuela. Spain almost destroyed it. The first European civilization was planted here in 1520, and from that date down to the present the history of this land has been an endless chain of slaughter, blood and battle.

Geographers have misrepresented Venezuela. It is a land of magnificent extent. It would require all of Germany and France and the Netherlands to take its place upon the map. It is as large, almost, as the United States east of the Mississippi river, omitting New York and New England. It is watered by 1,047 streams. It has a population of 2,400,000 souls. With all its tragic sorrow, it is a land of wildest romance, because somewhere in the depths of its primeval forests or the heart of its unexplored mountains is located in tradition the lost city of Eldorado, the Golden.

Somewhere beyond the sweep of river and slope of plain and stretch of mountain side there lies in tradition a civilization that was old when the caravels of Columbus first came.

But no white man has ever seen the shine of its gilded domes and come back to tell the story of its splendors. No white man has ever crossed the threshold of its homes and come back out of the mystic retreat.

Venezuela is the land of yesterday. In the administration of its government and the products of its people it is a hundred years behind the age.

But I beg that you will remember, as we look upon the cities here to-night on this canvas, that, though they have been razed by bombs and earthquakes, that though they have suffered thus many times, they have risen fresh into reunited life. Though her people have been dominated by tyrant and robbed by dictator, they never halted in their era of upward march, and if to-day this sister republic of the south lags behind in the march of human progress and marks time to the drum-beat of another age, it is because the pall of four hundred years of Spanish despotism and oppression hang yet heavily above her.

Now, in imagination, let me transport you to the city of New York, where we board a Red D Line steamer and start on our trip. (Colonel McCain then delivered a lecture which was beautifully illustrated with colored views and was highly entertaining and instructive.)

---

## FRIDAY'S SESSION.

TRENTON, N. J., January 16th, 1903.

Called to order by the President and prayer was offered by the Rev. William Allen, Jr., of Pennington, N. J.

President Voorhees—Is there any unfinished business or reports of committees?

Mr. De Camp—The Committee on Resolutions is ready to report on Resolution No. 1.

*Resolved*, That the State Board of Agriculture be requested to co-operate with this Association in securing proper legislation for the protection of the fruit industry in this State.

This resolution was passed by the State Horticultural Society on January 8th. We see nothing very pointed in the resolution, but we recommend its adoption, being in hearty sympathy with the matter.

President Voorhees—The resolution, as was pointed out when it was first offered here, is not clear. It refers to action taken by the State Horticultural Society in reference to the control of injurious insects, that this Board should co-operate with that Society to secure legislation which will give greater power to the entomologist in controlling those pests.

The resolution was adopted.

Mr. De Camp—Resolution No. 2.

*Resolved*, That the Executive Committee be instructed to incorporate in its annual report all resolutions presented to the Board, and its action thereon, unless the Board itself otherwise directs.

The committee reports adversely on this resolution, because the Executive Committee of the State Board, as we understand it, does not control the printing of the reports. The State prints the reports, and not the State Board of Agriculture, and we have got to do very much what the State Printing Committee sees fit to do, and therefore your committee reports adversely on this resolution.

Mr. Pancoast—Mr. President, the object of that resolution is to secure to the farmers of the State, who are unable either from the press of their business or for lack of sufficient leisure and means to attend the sessions of this State Board, full knowledge of what is done and what is attempted to be done by this State Board or by the members who attend its sessions, just as much as the men who can come here.

Mr. Ketcham—I move, Mr. President, that the report of the committee be concurred in. A resolution similar to this has been presented before this Board perhaps every two or three years for the past fifteen years.

Why, gentlemen, you can see the inconsistency of this thing. It is not politic to do it, it is not necessary, and it won't do us any good. Now, in the name of reason, in the name of good policy, of good sense, I do hope, Mr. President, that this Board will adopt the report of the committee. I am not a member of the Executive Committee, but I know they have not the power to say what shall be printed. The Executive Committee presents the report to the State Printing Board, and the State Printing Board says, "Cut it down; put in only what is actually necessary; what would be beneficial to the farmers; put that in."

Now, sir, in view of these facts, in view of the keeping up of our prestige, in view of keeping ourselves in line to receive favors as we have in the past, let us adopt the report of this committee.

The question was then put to a vote and the report of the committee was adopted.

Mr. De Camp—Resolution No. 3.

WHEREAS, Bribery at the polls is prevalent and threatens to convert republican institutions into a plutocracy;

*Resolved*, That the State Board of Agriculture requests the Legislature to submit to popular vote a law which will secure elections practically free from bribery.

Your committee reports adversely on this motion also, as there is a Commission in this State appointed on that thing, and we do not feel that it would be right for us to do anything in this connection to conflict with that Commission, and the committee, under those circumstances, reports adversely on that resolution.

Mr. Cox—I move that the report of the committee be concurred in and adopted.

(The motion being seconded.)

Mr. Pancoast—Mr. President, I fail to see that if there are already efforts being made to procure this needful legislation to cure this evil that we would hamper the men who are making that effort by expressing our sentiments upon the question. It is evident to everyone who is cognizant of the existing conditions that bribery at the polls is prevalent in this State.

It is a conservative estimate that in two of our richer agricultural counties, which contain within their borders no great cities, that one-fourth of the total vote can be bought by the highest bidder, and in important elections another fourth has to be paid to vote their own party ticket.

Our cities are the hot-houses wherein are forced into more rapid growth and earlier maturity the tendencies of our modern civilization, and it is a fair estimate that in counties containing great cities the purchasable vote is equally large. It has not attained its full growth yet, but it is increasing year by year, and, though it has not yet attained its full growth, its effects now are to prevent the best men of the State from accepting nominations to positions of public trust and responsibility. It prevents the very men whom it is for the best interests of the community that they should hold office from accepting such nomination. They cannot afford to accept nominations, because they know they could not secure their election without stooping to practices which are unlawful and illegitimate and would degrade their manhood.

Vote buying is a direct incentive to legislative and official corruption, since usually it is only by such means that the successful candidate can hope to recoup himself for the expenses of his election.

It tends to degrade the poor, as is proven by the fact that in at least one section of the State one of the proudest aspirations of young men about to attain their majority is that they will then secure the privilege of selling their suffrages.

It tends to degrade and debauch the young men of the rich and of the well-to-do, because it teaches them that all means are legitimate to attain success, no matter how unlawful they may be.

It destroys reverence for laws, because in every election men know that the laws governing the election are grossly violated in the community.

It brings our courts into contempt, because the whole power and influence, in many cases, of the sheriff and grand juries are used to shield, and not to punish, the guilty.

When it has become fully developed, this cancerous growth must eat out the heart of democratic institutions and must convert our republic into a plutocracy, the most evil of all forms of government known to man.

Is it to be allowed to thus prevail? If not, when is a reform to begin and who is to begin it?

Do you know of any satisfactory reason why you should not begin it here and now, by presenting this resolution to the authorities and by passing it now?

No politician can be expected, and no statesman can be expected, to attack this gigantic evil single handed.

Even a Governor, who is too great to attempt primary reform, feels that his strength is not equal for the far greater and more important question of electoral reform.

All great reforms come from the common people. No body in this State could wield in this direction such great influence as we farmers.

If we refuse, who is to do it? I appeal to you men here, who, to some extent, are more or less responsible for the existing conditions, in the remaining years of your life, to do what you can to remove this great curse.

I appeal to you, men of middle age, who are equally responsible, and to the end that you will use your strength and your efforts to secure the perpetuity of our republic, which has been secured to you from the sacrifices and from the sufferings, aye! even from the life blood of our sires and ancestors.

Mr. Pancoast finished his remarks by quoting Mr. Lincoln's speech at Gettysburg, and said:

May the spirit of Lincoln at Gettysburg live with and rest upon each one of you as you vote upon this question, and may you not forget the responsibility which is upon you.

Mr. Brown—Mr. President, this is a serious question. I don't know whether this resolution is correctly drawn or not, but I hope that some action will be taken here to-day in favor of supporting the laws that we have, or some means be taken to stop the prevalence of bribery at elections. This is a very important question to the farmers of the State of New Jersey.

Mr. Lippincott—Mr. President, I think we ought to have a little fuller explanation of the Committee on Resolutions as to why they object to this. I do not believe there is anyone here who does not object to bribery, and there must be some explanation or some fuller reason for the rejection of the resolution.

Mr. De Camp—If this resolution were approved it would require us to go to the Legislature and ask them to enact a law to prevent bribery at the polls.

Now, there is a committee or commission at work, appointed by the Governor a year ago on bribery, and they are trying to solve the problem, and there will be a law passed here this winter. They don't want any resolution from us to remind them to pass the law. There is no one who favors bribery; we understand that, but just as this is worded we could not recommend it. We now have a primary law, and the primaries are advertised in the papers and they are open from three to nine o'clock, and yet nobody comes; frequently there are only fifty votes cast at a primary.

It takes public opinion to enforce any law, and if the people themselves do not want it, or will not take an interest in politics, why they are to blame if it is left to the others. I know something about politics. I know that as long as the farmers remain away from the primaries and do not interest themselves in politics that a very few will continue to control the elections.

When it comes to the law, I am in hopes that this commission that is appointed will lay more strict guards around the polls; but, after all, when you come right down to the point, no law will be higher than the people who are behind it. We have got lots of laws on the statute books to-day. To-day politics decides the government. I would like to get every man in the State of New Jersey to take an interest in it as far as I could, so that we would have better elections and better officers.

Now, your committee is heartily in accord with the sentiments of this resolution, but when it specifies that our legislative com-

mittee shall apply for a law of this kind to be submitted to a popular vote, we feel that it would not be right for us to take that action.

Mr. Pancoast—Mr. President, I want to ask Mr. De Camp whether he knows that this committee or commission takes in general elections as well as primary. I understand it is confined exclusively to primary elections.

Mr. De Camp—All the elections. This commission has full power, and they are supposed to arrange something that will be better than what we have got, and we want to be in harmony with that committee.

President Voorhees—If there are no further remarks I will put the motion on the adoption of the report of the committee.

A vote was then taken and the report of the committee was concurred in.

(See similar resolution at the end of these minutes, which was adopted.)

Mr. De Camp—Resolution No. 4. The committee desires to bring this before the Board. They see the injustice of the matter, but they are not familiar with the law in question:

WHEREAS, The law prohibiting loose hay and straw from being carried across the Delaware river works a great injustice and loss to New Jersey farmers; be it

*Resolved*, That the State Board instruct its Executive Committee to endeavor to have the law amended or repealed.

Now, the committee is satisfied that that is working a serious injustice to the farmers of New Jersey, but they do not see the way to remedy it. We recommend it favorably if we can get anything to help these farmers; we have no objection to doing so.

Mr. Roberts—This is not a law that affects us so much as a rule, a regulation. But it does affect us very much in the selling of hay; there is no doubt about that. But, if I am told correctly, there is a United States law that provides that all ferry boats, common carriers, shall not in the same boats carry such things as hay and straw and cotton, with passengers. All our ferry boats are rigged to carry passengers with freight. Now, the application of this law, as I understood, was primarily intended for automobiles. These automobiles are largely propelled by

gasoline or by some other dangerous materials, not safe with hay and straw and cotton. That law has been applied to our railroad companies, and they have had no right to carry such things as loose hay and straw, and I don't believe our Legislature could have much to do with it. But I would be glad to see the law so applied that we could take those things across the river in bulk. It means $2 a ton for a load of hay to the South Jersey farmers. I have applied to headquarters, and they tell me that they are complying strictly with the Federal law. I don't see how we are going to get at it very well.

Mr. Collins—I have understood that quite recently the Pennsylvania Railroad Company enforced this old law and put it on the autos, and included loose hay and straw. I am told on good authority, they allow the autos now to go into Pennsylvania, while they shut down on the farmers' hay and straw. This means not only $2 a ton less, but sometimes $5. Now, if they have found some means by which those other parties are allowed to go back and forth, I would be very glad to see some way for the farmers to do the same thing.

The farmers in a circle of ten or fifteen miles around Camden are interested in this matter, and if we could only prevail on the ferry companies to allow us two days a week in which to cross with hay, I think that is possibly not so unreasonable. Probably if it were represented to them they would give us that privilege. We have not so far applied for it direct.

Secretary Dye—Isn't that the way out of it, Mr. President? Mr. Collins has suggested that the hay which goes to Philadelphia is most affected. Why don't you get together and present the matter to the railroad company? It seems to me you will accomplish more in that way than we can here.

President Voorhees—If you appoint a committee to wait on the railroad company they can have the endorsement of the Board.

Mr. Morgan—Mr. President, I was requested to present this resolution here from our local Grange and also from our County Board and our farmers. This is an old law and has been revived. It is a national law. But previous to framing the resolution, I consulted with our lawyer in Camden, and he recommended me to bring it before this Board to get the view of this Board and then refer it to our Congressman, who does all he can for us, and

he to bring it before the National Legislature, so that we can get our straw in bundles and our hay loose into the market.

We have a regular hay market in Philadelphia, and you may see every Wednesday and every Saturday a quotation in the papers about the sales of hay and straw in the market, loose, &c. Hay brought us from $1 to $1.20 a hundred in this market, and straw in bundles brought from $1 to $1.05 a hundred. As has been said, it costs from $1.50 to $2 a ton to get the straw and hay baled, and then you see in the market the baled straw and baled hay bring a less price than the loose hay or the loose straw, by $2 or $3 a ton. So that there is a difference between the two of about $4 a ton. Our farmers would like to have this passed, asking the Legislative Committee to use their influence with the common carriers to carry loose hay and straw across the Delaware river to the Philadelphia market.

Mr. Goble—Mr. Chairman, the remarks so far have all applied to ferries between Camden and Philadelphia. I come from another section of the State, where we have ferries that do not cross the Delaware. How much it affects the farmers in the northern part of the State I could not answer exactly, but we certainly have a few ferries that go across from Jersey to New York City, and any action taken at this meeting in the line of this resolution I would like to have it broad enough to include all the ferries.

President Voorhees—I think the resolution covers all the ferries.

A vote was then taken on the motion to adopt the report of the committee, which was carried.

President Voorhees—Are there any further resolutions, or any other committees to report, or any unfinished business?

Secretary Dye—By permission of the President, I will state that the next best thing after getting up a program of this kind is to have the speakers all come to time. We have been able to do just that thing up to this point. But our friend from Minnesota, who disappointed us last year, has disappointed us again. January 9th he wrote me: "I expect to start for your annual meeting Monday evening, January 12th, and will get there as soon as the railroad accommodations will permit. I hope to arrive in good time, and that your meeting will be a success. I am yours very truly, J. C. Curryer."

On the 14th I got this telegram: "Fate is against us. Accident makes it impossible to get there. J. C. Curryer."

What the accident is I don't know. Anticipating this possible break in our program, I wired Mr. Pettit—who prepared a very excellent article on the breeding and training of the horse before the Salem Institute—to be here this morning and read his paper; but for some reason or other he has not materialized up to this time. Looking around for a good man to take this place on the program, we asked our friend Van Dreser to stay this morning and repeat his poultry address, with the hope of getting the best parts of that in our annual report. So I hope, Mr. President, that Mr. Van Dreser will favor us once more.

President Voorhees—Dr. Phillips has an announcement to make at this time.

Dr. Phillips—We had an address yesterday about the cattle business and cattle breeding, and I hold in my hand the Creamery Patrons' Handbook, prepared by the National Dairy Association—a book of information for keepers of dairy cows. This book costs one dollar and the dollar goes to the treasury of the National Dairy Union, as a fund to fight the oleo business, and when you pay your dollar for the book you become a member of the National Dairy Association. There are, therefore, three objects that are desirable in purchasing it.

The book is up to date in dairy matters. I am not an agent for it; I simply announce it here. It is for sale at all creameries and by the Secretary of the National Dairy Union—Charles Y. Knight, of Chicago, 154 Lake street, I think.

President Voorhees—Now I take pleasure in introducing Mr. Van Dreser, who will talk to us on the poultry question.

Mr. Van Dreser then addressed the Board. (See address.)

Secretary Dye—Mr. President—if you will allow me, before Professor Smith makes his remarks—I do not want this Board to be in the position of seeming to dodge the matter that Mr. Pancoast brought to our attention, and with his consent and with yours I will offer this resolution:

*Resolved*, That the New Jersey State Board of Agriculture is opposed to bribery at the primaries and elections, and we hereby endorse the efforts now being made by the Governor and the Legislature to prevent this evil, and we pledge them our hearty co-operation in this work.

I offer that and ask for immediate action on it. The resolution was then moved, duly seconded, and on a vote was unanimously adopted.

Chairman Cox—We will now listen to the report of the State Entomologist, Dr. John B. Smith.

Dr. Smith then read his report, which was accepted and referred to the Committee on Officers' Reports. (See report.)

Then at 12 o'clock, there being no further business, the Board adjourned *sine die*.

FRANKLIN DYE,
*Secretary.*

HON. THOMAS H. DUDLEY.

Fourth President New Jersey State Board of Agriculture.

Elected in 1882.

# President's Address.

Although this is the second year of my service as your chief officer, it is the first opportunity I have had of presenting to you personally the President's annual address. In the first place, I think it is a matter for congratulation that at this time the industry we represent is, on the whole, in a prosperous condition. The farmers of this State, and of the whole country, should feel encouraged in their work, because of the improved conditions now prevailing and of the recognition that the work of the farmer is receiving; never in the history of this country has there been so great commercial prosperity as in the year just closed, and it is admitted on all sides that the impetus which has resulted in so great a development and expansion of business enterprise is due, in large measure, to both abundant harvests and higher prices for the crops of the farmer. In the last analysis, it is the farm that is the mainspring and true basis of genuine prosperity and progress, and though the question as to whether the farmer is obtaining his just proportion of the wealth that is being created by his activity may merit discussion, it is my judgment that at this time we would do better to discuss the matters connected with the work of this Board, and which, directly and indirectly, have so important a bearing upon our farmers' success and prosperity. In the last address an attempt was made to show the origin and development of this State Board of Agriculture and its usefulness to the farmers of the State in the various directions in which its activities extended, and I think that it was evident from the facts then presented that its work has been helpful to the farmer, not only in those matters which pertain directly to his farm operations, but that it has also exerted a powerful influence in upholding and maintaining the importance and dignity of the farming industry and in showing the relation of successful agriculture to the true progress of a State, and furthermore, that its future usefulness in

all these directions must depend upon how well the various lines of work under the direction of the Board shall be carried out.

In this address, therefore, I shall touch briefly upon the status of the various interests that have been committed to the charge of this Board, in order that you may be fully acquainted with the extent of the work and the manner in which it is carried out.

### THE GENERAL WORK OF THE STATE BOARD.

In the first place, the Board is charged with the general supervision of the progress of the various branches of agriculture during the year, in order to learn, if possible, the difficulties that are encountered and means whereby they may be overcome. The reports from the different parts of the State during the past year indicate that practically all lines of farming have been satisfactory. The statistical part has been tabulated by your Secretary, and will be presented at the proper time.

### COUNTY BOARDS OF AGRICULTURE.

The various County Boards under our supervision have in most cases held regular meetings and a satisfactory attendance has been recorded. In one or two instances, notably in Somerset and Gloucester, a greatly increased interest has been manifested, due in large part to the activity and ability of the officers in providing entertaining and helpful programs. The usefulness of these adjuncts to the State Board in organizing the farmers, in reviving an interest and encouraging enthusiasm in the work is very apparent in the improved condition of agriculture in these as well as other counties, where the meetings are faithfuly held and where the attendance is representative of the county. It has been my privilege to attend many of the meetings during the year, and while I am gratified with the work as a whole, yet I feel that it could be made more helpful if a deeper interest were taken on the part of those directly interested. Every county should have its center of helpful influence for the uplift of the business in the different parts of the county, and every farmer should regard the County Board as peculiarly his own institution and make it a

matter of pride to contribute his share to its success and usefulness. Individual effort is necessary here as elsewhere, and in the long run it will pay large returns.

### TUBERCULOSIS COMMISSION.

The next important line of work with which the Board is charged is that of the execution of the law in reference to tuberculosis in cattle. The Commission consists of members appointed by the President of this Board, and the responsibility for the results of the work of this Commission must ultimately rest with the Board. Its members should, therefore, be familiar with the character of the work, the method of its prosecution, and the results secured. The reports of these officers have been presented to you in full, from time to time, and are worthy of your careful consideration, in order that the future work may be more efficient, because of your helpful suggestions. It is my judgment that the methods of inspection in use in this State are wise, and that the relations of all concerned are carefully considered and properly adjusted, and that the conditions in reference to the disease are greatly improved, yet I believe that the time has come when the scope of the work should be broadened and the authority of the Commission enlarged, in order that it may seek and go into herds, and destroy animals manifestly suffering from the disease, and which now serve as centers from which the disease, in the course of trade, is spread to other herds in other parts of the State. The eradication of this disease and the prevention of its diffusion cannot be accomplished so long as the Commission can enter only upon request, as is now required by the law. Its power should thus be broadened, aside from any considerations of public health, but purely for the sake of those who at present own diseased animals, and of those who may be the future owners of animals which may come in contact with them. The prevalence of this disease near New Brunswick is indicated to some extent by the data obtained by the College Farm in the purchase of animals. During the past seven years all animals purchased were submitted to the tuberculin test, and but two out of one hundred purchased were rejected by the test. These animals were brought into the neighborhood by dealers who purchased them in different parts of the State. Of course, the parties selling knew that the

tuberculin test was required, and may have offered only those that they felt were free from the trouble; nevertheless, no animal was rejected on suspicion, though opportunity for such rejection was afforded, yet but two of those presented were rejected. It is abundantly evident, too, from the experience of the past year, that the powers of this Board should be so enlarged as to include all diseases of animals, or there should be some known authority for the detection and control of animal diseases other than tuberculosis. Under present conditions, should an unknown or especially contagious disease break out in any section of the State, there is no authority known to all to whom the interested parties may apply for information and relief, and be sure that prompt assistance will be given. Letters are sent either to the officers of the Experiment Station, State Board of Agriculture, or to the State Tuberculosis Commission, and are promptly referred to the State Board of Health, though by the time they get to this office, which is charged with the duty of investigation, certain animal diseases other than tuberculosis, the disease has either spread rapidly or the animal will have succumbed, or both. This matter has been brought strongly to the attention of the Board this year, and had the dread foot and mouth disease, now present in New England, broken out in this State, at least a week or ten days would have elapsed before anyone could have gotten at the proper authorities, and in the meantime, not only would there have been the spread of the disease, resulting in the sickness and death of animals, but it would have involved an enormous expense in the stamping out of the disease and destroying the germs. If there is a logical reason why the State Board of Health should be charged with work of this character, if it is so charged, then the fact should be made so prominent that everyone in the State, particularly the veterinarians, should know to whom to apply in case of suspicious diseases. I make these suggestions, not because the officers of the State Board are anxious to increase their labors and responsibilities, but the interests of the farmers and of the State may be conserved.

The law regarding the importation of dairy cattle has been faithfully executed, and has undoubtedly resulted in preventing the bringing into the State of many diseased animals, yet it needs revision in order that it may meet the many exigencies which are liable to occur, and which were unforseen at the time of its passage.

## INSECT INSPECTION.

The State Board is also charged with the duty of executing the law of 1898, in reference to the introduction and spread of injurious insects in the State. The State Entomologist has executed this law in so far as it has been possible for him to do so, and the effects have proved of great benefit along certain lines, but defects have developed in the law, and it should be amended or entirely repealed. As the matter now stands, horticulturists outside of the State get all the protection, while those within it get practically none. A nurseryman in the State is not required to have his premises inspected, though he can demand it, and can trade within the State without having a certificate and without having his nursery inspected, so that trees infested with the scale, which cannot be sold outside of the State, can be disposed of to either careless or ignorant growers within the State. This condition should not be allowed to exist. Furthermore, the law requires that the nurseryman, when he demands an inspection, must pay the expenses connected therewith. He does not, therefore, desire any more inspections than he can help, and practically everyone desires an inspection at the same time. This has required a large portion and practically the entire time of the entomologist at certain seasons, for which he receives no compensation under the law, and which is virtually paid for by the Experiment Station, which employs him. Neither are the requirements of the law observed by the railroad or express companies, and there are so many points of entry that it is practically impossible to prevent the introduction of scaly stock. Other States are spending large sums—New York, $25,000; Maryland, $15,000—annually, to do the work for which New Jersey receives an appropriation of but $1,000, and unless a better system is adopted in our own State she will be practically barred out from trading in other States, while her fruit growers will have to take such stock as they can get from local dealers, or such as the outside growers choose to give them. This matter is of the greatest importance to our fruit interests, and merits the attention of this body, representatives of all the farming interests of the State.

## FORESTRY.

The matter of the preservation and improvement of our forest area is very important and has been brought to the attention of this Board in various ways in past years, though no helpful legislation has resulted. It would seem that with the growing knowledge of the value of properly-managed forests as a source of wealth to the State this branch of agriculture should receive suitable recognition. Much interest has been manifested in the question in other States and by the National Government. The very great importance of the subject has resulted in the establishment of schools of forestry, of a National Forestry Association, of State Associations and of forestry journals, and these have stimulated the activity of scientific and practical men in the study of this branch of the world's wealth in itself, as well as in its relations to the conservation and improvement of the fertility of our arable regions. These studies have also resulted in the preparation of text-books and of directions for the ultimate building up of forestry in this country, so that there seems now to be no excuse for delay in making such provision as will result in the conservation and upbuilding of our own forest area. The Board has, in its Institute work of the past year, had the matter presented by a practical forester, and it is abundantly evident, from even a preliminary study of the subject, that with proper care and management the present forests might be made profitable and that much land now practically useless might be made a source of wealth. Many suggestions have been made by State officials and others in reference to needed legislation, but thus far practically nothing has been done, and the waste of property and the annual losses due to forest fires continue.

## IRRIGATION.

This is a matter which is also receiving very considerable attention by the National Government, and there seems to be no good reason why, if irrigation can be legitimately made a part of the functions of the National Government, why the work should be entirely confined to the arid and semi-arid regions. Investigations

that have been carried on in this State along this line have shown that while in many years the average rainfall is more than sufficient to meet the demands of vegatation, there occur periods nearly every year during which one or more crops suffer from lack of water, and furthermore, that small pumping irrigation plants are practicable, and that irrigation with these is a profitable practice. It has also been shown that there is a large waste of water in the State, and that it can be successfully impounded for irrigation purposes. The problem still remaining to be studied is whether gravity irrigation from streams would prove practicable, particularly in those districts where the soils are poor, but in physical character are well adapted for the growth of certain vegetables and small fruits. This is a matter which it seems to me is well worthy of investigation and one in which the Board should evince a proper interest, as affecting the utilization of a natural source of wealth, the water-supply of our streams, now running to waste, and from wells, which reach underground supplies.

## FARMERS' INSTITUTES.

Farmers' Institutes have been carried out by the State Board as in the past. It was my privilege, owing to the absence of our Secretary from the country on specially important business, to represent the Board at the annual meeting of the American Association of Institute Workers, in Washington, in June last, and I was much gratified that in such a representative body the concensus of opinion as to Institute methods which were regarded as best conformed closely to those which have been in use in this State.

From the beginning we have regarded the Farmers' Institute as an educational movement, and have tried to improve the character of the instruction from year to year. It is the farmer's school, and if we are to make further progress along right lines, we must adopt broader methods and aim for an ultimate end, namely, the genuine instruction of the farmers; and in order to do this we must, as the years go by, have a higher class of instructors—those who have been trained in the sciences of agriculture and are able to present in a right way the results of scientific investigations and to show their relations to farm practice. We cannot expect

to make genuine progress if the instruction is confined to purely practical lines. The work must, as time goes on, be placed on a higher plane, and Institute workers are already recognizing this fact and are preparing to meet it.

In this State there are, too, difficulties which are not encountered in so great a degree in purely agricultural States. Our conditions are such as to tend to draw from the farm. Farming is not the popular business, as is the case in some of the Western States, and this condition is a decided hindrance to the right sort of educative work. We do not get hold of the best material in all cases; besides, the variety of our soils and the location of our State in reference to markets makes necessary "special" and intensive, not "general" extensive, farming. So the Institute must be prepared to advise and educate the farmer in many directions, which in a sort makes the work more expensive. Along this line it is gratifying to note that the influence of the various educative forces, including the Institute, have borne good fruit, both directly and indirectly, in teaching the farmer to adapt himself to his condition. This is very clearly indicated in the report of the United States Department of Agriculture on "Field Operations of the Bureau of Soils, 1901," in which Dr. Whitney, the Chief of the Bureau, says of the soil survey of the Salem area: "The area in southwestern New Jersey, described in the present report, is a noteworthy locality in the eastern part of the United States, from the fact that the adaptation of certain crops to definite soil conditions has proceeded farther and has met with greater success there than in the great majority of communities."

Thus we have evidence that true progress has been made in our Institute work, and it has been accomplished without expenditure other than that provided in the annual appropriation to the State Board. We have had no assistance from the State Horticultural Society, which now receives a direct appropriation from the State, in addition to that annually furnished them from the funds of this Board. The time has come, however, when, with the annually increasing claims upon the State Board funds, the work of the Institutes cannot be broadened and carried out on these new and more effective lines unless special appropriations are made. It is a matter well worthy of the attention at this time of the representatives of the various sections of the State.

EXPERIMENT STATIONS.

It is a fortunate thing for any State when all of the forces whose aim is the betterment of any one industry shall work together. This State has been peculiarly fortunate in that all those working for agricultural progress and uplift have been both complementary and supplementary, working together harmoniously, recognizing only the one thing—the best interests of the farming industry. I believe that the Experiment Station has been wonderfully helped in its peculiar and special work by the support of this Board, and that the Board has been wonderfully helped by the Station in the work peculiar and special to it, and that, in a sense, the two institutions cannot be separated—that is, if either one did not have the privilege of, and accept the services of, the other, there would, as a result, be waste of effort and a distinct loss to the interests involved.

I shall not discuss at this time the work of our Stations, nor their influence upon the agriculture of the State; that would better be done by those not so intimately connected with the institutions as myself, but I think that, owing to the differences of opinion in reference to the functions of an Experiment Station, it would be well for me to express my views on that point.

It is my judgment that an Experiment Station cannot do its best work as an investigating institution unless the farmers are first made acquainted with the facts of science already established—that is, unless the Experiment Station has an audience that has a familiarity with the principles of science that have been already ascertained; then the work of adding to the principles and facts we have can be of no direct use to the farmer. The benefit to him is entirely indirect, and thus proportionately less valuable.

In the work of the Experiment Station, for best results, there must be a co-operation and intimacy between the man who works and the man who puts the work into practice. In order to secure this the farmer must be taught, and in order to accomplish this it is necessary that he have confidence in the man who does the teaching, as well as the scientific work that is done in connection with the instruction. In other words, the man who teaches the farmer must be practical, and he must be able to adjust his science to practice; I can see no good reason why the teacher should not

be able to run a farm and run it successfully, but I can see why the teacher is not a good teacher unless he can do this. I believe we cannot get the necessary intimacy with the farmers of the State, and we cannot do the work we ought to do in building up the agricultural practice on a scientific basis until the farmers believe in us as practical, as well as scientific, men. For this reason I have always maintained that there should be a farm connected with instruction of this sort, and that it should be run on right lines and serve as an object lesson in modern methods of farm practice; the eye is often able to detect the principles when the mind is unable to grasp it. I regard it as a fortunate thing that our Experiment Station has now this valuable educative adjunct in its work, and it rests with the farmers to make full use of it.

### THE AGRICULTURAL COLLEGE.

It may be claimed that it is the function of the Agricultural College to provide the needed education rather than the Experiment Station, and this view is correct in so far as the influence of his college influence extends, yet, because it is a college, its advantages are limited to the few who can afford the time and expense of the course, unless special and short courses are established, which the authorities in this State have not seen fit to provide, notwithstanding the importance of such a move has been urged by this Board, both in season and out of season. As I study this problem of agricultural education I am more and more convinced that the additional need now is for the school—the college is established and is prepared to receive all that come, yet it does not meet the situation. This brings me logically to the question of agriculture in the public schools.

### AGRICULTURAL EDUCATION IN THE PUBLIC SCHOOLS.

This question is a perennial one, and yet it is of the utmost importance. Fortunately there has been very great progress in educational lines in recent years, and we are better prepared to-day to urge the teaching of agriculture in the public schools than ever before, because we are getting a trained body of teachers, and we are getting the various lines of teaching in such a form as

to make it possible to give a logical system of instruction, which, if it is impossible to carry beyond the elementary stage, will be safe as far as it goes. Another impetus has been given to the question of teaching agriculture in the public schools by the establishment in many States of graded country high schools, where it will be possible, without interfering with the instruction in other lines, to teach those branches which shall be of the best service to the farmers' children. We must remember, however, that if we are going to get the proper sort of education along these lines, there must, first, be a demand for it, and we cannot get that demand until we have the farmers themselves—the fathers and mothers of those children—so much interested as to ask for a better farm education for their children than they themselves possess. It seems to me that in this respect the Granges, farmers' organizations, County Boards of Agriculture and other agencies can do a great work by arousing the farmers to the importance of the knowledge that can be gained from the study of the sciences as they apply to agriculture. As the Farmers' Institute work and allied forces increase their usefulness, we are going to have a greater interest among the farmers; and along with that will come the greater demand for the proper instruction in the lower schools.

There is one danger, however, in the grouping together of the common schools into a large high school—that the farm interests will be overlooked, and that we will find that the authorities will not make provision for agricultural studies. The farmers themselves will have to see to it that in these combined schools provision shall be made for instruction in those branches in which we are deeply interested. So long as the farmer, either individually or through his organizations, does not take an active, earnest interest in this matter, the city man and the "progressive educator" will use their influence in having the curriculum include a whole lot of studies—Latin, Greek, French, music, stenography, &c.—which the city boy seems to think he wants or the city father seems to think the boy needs, so that the country boy will not get any more of the right education in these larger schools than he did in the "little red school-house." This is going to be the difficulty, unless the farmers interested take their part in the organization and management of these schools, so as to see that the interests of the farmers are cared for and that the farmers' boys and girls receive their just proportion of helpful studies.

I am satisfied that true progress and genuine uplift along agricultural lines must come from the education of those who are to be the farmers of the future, as well as the education of the farmers of to-day, in so far as such education shall develop an interest in the work that is to go on hereafter.

### TRANSPORTATION.

Another matter which is of great interest to the farmer is the transportation of his produce. It costs too much to get produce to market. It is generally believed that much could be accomplished in the matter of more uniform and just rates for produce, yet how to do it is a difficult problem to solve, so long as the transportation companies do not realize, or if they do, do not acknowledge, the importance of the intimate relations between successful farming and profitable transportation to their business. This is recognized and acknowledged in States where the farming industry is the chief source of their income; there the success of the railroad is in proportion to the success of the farmer, and the influence of education in indirectly increasing traffic is recognized and taken advantage of by such far-seeing and influential railroad men as J. J. Hill, of the Great Northern railroad, who gives farmers in his territory free excursions, throughout the growing season, on his roads to the State Experiment Stations and Agricultural Colleges. He says that the impetus given to the farmer and the better farming resulting from annual visits to the college and the Experiment Station are immediately felt in the increase in the traffic on his roads. In Missouri the railroad officials provide a car, fitted up with various apparatus for instruction in agriculture, in which the Institute workers may travel to different parts of the State and carry with them the means of instruction without expense. The officials know that this work is a good business proposition for them. The Great Southern railroad also recognizes the importance of encouraging and helping, in a practical way, all efforts put forth for educating the farmer, and so they have their school train, which is stopped at different points and practical instruction given in the various matters pertaining to the farmer. The same thing is done in Canada, that country which is developing its agricultural resources in a marvelous manner, because of

the strong support given agricultural education, both by the government and by private corporations. The work of the corporations in other sections of our country is in direct opposition to that which is practiced by the railroad corporations of the East, thus proportionately increasing the advantages which those sections possess in the matter of competition. No particular pains are taken to cater to the interests of the farmer in the East; in fact, in certain instances the contrary is the case, notwithstanding that in many parts of our State, notably in Gloucester, Salem, Monmouth and Sussex, there has been a very marked increase in the amount of produce handled, due to the advance in farm methods, and it seems to me that the matter is well worthy the consideration of this Board. I am satisfied that even if the railroads do not see fit to adjust rates of freight, if they would but provide free excursions from the different parts of the State to the Experiment Station throughout the summer it would result in direct benefit to the roads, because of the impetus given to the adoption of advanced methods due to the object-lessons afforded by the inspection of the work there.

## FARM LABOR.

Another matter which has occupied the attention of our officers is that of farm labor; this is the most difficult problem that we have encountered, and thus far we have nothing practical to offer that will even in a small degree assist in the difficulty. Many suggestions have been made in reference to the matter, and while perhaps helpful, have not resulted in practical assistance. It is suggested that a broader system of education would be helpful; that the introduction of agriculture in the public schools would be a marked factor in the improvement in this direction.

Professor James, of Canada, than whom there is no stronger advocate of elementary education, claims that the advantages and benefits likely to result from such education are "that the best boys and girls will be saved for farm work. A great many who now drift into the legal profession, to make second-rate or third-rate lawyers; some who drift into the medical profession, to make indifferent doctors; some who appear to miss their calling, and by some means or other get into our pulpits—many of these will be saved for a more useful and more successful life upon the farm.

And a great many who might succeeed in these professions will be saved for farm work. A contented, successful farmer is one of the richest assets of any State. I wish I could emphasize and illustrate this thought as it ought to be emphasized or illustrated. Look over your own country, as I look over mine, and where to-day are the elements of danger? From what sources are coming those forces which are threatening? In what direction do we look for possible trouble? I know one direction in which we do not look. Wherever we can put our hands on a successful, contented farmer, we simply say, 'That man is all right.' We do not look for strikes, we do not look for trouble, we do not look for failure from that great body of men, and the more we can increase the great army of men, the fairly well-educated, the hard-working, contented, progressive farmers, wherever we find such men, there we look for success, especially of a material nature—and we look there, also, for those great moral forces which, so to speak, control and contain the destiny of the country, its future prosperity and its success."

It may be that Professor James is over-sanguine, yet I am satisfied that there is a germ of truth in his view, for, after all, what the average person desires is a feeling that he can make some progress, and if we make it possible by a broader education to secure that idea of contentment, then we shall have the labor that is needed. Others have suggested that the remedy lies rather in the idea so prevalent nowadays of a community of interests, or a pooling of our issues. For example, it is claimed that a number of farmers in the community might combine in a company, and thus materially reduce the need for labor by a better organization of it, and by the direction of masses of laborers, rather than individuals, as is now done in the large business enterprises and by corporations, while at the same time the individual farmer would retain his independence; besides, the work could be distributed in such a way that each farmer should direct that branch for which he is best equipped. It seems to me that there is value in this suggestion, as a business proposition, which does not contemplate the elimination of the individuality and independence of the farmer—it is well worthy of consideration, particularly for those lines of farming where large areas of special crops are grown on the intensive plan.

### DAIRY STATISTICS.

During the past year the State Board has also inaugurated a study of the dairy business, with the hope of securing information that will be helpful in the development of this branch of our farming, as well as in showing the relations of dairying to other lines of farm practice. There has been a notable increase in dairy farming in recent years, and the statistics thus far gathered show that the increase has been along progressive lines, namely, that the more important of the forage crops have introduced, the silo is a feature, and the selection of animals carefully conducted. The one thing that is more clearly shown than any other is that the business end is neglected. Very few of those dairy farmers from whom statistics have been gathered are able to state the profits or losses in the business. They know in a general way, but they have not definite information, and are, therefore, unable to compare that branch of farming with other branches, as, for example, stock growing or beef making, which require very much less labor. It is my judgment that, with the present price of beef, and with the development in the beef breeds, stock growing would again prove profitable in our State, and under many circumstances would be more profitable than the dairy business, chiefly because of the element of labor. This line of inquiry, it seems to me, will prove helpful, and should be encouraged, and the data secured published, and thus brought directly to the attention of the farmers of the State.

### ST. LOUIS EXPOSITION.

While the State Board of Agriculture was charged with the agricultural exhibit at the World's Fair, at Chicago, in 1893, and at the Buffalo Exposition, in 1900, there seems to be a feeling that there will be no need of a State agricultural exhibit at the Louisiana Purchase Exposition, at St. Louis, in 1904. It is believed by this Board that the exhibit at Chicago and at Buffalo were of very great service to the State, not only in showing its agricultural possibilities in many lines, but also its power to compete with others in special products, and while the officers of the Board do not court an in-

crease in their gratuitous labors, it seems to us that it would be unfortunate for the interests of agriculture if our State were not represented at St. Louis.

### THE KIND OF FARMING THAT PAYS.

There is no question but that at the present time the farmers of this State are making great progress; they are able, by virtue of their increased knowledge of soils, of plants and of methods, to grow largely-increased crops not only, but those best adapted to their soils and for the purpose for which they are needed. We have statistics which show that there has been an increase in yield of the crops in recent years, due to a careful study of the plant's needs and to the use of the right proportions and amounts of fertilizer, and that these do pay a very handsome profit to the farmer. We have obtained strong proof that fruit growing, rightly conducted, is a profitable business, and it is rightly conducted by that farmer who has studied his conditions and has a knowledge of the needs of his soils, varieties best adapted, the habits of insects and methods for their control, of the various diseases and their remedies. This knowledge and energy are required, yet the results are such as to make the business not only a profitable one, but a pleasant one. For example, I have a report from one farmer which shows that in the past year he obtained from forty-two acres, consisting of twenty acres of potatoes and twenty-two of fruits, over 5,000 barrels of produce, which was sold at prices which paid expenses, interest on investment and left a handsome profit besides. We have statistics from dairy farmers which show an average production per cow of 3,000 quarts of milk per year, worth at the farm $90 per cow. The cost for feed and care was about $45, thus leaving a handsome profit. Inquiry and observation show that as a rule the farmers in the dairy districts are concentrating their energies upon smaller areas; they are preventing the waste of soil and manure constituents by the growth of cover crops and better methods of handling manure; they are growing protein catch crops, which increase the crop product per acre not only, but which result in the improvement of their soil and in the saving of expenditures for fine feeds. So it is all along the line—farmers who have taken advantage of the suggestions offered by the work of

our various institutions, established for their benefit, are making a financial success; they are ready to meet and take advantage of the commercial conditions now prevailing. Farming for them, from a business standpoint, considering the amount invested, is profitable, besides having the further advantage of individual control and management, which is so helpful to the self-respect and dignity of the man. Farmers of the Board of Agriculture, I congratulate you again upon your business and upon the progress that is being made by you as individuals and as a body, and predict for you continued success in future years, provided you take advantage of your inheritance and do not grow weary in well doing.

HON. EDWARD BURROUGH.

Fifth President New Jersey State Board of Agriculture.

Elected in 1885.

# Report of Secretary.

*October 31st, 1902.*

SCOPE OF THE BOARD'S WORK.

The work devolving upon the State Board of Agriculture is not generally known. The Board was constituted by law April 4th, 1872, and there are now organized nineteen County Boards auxiliary to it. That law and subsequent amendments define the scope of the Board's work, as follows:

"The State Board of Agriculture shall have full power to investigate such subjects relating to the improvement of land and agriculture in its various branches in this State as they may think proper." "That in order to collect and disseminate reliable and useful information, and to encourage a higher standard in the agriculture and horticulture of the State, the Executive Committee is hereby authorized to cause to be made experimental and practical tests of specific remedies or cures of diseases of domestic animals and poultry, and of plants, vegetables and fruits, and insects injurious thereto, and to employ suitable persons to lecture before the State Board of Agriculture at its annual or other meetings, and in the counties of the State as far as the sum herein appropriated will allow."

While diligently trying to carry out the purpose of the law of its organization, its duties and work have been very much enlarged. Under the section just quoted, approved by the late Governor Abbett, lecture work in the counties has been inaugurated. This work has been placed in charge of the Secretary of the Board by the Executive Committee, and each winter some thirty or more of these meetings are held under the general name of Farmers' Institutes.

Twenty-six such meetings have been arranged for, for the coming fall and winter, beginning with November 11th, and more requests are coming in for similar meetings in localities not included in the foregoing list. These meetings are generally helpful to the agricultural interests wherever held, and marked improvement is shown in localities where a succession of such meetings have been conducted. The latest investigations of science connected with agriculture in all its branches is, by this means, carried to the farmers of the State; and the most advanced practical application of science in the field, the dairy, the orchard, &c., is made known.

The Newark *Daily Advertiser,* in a recent issue, speaking of the Institutes arranged for the present series, says of this work: "These gatherings spread knowledge appertaining to agriculture and kindred subjects among the farmers. Experiences are compared and valuable suggestions are exchanged. The farmers have the benefit, also, of the addresses of men skilled in the sciences, and they learn something about chemistry and its relations to the cultivation of the soil. There is also cultivated among the farmers a spirit of free masonry, and they learn to co-operate with each other in promoting public objects sought for by agricultural interests.

"The State Board of Agriculture is seldom heard of in the large centers of population, but within its important province the Board does a valuable work for the material benefit of the State. It has greatly advanced the welfare of the New Jersey farmer by work that shows itself only in results. The Board cannot insure against bad crop years or low market prices or individual mismanagement of a farm, but it can, and does, put the farmer in the way of utilizing all his opportunities, and it has done great work in helping him, by scientific methods, to overcome the natural enemies that assail him.

"The Institutes to begin next month will wear an air of cheerfulness, for, generally, this has been an exceptionally good crop year in New Jersey, and the farmer has prospered. Many who work under mortgage debt will be able to clear it off, as well as improve their farming equipment, and others will add considerably to their bank accounts. There will likewise be a largely-increased trade from the country for the tradesmen of the cities."

The annual meeting of the Board, held in the State House in January each year, affords opportunity to sum up the year's work, both of the farm and of the Institutes. Able addresses are made and reports, as required by law, from counties, from Tuberculosis Commission, from State Entomologist, &c., are presented. These all furnish the material for the Annual Report of the Board, which has had a growing demand, both in the United States and foreign countries—Russia, Australia, Japan, New Zealand, France, Germany, England and other countries, besides consuls and ministers, sending requests for it.

The Commission on Tuberculosis in Animals was constituted by law May 22d, 1894, its purpose being to eradicate tubercular cattle from the dairy herds of the State and to improve the methods of caring for dairy animals. This law makes the President and Secretary of the State Board of Agriculture members of this Commission, giving the President power to appoint five others, making the Commission seven in number. A later law, approved March 24th, 1899, adds to the duties of the Commission that of inspecting all dairy cows and breeding dairy stock imported into the State. The Secretary of the State Board of Agriculture is made Secretary of this Commission, in addition to his other duties.

The work of investigating and controlling the spread of the pernicious or San José scale and other injurious insects, under Chapter 104, Laws of 1898, committed to the State Entomologist, is also lodged with the Executive Committee of the State Board of Agriculture, who are to appoint Insect Commissioners in the several counties. The President and Secretary of the Board being required to examine and endorse all bills under this act to the Comptroller. As the appropriation for this special work is made to the State Board of Agriculture, the Treasurer of the Board is also Treasurer of this division.

The law regulating the sale of concentrated commercial feeding stuffs was approved March 15th, 1900. The object of the law is to prevent the sale of adulterated animal foods, a large and nefarious business of this character having materialized in this State. While the New Jersey Agricultural Experiment Station is charged with the duty of sampling and analyzing these goods as they are exposed for sale within this State, prosecutions under the act for violations thereof are to be brought by the Secretary of the State Board of Agriculture.

MEMBERSHIP—INTEREST IN RELATED MATTERS.

The State Board of Agriculture has ever had in its membership some of the best citizens, as well as the best farmers, of the State. The first President of the Board, elected in 1872, was the Hon. Joel Parker, of Freehold, then Governor of New Jersey; its Secretary, Dr. George H. Cook, State Geologist. In 1875, ex-Governor Hon. William A. Newell, of Allentown, was elected. In 1878, Thomas T. Kinney, of Newark, was chosen President. In 1882, Hon. Thomas H. Dudley, of Camden. In 1885, Hon. Edward Burrough, of Merchantville. In 1895, the Hon. D. D. Denise, of Freehold. In 1901, the present incumbent, Dr. Edward B. Voorhees, of New Brunswick.

From its organization to the present time the Board has taken an active, practical interest in schools, roads, taxation and similar matters. The present system of constructing stone roads by State aid and the creation of the department under a State Road Commission were initiated and established through the State Board of Agriculture.

The State Board of Taxation was created March 19th, 1891, under the influence of the executive officers of the State Board of Agriculture. Addresses were made before the Board at its annual meeting, January, 1891, by Hon. Barker Gummere and the Hon. John P. Stockton, then Attorney-General, on the general subject of taxation. Certain facts concerning the then existing methods of taxation were presented to Governor Abbett by the Executive Committee, and his sympathies were enlisted in the matter. So that, during the session of the Legislature, the bill creating the State Board of Taxation was passed.

While the Annual Reports of the Board are considered by competent judges outside of this State to be among the best of their class published, we take especial pride in that standard work on entomology—"Insects of New Jersey"—published by permission of the State Printing Board under Governor Voorhees' administration and with his co-operation, as a supplement to our Twenty-seventh Annual Report. This work is sought for by a large circle of scientists, teachers and students. It is used as a text-book in our State Normal School.

HON. D. D. DENISE.

Sixth President New Jersey State Board of Agriculture.

Elected in 1895.

will be summed up and such deductions made as are warranted by the replies received.

It is believed that, if the questions are correctly answered, much valuable information can be furnished the dairymen of the State, which, if utilized by them, may help them to secure better results from the same amount of money expended and labor bestowed than is now the case.

## IMPORTANCE AND VALUE OF AGRICULTURE.

The location of New Jersey is such that her territory will more and more, with each succeeding year, be taken up by manufacturing industries and a population of working people connected with these interests. And these manufactories will not necessarily be confined to the large centers of population, for railroad facilities are such that material can be quickly shipped to, and goods from, a manufacturing center wherever it may be located. The business, once established, will draw its own population of operatives.

This means that, as a farming State, the agricultural lands will continue to be gradually decreased. It indicates, further, that our farms will be increasingly devoted to the production of the more quickly perishable crops, to meet the demands of this growing population of consumers within easy reach of our farms. A smaller acreage, brought to a high state of productiveness with intensive cultivation, will, in the near future, be the rule of the farming interests. The State has been well named "The Garden State," and a large portion of it is well adapted to market garden and truck farming products.

Although the agricultural population of New Jersey is small as compared with the total population of the State, it represents a business whose capital is $195,359,106, and its products enumerated in this report are an important part of the commercial business of our transportation companies.

While it is proper to consider the business of agriculture in New Jersey as it is related to the State, it is also right to associate these interests with the same in the other States. In this way only do we get a full and comprehensive view of the importance and value of this business to the country and the possible influence and power in our country's affairs of the agricultural populations.

According to our census report there were in the United States, in 1900, 5,739,657 farms, with an average size of 146 acres. The total farm value was $20,514,001,838: represented by land, $13,114,492,056; buildings, $3,560,198,191; implements and machinery, $761,261,550, and live stock, $3,078,050,041. In connection with this vast business, the Philadelphia *Ledger* says, in part, in an editorial of July 23d, 1902:

"The prosperity of the United States is intimately associated with the fertility of its farms and the industry of its agriculturists. The product of American soil supplies not only the wants of our own people, but the surplus crop is practically a necessity for millions in alien countries. Our enormous yield of cereals, vegetables and other forms of agricultural products that may be utilized is attributable to the productiveness of the land, the geniality of climate, the perfection of farm machinery and appliances, and, lastly and most importantly, the energy and intelligence of the American farmer.

"The actual raising of crops would not be of great avail, however, but for the wonderful facilities for transportation which American enterprise has provided. The rapid development of railroads has made it possible to market crops at a profit in distant communities, and the 'good roads' movement has further contributed to the welfare of the agriculturist.

"In olden times the routine of farm work was not more monotonous than the persistence in clinging to traditional methods. The farmer of to-day—and none more so than the American—has a great advantage over his prototype. He makes a study of his business, appreciates fully the importance of the rotation of crops, undertsands the utility and relative value of fertilizers, is always receptive of new ideas, and his affairs flourish in proportion to his intelligence and application. He is not the dull and hopeless delver of the soil, but an independent man, with all the endowments of reason and all the possibilities of success that confronts his city brother.

"The American farmer is one of the highest products of American civilization. His forebears blazed the way through the trackless wastes, and he maintains their sturdy independence and exemplifies the undaunted spirit which characterized them in their struggles against adversity. His prosperity is but the harvest of the seed they sowed."

## CONDITION OF PROSPERITY.

The business of agriculture, like any other industry, is dependent for the best results upon intelligent management. At the same time it is unlike most other occupations, in that it is largely dependent upon the favoring operation of nature's forces: sufficient rain, sunshine and a temperature conducive to crop production.

The intelligence of the agriculturist is shown in his ability to co-operate with nature in the manipulation of the soil; the selection of seed; the choice, source, variety and application of plant food, and the care and marketing of the crop so as to secure the largest maximum profit. Quite as much, if not more, is this intelligence needed in the choice, breeding and management of domestic animals, especially in the dairy. Strictly speaking, the farmer is in partnership with nature, and must need to know something of nature's laws if he would secure her full co-operation.

With the exception of the shortage in the hay crop, nature has done her full part for the farmers of New Jersey during the year 1902; and the forehanded, progressive farmers of the State come to the close of the year with very encouraging rewards crowning their work.

The following questions bearing upon the matter of profit were sent to two representative farmers in nineteen counties, viz.: 1. "Are the average good farms being run at a profit?" 2. "If so, what per cent. above cost of living and expenses?" It will be noticed the question covers only "average good farms;" but such farms include a very large majority of all the farms of the State.

Twenty-six of these correspondents answer question 1, "Yes." One only, in lower Cape May county, says, "I think not." One in Warren county states, "I believe few of our grain farms are paying any profit. I think nine out of ten farms are rented to tenants, making a poor return for both landlord and tenant. So few farmers are making any money above living expenses that the number is hardly worth mentioning. The tenant system is ruining our fine farms; and until we get back to the good old times when farmers own and work their own farms, and suit themselves to the changed conditions of the times, farming will

not pay any better. I firmly believe that farming can be made to pay a fine profit if farmers would only get out of the old ruts of trying to make wheat and corn their money crops, and pay more attention to producing and catering to the wants of our rapidly-growing population at our doors."

The per cent. of profit, as given by these correspondents, runs from 2 per cent. to 25 per cent., the majority being from 5 to 10 per cent. profit. It should be noted that these answers to our questions were from the Directors of the State Board, and I believe they have been conscientiously made up. It is gratifying to be able to state so emphatically a condition so encouraging.

Of course all tillers of the soil have not had equally gratifying results. Some have had to contend with adverse local conditions. Some have stubborn and unsuitable soils. Many are poor financially and have not the wherewith to farm even as well as they know, but none of these things can be charged against the business.

The agriculture of the State is chiefly conducted on four general lines: Dairying, with all that appertains to it; fruit production, comprising pears, peaches, apples, grapes and smaller fruits; poultry and egg production; market gardening and green-house productions.

The increase in the acreage and production of corn is indicative of an increase in the dairy business. This indication, when associated with the fact that during the past year 17,127 cows were brought into New Jersey from other States (a number largely in excess of previous years), confirms this conclusion.

It will be seen that, for so small a State and with so large a portion of its territory taken up with truck farming and market gardening, the yield of corn is large. The wheat yield was reduced somewhat because of the unusual and quite general late seeding. Oats were better than for some years past; rye, an average crop. The acreage of buckwheat, that once popular crop, is being reduced each year. Hay, owing to lack of sufficient rain at a certain early period of its growth, was reduced about 100,000 tons below the previous year.

The white potato crop broke all previous records by about 3,000,000 bushels in excess of previous years. The price to the grower, during the harvesting season, was low; but the crop, being so well developed, was nearly all marketable, thus making its

money value to the farmer largely in excess of former years, as well as the yield.

The production of sweet potatoes is being extended on our lighter southern soils. The crop is large and valuable. It gives a good return if planted on suitable land and is intelligently handled. There are no sweet potatoes grown that excel the New Jersey product, and few, if any, equal it. Gloucester county produces about fifty per cent. of the total product of the State.

## DETAILS OF CROP YIELDS AND VALUES.

The Government Crop Report for December, 1902, for New Jersey, gives a yield of 34.5 bushels per acre for corn; wheat, 16; oats, 32.2; rye, 16.4; buckwheat, 22.5; hay, 1.22 tons; white potatoes, 132 bushels, and sweets, 99.

Our table places the yield of the same crops: Corn, 35 bushels per acre; wheat, 16; oats, 35; rye, 16.4; buckwheat, 22.5; hay, 1 ton; white potatoes, 132 bushels, and sweets, 99.

We place corn at 56 cents per bushel; wheat, 76; oats, 39; rye, 60; buckwheat, 64; hay, $16 per ton; white potatoes, 55 cents per bushel, and sweets, 60 cents.

Our figures for corn are a little higher than the Department of Agriculture gives, but lower by five bushels than our County Board reports. We take the Department figures on wheat, which are lower by three bushels per acre than the county reports. Oats, we take our county reports. For rye and buckwheat we take the Department figures. The former crop (rye) is two bushels lower than our reports, while the two reports agree on buckwheat.

The Department makes hay thirty-seven hundredths higher than our secretaries. It may be the second crop was included in the former report and not in the latter—we give the crop at one ton per acre. White potatoes, same per acre as the Department, about in accord with our county secretaries' figures; while for sweets we have taken the Department's figures for November, which are thirty-three bushels less than our secretaries' report. It may be too low.

The acreage of the crops named is taken from the December report of the United States Department of Agriculture.

Eleven secretaries give the wholesale price of milk, which averages three and one-half cents per quart, and the retail price six and one-half cents per quart. In our estimate of the total value of this product for the State we have used a wholesale price of three cents per quart.

NOTE.—The reports of County Board Secretaries are given as reported by them in the table of crop statistics preceding the County Board reports.

Accompanying the foregoing explanations the following table of the yield and value of the crops named is given. We believe it to be a conservative caclulation of the yield and value of the crops named:

| *Crop.* | *Acreage.* | *Yield.* | *Value.* | |
|---|---|---|---|---|
| Corn | 292,770 | 10,245,950 | $5,737,732 | |
| Wheat | 106,004 | 1,696,064 | 1,289,008 | |
| Oats | 67,852 | 2,374,820 | 926,179 | |
| Rye | 68,615 | 1,125,286 | 675,171 | |
| Buckwheat | 13,404 | 301,590 | 193,017 | |
| Hay | 408,081 | 408,081 | 6,929,296 | |
| White Potatoes | 57,113 | 7,538,916 | 4,146,403 | |
| Sweet Potatoes | 20,588 | 2,038,212 | 1,222,927 | |
| | | | | $21,119,733 |

The estimated value of the above-named crops is $21,119,733, but there are others that should be included in the estimate. The season having been favorable to the production of large crops, with business in general prosperous, the demand has, in most cases, been equal to the supply. We are, therefore, justified in placing these productions not lower in valuation than are given in the United States census of 1900. They are as follows:

| | | |
|---|---|---|
| Clover and Grass Seed | $2,795 | |
| Miscellaneous Vegetables | 4,914,803 | |
| Dry Beans and Peas | 6,754 | |
| Onions | 105,327 | |
| Small Fruits | 1,406,049 | |
| Grapes and their product | 81,758 | |
| Orchard Fruits, with Cider, Vinegar, &c. | 2,594,981 | |
| Flowers and Plants | 1,953,290 | |
| Seeds | 43,191 | |
| Nursery products | 339,926 | |
| Nuts | 20,660 | |
| Forest products | 469,005 | |
| Poultry and Eggs | 2,204,120 | |
| Wool | 31,266 | |
| Milk—Total product, 77,714,055 gallons, at 3 cents per quart | 9,325,686 | |
| | | 23,499,611 |
| Total value | | $44,619,344 |

SHEEP.

The table shows our wool product to be very low. The sheep industry has been on the decline for the past fifty years in New Jersey. What sheep are kept are chiefly in the northwestern counties—Warren, Hunterdon, Morris, Sussex and Somerset. Several reasons have been given for the falling off in this business—one of which is loss occasioned by dogs; but, if our dog laws were enforced as they should be, this menace would be largely removed. The business should be a profitable one, in the counties named at least, and should be very much increased.

The total number of farms in the State is 34,650. The improved land—that which is capable of profitable cultivation—is 1,977,042 acres. This area is overhauled by the farmers of the State each year and, by cultivation and suitable manuring, is encouraged to produce the large variety and quantity of the crops named in the foregoing list.

In addition to other natural methods of improving the soil and feeding the growing crops, from year to year, there is used commercial plant-food or fertilizers in the sum of $2,165,320. Although farm laborers seem hard to obtain, there is expended for this item alone $6,720,030.

The stock comprising our flocks and herds—horses, mules and other animals—is valued at $17,612,620. A total for land, buildings, implements, machinery and live stock of $189,533,660. Gross returns, $43,528,871; expended for fertilizers and labor, $8,885,350.

The growing demand for pure and healthful guaranteed milk has led to the establishment of some of the best-appointed and well-managed dairies to be found anywhere in the country. All such dairies tend to increase the demand for high-grade milk. Indeed, it may be said this demand is becoming quite general, and, with the other agencies referred to in this report, must lead to a more perfect system of dairying throughout the entire State.

There is an increasing portion of our annual milk product being used in the manufacture of butter each year in the numerous creameries throughout the State. No better butter is made than is put on the market by some of these. The multiplication of creameries remote from the large centres of population should help

to increase the price of milk to those producers; the residuary product of the creameries can be utilized by the farmers with advantage. There is no system of farming better adapted to improve the land than that which includes dairying, when it is wisely managed.

### ORGANIZATION AND CO-OPERATION.

I am firmly of the opinion that the farmers of our State and country would be greatly benefited by organization and co-operation; and this not only for purchasing needed farm supplies, but more especially for securing a comprehensive distribution of their products, so as to reach all possible ponts where a demand might exist, thereby realizing a far greater profit than is possible with present methods, or lack of method, controlling in this matter. Just the best way to accomplish this must be determined by experience and trial.

The organization of the Grange of Patrons of Husbandry has done a great deal along this line, especially in the matter of purchases. Is it not possible to co-operate, also, in the distribution and marketing of farm crops? I believe the intelligence of our farmers is equal to this.

Other agencies than the farmers control the disposition of his products to the consumers, and every added link in the chain of agencies until the final purchase adds to the cost to them. Some of this expense to the consumer might be obviated and a more profitable market secured to the producer by a hand-to-hand deal. This loss may not seem to be very great to one individual, but for the producers of a county or State it is a very large sum.

The producers, or the agencies established and controlled by them, should follow their products to their last wholesale distribution at least. Farmers who retail their crops know there is a wide margin at times between prices received by this method and the price paid by the dealer, familiarly known as the middle man.

By an agency of their own producers of market garden crops and fruits especially should be in daily touch with all markets within reasonable freighting distance, so that the locality having the greatest need or offering the highest price at the time could be chosen as the shipping point. By this course, too, a congested market would be overcome and a more equitable distribution to consumers be secured.

## THE LABOR QUESTION.

The labor question is still a serious one for all who are engaged in agricultural pursuits. To our question, "Is the number of farm laborers evidently on the increase or decrease?" there is substantially but one answer—"Decrease." Chief reasons given for this are the activity in all manufacturing interests and a better wage than farmers can afford to pay, which attracts laborers there; also shorter day, or a day of less hours. One only—Bergen county—believes there is an increase in farm laborers, which he attributes to the increase of foreign laborers in that locality.

The wages per month, as reported, both with and without board, are quite uniform throughout the State. The average per month with board is $17; without board, $28.36. These figures would seem to show that the farmers generally allow about $3 per week as the cost of boarding a farm hand. But, if all food supplies were bought outright and help hired indoors to assist in caring for boarded help, a higher allowance would need to be made for board. Quite frequently the man who boards himself and is hired by the month at the higher figure is allowed the use of tenant house and garden in addition to his monthly wage.

Both these considerations—the boarding of the one and the perquisites of the other—should have their full weight in estimating the advantages possessed by the farm laborer; they do not obtain, as a rule, in other employments.

If a shorter day, say ten hours, and a larger price for services rendered are essentials to secure farm laborers in greater number, then it would seem such laborers should be more efficient than the average farm hands of the present.

If increased intelligence is needful now to successfully manage a farm, correspondingly the farm hand should be better qualified for the detail of farm work. While the various branches of this work are essentially natural classifications of it just as much as are the different branches or parts of a manufacturing business; yet, with our small farms, it is not possible to have different men hired to do each part as in the manufactory; but one or more men, as the case may be, must of necessity be qualified to work in every

part, as occasion requires. Where general or mixed farming is followed, a wider knowledge is more needful than would be required in a single line farming, or where but few branches are followed.

Although improved farm machinery has been multiplied and the very best implements for ploughing, planting and cultivating increased, both which help very much to facilitate farm work; these alone will not accomplish the task unless skillfully handled. The conclusion is inevitable, both employer and employe need increasing knowledge along agricultural lines for best results.

For men with reasonable qualifications to do farm work and a willingness to do an honest day's work, I believe most farmers are willing to pay wages that will compare favorably to that paid for equal skill in other callings.

With the growing prosperity of the agricultural interests, an increase in the wages of good farm hands will naturally follow. In fact, the growing demand for operatives at good wages in the manufacturing interests will make this necessary in a State so much devoted to manufacturing as New Jersey is.

The question of farm help is a perplexing one—theorize as we may about it—but experience may solve the problem.

Perhaps a syndicate of farm management, embracing a neighborhood or township, with gangs of men for the several branches of work to be done, going from farm to farm throughout the season and cleaning up that particular work on that farm in one or two days, and so throughout the season for all work on each of the farms embraced in the syndicate, may become a necessity in the near future.

Such an arrangement would make it possible for all these men to be boarded or lodged at one or two points. They would have companionship in the evenings, and could be provided with reading material, both entertaining and bearing upon the work they are employed to do. Social headquarters, elevating the ambitions and character of the men might also be furnished. Furthermore, this arrangement would overcome one undesirable feature of farm life to the farmer's wife and daughters—that of boarding farm help.

By such a co-operation as indicated, it would be possible, also, to employ such scientific skill connected with handling of the soil,

feeding farm stock, anticipating and preventing diseases, &c., &c., as would be most profitable.

Then, too, as a result of such centralized, wise management, the products of these farms would be marketed in larger bulk at each shipment—would be prepared for market according to the current demands, and the best markets found for each and every shipment. In such an arrangement, co-operation of brain power, under the direction of a scientifically-trained farmer, would be one of the greatest gains.

The Ontario Bureau of Industries, Bulletin No. 81, for November, 1902, says, under the head of "Labor and Wages": All classes of farm laborers have been difficult to obtain during the season. In a few instances local reasons are given for the scarcity of hands, such as lumbering, handling beets for sugar factories, &c.; but the exodus to New Ontario and the Northwest appears to be the chief cause, and the drift of rural population citywards also continues. It is pointed out many times, both directly and indirectly, that the class of persons leaving Ontario farms for the reasons above assigned is much superior to those who are being brought in to take their places. In this connection a number of correspondents seriously state that the introduction of Chinese labor would be better than the continuance of the condition of things now prevailing on the farm during the busy season. Notwithstanding the introduction of labor-saving machinery, the supply of good farm hands has been so scarce that more land is being given to pasture. Domestic servants on the farm are still hard to find, town life being so much more attractive. Wages for all classes of farm help are not likely to fall, and several aver that it will be utterly impossible for farmers to stand any increase in rates.

The wages of farm laborers for yearly engagements show an average of $165 with board and $268 without board.

The rates for the working season were $18.52 with board and $27.51 without board.

## FARMERS' INSTITUTES.

The Institute meetings referred to in the beginning of this report to the Governor were subsequently held. The attendance, in some cases, was better than formerly; in the majority about as

in previous years, in two or three not up to other years. The attendance should be larger than it has been, not for one or two sessions only, but for the entire meeting. When farmers appreciate the possible benefits to be derived from meetings of this character, they will take such interest in them that they will make every other business for the time being give place to the Institute, and be present at the first and each succeeding session and at the time of opening.

Should an interest like this become general throughout New Jersey, as it is in some adjoining States, your Executive Committee would be encouraged to hold all the meetings possible, and make every reasonable effort, within the limits of our appropriation, to give the farmers of New Jersey the most capable speakers and experimentalists available.

There are still living some farmers who are averse to these schools of agriculture. To learn by experience may be very well, but to take part in the proceedings of the Institute and listen to speakers whom they are pleased to denominate theorists and book-farmers is to them humiliating—a sort of confession that they do not understand their business; and so the old prejudice against the truth works to keep such men from receiving the latest and best information gleaned, not only from scientific study, but also experience in the fields of agricultural practice; albeit, such men seem entirely willing to copy what their neighbor has learned at the Institute and put in practice on his farm. Such men should be reminded that all the knowledge to-day available to the intelligent farmer, and so necessary to him, was not secured behind the plow. The *Farm and Ranch,* of Texas, in the issue of December 27th, 1902, says:

"The good farmer is one who has learned much about farming, and if he has written or published a book or books containing the substance of what he has learned, and others read and learn what the books contain, then they become book-farmers. But the greatest benefits agriculture has received has been from book-farmers, who never farmed a day in their lives—men who have studied agricultural science and published important facts for the use of practical farmers.

"Southern farmers were saved not less than $180,000,000 annually by the scientist who showed them the great value of cotton

seed. The fruit-growers of California have received millions of dollars of benefit from the scientific farmer (who never farmed) who introduced from Smyrna the bug that fertilizes the famous Smyrna fig, and without which these figs cannot be grown. The cream separator, the Babcock milk tester, the various sprays, fungicides and insecticides, and the determining the value of feeds and fertilizers, all of which are of immense value to farmers, are contributions from strictly book-farmers."

## TEXT TO ACCOMPANY MAP.

*Cereals, Hay and Potatoes*—Corn, wheat, oats, hay and white potatoes may be considered as companion crops; as, land that is well adapted by natural conditions of composition, texture and arability for the production of one of these will produce all of them. Such land is found in all the counties of the State, but only to a limited extent in the sandy sections of Monmouth, Ocean, Burlington, Atlantic and Cape May counties, and the very mountainous portions of some of the northern counties. Where these standard crops are profitably grown, mixed farming and dairy husbandry prevail.

*Dairying*—While almost every farmer, no matter where located, has one or more cows, the business commercially is restricted to certain sections, and these are divided into two classes—those that cater to a local trade in our towns and cities, and those who ship the product to distant markets by railroad or dispose of it in co-operative or other nearby creameries.

The location of the larger towns and cities, as laid down on the map of the State, will indicate the districts and markets of the first-named class. The latter, those who sell to the creameries and in distant markets and shipping by railroad, are chiefly in that part of the State west of a line from Montclair, south to Freehold, to Bridgeton.

*Early Crops*—The lighter sandy areas of the State have a natural adaptability to the production of the early market garden crops, and they are being brought into profit more and more each year as the summer population of our seaside resorts increases. This particular section follows the coast line from Raritan bay

southward to Cape May Point, and, to some extent, the western border along Delaware bay and river to Burlington.

*Truck Farming and Market Gardening* cover a large area in proximity to Camden and Philadelphia on the west, and Newark Jersey City and New York on the east. Of the former section, a large part of Gloucester county is devoted to such crops, with also parts of western Burlington and Camden counties, and these are the principal industries there. The latter section includes the northern part of Monmouth county. The soils of the sections named have a peculiar fitness for such crops.

*Sweet Potatoes* are grown for market chiefly in the southern counties, Gloucester county producing more than any other.

*Apples* are produced on most farms, but are more profitably grown in the northern half of the State above Trenton and in the western part of Burlington and Gloucester counties.

*Peaches* are produced in nearly all parts of the State for local market or home use; the sections devoted to the business, as a market industry, are chiefly in the northwestern part of the State. This particular division would be marked by a line beginning north of Trenton, thence to Summit, Caldwell, Pompton and Ringwood. Of this section Sussex and Hunterdon counties lead.

*Pears*—Monmouth, Camden and parts of Burlington and Gloucester grow immense quantities of pears. These are the chief market sections. This fruit, however, is an easy grower in most localities where apples and peaches flourish.

*Melons*—Both watermelons and cantaloupes, or muskmelons, are extensively grown for market in Gloucester and Cumberland counties, and in portions of northern Monmouth and western Burlington counties.

*Strawberries, Raspberries and Blackberries* are profitably produced wherever a nearby market is found, but the large commercial acreage of these fruits is in the counties of Cumberland, Atlantic and Burlington, Cumberland leading in strawberry production.

*Cranberries*—The large plantations of this healthful fruit are chiefly within Ocean and (eastern) Burlington counties. Land not adapted by nature for other crops is valuable for the production of this berry.

*Grapes* are extensively grown (more than 5,000 acres) in Atlantic county and parts of Cape May and Cumberland. The unfer-

mented juice of the grape, as put up at Vineland, Cumberland county, has an extensive market.

*Plum Culture* is increasing, and many tons are annually put on the market in our fruit-growing sections.

*Cherries,* too, are a profitable crop, and are grown on most fruit soils.

*Currants* also grow well, and have a good market.

*Huckleberries* grow spontaneously in the wooded areas of the State, especially in the southern part, where forest trees are not so tall as to prevent their development. Millions of quarts of this fruit are annually gathered and marketed, and are a source of profit to owners and pickers.

## CANNING INDUSTRY.

There are about fifty canning establishments in the State, the larger number being in Cumberland, Salem and Burlington counties. Corn, most vegetable products and all fruits produced in the State are used in greater or less degree in this industry; thus a market is provided near at hand for the farmers, who find it profitable to produce such crops for this purpose. The report of the Bureau of Statistics of New Jersey gives the total selling value of canned goods put up in the State for the year 1900 as $1,480,751. In the canning of tomatoes New Jersey is the fourth State in the list—the pack for 1902 being 739,845 cases. (The number and location of the canning establishments of the State was furnished by J. S. Turner, Bridgeton, N. J. See map.)

## POULTRY.

The lighter or sandy soils of New Jersey furnish ideal natural conditions for the poultry business. Porous, always clean, soon dry after rain, with a climate, in the southern part of the State especially, comparatively mild. Having fine and nearyby markets, no better location exists. The business is large and growing.

A comparative statement contained in the census report for 1900 says:

"The total number of dozens of eggs produced in New Jersey in 1879 was 6,686,142; in 1889, 8,031,571, and in 1899, 11,942,550, the increase in the last decade amounting to 48.7 per cent.

"Of the $4,204,120 given as the total value of the products of the poultry industry, 46.1 per cent. represents the value of the eggs and 53.9 per cent. that of poultry raised."

## THE OYSTER INDUSTRY.

Oyster production in the waters of New Jersey, although large now, is yet far below the possibilities. Localites favorable to the industry are: Cheesequake, Rartan, Keyport, Shrewsbury, Barnegat, Tuckerton, Great Bay, Egg Harbor, Eagle Bay, Absecon, Lakes Bay, Ludlams, Great Sounds, Leamings & Townsends, Delaware river, Delaware bay and Maurice river cove. While thousands of acres are now under productive management, the unoccupied acreage adapted by natural conditions for oyster planting is far in excess of that now cared for.

Hon. Thomas F. Austin, Superintendent State Oyster Commission, says:

"The oyster industry of Delaware river, Delaware bay and Maurice river cove, in this State, is an extensive one and capable of indefinite expansion. The bottom suitable for the propagation of oysters contains about 90,000 acres, of which not more than 10,000 are at this time productive. The planting bottom, or what is known as Maurice river cove, contains about 50,000 acres, of which 13,000 acres are in actual cultivation.

"A careful canvass of the oyster shippers of Maurice river, Bivalve and Greenwich piers has shown that the value of the oysters shipped from this locality—Cumberland county—for the past year was two million two hundred and sixty thousand dollars ($2,260,000)."

The figures given for suitable natural acreage, of present productive acreage and value of oysters shipped for the localities named indicate the possible extension of the business, under favoring conditions, and also its possible productive value.

# AGRICULTURAL MAP OF NEW JERSEY,

—PREPARED BY—

FRANKLIN DYE

SECY. STATE BOARD OF AGRICULTURE

5 4 3 2 1 0 5 10 15

SCALE OF MILES

—KEY—

County lines are represented thus: ——

Railroads " " "

Canning factories " " ⊙

NUMBER AND LOCATION OF CANNING FACTORIES FURNISHED BY J.S.TURNER, BRIDGETON, N.J.

NOTE.—*Corn, Wheat, Oats and Hay with Commercial Dairying* chiefly west of a line from Caldwell, south to Freehold, to Bridgeton, excepting the more mountainous regions of the northern counties. Rye grows the State over.

*White Potatoes*—Monmouth, Middlesex, Mercer with western Burlington, Camden and Gloucester.

*Sweet Potatoes*—The southern counties, Gloucester leading.

*Early Market Garden Crops*—Along the Ocean and Delaware River coast, south from Raritan Bay to Cape May, north to Burlington.

*Truck Farming and Market Gardening* prevails within a radius of twenty miles of New York, and of Philadelphia.

*Apples, Peaches and Pears* grow in all parts of the State. *Apples for market* chiefly in the western, central and northern part of the State. *Peaches* in the northwestern. *Pears*—Monmouth, Camden and parts of Burlington and Gloucester.

*Watermelons and Cantaloupes for Market*—Gloucester and Cumberland, northern Monmouth and western Burlington.

*Strawberries*—Cumberland, Atlantic and Burlington.

*Cranberries*—Ocean and east Burlington.

*Grapes*—Atlantic, Cape May and Cumberland.

*Tomatoes*—The State over. But for canning and early market, chiefly Salem, Cumberland, Burlington, Monmouth, Camden, Gloucester and Cape May.

# Report of the State Entomologist.

JOHN B. SMITH, SC.D.

# Report of the State Entomologist.

JOHN B. SMITH, SC.D.

Perhaps the most interesting and important work of the year of this office is the attempt to introduce and acclimate in our State the Chinese lady-bird (*Chilocorus similis*), which, it seems certain, keeps in check the pernicious or San José scale in its native home.

Up to 1901 we believed Japan to be the native home of the pernicious scale; but the investigations made by Mr. C. L. Marlatt, of the United States Department of Agriculture, shows that Northern China is entitled to that distinction, and that where it occurs naturally the insect is not at all injurious. It is, indeed, rather rare, and not more obtrusive than our common native scales are with us.

The insect agent that acts as a check seems to be the lady-bird beetle already mentioned—so close an ally to our own native, twice-stabbed lady-bird that probably no one who is not an entomologist can see any difference between them.

Having determined the enemy, the next problem was how to get him into the United States, and several lots were forwarded to Washington in 1901, of which exactly two specimens survived the spring of 1902. But these proved to be male and female, and they began to multiply at such a pace that before midsummer there were enough to start a distribution. I had kept myself posted as to what was doing, and put in an early claim for a consignment as soon as it was certain that a distribution could be made. So, in early July, two dozen specimens were sent me, and these were placed on two very scaly trees, inclosed by wire-netting cages.

I should say here that this was not the first effort to introduce this insect into New Jersey. In 1897, while yet it was believed that Japan was the home of the pernicious scale, correspondence

was had with Japanese entomologists, and I attempted to ascertain what species of *Coccinellids* would be likely to act as checks. In 1898 I actually received a sending of specimens, of which nineteen were living. These were placed on scaly orchard trees at once, and were then lost to view. Evidently the surroundings were not favorable, or the insects may have been so much weakened by the long journey that they failed to reproduce.

The new attempt is made under much better conditions. The specimens reached me in lively, healthy condition, and they were placed under shelter, with abundance of food. Later on a small lot of larvæ was received, which were placed on the same trees.

There was some breeding in late summer, and the insects increased somewhat, but nothing like the way they seemed to multiply at Washington. Unless they do very much better next summer, they will serve no better purpose than our own *bivulnerus,* of which we know that it controls the same scale in Southern California. The cages will be kept over the trees all winter, and, unless the beetles make a start promptly next spring, a new supply will be introduced from Washington, so as to give a full season for breeding. It should be emphasized that starting these insects is a slow piece of business, and that no practical benefit can be expected by the fruit grower for several years to come. It should also be remembered that our own species finds itself severely checked and unable to multiply, so as to control the scale insect. It is not at all improbable that the same factors will check the introduced species, so, while I do not wish to discourage, neither do I want to raise false hopes as to the probable outcome of the experiment.

The work with the Chinese and the European Mantis has been continued, and there is a probability that the Chinese species has been established in the southern part of the State. It is by no means common as yet, but specimens or new egg masses have been found at all points to which the eggs were distributed. The European species has not been seen anywhere, so far as I am aware; but it does not follow that none of the specimens survived.

In the matter of inspecting nurseries with the view to granting certificates, matters are becoming serious. There is practically no section of the State in which the pernicious scale is not more or less prevalent, and, do what they will, nurserymen find that the insect makes its appearance on their stock. For a man who has

thousands of dollars invested and hundreds of thousands of trees to sell, the situation is desperate. He must have a certificate, and he cannot get a certificate unless he can show clean stock. Inspection work this year has been a serious task, and in some places several examinations were made before a satisfactory condition of affairs was secured. This takes time, and for nearly two months Mr. Dickerson and myself were busy with nursery affairs whenever Station and College work permitted. It has been my effort to help every nurserymen who honestly tried to secure clean stock, and hundreds of trees and shrubs have been taken out and destroyed in the effort.

New Jersey is not alone in her predicament. In some other States matters are as bad, and in yet others they are rapidly becoming so. The inspectors and officers that have to do with granting certificates realize that it is becoming ever more impossible to state with any degree of positiveness that any given block of trees is clean. In the early winter of 1901 there was a fully-attended meeting of such officers at Washington, D. C., and in October, 1902, there was another meeting at Atlanta, Georgia. At both of these meetings I urged a modification of the requirements for a certificate, and at the Atlanta meeting I found others seconding my effort. In fact, the outcome was that in two cases where I could not give a clean bill of health, an arrangement was made with the proper officers in the States to which the stock was sold, to accept it when carefully picked over and fumigated. From the present indications there will probably be less than half a dozen nurseries in the State which will be strictly entitled to a clean bill of health in 1903! This means the ruin of the nursery business in New Jersey, except to supply local trade, and we have now the spectacle of a law which provides safeguards for the foreigner and none for our home growers. Nurserymen do not need a certificate to ship within the limits of the State, and they cannot be even required to fumigate their stock before sending it out. The consequence is that young orchards are often infested when set, and are at death's door when they are of an age to bear.

The whole subject has outgrown the present organization. The sum of $1,000 covers pay for an assistant, and most of the balance goes for traveling expenses, office expenses and necessary ap-

paratus. The work of the Entomologist in the Experiment Station is increasing constantly, and College duties demand a certain fixed time during the spring and fall terms. When it was a mere matter of making more or less perfunctory inspections, the additional work of the State Entomologist could be assumed without much effort; but as conditions are now, there is plenty of work for two men, and the assistant must be one who can be relied upon and who has the necessary technical training. If New Jersey is to have a really effective organization for controlling the spread of injurious insects within her boundaries, there must be an increased appropriation to pay for work done, and there must be greater power to enforce the directions of the Entomologist.

And this brings me to another point—the line between the duties of the investigator at the Experiment Station and the State officer who is under the Board of Agriculture. As an investigator, when I work out the life history of an insect, ascertain the methods for its control and publish them in a bulletin or report, my task is done. My duty is to the agricultural community at large, and not to the individual. But as an officer of this Board I recognize a duty to the individual, and when a man writes of an orchard that he thinks is scaly and asks advice and information, I go to him, if I can, examine his trees and give directions suited to his particular needs. I have spent many days during the past year in orchards, locating infested trees and actually teaching men to recognize their insect enemies. All these days are taken from research work, and, if we add the days spent in inspections or in attendance at meetings, dealing primarily with the business of the State Entomologist, it makes a very appreciable fraction of the entire year.

I do not for a moment assert that the present law has not been of great use and importance; indeed, we have reached sections and men that had never been reached before or in any other way. It is simply a piece of machinery that no longer fills the demands that are made on it. And here, also, New Jersey is but meeting the difficulties met in other States. In at least one State the Insect laws have been amended at every session of the Legislature for at least five years; another, with an elaborate system of inspection and control, is getting ready to replace it by one yet more elaborate.

Almost every State now has laws on this subject, and in none of them is the sum appropriated so small as that given in our law. It would seem to be a matter for the consideration of the Legislative Committee of this Board, or for this Board as a whole, to determine what measures should be adopted or recommended to put the subject upon a better footing.

A feature of the past summer, which I have rather encouraged, were several informal field meetings—the fruit growers of some neighborhood inviting me, through one of their number, to visit some particular orchard. There the men would gather, many of them bringing specimens, and I could point out to all of them in turn just how the insects looked under a glass and how it might be recognized in all its stages. Such meetings brought out questions and experiences, and every man found out just what he wanted to know.

And it was not scale only that was discussed, for I always took advantage of the opportunity to point out other avoidable injuries, and to impress upon the growers the importance of really knowing something about the plants from which they expect to derive an income.

So, during the late winter and early spring of 1902, I followed the applications of the lime, sulphur and salt mixtures in some orchards, and started others along the same lines, with suggestions and advice. And later, when the question of results came up, I showed some of these men just what had been accomplished where there had been failure and the reason for the failure.

It seems as though scale and remedies for scale must be the burden of all insect talks nowadays, and yet there are other pests whose powers for injury are not to be despised. The pear midge is now almost eradicated in New Jersey. The only place where it still holds its own is at New Brunswick. A neighbor of mine, a good man and a dominie, has a lot of old, scrubby pears trees that have been dying for the last five years. He does not own the lot, he does not want the trees, and the owner won't spend the money to have them chopped down. So there is always some bloom, some set of fruit, which becomes filled with midges, and leaves a surplus that comes over into my Experiment Orchard. Last year I picked off at least 80 per cent. of the pear set because it was full of midges. Fortunately, under orchard conditions, this insect is

readily controlled, and I am keeping a sharp lookout for its occurrence.

The sinuate pear borer has been again introduced into New Jersey on *Cratægus,* but I have compelled the destruction of all the infested plants as a condition of certifying the nursery, and I believe I have prevented the renewed spread of the species.

Nurserymen generally recognize the importance of keeping clear of pests that might come back upon them, to their discredit, and as a rule they accept my suggestion that such plants are undesirable, without demur.

It is unfortunate that I have no club as against the ignorant or careless orchardist or the owner of infested trees, shrubs and hedges near and in villages, towns and even cities. The present machinery is cumbersome, and in most localities I dare not set it in motion, because to deal equally with all would involve every landholder in the district.

Some of the Insect Commissioners have done good service during the year, and deserve the thanks of this Board, because, with few exceptions, where special work was required, they receive no other compensation.

One more point in which the Entomologist has co-operated with the State Museum authorities: Thirty-five cases of insects have been prepared and are now on exhibition in this building. They illustrate some of the more common species, injurious and otherwise, in all their stages and with samples of the injury done by them. Part of these cases were at the Buffalo Exposition and received medals; others of them were sent to Charleston and were also recognized by medals. It is intended, in a way, to illustrate the work of the State Entomologist and of this Board; but it is prepared so as to be also educational in character. Altogether, the Entomologist has not had much chance to idle during the past year.

Mr. Ketcham—I would like to ask Professor Smith which he would recommend or give preference to—the lime, sulphur, and salt wash or the crude oil? Which, in his opinion, is best to use?

Dr. Smith—I think that probably for general use the so-called California wash—the lime, sulphur and salt wash—is the safer, and from last year's experience it is probably at least as effective as the oil.

On peach trees, under ordinary conditions, the lime mixture is practically the only one that should be used. The oil has been used on peach trees successfully and safely, but the margin of safety in the application of the oil is so small that, unless the application is carefully made considerable harm may and has resulted. With trees of other kinds, the margin of safety is greater and the oil can be more safely used. And, I will say in this connection, some men, who have used both the lime and the oil, prefer the oil. It is more convenient to handle, and it is hardly more expensive when we take into consideration the labor involved in the preparing of the lime, salt and sulphur mixture. On the whole, this mixture has the advantage of safety, and therefore I am advising it pretty generally, and particularly on peach trees.

I have just been asked whether the mosquitoes were about at this time, and whether there was any danger of being bitten. I want to say that there are plenty of mosquitoes about. I don't know that there are any at the State House at the present time, but I have instituted a winter campaign against mosquitoes, by finding out where they were to be looked for, and just a day or two ago one of those experiments came to an end. I found a factory right at the edge of the Newark meadows, about a hundred and fifty or a hundred and sixty feet in length and about fifty or sixty feet wide, with a cellar under the whole factory, and I thought probably that would be rather a good place to look for mosquitoes; and so I sent down and had the owner to go down, also, into the cellar, and in that cellar they were all around the walls and all over—mosquitoes in any quantity—thousands of mosquitoes in the cellar. Well, the man got a scare; he thought if he had mosquitoes at that rate during the winter, in the summer time they would produce something terrific. So we fumigated; we used these formaldehyde candles they have around the market, and in something like two hours the cellar was entirely clear of mosquitoes—that is, the entire hibernating lot of mosquitoes in the cellar was cleared out.

That is an indication, gentlemen. We know how the mosquitoes pass the winter. It is not such an awful hardship to reduce the early crop if every man will take care of his own cellar. I have them in my own cellar. In the city of Borden-

town, not very far from here—I don't know how many cellars have been examined by Mr. Turner Brakeley, who has been assisting me to a very considerable extent—there is not a cellar in the city of Bordentown that has been examined that does not have anywhere from fifty to a hundred and more mosquitoes. Some of them are the common, every-day, rain-barrel mosquito, a good many of them are the malarial mosquito. So that there is a good crop going over the winter. I am not going to let up on the mosquitoes, but there are other things to be looked after in the State as well.

A Member—I have understood that the eggs of the mosquito do not all hatch out at one time, but they will lie dormant, perhaps, for six months or longer; is that so?

Dr. Smith—That is true for certain kinds of mosquito. I have had sods containing mosquito eggs in the laboratory for over three months, and from time to time have put pieces of the sod in water and the eggs have always hatched. Just so long as the sods remained dry the eggs remained there fertile and ready to hatch. Just as soon as the sod was covered with water it hatched out; that is not true, however, of all species of mosquitoes.

A Member—How many kinds of mosquitoes are there?

Dr. Smith—We have about twenty in New Jersey.

A Member—Are you watching the whole twenty kinds?

Dr. Smith—Oh, no; I think we ought to keep a few of them. At any rate, those that are not particularly vicious. As a matter of actual fact, there are not more than three or four species of mosquitoes that are troublesome in the State, but they do the business for most of the State, I think.

A Member—May I ask which they are? May I ask which you say carries the malaria?

Dr. Smith—So far as I know there is only one species—the *Anopheles Maculiparis*, as it is called.

# Science and Its Use by the Farmer.

BY DR. W. H. JORDAN, GENEVA, N. Y.

# Science and Its Use by the Farmer.

BY DR. W. H. JORDAN, GENEVA, N. Y.

The industrial life of the civilized world is in the process of rapid development and change. We are fond of pointing to the marvelous transformations now taking place in the arts as the evidences of human progress, and those who deny or even question that the material greatness which attends our nation is a sure testimony of national strength are regarded as theorists, whose words are not to be taken as having any practical significance. Our individual conclusions concerning present business and social conditions will depend upon our point of view—they will vary as our definitions of human progress vary. If the opportunity to lead a strenuous business life, to become a great captain of industry, to sweep on with an almost irresistible tide of business exertion, that leaves little time for home life and hours of reflection; if mass is to us the symbol of power, and if we regard the acquisition of wealth as an adequate and complete reward for a life of toil—if these things are to us the highest ideals of human living, then we believe that real progress has been rapidly advancing. But if, on the other hand, we desire leisure for reflection, if we would cultivate home life and our social well-being, if we hold that the greatness of a people consists in its intellectual and moral attributes, and that culture of the human mind and heart should be the goal of all effort, then we are less confident in proclaiming our boasted progress as the perfect development of the noblest ideals.

There is, however, a seeming futility in raising such questions as these. Changes are here, new conditions exist, business methods are transformed, life is strenuous, and whether or not to-day pleases us more than yesterday, did we find ourselves absorbed and con-

trolled by commercial and social conditions whose sweep we are powerless to resist. That which we call progress, the philosophical student terms evolution—a movement of the mass, which is the result of causes infinitely varied and complex. Against this individual protest will not avail; resistance is futile, a refusal to recognize our changed environment is suicidal, and the only course left open to us, as intelligent units of society, is to secure for ourselves, either as individuals or as a class, a favorable and harmonious adjustment to our environment. Do not understand me as disparaging present conditions and opportunities. We live in a day of large privileges and great possibilities, in which high purposes and strenuous endeavor may reap substantial rewards.

In this march of events agriculture has not fallen to the rear. The equipment and methods of the best farms of to-day stand in almost startling contrast with the agriculture of even fifty years ago. In implements, processes, commercial conditions and literature recent changes have proceeded with a galloping speed that I fear has been a cause of confusion and perplexity to many humble tillers of the soil. There are those, also, who stand in the watch towers of conservatism and cry a rebellious warning against the new agriculture, with its complex requirements. In the waving fields of grain to be harvested for home consumption, the oxen fattening in the quiet pastures, the home dairy and the all-round, self-dependent farm, these conservators of the past would find their delight, and they look with small favor upon the bags of imported fertilizers and feeding stuffs that puzzle the brain and confuse the judgment, even when they do not distort the truth. These home-loving and quiet-loving followers of the plow are not charmed by the buzz of the separator and the spiteful hiss of the steam sprayer. The Babcock test has not yet won their confidence, and the mysteries of fungicides and insecticides they do not approach. But this type of farmer is passing, and the stern demands of competition are urging, with unanswerable and irresistible logic, to the modern requirements of successful agriculture.

It may comfort and establish us if we become convinced that these troublesome readjustments are not to be avoided and are even highly desirable, and to be assured that modern knowledge, chiefly that which we call science, now stands in a necessary and helpful relation to the husbandman.

My first assertion, and one not difficult to defend, is that the conditions imposed upon the agriculture of to-day are evolutionary results. The unusual views of theorists, the proverbial attractiveness of something new, a desire of the scientific man for professional opportunity, selfish motive and legislative enactment, may seem to the unthinking to be the initial causes of these transforming changes that have overtaken agriculture with their attendant and directive factors—the College of Agriculture, the Experiment Station, the Station Bulletin, the Farmers' Institute and the many investigational and educational efforts that aim at the uplifting of rural life, socially and industrially. But whoever thinks that the act of Congress of 1862, establishing the Land Grant Colleges, had its beginnings in the conceptions of any one man or body of men, sees only the surface movings of the energies which transform and direct the conditions of human living. The honor which we freely accord Senator Merrill is his, because he and his advisors became the medium through which an unformed and almost unconscious purpose of civilized society was apprehended and developed into a concrete and efficient means of progress. So has it been with subsequent developments. The roots of every thoughtful man's purposes and concepts of right and duty reach into and feed upon the purposes and concepts of the social mass, and when a legislator produces for us a beneficent law, or a philosopher demonstrates a great truth, or a poet sings an inspiring song, the high privilege and honor which attend such distinguished service consist in giving expression to the thought and purpose of humanity which was struggling to the surface. To me such a conception of leadership dignifies the leader and glorifies his service. So does it magnify the importance and permanence of the present developments in agricultural practice and conditions to reflect that these changes are not brought about by ephemeral surface movements, originating with men who have left the moorings of conservative thought, but that they are evolutionary results, imposing a new environment and rendering necessary on the part of the husbandman new instruments of offense and defense.

But these thoughts are too general. Let us come closer to the immediate influences which have reacted upon the present social and industrial status of the farmer. The fundamental factor in

developing what we know as modern agriculture is the discovery of the laws and facts which in a co-ordinated and systematized form we term science. But science is a product of the human mind. It is a mass of knowledge secured by the application of this mind to distinct problems touching the unknown—by a search after truth—having for its initiative and inspiration the divinely implanted human impulse to understand and control the laws and energies of the material world.

Science is the fruit of men's inborn and irresistible purpose to master his environment. In the last analysis, then, it is this purpose which created the Land Grant Colleges and the Experiment Stations. In just so far as man has gained an insight into nature's complex machinery he has instinctively sought to use his new knowledge in promoting his welfare, and hence the Colleges, where truth, new and old, is to be garnered into the storehouses for the instruction of young men and women. New truth is sought partly because the old has been found to be useful, and hence the Experiment Station, whose function is to probe the unknown. The College and Experiment Station not only subserve man's intellectual and moral interests, but they are created to be his weapons of offense and defense in his struggle for the mastery of matter and of energy. Have you looked upon your Agricultural Colleges and Experiment Stations in this light? Have you comprehended the fact that man's bold and brilliant explorations into the realms of the unknown brought these organizations into existence as necessary instruments for promulgating and enlarging the knowledge that has become so closely related to the productive and industrial arts? The mind of man is not to be restrained from satisfying its longings after truth, and human society will not be thwarted in its instinctive purpose to utilize all knowledge as a means of accomplishing man's adjustment to, and ascendancy over, the materials and the forces with which he is in daily contact and which he must to some extent fashion and control. I reiterate the statement, then, that those features of the agriculture of to-day which differentiate it from the agriculture of the past have their source in science, which is equivalent to saying that they have their rise in the investigational impulses of the human intellect. Such a view, the correctness of which is not to be gainsaid, should teach us to respect and heed these highest and most useful factors of our modern industrial life.

But we must consider more than the devlopment of knowledge. New conditions are being met, requiring radical readjustments in our agricultural practice. First of all, what we call division of labor, combined with the demand of this luxurious age for high-class products, has had a marked effect upon what is required of the agricultural practitioner. Division of labor means specialities; high-class specialities mean expertness, and expertness demands training of both head and hand. The time was when the farm and the farm home were almost self-dependent. The food and clothing necessary for comfort, from the "linsy-woolsy" dress to the coarse shoes, from the corn bread to the old-fashioned pastry, were home products, in the making of which the whole family had a share. Now the looms and factories of the great city, the pastures of the fertile West and the products of the tropics contribute to a luxury of rural home life little dreamed of by those who cropped the virgin soil. For these additions to the variety and refinements of their tables and to the conveniences and the decoration of their homes our farmers must exchange something of their own producing which the rest of the world needs, and that something must be the best of its kind. And the marvelous means of transportation has made this possible. The whole world is now at our command. Nothing is too distant or too rare for our desire not to reach it and add it either to our utilities or to our luxuries. This places the farm in a very different relation to the exchange of commodities than was the case when, in New England, the day's labor of a neighbor was paid for with a bushel of corn, and the few articles for the personal adornment of the daughters of the house were secured by exchanging for them the products of the dairy, the spinning-wheel and the home loom. Easy and rapid transportation does more than this for the farmer—it brings him into competition with all the world. When people traveled in stage-coaches and freight was hauled by oxen on wagons and sleds, farmers only exchanged commodities with their neighbors or with the traders of a near-by city. Any city market was largely dependent upon the products of the immediately surrounding country. The farmers of Massachusetts cared little about what the farmers of Connecticut might offer for sale, for competition, owing to limitations of time and space, was not possible. Now the price of Elgin butter sets the price for the markets of the nation; New

Jersey fruit raisers find a competitor in California; Missouri apples influence the price of those grown in Maine, and the wheat of New York is displaced by that produced by the western prairie. Competition has been broadened and sharpened, until a small yield of crops does not pay and inferior articles are a drag on the market.

Moreover, nature is presenting us with new problems largely because of what man has done. He has cut off the forests, devastated the soil, made possible the spread of injurious plants and insects, and developed new types of plants and animals, so that we now talk about conserving soil moisture, buy fertility, fight fungous and insect pests, coddle the life of the high-born sugar beet, and study how to support the artificial status of the gilt-edged, "twenty-five-pound" dairy cow.

Surely the modern farmer is called upon to live a strenuous life. Great problems press in upon him, Nature often turns upon him an unfriendly face, the greed of his fellow at times oppresses him, and it is not strange that he sometimes feels that the hand of man and the hand of Providence are against him. Where shall he turn for aid? In what I have already said I have tried to make it clear to you that certain new factors in the agriculture of to-day—the Agricultural College, the Experiment Station, the Farmers' Institute and the literature which these organizations and efforts have produced—are evolutionary results, providentially correlated to these great changes in the conditions surrounding the art of agriculture and clearly designed to aid the farmer in adjusting himself and his business to a new environment. This argument will be strengthened if it appears that these agencies have shown an adaptation to their function and are now justifying their existence.

Now, it is not my purpose to play the part to-day of an apologist of agricultural science and agricultural education, for these need no defense, and, besides, too much apology is an evidence of conscious weakness. It is well, however, to occasionally confirm our beliefs and strengthen our purposes by passing before our minds the facts that relate to the chief business of our lives.

Let us first consider the educational field. Much sarcasm and denunciation have been aimed at the College of Agriculture, especially in the Eastern and Middle States, because it has not sent more graduates back to the farm. If there has been a partial

failure in this respect it has been a resultant of several causes, among which are (1) lack of appreciation of the advantages of a training in the applications of science to agriculture; (2) the attractiveness to the educated man of other business and professional opportunities in this rapidly-developing nation; (3) the location of the College of Agriculture in an unsympathetic environment, and (4) because of inexperience and lack of models there was failure at first to establish courses of study adapted to the end in view. There is no need of enlarging upon the operation of these causes, for the mere statement of them is sufficient to make their reality clear. But is agricultural education the lamentable failure many would have us believe? I most emphatically deny that it is. In the first place, a large number of graduates from our Land Grant Colleges are able and efficient workers in the agricultural field as teachers of agriculture, investigators, institute speakers, writers, superintendents of large agricultural plants and actual owners of farms. It is true, though, that what may be classed as the direct result of agricultural education, and what many seem to regard as the most important result, viz., the sending of young men to the farm has not met the earlier and somewhat chimerical expectations. The past is not a measure of what is or is to be, however, and the tremendous present growth of agricultural education, especially in the Middle West, a growth which we of the Eastern and Middle States scarcely yet appreciate, is an indication of what we may expect throughout all the borders of this nation with the ripening of the conditions which stimulate and nourish such a movement. It behooves us to be careful lest eastern conservatism, while it should zealously guard all our precepts of sound education, prevents our keeping to the front of real progress.

To my mind, agricultural education is abundantly justified by what may be called its secondary results. Call to mind, if you please, the sixty Agricultural Experiment Stations of this country, employing over 700 experts and assistants and issuing annually about 450 reports and bulletins, to be mailed to over half a million addresses. Place along side of this effort the 2,500 Farmers' Institutes held yearly in the United States, which are attended by over 800,000 persons. Reflect, also, that there is a widespread and growing movement towards the establishment of secondary schools of agriculture, as well as towards the study of rural science in our public

schools, and that nature study, whatever that may mean to different persons, is attracting wide attention and is gaining a foothold in our systems of public instruction. Measure, if you can, the magnitude and importance of these developments in the education of the people and you will be prepared to understand the import of the undisputed fact that the Land Grant College, through its departments of science and agriculture, has been the factor most potent of any in initiating and directing these new and immeasurably important steps in educational means and methods. It is not exaggeration to assert that the productive energies of this nation are being most powerfully strengthened by the training our young people are receiving in science and in its applications to the practical affairs of life, agriculture not excepted. The efficient use of the vast sums which this nation expends in fortifying its industrial position is primarily dependent upon the real knowledge possessed by our engineers and artisans concerning the properties of matter and the laws of energy, and so shall we conserve and utilize our vast stores of fertility, the corner-stone of all prosperity, according as we solve the complex problems of the soil and of plant growth, and acquaint those who direct agricultural methods with all that is known in these directions.

I have classed the Experiment Stations as one of the secondary products of the institutions established by the act of Congress in 1862. This is generally conceded. The Station movement originated with, and was directed by, these colleges, and the Stations themselves are nearly all college departments and are very largely manned by college graduates.

Let us consider, briefly, the place that Station results now occupy in agricultural practice—a place larger than we ordinarily realize, I suspect.

In the first place, certain laws designed to protect and inform the farmer in the matter of purchasing fertilizers and feeding stuffs originated in connection with the Station movement, and these laws are in many States executed by Station Directors. What a chaotic condition would now prevail in the fertilizer and feeding stuff markets if these goods were subject to no inspection! Here in New Jersey you have occasion to be especially thankful for the very efficient way in which your Station Director has attended to this part of his duties and for the valuable instruction he has

given you relative to the intelligent purchase and use of plant and animal foods.

Experiment Station investigations have shown the dairyman what milk is, how it varies, how to measure its value for specific purposes and how to maintain just and definite commercial relations with the creamery and cheese factory. Imagine, if you can, what would be the situation of the market gardener and fruit raiser in these centers of vegetable and fruit production if he did not have fungicides and insecticides to use as a defense against the pests which swarm in upon those regions where intensive culture has long been practiced.

The New York Experiment Station is located in the midst of extensive nurseries and large commercial orchards, the owners of which regard the sprayer to be as essential to their business as the plow or the pruning knife. The experiences of 1902, in the extensive rotting of apples, has taught the apple raisers of the Empire State the danger of neglecting thorough spraying, for the unsprayed or improperly sprayed fruit has been the occasion of large financial loss.

This year we have had a peculiar condition in New York. You know what the apple scab is. There is a fungus growth in the State of New York this year—the first time since some time in the eighties, I am told—which works only on the spots on the apple where the scab had broken the tissue, and thousands of barrels that were packed and put into cold storage have rotted because of that other fungus imposed upon the place where the scab had been and done harm to the tissue. And those orchards that were thoroughly sprayed (I am not talking about easy spraying)—were thoroughly sprayed—have been practically free in our region from the scab, consequently the second fungus has not been able to attack the apples.

I do not know how it is with you New Jersey people, but we found a peculiar condition of things in regard to the handling of the potato crop in many places in New York. A good year will come when there is no blight, and a lot of farmers will say, "Oh, well, it is no use to spray; I have lost my work." And the next year will be a blight year, and the "old scratch is to pay" with the potato crop.

Now, we have started in the New York Station—not because

we expect to find anything new—a series of experiments in all parts of the State, that we are going to keep up—good year, bad year, indifferent year or any kind of year—and keep a record of the financial side of the question, if possible, to make the farmers see the advantages, year in and year out, of attending to the potato crop, with spraying orders as they ought to—spraying four, five, six or seven times.

A Member—Speaking about potatoes, I would like to ask a question: In some of our sections there has been some talk of the tendency of spraying, with Paris green in particular, as inducing the blight. Have you had any experience in that?

Dr. Jordan—No, sir; not in that line. There is quite a discussion going on along the line of the injury of the arsenical materials to the potatoes in the State of Maine. But the bug death is in the crop there. I do not know the results of the work there. I have noticed that the experiments carried on by the College authorities of Maine by the Experiment Station did not show any injury from the arsenical materials or arsenical poisons. But it is being carried on further, and I am going to wait. We know so many things in the soil that are not so. Some of our Institution Directors are getting mighty cautious.

We wash in New York with what we call the California wash. The scale got into our orchards on the Experiment Station Farm. We have something like five thousand varieties of fruit, and it is a burden. We do not know what to do with them sometimes. We had fifteen big trees—tremendous big trees—getting festered from the tops. I think those scales fly. We had, also, a lot of little trees—well, the little trees were easy, because they were so small; but on fifteen of the big trees we used California wash, and our Entomologist—a pretty tolerably sharp-eyed fellow—could not find a scale on those trees this summer. Not a scale, and that was to me very satisfactory.

Then I went to Rhode Island, to a very large peach orchard there, and I went Northwest into two or three orchards—one pear orchard and one apple orchard—that were not lost cases, but were badly affected, and the results have been practically the extermination of the scale where we have treated the trees; so that in two of these orchards—in the apple orchard and in the pear orchard—a fine crop of fruit was harvested. But trees that

were left as examples (that is a rather dangerous thing to do, but we wanted to see what would happen) the fruit was practically worthless.

Spraying saved the pickle industry of Long Island, and it is the potato grower's defense in certain seasons. That ominous importation, the San José scale, which has forced us to legislate for its control, in my judgment need no longer trouble the dreams of the fruit grower. Extensive experiments by the Station with which I am connected, as well as results reached elsewhere, indicate that this pest can be controlled with as much certainty as is the case with other pests which we no longer fear as fatal to profitable production. Here the Experiment Station has again justified its existence. It is so evident that the control of fungous and insect troubles is largely one of the fruits of Station effort, that to claim this seems entirely superfluous.

It is possible to multiply indefinitely illustrations of the really useful applications of science to agricultural practice that have had their source in the Experiment Station. Soil management has been placed on a more intelligent basis, the losses from farm manures and the means of preventing them are better understood, uniformity in feeding animals has been promoted, and our knowledge of the needs of different classes of animals and how to meet these needs is greatly increased; animal diseases have been brought more fully under control, the laws of farm hygiene and sanitation are better known, and in hundreds of ways the farmer who so desires and has the necessary mental activity may relieve his practice of many uncertainties and often successfully overcome the unfavorable conditions which surround him.

It must be conceded that some earnest, but more or less pessimistic, friends of agriculture do not consent to the conclusion that applied science has strengthened the hands of the farmer. These doubters present several stock arguments in support of their position. They point, first, to the fact that many farms are in a dilapidated condition and produce poor crops; that blight and worms still devastate fields and orchards, and that great numbers who till the soil are not prosperous, but eke out a precarious living.

They declare, in the second place, that even under the most favorable circumstances the profits of the farm have not increased.

In the third place, it is asserted with great emphasis that lots

of farmers either know nothing or care nothing about the Agricultural College and the Experiment Station, or else are decidedly opposed to what is declared to be book farming.

Last of all, mention is made of certain farmers who are students of agricultural science, but are not financially successful, and the uselessness and even harmfulness of so much theoretical knowledge is thereby declared to be demonstrated.

These arguments have little real weight; nevertheless, they are often used with much effect in the presence of persons not well informed on these subjects, and create impressions not easily removed. Such arguments cannot be answered by the statistical method. It is impossible to figure out in terms of dollars and cents just how much better off agriculture is than it would have been had the aid of science never been invoked.

But there are other arguments, fully as convincing as figures, which are proverbially honest, but frequently lie.

The utility of knowledge should be measured by the successes of those who use it, rather than by the failures of those who do not. Use, and not disuse, determines the value of an instrument. It is about as reasonable to argue against agricultural science and education, because of wretched and badly-managed farms, as it would be to attack our public school instruction because there are those who cannot read or write. It is not consistent to condemn any supposed agency for good because some persons do not appreciate its potential usefulness. On this basis, the church, public schools, philanthrophy and any beneficent factor of civilized life would be discarded as not subserving our social and moral interests.

The argument that agriculture is no more profitable, or even less so, than it was a half century ago is highly fallacious as applied to the influence of science. If scientific knowledge was the only new factor in the farmer's changed environment, and if we did not have to reckon with a redistribution of agricultural production and meet a consequent greatly intensfied competition, then, perhaps, we could approach an exact measurement of what this knoweldge is accomplishing on the farm. As it is, we can only again emphasize the fact that applied science is to all appearances the agency that has powerfully aided the farmer in successfully readjusting his practice to new conditions.

Those who find in the unsuccessful book-farmer an evidence of the futility of scientific knowledge fail to see clearly all the essentials of business prosperity. Knowledge, however great, is certainly futile in the absence of what we call "business ability" or judgment. It often happens, and quite naturally, that farmers of a reflective and studious frame of mind are deficient in ability to manage practical affairs, and the relation of cause and effect is confused. To predicate that knowledge is a weakness is to defy all human experience.

It is true many farmers do not know or care about the efforts that are organized in their interests. A certain fraction of our agricultural people manifests a strange blending of dangerous credulity and equally dangerous conservatism. They are often observed to accept the astounding claims that are made for some worthless or unduly expensive patent food, and at the same time stand ready to cast their influence, so far as they have any, against those institutions established for their benefit, which they denounce as wasting the people's money. If I had the persuasive tongue of the fair-ground fakir, I could safely agree to present to your next Legislature generously signed petitions in favor of abolishing your Experiment Station and this Board of Agriculture, so numerous are those citizens who are best satisfied when they are opposing an existing order of things.

I would not conclude this discussion and leave the impression with you that I am chiefly concerned about the material prosperity of our rural people. It is hoped that none of us see the issues of life in such distorted proportions as to believe that what man does is of more importance than what man is. It would, indeed, be discouraging if this educational impluse that is now pressing in upon the farm is to confer only material strength. The constructive and enduring qualities of a people are found in its intellectual and moral fiber, and not in its wealth; and if the College, the Station and the Institute do not induce larger thinking, elevate our moral standards and intensify our altruism, these agencies will fail to exercise their most useful function.

# Soils—Their Requirements and Improvements.

H. J. WHEELER, PH.D., KINGSTON, R. I.

# Soils—Their Requirements and Improvements.

H. J. WHEELER, PH.D., KINGSTON, R. I.

The subject assigned to me for to-day might have seemed comparatively simple a few years ago, but the continued study of questions in this field for several years has led me to the belief that it is one of the most difficult of agricultural problems. Were our soils all derived from the same kind of rock instead of from multitudinous ones, the problem would still be complex owing to the varying degree of fineness of the particles, the manner in which they were laid down, the nature and extent of the resulting decompositions, the amount of organic matter and the influence of those various factors upon plant growth. Perhaps no better illustration of the effect of physical conditions can be cited than their influences upon the growth of lettuce. This plant demands an open, porous soil into which the hand can almost be thrust. If attempts are made to grow it in fine, compact, clayey soil deficient in organic matter, they are likely to result in failure. In certain greenhouse experiments at the Rhode Island Experiment Station, finely-chopped hay was mixed with the soil of one section and omitted from the other. The soil of both sections was taken from the same pile of thoroughly mixed earth. The manures were carefully weighed and made identical in each instance. Observations of the soil temperature were taken at like depths in each section without detecting differences, but, nevertheless, lightening up the soil with the finely-cut hay insured good crops of radishes and lettuce, while practical failure was met with where this was not done. The fact that the physical conditions are of vast importance should be recognized by every tiller of the soil, particularly where chemical manures must be employed.

In 1898 an instance of enormous injury to a clay soil, by continuous applications of nitrate of soda, was pointed out to me at the Agriculutral Experiment Station at Poppelsdorf, on the Rhine, near the city of Bonn. The soil had become so hard and caked that tillage was rendered well nigh impossible. The particles of soil had become too fine. The difficulty was overcome by treating it with lime, which caused many of the small particles to unite into larger ones, by which process the soil became more porous, permitting the free entrance of air and the proper movement of water, two factors of vital importance in plant production.

In connection with rotation experiments at the Rhode Island Station it was found, soon after breaking up the mossy land which had been neglected for some twelve to fifteen years, that by liberal manuring with complete fertilizers, fifteen bushels of shelled corn per acre was about the maximum that could be obtained, and potatoes could not be grown at a profit. After seeding again to grass and taking proper steps to overcome certain unfavorable chemical and physical conditions of the soil, more than ninety bushels of shelled corn and more than three hundred bushels of potatoes per acre were obtained by the same manuring. Upon the same soil, and under conditions like those where the Indian corn and potato crops were failures, from tweney-five to thirty bushels of rye were obtained per acre; yields of grain which have not since been equaled.

It is a great piece of good fortune that stable manure is naturally calculated to assist in improving the physical condition of practically all kinds of soils, clays are rendered thereby less compact, and sandy soils are made more retentive of moisture and manures. There is probably little doubt that a considerable portion of the beneficial influence of stable manures upon certain soils is due also to its strongly alkaline reaction, by which the conditions are rendered more favorable for the growth of certain plants. This action of stable manure cannot result in marked permanent benefit in this direction owing to the fact that the ammonia to which the alkaline reaction is due is soon changed into nitric acid in the soil. On this account, as well as owing to a depletion of plant food, certain soils deteriorate rapidly when seeded to grass, even when an excessive application of stable manure is made prior to seeding. Striking illustrations of this are

common in Massachusetts and Rhode Island, where meadows the second or third year are almost devoid of timothy and the land is occupied by red-top and Rhode Island bent. I remember now with the greatest interest one field of this character upon our old farm in Massachusetts where, even the first year, an excellent stand of timothy could not be secured, and where the second season the grass consisted almost entirely of red-top. Upon this land, also, beets failed to thrive, the healthy green of the foliage was seldom seen, but in its place a dark, red color. Onions could never be grown successfully upon this field, merely, as I supposed, at that time, because onions would only succeed well where they are grown successively upon the same land. Subsequent observations have led to the belief that this old idea regarding onions was due to the extra tillage and manures which the soils received and to the original favorable conditions of the soil, which conditions the farmer recognized only by the ability to produce this crop. Under the circumstances the farmers little realized that by proper treatment, adjoining fields could be made to produce equally good crops at small expense, even notwithstanding that onions had never been grown there before.

Much is said about humus and the influence of stable manure upon humus formation, with the idea that a considerable amount of humus is necessarily beneficial to the soil. While this is often true, nevertheless there are cases, like that of the adôbe soil of the Valley of the Rio Grande, in New Mexico, which contains not more than from 1 to 1½ per cent. of humus, which are wonderfully fertile; and, on the other hand, upland, naturally well-drained soils in Rhode Island, containing from 3 to 4 per cent. of humus, which are not capable of producing Indian corn large enough to yield grain, and whose physical condition is probably rendered worse by the large percentage of humus (matiére noire) because of its extremely fine condition. The influence of the presence of decaying organic matter in these soils before it has reached the stage of actual humus may, nevertheless, be highly beneficial from a physical standpoint, a fact which explains, to a large extent, the helpful action of stable manures and the wonderful increase of the crops after the first course of the rotation.

A more striking instance of failure to appreciate the physical side of the soil question could hardly be found than that of a

Massachusetts farmer of my acquaintance, who not only took no particular precautions to keep rain water out of his barn cellar, but to absorb it and the liquid manure he carted sand from a bank nearly two miles distant. After dumping it in his barn cellar he carted it out again upon his sandy and gravelly soil. This was continued year after year, notwithstanding that a good bed of muck was almost within a stone's throw of the stable and that the time spent in hauling sand would have sufficed to get out sufficient muck for the purpose. Had he possessed a stiff clay soil there might have been some rational excuse for using sand, though, on the whole, muck, reinforced with applications of lime, would, perhaps, have been even then more helpful.

In New Jersey you are fortunate if you can carry crimson clover through the winter, a feat which is only occasionally successful in Rhode Island. The fact that this plant, common red clover, cow-peas, soy beans and certain other leguminous plants are able to gather atmospheric nitrogen and, at the same time, add large stores of organic matter to the soil, is too well known to-day for me to say more than to urge the use of these plants wherever they may be grown profitably.

Two of the leading authorities in Germany were recently engaged in a lengthy controversy as to the merits of green manuring, and I fear that whichever side I were to take enough opponents would be found in the present audience. In fact, it is not an easy matter to say that green manuring is or is not advisable, for so much depends upon the local conditions. If the only returns from a dairy business are in the form of manure, it would doubtless be more economical to practice green manuring than to make manure solely for its own sake, in order that it may be used to improve the physical condition of the soil. If, on the other hand, there is a shortage of fodder, and feeding the produce of the farm to stock is accompanied by a good profit, aside from the value of the manure, then green manuring could hardly be recommended. Farmers stand near one or the other horn of the dilemma, or certainly between the two, and individual good judgment only can decide what is best in any particular instance.

Those familiar with some of the recent graphic illustrations of the losses of liquid manure which have appeared in certain Station Bulletins are well aware that the chief value of stable

manure rests in the liquid portion, which should under no circumstances be lost.

Regarding the solid portion, which many are more apt to treasure because of its bulk, some very novel ideas have recently prevailed.

Professor P. Wagner, of Darmstadt, Germany, would have us believe, since stable manure is an important factor in aiding in the destruction of nitrates, that its use is more harmful than beneficial. Dehérain has, nevertheless, very properly pointed out that Wagner's experiments were with abnormally large amounts of manure, and that under normal conditions of use, the quantity introduced into the soil is not great enough to give such disastrous results as Wagner pictures, a fact well illustrated by the beneficial influence of nitrate of soda used in connection with stable manure in the experiments at Rothamstead, England.

After all the careful and profound study of the stable manure problem, scientists have arrived at about the same conclusion already reached by the hog which maintains its residence in the barn-cellar, to the effect that the best thing to do with stable manure, if it is kept stored, is to spread it about and tread it down. Dehérain has recently called attention to the serious losses of ammonia that result when stable manure which has been stored is hauled out upon the land and spread at once or allowed to lie in heaps during windy, pleasant weather. If it were possible he would have the plow follow immediately after the spreader. Where this cannot be done a decided advantage could doubtless be gained from spreading the manure upon soft snow, or just prior to or during a rain, for, under such circumstances, the liquid or most valuable portions would be carried into the soil where danger of loss is wholly overcome or reduced to a minimum.

Stable manure is, usually, though not always, relatively deficient in phosphoric acid and potash, it being, when properly cared for, primarily a nitrogenous manure. Hen manure is deficient along the same line, though it is a far richer nitrogenous manure than the dung of ordinary domestic animals.

Seaweeds (excepting eel grass) are very rich in nitrogen and well supplied with potash, but are deficient in phosphoric acid. To this latter fact may probably be attributed the condition frequently referred to in Rhode Island, where, it is said, that the land has been "seaweeded to death." The continual application of a

rich, nitrogenous and potassic manure must soon exhaust the soil of its natural supply of phosphoric acid, particularly if plants are grown which remove large amounts of phosphorous from the soil. The use of bone, acid, phosphate, basic slag meal or other phosphatic manures will readily overcome the conditions which thus arise.

Many farmers waste their stable manure unnecessarily and yet purchase chemical manures. It is, nevertheless, a dangerous task to denounce such a practice in proper terms. Director Jordan, of the New York Station, after giving utterance to a sentiment in Massachusetts to the effect that commercial fertilizers were the lazy man's manure, seemed to have stirred up a whirlwind. Though he, like many another who has told an unpleasant truth, plainly has come to be considered a prophet even in that State. There can be no doubt but that owing to the ease with which commercial fertilizers may be purchased and applied to the soil, many a shiftless farmer has neglected to sufficiently look out for the manurial leaks at home, greatly to his ultimate disadvantage.

Notwithstanding all that has been said regarding the merits of stable manures, there are millions of acres in the United States that must be manured, at least in part, with something else, for the reason that the supply of this mal-odorous product is insufficient to meet our needs. Recognizing this fact we are led to a consideration of the substances that may be employed for this purpose and of the requirements of our crops and soils.

## POTASSIC MANURES.

Aside from seaweed, stable manures, wood ashes and cotton-hull ashes, our chief and almost sole supply of potash comes from Germany. Kainit, containing from 11 to 12 per cent. of potash; double sulfate of potash and magnesia (double manure salt), containing 26 to 27 per cent., and the high-grade sulfate of potash and muriate of potash, containing 48 to 50 per cent. of potash, respectively, are the salts usually offered for sale in this country. A double carbonate of potash and magnesia and nitre (nitrate of potash) are sometimes employed, but the prices demanded for them have been usually so high as to practically prohibit their use, except possibly in greenhouse culture, where the value of

the product upon a given area is so great that the extra cost of the manures is an item of comparatively minor importance.

In Europe it is usually recommended, particularly in employing Kainit and muriate of potash, to make the application to the crop before that for which the potash is especially wanted. In this country the use of the salts immediately before the crop is to be grown is the more common practice, and this mode of procedure is doubtless justified here by our more copious rainfalls and the consequent favorable conditions for the interchange of bases and acids within the soil and the leaching away of the resulting chlorids of lime or magnesia.

Under ordinary conditions, and for most crops, muriate of potash, on account of its cheapness, is the salt usually recommended, but for tobacco, hops, sugar beets and for potatoes, if extra quality and a high percentage of starch is sought, it should usually be avoided. It is probable that in a very dry season muriate of potash may produce a larger crop than the sulfate, owing to its greater solubility, but under ordinarily favorable conditions this factor would be of minor importance. The practical potato growers of Rhode Island, who have done much experimenting in this line, have practically all arrived at the conclusion that in their potato manures the best plan is to use about equal weights of high-grade sulfate and of muriate of potash.

So much depends upon the soil and crop that it is practically out of the question to give specific directions as to the amounts of these salts to use, for at the best no chemist is a substitute for individual intelligence on the part of the farmer, though, in a supplementary manner, he may be helpful.

### NITROGENOUS MANURES.

Aside from seaweed, stable manure and various waste products of certain factories and mills, we are dependent chiefly for our supply of manurial nitrogen upon nitrate of soda, sulfate of ammonia, dri ` blood, tankage, dried fish waste, hoof meal and horn meal. It is not improbable that certain of the ready-mixed fertilizers upon the market contain roasted, pulverized leather, a substance difficult to recognize in certain mixtures. At all events,

I have been informed by men who are in position to know that large quantities of this material are utilized by certain fertilizer manufacturers.

Of these substances, nitrate of soda stands, in efficiency, at the head of the list, and for some crops, particularly upon certain classes of soils, this substance possesses a very marked advantage over any or all the other nitrogenous manures. In support of this statement I need do nothing more than cite the tabulation of European data regarding its use with beets in comparison with sulfate of ammonia, which is presented by Stutzer in his work entitled "Der Chilisaltpeter." These results have been confirmed repeatedly in our own experiments with beets, and with spinach, lettuce, radishes, turnips and a large number of crops similar results have been secured.

For the cereals, millet, blackberries and other plants such a marked superiority of the nitrate is not observed, provided the soil conditions are favorable for the nitrification of other manures.

Where immediate response is required to manurial treatment, and where nitrogenous manures are needed in the early spring, while the soil is still too cold to be most favorable to nitrification, nitrate of soda will continue to be the favorite manure. P. Wagner rates the effectiveness of a given amount of nitrogen in sulfate of ammonia as about nine-tenths that of the same amount in nitrate of soda. Our own result is slightly higher, namely, 9.2 in the case of cereals. This is under conditions where losses by drainage were precluded. In experiments in the open field with cereals there has been more or less fluctuation dependent upon the character of the season, the rainfall, &c. It may be said, however, that under ordinary conditions, nitrogen in sulfate of ammonia appears to be approximately as effective for the cereals as in nitrate of soda. In order to impress the importance of soil conditions it may be stated that upon certain Rhode Island soils sulfate of ammonia has exerted a poisonous influence the first year, while nitrogen in dried blood proved upon the same soil only half as effective as in nitrate of soda. In another part of Rhode Island sulfate of ammonia gave good results the first season with Indian corn; the second year its action was far from satisfactory, and upon the occasion of its third application it became distinctly poisonous. In still another

and more remote section of the State marked injury from its use was not observable until the fourth or fifth year.

It was found in these cases that the soil lacked carbonate of lime, and was in consequence, acid (sour), to which fact the ill effect of this otherwise valuable manure was attributed. Professor Wagner, Pagnoul and others had noted similar ill effects, and upon an examination of the data then on record regarding its use at Rothamstead, a gradual decrease in efficiency was observed and pointed out. At that time no one had shown the positive reason for this condition.

The use of air-slacked lime was found to correct the fault, as has been demonstrated at the Rhode Island Station in experiments with nearly two hundred varieties of plants. During the progress of the Rhode Island experiments, Professor Wagner, from a single experiment with carrots, arrived at the same conclusion, and quite recently results have been published in England showing that liming has now overcome the tendency to unfavorable results with sulfate of ammonia at Rothamstead. Fortunately for Wagner, who makes no mention of the reaction of his soil, he did not select a plant which prefers a very sour soil, or he would doubtless have arrived at the conclusion that air-slacked lime could not overcome the difficulty.

Mention is made of this circumstance to show that experiments with a single variety of plants do not furnish, as a rule, a satisfactory basis for far-reaching conclusions. Soil conditions under which sulfate of ammonia fails to reach its normal effectiveness may, as cited in the case of dried blood in the Rhode Island experiments, seriously reduce the efficiency of all kinds of organic nitrogen, though this is less likely to be the case when it is associated with large amounts of bone, as for example, in steamed or raw bone as contrasted with fish.

Regarding the use of fish as a manure, it is quite common in certain parts of Connecticut, Rhode Island and Massachusetts to hear farmers affirm that fish induces the growth of common sorrel. This has been explained by Jenkins as possibly due to the action of the salt associated with the fish, or to the influence of the products resulting from its decomposition, upon the seed-coat or outer covering of the seed, which causes it to germinate more rapidly than otherwise. Personally I am of the opinion that in

non-calcareous soils the application of nitrogenous organic manures tends to lessen the basic ingredients, owing to the latter being seized upon by the nitric acid which results from their decomposition. In support of this idea I need but cite an instance from our own experiments, where the use of sulfate of ammonia rendered the soil incapable of supporting barley, clover and timothy, and even Indian corn grew to only about one-third its normal height. Under the same conditions sorrel flourished as I have never seen it do elsewhere. The crop fully occupied the land and grew nearly knee high. Upon immediately adjoining land only a relatively small amount of sorrel was produced upon a plot that received dried blood, and but very little where nitrate of soda had been applied.

Below is given the relative assimilability of nitrogen in various substances, as reported by Wagner:

| | *Relative value.* |
|---|---|
| N in nit. soda | 100 |
| N in sul. am. | 90 |
| N in blood, horn and green plants (soft) | 70 |
| N in fine bone meal, meat meal | 60 |
| N in stable manure | 45 |
| N in wool dust | 30 |
| N in leather meal | 20 |

In our own experiments we found, after liming, an efficiency of 90 for dried blood, and Th. Pfeffer, at Jena, gives closely approximating results, claiming that certain unnatural conditions prevailing in the experiments by Wagner were the reasons for his low result. Our own experiments indicate that leather is practically valueless if applied to an acid soil, but that its value rises to 13 (upon the basis of 100 for nitrogen in nitrate of soda) after the soil is limed.

Enough has been said to show that the farmer who buys a mixed fertilizer solely upon a representation of the amount of nitrogen which it contains, regardless of the materials used to furnish it in the mixture, scarcely deserves the right to-day to be classified as an intelligent farmer. From what I have said I would not be understood as condemning the use of ready-mixed commercial fertilizers, but merely as entering the strongest sort of a protest against buying a "pig in a bag."

It is a satisfaction to be able to pay your State a well-earned compliment by saying that it is one of the few in the Union where the gentleman in charge of the inspection makes an effort to tell you all he can about the composition of your ready-mixed commercial manures, so that a farmer can buy safely after studying your bulletins. When the laws of various States require a guaranty of the forms of the nitrogen in the goods, we shall have thrown an additional and desirable safeguard about the purchaser.

### PHOSPHATIC MANURES.

Ground bone, in its raw and steamed condition, was for years the farmers' standby. Its place was gradually encroached upon by dissolved bone and dissolved bone-black, both of which are now giving way to acid phosphate. Floats which are finely ground—unacidulated phosphate rock—are now in use to a limited extent. Upon muck or peat soil and upon upland acid soil to be devoted to certain leguminous plants and grasses they are to be recommended, but for ordinary soils and rotations, and particularly for garden vegetables, benefit to justify paying even the low price per ton has not been obtained in the course of our experiments. Raw and ignited iron and alumina phosphate (Redonda phosphate) are not usually offered for sale to farmers, except in mixtures. The "ignited" material has, however, been sold recently in New England under another name. Even though practically unknown on the market, it is believed that large amounts of it are used for manurial purposes, and in our own State we have found it in certain ready-mixed fertilizers. Under such circumstances every farmer should be informed regarding it. In France it has been reported to give excellent results, approaching somewhat nearly some of our most highly-esteemed phosphates. In other European countries it has been held to be one of the most dangerous adulterants of commercial fertilizers. Recent experiments with the ignited product at our own Station have shown, notwithstanding that it contains nearly 40 per cent. inverted (available) phosphoric acid, that if used upon an acid soil its efficiency for grass is but minimum, but that upon limed soil it gives very good results. More recent data at our own Station bear out the con-

clusion that the presence of lime or some basic substance is an important factor in determining the efficiency of this manure—a discovery which furnishes a possible explanation of the many conflicting reports regarding this substance in Europe. Even upon limed land certain plants are much better able to utilize it than others. Prianichnikow has recently shown the enormous feeding power of certain of the legumes for phosphates as compared with certain other plants. Lawes and Gilbert had long ago shown turnips to be unusually dependent upon a generous supply of readily assimilable phosphoric acid.

It will be seen from what has been said of ignited alumina phosphate that we have once more considered a substance which may be present in our ready-mixed fertilizers, the action of which is determined very largely by the character of the soil itself or by the other manures employed in connection with it. This fact furnishes an additional reason why the consumer should know as much as possible regarding the character of the materials which enter into the ready-mixed fertilizer which he buys.

The old notion that soluble phosphoric acid produced from rock is less valuable than that from bone and bone-black is fortunately quite well exploded, as indicated by the fact that the use of acidulated phosphate rock has become quite general among farmers. It may, nevertheless, be true that the so-called reverted phosphoric acid in dissolved bone and dissolved bone-black is somewhat more valuable than in acid phosphate (dissolved phosphate rock); but the percentage of reverted acid is usually too small to be of very serious consequence. The phosphoric acid of unacidulated bone has recently been pronounced by Professor Wagner and Maercker as of no more value than that in certain mineral phosphates. Exception to this, so far as concerns all but clay soils, has been taken by Julius Kühn. There are probably few American agricultural chemists who do not hold that Wagner's views are extreme, though believing, nevertheless, that much of the virtue of bone which has in the past been attributed to its phosphoric acid was actually creditable to the nitrogen.

Basic slag meal is a comparatively new phosphatic manure which has rightly gained universal favor in Europe. It is an ideal phosphate for practically all classes of soils. Our own results with it, extending over a period of nine years, are wholly

satisfactory for all classes of crops, and for use upon acid soils it has no equal among the phosphatic manures. Favorable reports are also made regarding its use as a dressing for grass in Massachusetts.

### MAGNESIA.

Not long since we were led to believe that our Rhode Island soil was perhaps in need of magnesia, a suspicion which has since been fully justified by experiments showing a marked gain from its use. At Amherst, Mass., similar deficiencies were reported, somewhat earlier, by Goessmann. Kainit, double sulfate of potash and magnesia, wood-ashes and magnesian lime all furnish this substance, and if care is taken to occasionally apply a manure in which it is present, the needs of our plants are quite likely to be met.

### SODA.

Time forbids an extended discussion of the soda problem. Much has been said in the past century regarding its use. It finally was quite generally accepted that if plants require soda at all, it is only in minute quantities, and that a sufficient amount is always present in the soil. If taken up by plants it is considered an almost useless factor from every standpoint. Its ability to entirely replace potassium has been abundantly disproved, but as an indirect manure it is considered frequently helpful.

Recently, Atterburg claims to have shown its value as a nutrient in the presence of a limited supply of potash, and Wagner has claimed that the use of soda in the case of a limited supply of potash added one-half to the plant product. Jordan and Jenter, in recent experiments, have shown that certain plants can appropriate considerable quantities of soda, but conclude that it cannot replace potash, nor is its application to soils necessary or helpful as a direct manure. Our own experiments, covering continuously a period since 1894, show no distinct advantage in plant growth from the use of soda in the presence of an ample supply of potash. Where potash is lacking soda has been found to be helpful by its liberation, not only of potash, but of phosphoric acid and magnesia. It may also help as a carrier of

nitrogen to the plants as suggested at Rothamstead. Our results indicate at present that with certain plants it may possibly be helpful in some other way, perhaps as a neutralizer of organic acids formed within plants during the synthetic processes. That it is capable of conserving the potash supply of soils by entering the plants and preventing the assimilation of potash far beyond the real needs, has been seen from our own and other experiments, but I am not aware that this economic feature of soda manuring has ever before been pointed out.

So far as concerns this feature, it would have little or no economic importance with millet, potatoes or with other crops which do not, under any circumstances, assimilate more than minute amounts of soda, but with beets, radishes, flat turnips and plants capable of appropriating large quantities of soda, it may be a matter worthy of consideration.

## LIME.

Regarding lime I will say that time does not permit me to give the subject proper consideration, but those who are interested in its use may obtain Farmers' Bulletin No. 77, entitled "The Liming of Soils," by addressing the United States Department of Agriculture, Division of Publications, Washington, D. C. Before closing I shall refer extemporaneously to certain matters connected with the use of lime and of various chlorides.

I will say that for asparagus, nitrate of soda has always led sulfate of ammonia in our experiments.

Those of you who have read Professor Brook's recent work on "Agriculture" may have seen the caution against using sulfate of ammonia and muriate of potash at the same time.

He says if these are applied together an interchange of acids and bases only take place by which potassium sulfate and ammonium chloride are formed, and that this latter compound "is highly injurious to plants."

Now, I will say that we have been experimenting for the last three or four years with chlorides. Calcium chloride was used in connection with some potato scab experiments, and it reduced the size of our potato plants from the normal height down to four or five inches, a result quite in agreement with what most of the

agricultural text-books say regarding its action as a plant poison. Our interest was especially awakened in the matter by the result of that and other experiments, and I thought it would be well to see what effect air-slacked lime would have if applied to the soil where the calcium chloride had been added. We found, in fact, upon the application of air-slacked lime, that the poisonous after-effect of calcium chloride was entirely overcome. Similar results followed the application of caustic magnesia.

Mr. Roberts—What quantity of lime produced that result—the usual quantity applied?

Dr. Wheeler—In this instance we used about two and one-half tons per acre, but doubtless from one ton to two tons would have done as well.

We have also applied ammonium chloride to the soil directly, and found it to be apparently as powerful a plant poison as the calcium chloride, but upon applying with it either caustic magnesia or slacked-lime, instead of continuing to act as a plant poison it proved to be a most excellent nitrogenous manure, rising in efficiency as high as sulfate of ammonia, or almost equal to nitrate of soda. If any of you are alarmed by reading this warning which has been given in relation to the use of sulfate of ammonium and muriate of poatsh together, I can assure you that if you will test your soil and make sure that it is not acid, and see to it that it contains a little lime in the shape of wood-ashes or slacked-lime, you may use those two substances together without any fear whatsoever.

We likewise tried magnesium chloride, but observed no toxic effect, even under the conditions where calcium chloride and ammonium chloride were poisonous. Nevertheless, many authorities state that magnesium chloride is a plant poison.

It is supposed that magnesium salts may act as plant poisons for other reasons, *provided lime is deficient.* On this account, we are cautioned about making successive applications of magnesian lime, though it may occasionally be used with good results. Fish is said to induce the growth of sorrel, which has been explained by the supposed possible softening of the seed-coat by the common salt (sodium chloride) associated with the fish or by the products of decomposition of the fish itself. To make this plain let me illustrate.

In 1898 I visited the Agricultural Experiment Station at Tharandt, Germany, and Professor Nobbe showed me some clover seeds that had been placed in water twenty-five years previously, and a few days before I was there one of these seeds had sprouted. He said that most of them germinated the first year and the rest have been germinating at intervals ever since. It may be many years more before they will all have germinated. He called attention to the fact that in some years the outer covering is thicker than in others, depending upon the climatic and other conditions, and hence its germinating power varies even when the clover seed seems to be all right.

If one of those clover seeds that has been in water for twenty-five years is scratched with a sharp instrument and again placed in the water it will germinate in a very few days. So the Germans have been led to invent scratching machines for certain seed. A knowledge of these facts probably led Jenkins to the explanation of the action of the fish manures already mentioned. To me it seems more likely that the action of the fish is due to an increased acidity of the soil, which they induce by removing basic ingredients, for sorrel thrives best on acid soil.

(At the conclusion of the paper the following discussion took place):

A Member—Do you claim that basic slag meal is superior to ground bone?

Dr. Wheeler—Very much so, as regards quick-acting phosphoric acid. I think there is no comparison between the two, and I have extended data here at hand which supports such a conclusion. We have tried ten or twelve kinds of phosphatic manures upon plots located side by side, one series limed and the other unlimed. This trial has been in operation since 1894. If you were to look over the results you would find that basic slag meal, in almost every instance, has proved superior to the other phosphates.

A Member—Where can it be bought?

Dr. Wheeler—I believe Jacob Reese, of Philadelphia, controls the sale of it in this country. It is sold under the names slag meal, odorless phosphate and Thomas phosphate. I presume it may, from time to time, be sold under other names, particularly as it is an excellent thing.

Mr. Gillingham—How does the price compare with bone per ton?

Dr. Wheeler—The price is lower per ton with us. Of course, the ton of bone has an additional value in its nitrogen, for which an allowance should be made, but when it comes to the question of phosporic acid, for *immediate* results, I think that the phosphoric acid in basic slag meal is from two to three times as efficient as in bone? Do you take exception to that, Mr. President?

President Voorhees—Our results here showed that it gave about 66 per cent., as against a 100 per cent. for soluble phosphate.

Mr. Roberts—Within a few days I think the basic slag meal was $13 a ton. We asked the price.

A Member—What percentage of phosphoric acid does basic slag meal contain?

Dr. Wheeler—The percentage of phosphoric acid will range, probably, from 17 to 20—that is, the total phosphoric acid is a little higher than in the highest grade acid phosphate.

A Member—You may have had good results with your experiments in your section, but I think it would be well for us to go a little slow on that basic slag meal for phosphoric acid, as far as my experience goes. I do not think there is any advantage to be derived from it in our section.

Dr. Wheeler—It is quite possible that the gentleman is correct and that I am correct, because I remember distinctly there was a certain slag meal produced in Europe which had a very different value from one produced in a certain section of Germany. For instance, at the Peina Bessemer Steel Works a good product is made. Much depends upon the process of manufacture. It may be that the basic slag meal which is being sent out now in this country is not as valuable as that with which we experimented. Ours was imported from Europe.

A Member—I think four or five years ago I did some experimental work with this for a gentleman who wanted me to give it a thorough test, which I did, so far as I could, and the result was not satisfactory to me; not convincing enough to induce me to use it.

Dr. Wheeler—I will say that the agricultural chemists of this country will doubtless soon get their heads together and apply some tests to this basic slag meal, so that we may know as to

the relative efficiency of different lots, and then, perhaps, some of these difficulties you mention will not arise, because we can then control it. We know that slag meal, if properly made, is as likely to give as good results here as it has in Europe. It is an ideal phosphate for acid soils, upon which the efficiency is raised by the excess of lime it contains.

Mr. Roberts—I have never used any phosphate that gave me as good results as basic slag meal. I used it several years ago and the results are most remarkable to this day.

Dr. Wheeler—I consider that upon sandy soil it is one of the safest phosphatic manures to use.

A Member—Does this basic slag meal which you are speaking of now form a complete fertilizer by itself?

Dr. Wheeler—No; it supplies phosphoric acid.

Mr. Roberts—And iron.

Dr. Wheeler—Iron and lime. It must be supplemented by nitrogen and potash.

A Member—About what quantity would you use?

Dr. Wheeler—Practically the same as you would if you were using acid phosphate. Simply put it in the place of acid phosphate.

I will say that we have recently found, after applying everything else that the soil needed, that we increased our crop production about 7 per cent. by the application of salts of magnesia, showing that by using ordinary commercial manures, even with lime, we were getting somewhat less crop than we should, simply because it still lacked a little magnesia.

I mentioned to you a few moments ago the results of the observations made by Professor Wagner in Darmstadt. He has cited a large number of European experiments conducted for the purpose of comparing nitrate of soda with sulfate of ammonia, showing that with certain plants nitrate of soda always gives a greater crop than sulfate of ammonia, and claims that it is due to the direct manurial action of the soda. In our experiments in Rhode Island, we found also that certain crops, such as asparagus, spinach, lettuce, beets and Swedish turnips, always gave a greater crop with nitrate of soda than sulfate of ammonia, even though lime was applied in each case in like quantity.

The question arose in our minds, is it due to the soda as a direct manure, or is it to be accounted for in some other way?

We accordingly took soil from our limed sulfate of ammonia plot and from the limed nitrate of soda plot. We said, if Wagner is right, then the addition of more soda to the sulfate of ammonia plot will bring the yield up to that from the nitrate of soda plot. But, upon adding either sodium sulfate or sodium chloride enough to bring the amount applied to the ammonium sulfate plot up to the amount of soda applied to the nitrate of soda plot, we were unable to bring that yield up at all.

But, as soon as we put on sodium carbonate, which is alkaline in its action, then the yield came more nearly up to that which was produced by nitrate of soda.

We then applied potash salts upon the sulfate of ammonia plot, saying that if the soda of the nitrate of soda had been helpful by liberating potash, the application of more potash with the sulfate of ammonia should bring the yield of that plot up to the yield of the nitrate of soda plot. But it did not increase our yield at all. On the contrary, it reduced it slightly.

We then turned around and made a generous application of air-slaked lime to the sulfate of ammonia plot, with the result that the yield upon that plot then came up very nearly to that which we obtained upon the nitrate of soda plot.

All of these results indicate that the greater yield obtained with nitrate of soda, as compared with sulfate of ammonia, was not due to the direct manurial action of the soda, as claimed by Wagner, but that it was due, to a very large extent, to the reaction of the soil, induced by the nitrate of soda, and the influence of that reaction upon the growth of the plants—a factor which Professor Wagner never considered in the slightest in his experiments.

Nevertheless, we have not been able, by such means, to raise the yield with certain plants quite up to what it was with nitrate of soda.

Considering this and other experiments, I am inclined to believe that, with a very limited number of plants, sodium may possibly have some direct beneficial effect when there is a deficiency of potash. That sodium can entirely take the place of potash, I think every agricultural chemist in the world will dispute.

For certain plants its power of usefulness, if such power exists at all, is so limited that the amounts of soda in the rain-water or in the soil are doubtless ample to meet their needs.

Now, as regards lime. We are all aware that it is necessary to the growth of all kinds of plants, as a direct manure. It also has an indirect action. It is a liberator of potash, though our results do not indicate very great efficiency in that respect. It has, however, upon our soil, been a very important factor in liberating phosphoric acid. I remember that there are several instances on record in Southern France where lime also proved to be a great liberator of phosphoric acid, and I suspect that you will find that true, also, of many of your red soils in this State, where phosphoric acid is possibly in combination with iron to a considerable extent. It is a subject for study that might prove beneficial.

I remember that upon the brown sandstone soils of Germany, many of which were said not to be acid, lime was shown by Wicke to be very helpful. Often, also, it is indirectly helpful upon stiff clay soils, by virtue of its improving their physical condition.

On sandy soil too much of it may be highly injurious, and if used it may be safely applied in the form of wood-ashes. If lime is used, as such, it should, preferably, have been exposed to the air for a long time, and must be used in very small quantities, perhaps not exceeding half a ton to the acre. Upon heavy clay soils or upon those full of organic matter two and a half to three tons per acre have been used in our own State, with highly beneficial results.

In experiments with potatoes upon our acid soil we found that lime seems to exert less influence upon the total yield than upon the increase of the tubers of merchantable size.

It transpired that liming made the tubers very much more scabby, and we spent about six years in studying the potato scab, demonstrating conclusively that the chemical reaction of the soil determines, in a very large degree, whether or not the potatoes will be scabbed.

You will remember that Professor Halsted recommended the use of flowers of sulphur in preventing potato scab. We found that upon our soil the flowers of sulphur applied in quantities which he recommended proved positively harmful, poisoning our land; but upon the application of lime we overcame it. Evi-

**Fig. 1.**

Clover (first crop). Kingston, R. I.

Clover. Limed. Clover. Unlimed. Weeds.

Both plots manured alike with potash, phosphoric acid and nitrogen.

**Fig. 2.**

Grass (first crop). Hamilton, R. I.

Limed. Unlimed.

Both plots manured alike with potash, phosphoric acid and nitrogen.

dently there was a little acid produced from the oxidation of the sulphur, which made our soil worse than it was before.

We have found, if we apply lime in rotations, immediately following the potato crop, and if we are careful to spray the seed tubers with corrosive sublimate solution or formaline before planting, that we can still lime our land at intervals of five or six years and not be troubled with potato scab to a noticeable extent.

In fact, we have never had enough scab in the course of the eight or ten years that this system has been followed to give us any difficulty whatever, and it has not interfered in the least with the salability of the potatoes; but, had we applied the lime immediately before the potato crop, and had we not treated our seed tubers with corrosive sublimate or formaline, we should have had a crop almost entirely covered with scab, as we have abundantly demonstrated in the course of several experiments.

We are well satisfied that the influence of stable manure in promoting potato scab is due to the ammonia which it contains. This is alkaline, and an alkaline condition is conducive to the growth of the scab fungus.

I have been interested to see that Professor Wilforth, Director of the Experiment Station in Bernburg, Germany, about a year since, discovered (?) the same thing, and published it without reference to the Rhode Island work, notwithstanding that he had received our bulletins and reports ever since 1891, in which all of our experiments were fully illustrated and described. Subsequently Hollrung, of Halle, in reviewing the article for a German publication, called attention to the fact that it had already been discovered in Rhode Island more than two years before Wilforth published his results.

A Member—Why is it that the scab is so much worse in some years than other years? This year potato tubers are particularly free from it?

Dr. Wheeler—I think the moisture has a great deal to do with it. The influence of soil acidity is also very much greater in some seasons than in others. If the season is very dry certain agricultural plants suffer more upon an acid soil than they do if it is wet, probably because the acid solution between the particles of soil is more concentrated in the dry season. In a similar way the growth of the scab fungus (which is a plant) would be likely to be affected.

We used sulfate of ammonia, a valuable source of nitrogen for the potato crop, and it was found to be nearly or quite as effective as the flowers of sulphur in preventing scab upon limed land. The ammonia of the sulfate of ammonia is changed into nitric acid in the soil. This may combine with lime, magnesia or potash, and be taken up by plants or these nitrates may be leached away. In either case the basic substances are thereby removed from the soil more rapidly than would otherwise be the case. The sulfuric acid of the sulfate of ammonia accumulates in the soil, which, aided by the nitric acid, brings about a condition which is unfavorable to the scab fungus. Dried blood would be much better than tankage on a soil where "scab" results, for the reason that the latter contains some bone. Acid phosphate, sulfate of ammonia and kainit should be helpful in lessening the trouble. Muriate of potash would probably be less effective in this way than kainit.

Mr. Gillingham—Will not muriate of potash, when used with ammonium of sulfate, lessen the value of the latter by forming ammonium chloride.

Dr. Wheeler—I am well satisfied that in any soil where you get a large amount of potato scab you need not be afraid of danger on account of forming ammonuim chloride, because the soil will not be acid, and ammonium chloride in reasonable quantities is poisonous only upon acid soil. Upon a very acid soil you cannot get more than traces of scab on your potatoes. We have planted potatoes all covered with scab, using acid phosphate and muriate of potash mixed with nitrate of soda and dried blood, and were unable to obtain a scabby product, but as soon as we added air-slacked lime or wood-ashes with the other mixture, every tuber produced was almost entirely covered with scab, and the crop was utterly valueless. This explains why some people complain of scabbed potatoes and others do not.

Here is a photograph showing the quantities of nodules upon soy beans, without nitrogenous manures, with a small amount of nitrogenous manures and with a large amount. Where little or no nitrogen was applied the plants probably took more nitrogen from the air than when liberal amounts were furnished in the manures, hence the greater quantity of nodules. When one applies large

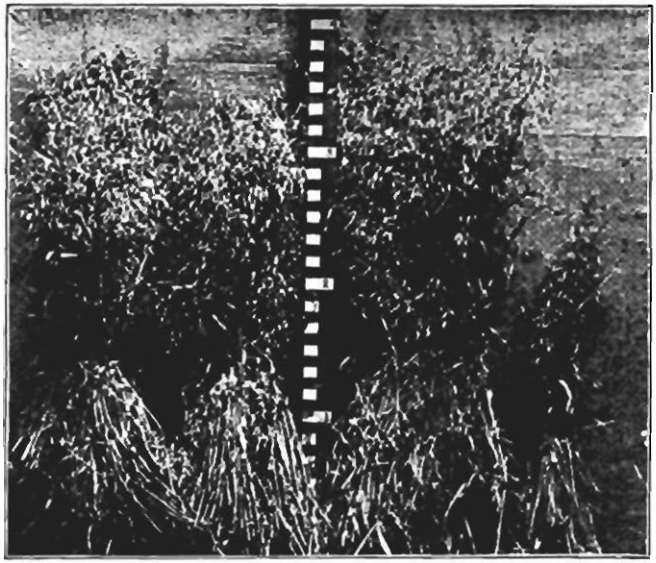


**Fig. 10.**

Oats.

| Plot 29. | Plot 27. | Plot 25. | Plot 23. |
|---|---|---|---|
| Limed. | Unlimed. | Limed. | Unlimed. |

Nitrate of soda. Sulfate of ammonia.

All manured alike with potash and phosphoric acid.

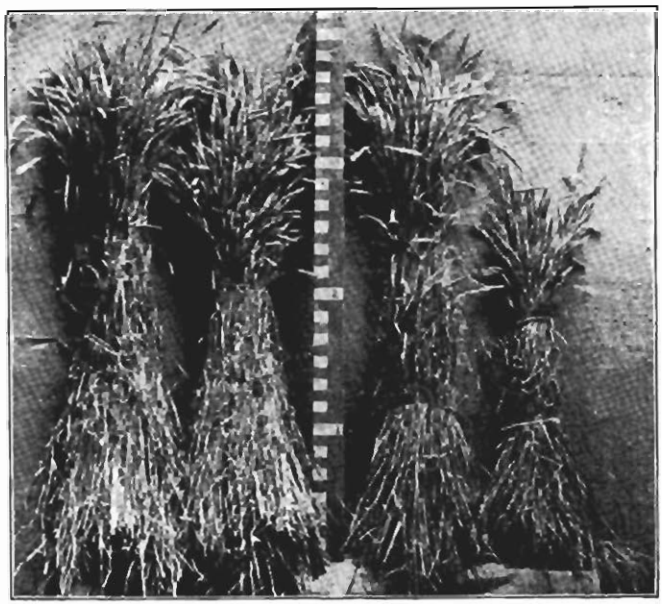


**Fig. 11.**

Spring Rye.

| Plot 29. | Plot 27. | Plot 25. | Plot 23. |
|---|---|---|---|

amounts of nitrogen in assimilable form the plants usually take less from the air than under other conditions.

Here are four photographs showing the effects of lime in connection with oats, rye, barley and wheat.

These are shown to bring to your attention the fact that rye will flourish very well upon acid soil, oats follow next, and these are succeeded by wheat and barley, for the latter two will not succeed well upon an extremely acid soil. Upon soil which is moderately acid the crop will be reduced somewhat. This shows that wheat and barley are more likely to be favorably affected by liming than oats, and that oats, in turn, are more likely to be helped than rye.

Mr. Roberts—What is the effect of lime upon Indian corn?

Dr. Wheeler—It is not likely to be immediately helpful, even upon very acid soil, *provided the nitrogen which you employ is immediately assimilable.* If the nitrogen is applied in organic materials, it is likely that lime may be very helpful, on account of its aiding in the transformation of the nitrogen into nitric acid.

From the photograph you will see that where sulfate of ammonia was used red-top predominates; with nitrate of soda, on the contrary, timothy predominates; thus these two manures have a wonderful effect upon the relative amounts of these two grasses, probably, on the one hand, on account of the basic action of the soda of the nitrate of soda being favorable to the timothy, and, on the other, to the tendency of sulfate of ammonia to bring about acid conditions, under which red-top can thrive and timothy cannot.

Here is a whole series of photographs showing the results of experiments with beets, grasses and clover conducted in different parts of Rhode Island. I will say that these liming experiments were begun upon the Experiment Station farm, and at the outset some of my colleagues in neighboring States shrugged their shoulders and said, "Your land must be exceptional! Do you believe these conditions prevail elsewhere?" So, in order to answer that effectively, we went into all the nooks and corners of Rhode Island and conducted these experiments, and we found the conditions did prevail very generally in our State. They have since been found to exist in Eastern Connecticut, in Maryland, in very

large sections of Massachusetts and in some portions of New Hampshire. I think your President would vouch for their existence, also, in some sections of New Jersey. In New York, near Saratoga, wonderful benefit from liming in connection with beets is reported. In fact, upon soils derived from sandstone, granite, gneiss and mica-schist, one may usually expect the liming will, sooner or later, be necessary.

A Member—What do you recommend as a manure for red-top?

Dr. Wheeler—Nitrate of soda, muriate of potash and acid phosphate.

A Member—How about lime on red-top?

Dr. Wheeler—It may help it a little, but it is not so necessary as it is for certain other grasses and for timothy.

I have here the results of an experiment conducted in Rhode Island, where the land was occupied exclusively by red-top. This was upon the farm of Mr. J. Overton Peckham, of Middletown. We used as a top dressing the same substances which I have just mentioned, and obtained 5,331 pounds of "barn-cured" hay per acre. Where no top dressing was used, only 666 pounds of hay per acre were obtained. After paying for the manure there was left a net gain of $18.64 per acre; estimating the hay at $16 per ton for the "barn-cured" product. That was this last season (1902).

Upon a farm on the island of Rhode Island, where there was some timothy mixed with the red-top, the crop upon the unmanured plot amounted to only 1,284 pounds of "barn-cured" hay per acre, but upon the plot which was top dressed we obtained 6,567 pounds per acre. This left, after paying for the manure, a net profit of $23.59 per acre.

The manures cost from about $17 to $18 per acre, and the hay was all valued at $16 per ton in the barn-cured condition. I presume this price may be high for your State, but it is low for our own, because it has been selling at about $20 with us.

A Member—Hay is $1 a hundred in our State.

Dr. Wheeler—Then those figures for the net profit from the use of the manures ought to be raised very materially. I tried to be very conservative in setting the price at $16, for I did not like to have the farmers take exception to the prices used in the calculations.

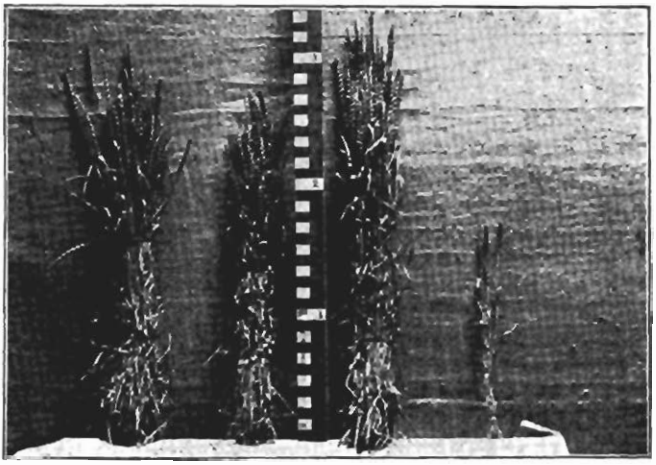


Fig. 8.

Spring Wheat.

| Plot 29. | Plot 27. | Plot 25. | Plot 23. |
|---|---|---|---|
| Limed. | Unlimed. | Limed. | Unlimed. |

Nitrate of soda. Sulfate of ammonia.

All manured alike with potash and phosphoric acid.

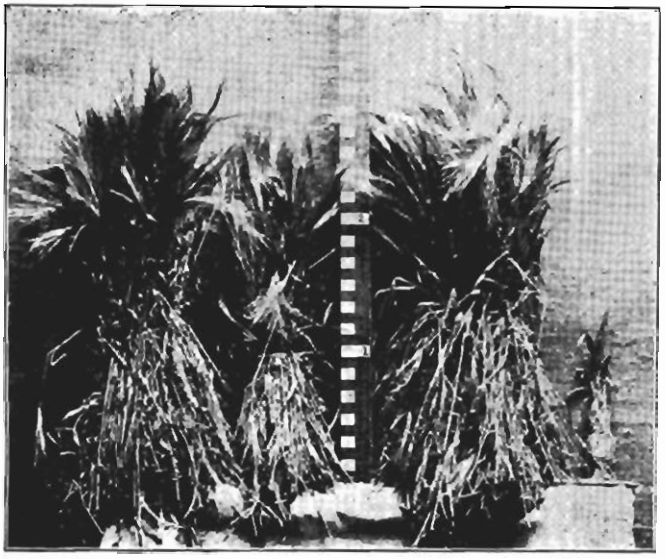


Fig. 9.

Barley.

| Plot 29. | Plot 27. | Plot 25. | Plot 23. |
|---|---|---|---|
| Limed. | Unlimed. | Limed. | Unlimed. |

A Member—Will you give the proportions of the manures for red-top?

Dr. Wheeler—Certainly. In order to accomplish this result we applied 350 pounds of nitrate of soda per acre, 300 pounds of muriate of potash and 600 pounds of acid phosphate.

A Member—How much nitrate of soda do you recommend?

Dr. Wheeler—If the soil is very deficient in nitrogen, 300 to 350 pounds per acre may be applied, but only upon condition that enough potash and phosphoric acid are at hand to produce a maximum crop.

A Member—Don't you think that would scorch it on sandy land?

Dr. Wheeler—No, not if put on when the grass is dry. It never should be put on when it is wet, excepting, possibly, during a brisk rain.

A Member—Did you ever apply a smaller quantity, about 100 pounds of nitrate of soda per acre?

Dr. Wheeler—We have done so frequently. In fact, the farmers of Rhode Island seldom apply more than from 120 to 150 pounds per acre, but our own experiments show an immense advantage from the use of greater quantities. I have not the exact figures here, but I will say that, as I now recall it, by the use of from 133 to 150 pounds of nitrate of soda per acre (with enough of the other manures), we get about two and one-half tons of hay per acre, but upon increasing the application to from 350 to 400 pounds of nitrate of soda per acre, we raise the hay crop to four tons or more.

A Member—What effect does that have on the quality of hay?

Dr. Wheeler—We have analyzed the hay and find that where the larger amount of nitrogen was applied it was always as rich, and sometimes even richer, than the other.

A Member—I don't mean in regard to the constituents, but the appearance, the general appearance, doesn't it tend to rust it just a little?

Dr. Wheeler—Our grass has not been troubled with rust, excepting where it was not properly manured. A lack of food weakens the grass and makes it subject to disease.

A Member—Will the same thing hold good with timothy as with red-top? Do you obtain the same effect with nitrate of soda?

Dr. Wheeler—We have been experimenting continuously with timothy and red-top grass on one piece of land for four years, using acid phosphate, muriate of potash and nitrate of soda, and obtained three and one-half tons of hay in 1899, 4.1 in 1900, 4.7 in 1901, and 4.1 the past season. Where a full ration of nitrate of soda was applied the grass is now about 66 per cent. timothy, but where we used only a small amount of nitrogen, timothy now constitutes only 33 per cent. of the whole.

A Member—Have you used that on clover and timothy mixed?

Dr. Wheeler—Yes! However, where there is clover and timothy mixed one need not use quite so much nitrogen, because it is not necessary. We have, however, this year used the full ration of nitrate of soda with both potash and phosphoric acid, on a mixture of clover and timothy, and obtained a first crop of about five and one-quarter tons of hay, and also a second crop of over a ton, making from six and one-quarter tons to six and one-half tons of hay upon an acre.

A Member—How much did you apply?

Dr. Wheeler—In this particular case, 350 pounds of nitrate of soda. Muriate of potash was applied at the rate of 300 pounds per acre, and acid phosphate at the rate of about 800 pounds per acre. This was in an experiment for the purpose of learning what are the minimum quantities of acid phosphate and of muriate of potash to apply per acre to insure four to four and a half tons of hay.

A Member—How much potash do you recommend on clover?

Dr. Wheeler—I cannot say absolutely what is best for you, for it depends, like nitrate of soda and acid phosphate, upon the character and fertility of the soil. We have been using from about 200 to 300 pounds of muriate of potash per acre for grass.

A Member—In using this nitrate of soda, if you use it when it is dry, do you get much benefit from it if dry weather should follow immediately after using it?

Dr. Wheeler—No. We have nearly always applied it for grass in our State at a time between the 15th of April and the 1st of May, and have always had sufficient rain afterwards. If you do not get a rain afterwards, it would not be of any use. All these easily soluble chemical manures must have rain to carry them into the soil.

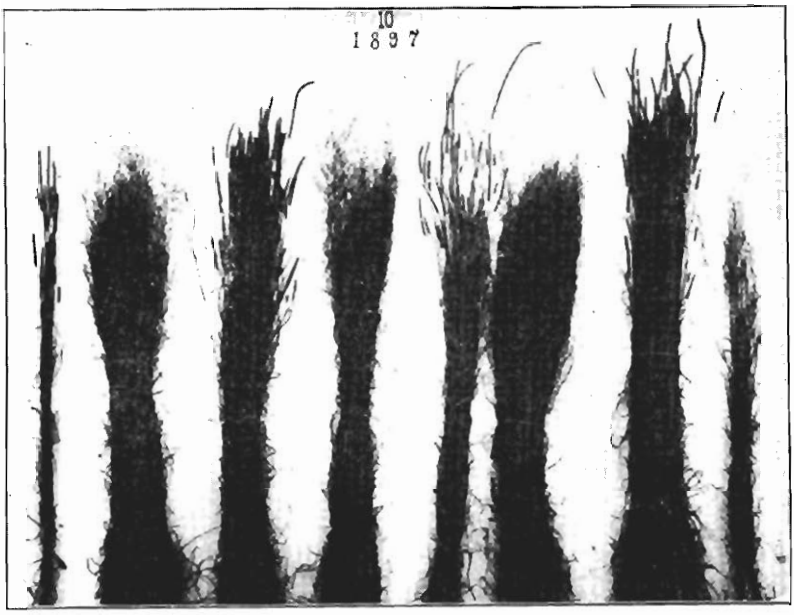



**Fig. 5.**

Showing the relative development of Timothy and redtop on limed and unlimed soil.

1 2 3 4 5 6 7 8

The odd numbers represent Timothy, and the even ones redtop.

Plot 23. Unlimed. Plot 25. Limed. Plot 27. Unlimed. Plot 29. Limed.

Sulfate of ammonia. Nitrate of soda.

All manured alike with potash and phosphoric acid.

**Fig. 6.**

Cantaloupe.

Plot 29. Limed. Plot 27. Unlimed. Plot 25. Limed. Plot 23. Unlimed.

Nitrate of soda Sulfate of ammonia.

All manured alike with potash and phosphoric acid.

**Fig. 7.**

Watermelons.

A Member—Do you re-seed those meadows every year?

Dr. Wheeler—We do not! We are trying to see how many years we can hold the yield up to about four tons of hay per acre, and without re-seeding. We have succeeded in getting our fourth crop, which amounted to 4.1 tons, and I think we shall probably secure nearly four tons next year, and we are going to see how much longer it can be done. Those who are interested in top-dressing grass-land should read Bulletin No. 90, of the Rhode Island Station, which is just going to press.

A Member—Do you apply this all in one application?

Dr. Wheeler—Yes, all in one application.

Mr. Roberts—At what time of the year do you apply it?

Dr. Wheeler—From the middle of April until the first of May. Possibly in your State it should be applied earlier. It must be done early enough so that we can get rain to take it into the soil. That is absolutely necessary. In our State I believe it is readily possible to increase the net returns from our Rhode Island grass-land more than $5 per acre. In fact, the possibilities are in many cases far greater, as I have shown by the figures presented to you. If we can increase the net profit from the hay crop of Rhode Island $5 per acre, it will mean a net gain to the State of over $390,000 a year. The benefit to be derived from a proper manurial treatment of the grass-lands of your State would be surprisingly great.

A Member—Will the application of nitrate of soda be of benefit the second year?

Dr. Wheeler—There is some benefit observed from the nitrate of soda even the second season, but I should hope to grow a crop that would take it nearly all out of the soil. I believe it to be the best economy to be generous enough to apply some each year. This should be done under all circumstances, unless heavy manuring was resorted to before seeding. Even then top-dressing is usually desirable after one or two years. Grass is as well worth good treatment as any other crop on the farm.

A Member—Do I understand you to claim that where the application of dissolved rock and dissolved bone is made the residue that is not taken up—*i. e.*, the residue of phosphoric acid—is equally as available from the rock as from the bone for a subsequent crop?

Dr. Wheeler—I think that would depend very much upon the character of the soil. I don't think it is all quite as likely to be, but if you have some lime in your soil I don't think it will make as much difference as otherwise. If the soluble phosphoric acid passes into combination with iron in the soil it may be less likely to be taken up by the plant the succeeding year than it would had some lime been present with which it could combine.

A Member—Suppose you had a cover crop that converted that phosphoric acid into organic combinations, what then? Would you have to grow a winter crop to get rid of the residue?

Dr. Wheeler—I think, in many ways, it is very desirable to use a cover crop for the winter. You protect your soil, and, by the use of legumes, gather nitrogen from the air, storing potash and phosphoric acid, perhaps both, in fairly good manurial form. I do not know, however, and am not prepared to say positively, as to the efficiency of the phosphorus in crops like clover, though it is probably quite efficient.

A Member—What is your experience with barnyard manure for Kentucky blue-grass.

Dr. Wheeler—If you use large quantities of barnyard manure I believe you can grow Kentucky blue-grass without lime, particularly if the soil is not very acid; but upon our very acid Rhode Island soils, if we seed down with a large amount of stable manure, it is impossible to hold a good stand of Kentucky blue-grass or timothy more than one or two years. With lime you can hold it.

A Member—On a soil where you raised Kentucky blue-grass, what effect would lime have where you manured the soil?

Dr. Wheeler—It might help some. But I should not consider land that would retain a stand of Kentucky blue-grass for several years as probably in great need of lime. I have possibly omitted to say that if lime is to be applied to grass-land it ought to be spread on the furrow and harrowed into the soil. It may be somewhat helpful as a top-dressing, but that is not, by any means, the ideal way in which to use it.

President Voorhees—There are several questions that have been handed to me. A number of them have been answered by Professor Wheeler, and those questions can, perhaps, be dropped. But there is one here that has not been answered. That question is:

"Is it practicable for farmers to test and determine whether soil is or is not acid?"

Dr. Wheeler—I will say, in reply to that, that it is perfectly practicable for farmers to do it. If you will take one-third of a glass of soil and moisten it with water until it is of such a consistency that if you take it up on a spoon it will just barely drop off; then take a strip of good, blue litmus paper (I don't mean a piece of hard paper, such as is sold by a good many of the druggists, but I mean a piece of litmus paper made from filter paper, such as Eimer & Amend and Richards & Company, of New York, sell) and introduce it into the soil. To do this, take, for instance, a knife blade, part the soil, then insert the litmus paper and press the soil back upon it. Allow the paper to remain there for fifteen to twenty minutes. If you find a reddish color extending to a considerable distance above the point of contact of the soil with the litmus paper, you may make up your mind that you have quite acid soil. But if it only turns red up to the point of contact, it is not so bad.

Now carefully remove the litmus paper and rinse it by dipping the end which was in the soil into water. If the blue color has all disappeared and a red one has taken its place, you may make up your mind that the soil is acid.

In the case of soils that are red, it is desirable to merely press one side of the litmus paper against the soil, because the red soil adheres readily to the paper, and one may mistake it for the red of the litmus paper. If the soil is very acid and you press the litmus paper upon it, then a red color will come through to the upper side, taking the place of the blue.

Another test applicable for soils which contain a great deal of humus is to place a teaspoonful or two of the soil in a glass; add water until it is two-thirds full, then add some ammonia water and stir it thoroughly. As a check, take another glass and add water only, allowing both to stand for the same time. In case the soil contains a large amount of sour humus, there will appear a chocolate or very dark-colored liquid in the glass, to which the ammonia water was added, while, where the water only was added it will in time settle out practically clear.

If the soil is well supplied with carbonates of lime and magnesia it will not be acid, and an application of ammonia water will not thus dissolve the humus.

The litmus paper is applicable to all kinds of soils, but the ammonia water test is a good one with which to supplement it in the case of soils suspected of containing acid (sour) humus.

President Voorhees—Another question is this: "Does the use of acid phosphate cause acidity of the soil?"

Dr. Wheeler—The use of acid phosphate makes an acid soil no better, and it may slightly increase the acidity. We had a field of oats upon which, after the application of acid phosphate, two or three weeks elapsed before the oats assumed a normal color and really made much growth. The reason they finally began to grow was that by that time the acidity of the acid phosphate had probably become somewhat reduced.

A Member—Will sorrel grow on acid soil?

Dr. Wheeler— Yes. I think as a rule it thrives best where it is exceptionally acid. It has, nevertheless, been reported to have grown well indeed upon an old mortar bed, and I have known it to grow in my garden upon a bed of lime.

President Voorhees—Here is a question: "What is the proportionate value of magnesian and pure lime?" That is, we buy in this State magnesian lime, and the question is how much to pay for magnesian lime when pure lime sells for a certain price? What is the relation, and will it be better to buy it?

Dr. Wheeler—I think it is well to use magnesian lime occasionally. For instance, if one were liming land once in five years, I think that the application of magnesian lime every tenth or fifteenth year might be more beneficial than the continuous use of ordinary lime. I should not use magnesian lime consecutively upon the land for fear that the quantity of magnesia might increase too much in proportion to the lime, under which circumstances a poisonous effect may be produced.

However, I am inclined to think that the fear along this line has by some writers been somewhat exaggerated.

A Member—Air-slacked lime got from the masons, is that good? I understand some people say it is not.

Dr. Wheeler—Yes! In fact, most of the lime that we apply is masons' lime, which we slack ourselves, either by exposing it to the air or by sprinkling water upon it. By sprinkling it by means of a sprinkling-can you can slack it so that it will crumble to a powder and still be dry in the sense in which we speak of it.

**Fig. 3.**

Clover (second crop). Hamilton, R. I.
Limed. Unlimed.
Both plots manured alike with potash, phosphoric acid and nitrogen.

**Fig. 4.**

Table Beets. (Slocumville, R. I.)
Unlimed. Limed.
Both plots manured alike with potash, phosphoric acid and nitrogen.

A Member—Which is best, air-slacked lime or water-slacked?

Dr. Wheeler—Upon a sandy soil I prefer air-slacked lime which has been exposed for as long a time as possible; upon a very peaty or dark soil full of humus I should prefer water-slacked lime.

Mr. Roberts—For what reason would you prefer the old lime upon a sandy soil?

Dr. Wheeler—Because it is so caustic that it is likely to injure the plants upon a sandy soil, but upon a soil full of organic matter the acids of the soil will seize upon the lime and lessen its burning tendencies.

President Voorhees—There is one other question—we will have that, and then we must close: "When did you find the best time for applying lime, the spring or the fall?"

Dr. Wheeler—That depends upon the crop. Usually in the fall, but if I were going to grow beets, spinach, lettuce or some plant greatly helped by lime, I should not hesitate about applying it immediately in the spring. If I were going to grow lupines, serradella, soy-beans, cow-peas or other plants easily injured by lime, I should prefer to apply it, if possible, two or three years before I intended to grow them.

At the afternoon session Mr. Roberts said: While I take issue with some things Dr. Wheeler said, I really think it was one of the best discourses I ever heard here. Everything was practical, and it came right home to us. I think he gave us farmers what we want.

This matter of using nitrate of soda: I have used 300, 200 and 100 pounds and less, and I have come to the conclusion that I would a great deal rather have on a grass field 100 pounds to the acre than more. He advised you to use 350 pounds, but I advise you not to do it, and I will tell you why. You may increase your tonnage, but it may not be worth while. If the whole field will grow a kind of a rusty brown straw, good for nothing for food and good for nothing for straw, you would not know what to do with it; and that is just the kind of timothy hay you would get—and I have done it—if you use 350 pounds to the acre. About 100 pounds to the acre gave me very satisfactory results, and I used it for several years, on maybe 100 acres, 100 pounds per acre. I have had for many years some very excellent foremen,

and they begged me to cease using the nitrate of soda; they said they could get more money for my crop if I would not use that; and for the last two years I have not been using any at all, and we have had a fairly good crop, and we got, I believe, more money for it than we did the other way, for our hay gave better satisfaction to our customers, so we do not use it any more on our best improved land.

A lot of land recently came into my possession which has been idle for sixty years. I thought I would use some nitrate of soda on that this spring, but I won't put on more than 100 pounds to the acre.

I speak of this at this time because I have been all through that experience, and I don't want you to go away with the idea that it will be well to use 350 pounds.

Mr. Denise—What do you put on to get that five tons per acre?

Mr. Roberts—Well, we never put nitrate of soda on alone. Where we put it on we have always mixed, say 100 pounds of nitrate of soda and 100 pounds of muriate of potash and some bone or acid phosphate—something of that kind—so as to make a complete fertilizer, and we have raised large crops.

# Report of Commission on Tuberculosis in Animals

FOR THE YEAR ENDING OCTOBER 31ST, 1902.

# Report of Commission on Tuberculosis in Animals—1902.

While there has existed a growing prejudice against cattle inspection for the existence of tuberculosis in some States, such investigations are steadily increasing in New Jersey, and this, not by compulsory law, but by the voluntary applications of cattle owners. This fact is considered a strong endorsement of the work in New Jersey, both as to its importance, and the methods of inspection and appraisement adopted by the Commission.

It should be remembered, the New Jersey law does not give the Commission power to investigate any dairy within the State, except as requested to do so by the owner, or by the Secretary of the State Board of Health.

The increase in the appropriation for this work, made last year by the Legislature and approved by the Governor, has enabled the Commission to continue the work of inspection for all who have applied up to the close of this fiscal year. Should there be any balance left unused for the year ending with October 31st, 1902, it will be owing, chiefly, to the lack of knowledge on the part of cattle owners, that facilities have been provided by the State for the inspection and purging of their dairy herds.

The restriction of the law, confining the investigations of the Commission to those herds only whose owners make application for inspection, makes the work, as a State work, slow and lacking in comprehensiveness. But, notwithstanding this limitation, there are large areas in some sections of the State where farmers generally are taking advantage of the law that seem to be almost, if not entirely, rid of bovine tuberculosis. It is to the credit of enterprising farmers, who have co-operated with the Commission, that this is so.

They are adopting improvements in the location, construction and ventilation of stables, and such precautions against *introducing diseased animals* into their herds, as are suggested by the Commission. If farmers generally throughout the State will thus co-operate with the Commission there will soon be a general improvement in the health of our dairy animals and their product will be above suspicion.

Tuberculosis is now recognized as a contagious disease and is propagated by contact of tubercular with healthy cattle, and by such products and places as are contaminated by tubercular cattle. The conditions, too, under which the cattle are kept have a decided influence on the spread of tuberculosis.

The investigations of the dairy herds, placed in the hands of the Commission throughout the State, prove most conclusively the foregoing statements. Numerous instances could be given where the introduction of a tubercular animal into a healthy herd has, within a shorter or longer period (determined somewhat by local conditions), transmitted the disease to other members of the herd.

A semi-basement stable in Warren county, constructed of stone with windows on the south side only, arranged for two rows of animals, one row on the north side next the embankment wall, with no windows; the other row on the sunny side with a few windows, showed, on investigation, a much larger per cent. of animals affected in the north row, on the dark side of the stable, than were affected in the row on the south side.

No other cause could be found, nor reasonably assumed, to produce this difference than the absence of sunlight in contact with all parts of the stable at some hour of the day; and the cold, damp condition of that side of the stable. The windows named were too small to admit much sunshine, and were so placed that that little could not reach the north row of animals.

A herd in Mercer county, where the cattle were closely placed in a low, dark, damp, unventilated stable, was seriously decimated by the introduction of one diseased animal put into the herd three or four years before our investigation. Prior to her introduction, the original cattle had been healthy. When the condemned animals were removed from this herd and killed, a post-mortem examination showed the purchased animal to be diseased throughout and in the most advanced stage; and the

other animals condemned were affected according to their position in the stable. Those standing next the introducer of the disease were the most seriously affected—the second one from her not quite so badly, and so on. About half of this herd was taken out.

A well-kept dairy in Cumberland county, which we were called to examine, had a few members affected by the introduction of one diseased animal five years before. The conditions here were: Stables well lighted, with good ventilation and sanitary arrangements of such a nature that those cases that had become infected were slow in developing, while the number infected was small compared with other herds where conditions were the reverse.

The two (latter) cases named (and scores of others could be produced) show not only that bovine tuberculosis is a contagious disease, but also that conditions under which cattle are kept has much to do with the rapidity with which the disease will assail the healthy members of a herd. All the animals were tested with tuberculin.

That more applications have not been made for examination is due to ignorance of the co-operation of the State with the farmers for the removal of diseased animals from their herds, and ignorance of the disease and of its damaging effects, if allowed free range. Instance the following:

A herd of more than twenty animals in Cape May county was brought to the attention of the Commission and an application made for examination. This herd had showed strong evidence of serious trouble of some sort for a long time. The owner of the cattle, an old-time farmer, did not believe in this tuberculosis in cattle. It was all humbug. The son, however, a man over twenty years of age, had read and heard enough about this disease to lead him to conclude that that was the trouble with their cows. Accordingly, application was made, and, on physical examination alone, five animals were taken out and destroyed; all very badly diseased, and a test made a little later left only about five of the original herd.

A healthy herd could be maintained in such a contaminated stable only by the most thorough cleansing, disinfecting and considerable reconstruction of stalls, mangers, &c., with new materials. The old farmer in the case named—and there are scores of other converts under similar tangible evidence—was decidedly convinced that there is such a disease as bovine tuber-

culosis, and that it behooves cow owners to be on the alert against the introduction of this disease into their herds, and the importance of maintaining healthy conditions in the stable life of their cows.

A farmer in Gloucester county wrote the Secretary of the Commission asking for advice, stating that five years previously he had purchased a finely-bred animal of a certain breed to improve his dairy. He had raised from this cow five calves. A year previous to the date of writing he had killed the mother and removed her to the woods. At the date of writing he slaughtered her first calf, then a cow four years old, and consigned her, also, to the buzzards. The other animals were all showing evidences of a similar trouble: coughing, emaciated, running down in vitality. Now, will you tell me, said he, what is the matter with my cattle? There was but one answer to his question, as a subsequent investigation proved. If this farmer had known of this disease, and been *on his guard against introducing diseased animals into his herd and keeping them there,* his loss would not have occurred.

This case is one of many, and shows the necessity there is for just such *educational work* along the lines named as is being done day by day by the Commission. The only sure way to escape the ravages of this disease is to allow *no infected animal a place in the herd.*

Coupled with this should be such construction of stables as will allow sunlight, as much as possible, to penetrate over the entire stable a part of the day; ventilation that will remove foul air; absolute cleanliness of floors and mangers, allowing no accumulations of refuse of silage, malt sprouts or manure to mould and otherwise pollute the air, and a flooring of such material as will permit thorough cleansing and dryness.

It is gratifying to be able to state that numbers of the more progressive dairymen of the State have adopted improvements where needed, as suggested by the Commission, even when the expense has run into hundreds of dollars. But many stables could be greatly improved at a very little cost to the owner. At this stage of the dairy industry every dairyman should be, not only willing, but eager to have his cows and his stables up to such conditions of health and cleanliness as are now made possible by the increasing intelligence connected with advanced dairy management and the growing demand for pure, wholesome milk.

There are losses incurred on account of this disease. "Renneberger estimated that the losses from tuberculosis in cattle in Germany amounted to 90,000,000 marks a year, and Wilson estimates the English losses at 3,000,000 pounds sterling a year. In the older parts of the United States there are localities where the prevalence of tuberculosis approaches the prevalence in badly-infected countries abroad." (Dr. Leonard Pearson's address at Buffalo, October 8th, 1901).

An approximation of the losses to cow owners in New Jersey, caused by the ravages of this disease, is made from the several reports of the Commission, giving, first, the total number of cows examined, the number condemned and the sum paid, as follows:

| *Year.* | *Total No. Examined.* | *Total No. Condemned.* | *Total Amount Paid.* |
|---|---|---|---|
| 1895 | 750 | 140 | $4,227 46 |
| 1896 | 1,219 | 159 | 4,149 74 |
| 1897 | 865 | 134 | 3,299 99 |
| 1898 | 1,433 | 245 | 5,098 20 |
| 1899 | 1,415 | 232 | 5,363 25 |
| 1900 | 2,323 | 339 | 7,385 87 |
| 1901 | 2,512 | 342 | 7,260 75 |
| 1902 | 2,500 | 370 | 8,123 62 |
| | | | $44,908 88 |

But for this disease these cattle would have been worth to their owners $40 per head, or a total of $78,440, showing there was an actual loss to the owners of $33,748.81, or the difference between $40 and $22.79 per head—the latter figure being the average paid by the State to encourage cattle owners to eradicate this diease. These figures cannot be taken as a basis for determining the condition of the unexamined cattle of the State, however, for only herds known to be diseased or concerning which there was a strong suspicion, were placed in charge of the Commission.

Special tests have been made, by arrangement with the owner, where but slight suspicion existed that any animals were diseased. Such tests have shown as low as 1 per cent. Our general conclusion is that the milch cows of New Jersey compare favorably with the cattle of other Eastern States, having laws similar to ours and using the same general methods of inspection;

and it is fair to conclude that the improvement in our cattle, though gradual, is permanent.

The report of examinations made, cattle condemned, &c., to October 31st, 1902, is as follows:

| *County.* | *Total No. Examined.* | *Total No. Condemned.* | *Total Sum Paid.* |
|---|---|---|---|
| Burlington | 225 | 44 | $1,045 50 |
| Camden | 25 | 10 | 356 50 |
| Cape May | 8 | 3 | 34 50 |
| Cumberland | 105 | 17 | 429 75 |
| Essex | 2 | 2 | 45 00 |
| Gloucester | 90 | 16 | 377 25 |
| Hunterdon | 69 | 11 | 171 00 |
| Mercer | 378 | 85 | 1,844 50 |
| Middlesex | 147 | 33 | 773 25 |
| Monmouth | 7 | 4 | 73 50 |
| Morris | 25 | 3 | 51 00 |
| Salem | 476 | 45 | 959 25 |
| Somerset | 202 | 42 | 919 00 |
| Sussex | 725 | 52 | 1,010 62 |
| Warren | 16 | 3 | 33 00 |
| | 2,500 | 370 | $8,123 62 |

| | | |
|---|---|---|
| Total Appropriation | | $15,000 00 |
| Total sum paid for Cows | $8,123 62 | |
| Expenses of Inspection | 1,068 77 | |
| Expenses of Commission | 408 21 | |
| Secretary, Assistant and Stenographer | 1,816 00 | |
| Stationery and Blanks | 69 20 | |
| | | $11,485 80 |

## IMPORTATION LAW, APPROVED MARCH 24TH, 1899.

The requirements of this act have been enforced with all efficiency available to the Commission. This law is a fitting complement to the previous enactment, whereby it is made possible to have the dairies already within the State examined. There would be little advantage in cleansing existing herds of disease, while allowing the importation of affected animals into the State to re-infect our dairies.

Difficulties are met with in the enforcement of this law, as is the case with most laws, but these are being gradually overcome as

the need for and the requirements of the law are becoming better understood. Among other beneficial results—it causes cattle dealers and other buyers to be more careful in their selections, so as to get sound cows from healthy districts. Farmers, also, are more careful in purchasing, and they are demanding, as never before, tested cows. We have inquiries, also, as to who are the most reliable dealers—who import the best looking and healthiest cows—showing that dairymen, when their herds are cleansed, are not willing to put suspicious animals in them.

The total number of cattle imported during the year ending October 31st, 1902, as recorded on the importation books of the Commission, is 17,127, which is 5,493 more than for the previous year. The total number inspected and recorded since this law went into force November 1st, 1899, is 38,342. These figures show what possibilities there are for flooding our State with broken-down or diseased cattle, were there no safeguards thrown around the business of importation.

The general rate of condemnations of tested cattle, under the Importation law, is from 2 to 2.5 per cent. But some of our records show that, in exceptional cases, condemnations as high as 25 per cent. of those purchased for shipment failed to pass the test and were not shipped.

The law and its administration seem to be giving general satisfaction. If persons intending to purchase will co-operate with the Commission, by *early and prompt notice* of their desires in the way of purchases, *giving State and place they intend to ship from,* and the *point or destination in New Jersey they intend to ship to,* many annoyances, caused by delay in notifying the Secretary or lack of such information as is indicated above, would be overcome. With the co-operation of the cattle dealers and dairymen of the State the work of the Commission will be made more generally effective and valuable.

To all owners of cattle, and especially those who are depending upon outside purchases to maintain their dairy herds, rather than on raising calves from home-grown stock, the Commission urges the great importance of buying only healthy animals and of isolating all animals whose health is at all suspected. No animal affected with tuberculosis should be allowed to live among others that are supposed to be free from disease.

There may be—there doubtless are—some evasions. There are men in every business who take peculiar delight in beating the laws of the State. But occasionally such men are overhauled. While trying to carry out the provisions of the law in as conservative a way as it is possible to do with efficiency, the Commission will endeavor to have all who are affected by its provisions comply with its requirements.

FRANKLIN DYE,
*Secretary.*

October 31st, 1902.

# Report on Animal Diseases.

TREATED BY THE STATE BOARD OF HEALTH.

# Report on Animal Diseases.

TREATED BY THE STATE BOARD OF HEALTH.

*To the State Board of Agriculture:*

GENTLEMEN—In accordance with the provisions of section 10 of the act approved May 4th, 1886, the Board of Health of the State of New Jersey reports the cases of contagious diseases of animals which have been brought to the attention of the Board during the year ending October 31st, 1902, together with the action taken in each case, as follows:

## ANTHRAX.

In June, 1902, suspected cases of anthrax were reported at Fort Mott, Salem county, and examination of the animals verified the diagnosis. T. B. Rogers, D.V.S., of Woodbury, was employed to carry out the instructions of this Board, and his report is as follows:

"WOODBURY, N. J., July 17th, 1902.

"*Dr. Henry Mitchell, Secretary State Board of Health, Trenton, N. J.:*

"DEAR SIR—On the 24th ult. I received instructions from you to proceed to Fort Mott for the purpose of investigating an outbreak of anthrax in that neighborhood. In company with Dr. Kille, of Salem, who reported the outbreak, I went over the ground and found that the losses were confined to the farms of Joseph Camp and Philip Donegan. In all Camp lost four and Donegan four head. These cattle were pastured on a piece of meadow open to the tide. This piece of land forms a rough, almost equilateral triangle, the river forming one side. Considerable excitement prevailed in Salem over the matter, and a provisional quarantine had been placed on the district by the local authorities. I vaccinated the cattle exposed by reason of their nearness to the outbreak with the exception of the herds of Armstrong and Newell, who declined vaccination until too late. No deaths have occurred since the termination of the second vaccinations on July 14th. It will be noted that the vaccinations were made somewhat slowly. This is accounted for by the fact that the cattle were very

wild, and were pastured far away from their stables. In addition to this the stables were not provided with stanchions or other means of restraint. Valuable assistance was given by Dr. Richards, U. S. Army, stationed at Fort Mott, whose influence with the farmers rendered my work much more easy and pleasant. In all 85 head of cattle were vaccinated. The cause of the outbreak must be obscure, the most likely supposition being that it came from Wilmington tannery wash. Releases were obtained for all vaccinations, and the owners of cattle were satisfied with the way they were treated by your board.

"I have the honor to be

"Your obedient servant,

"THOS. B. ROGERS, D.V.S."

The following list shows the number of vaccinations performed:

REPORT OF CATTLE VACCINATED AT FORT MOTT.

| | | | |
|---|---|---|---|
| Joseph Camp | | 2 | cattle. |
| B. W. Biddle | | 11 | " |
| Philip Donegan | 3 horses | 7 | " |
| Peter Callahan, Jr. | | 19 | " |
| W. P. Van Leer | 7 horses | 10 | " |
| Christopher Donegan | 1 horse | 11 | " |
| Ed. Hann | | 14 | " |
| | 11 | 74 | Total, 85 head. |

August 4th, 1902, Dr. Rogers, of Woodbury, sent a communication to the State Board of Health, in which he reported that a cow had died on the farm of William Ervin, Pittsgrove township, near Elmer, and as anthrax existed on Ervin's place last year, there was reason to suppose that proper precautions had not been taken by the owner. A quarantine notice was sent to Mr. Ervin, and on August 18th report was received from Samuel Christy, V.S., of Elmer, that the cattle had all been inoculated with anthrax vaccine, and the quarantine restrictions were removed.

August 8th, 1902, Wilmer B. Kille, D.V.S., of Salem, reported the death of a cow on a farm located in Lower Penns Neck township, Salem county. The owner of the animal was John Curry. The cattle had been pasturing on a field of about twenty acres all the spring. Late in July the herd broke into an adjoining pasture consisting wholly of swampy land. In a few days one of the animals was taken sick and died. Upon the death of another animal a specimen was sent by Dr. Kille to the bacteriological laboratory of the State Board of Health, and examination

proved that the deaths were caused by anthrax. On August 15th, 1902, the premises were quarantined. The restriction was continued until September 9th, upon which date L. D. Horner, D.V.S., of Woodstown, reported that all animals were in a healthy condition, and that the necessity for isolation no longer existed.

September 28th, 1902, Wilmer B. Kille, D.V.S., of Woodsbury, reported suspected case of anthrax upon a farm located in Elsinboro township, Salem county. The owner of the herd was John Farnkoph. A specimen from a cow which had died was sent to the Laboratory of Hygiene, but the result of the examination was negative. The animals on the farm were kept under surveillance for several weeks, but no new cases occurred.

## GLANDERS.

The larger number of cases of glanders which have been reported during the year occurred in Essex and Hudson counties.

The following table shows the order in which cases of glanders occurred, with other data which may be of interest:

GLANDERS, OCTOBER, 1901, TO OCTOBER, 1902.

| NAME OF SANITARY DISTRICT. | Date and number of cases reported. | | Name of person making report. | Disposal of each case. |
|---|---|---|---|---|
| | 1901. | | | |
| Jersey City | Nov. 30 | 1 | D. W. Benjamin | Animal destroyed. |
| Little Ferry | Dec. 19 | 1 | A. Woods | " " |
| Passaic | Dec. 30 | 1 | J. P. Lowe, D.V.S. | " " |
| | 1902. | | | " " |
| Newark | Feb. 26 | 1 | D. D. Chandler | " " |
| Passaic | Mar. 17 | 1 | J. P. Lowe, D.V.S. | " " |
| Passaic | Mar. 20 | 2 | J. P. Lowe, D.V.S. | " " |
| East Orange | April 10 | 2 | W. F. Harrison, V.S. | " " |
| Hoboken | May 10 | 11 | W. F. Harrison, V.S. | " " |
| Hoboken | May 20 | 1 | D. J. Dixon, D.V.S. | " " |
| Caldwell | May 26 | 2 | W. F. Harrison, D.V.S. | " " |
| Jersey City | May 29 | 5 | T. E. Smith, D.V.S. | " " |
| Montclair | June 4 | 1 | H. N. Parker | " " |
| Newark | June 23 | 1 | W. F. Harrison, D.V.S. | " " |
| Passaic | July 7 | 1 | J. P. Lowe, D.V.S. | " " |
| Jersey City | July 19 | 1 | D. W. Benjamin | " " |
| " " | July 25 | 1 | D. W. Benjamin | " " |
| " " | July 28 | 2 | D. W. Benjamin | " " |
| " " | Aug. 4 | 1 | D. W. Benjamin | " " |
| " " | Aug. 8 | 2 | D. W. Benjamin | " " |
| " " | Aug. 9 | 1 | D. W. Benjamin | " " |
| " " | Aug. 11 | 1 | D. W. Benjamin | " " |

## RABIES.

January 28th, 1902, a report was received at the office of the State Board of Health that a number of pigs belonging to Mr. McClellan, of Titusville, Mercer county, had been bitten by a rabid dog. In the absence of E. R. Voorhees, D.V.S., of Somerville, George E. Fetter, D.V.S., made an examination of the animals, but discovered no symptoms of rabies. The owner was instructed as to the oversight and care of the animals, and no cases of the disease developed.

## TUBERCULOSIS.

During the year three outbreaks of tuberculosis in cattle have been reported to the State Board of Health and referred to the Tuberculosis Commission.

Summary of cases receiving attention during the year:

| *Disease.* | *Suspected Cases.* | *Actual Cases.* |
|---|---|---|
| Anthrax | 13 | 10 |
| Glanders | .. | 56 |
| Rabies | 5 | .. |
| Tuberculosis | .. | 3 |
| Total | 18 | 69 |

Very respectfully,

HENRY MITCHELL,
*Secretary.*

# How Can the East Compete with the West in Dairying?

PROFESSOR JOSEPH L. HILLS, DIRECTOR VERMONT AGRICULTURAL EXPERIMENT STATION, BURLINGTON, VT.

# How Can the East Compete with the West in Dairying?

PROFESSOR JOSEPH L. HILLS, DIRECTOR VERMONT AGRICULTURAL EXPERIMENT STATION, BURLINGTON, VT.

I approach the consideration of the subject of Western competion in dairying this afternoon with some diffidence. In the first place, my life work has lain along lines which have not enabled me to take a comprehensive view of subjects dealing intimately with market conditions. I have studied the general subject, more or less, in connection with College, Dairy School, Farm Institute and Experiment Station work, but almost always from the standpoint of the producer. To cover such a subject broadly, one needs to occupy the several standpoints of producer, commission man and consumer. And secondly, I am out of my latitude in a region where a very different sort of dairying obtains than that I am accustomed to—a dairying with which the West fiercely competes. I may, therefore, say many things which have but little application here. I trust, however, that my hearers will not hesitate to supply deficiencies, to point out infelicities or to indicate errors in the discussion. Pray be free to debate, to controvert, to differ at your hearts' content; thus will the grain be threshed from the straw.

Lies have been classified as white lies, black lies and statistics. Again, it has been said that while "figgers don't lie, some liars figger." Notwithstanding these strictures, I am going to risk calling your attention for a moment to certain statistics, drawn from the data furnished by the last census, showing the wonderful increase in the dairy industry in the West during recent years and the relatively small volume of Eastern dairy interests. These refer, on the one hand, to the six New England States and to New Jersey, and, on the other, to the twelve Northern Central States—

Ohio, Indiana, Illinois, Michigian, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas—all of which are now largely engaged in dairy husbandry.

*Cows*—According to the last census there were nine and one-half times as many cows in the Northern Central States as in the New England States, and fifty-five times as many as in New Jersey (New England, 937,891; New Jersey, 167,799; Northern Central States, 8,927,882). During the last fifty years the number of cows in New England has increased 54 per cent., while in the same time the number in the Northern Central States was multiplied 571 per cent. (New England, 1850, 608,219; 1890, 937,891; Northern Central States, 1850, 1,564,219; 1890, 8,927,882). During the past ten years, however, New England cows have increased 14 per cent. in number and Western ones but 8 per cent., as against no increase and 53 per cent. during the preceeding decade.

If, however, we turn to the data showing the number of cows to the square mile, and to the unit of population, we find that the difference between the sections is largely one of area, that the East is outclassed because of its small expanse of territory.

There are 22 cows to the square mile in New Jersey, 30 in Vermont, 24 to 27 in Southern New England and 32 in New York. In Iowa only of the twelve Northern Central States is the bovine population as dense as 21 to the square mile. To the unit of population, however, the number of cows in New Jersey is low. There are but 89 cows per 1,000 population in your State, 275 in Maine and Maryland, 805 in Vermont and 339 in the dairy belt of the West. Northern New England and the Northern Central States are exporters of milk and milk products. New Jersey, however, can hardly supply its own needs. Its average cow makes 494 gallons of milk yearly, equivalent to less than a pint daily per capita, all dairy products, milk, cream, butter, cheese, &c., being included. This is too little. When one considers, moreover, that much of New Jersey milk goes across the Hudson and the Delaware it is clear that there is room for more cows in Jersey.

These figures are doubtless not new to this audience. They serve, however, to show that the volume of Eastern dairy production in proportion to her area compared favorably with that of the West in 1890.

To all intents and purposes, New England and New Jersey sell their dairy products at home only. This of itself, however, is a great and ample market. I do not need to tell Jersey farmers that with New York on one side and Philadelphia on the other, not to speak of the large home cities, they have a great advantage in many ways over those who are located as we are, two hundred miles away from any large and adequate market. But more and more each year the goods of the great West are elbowing home-made products out of their own place. Every year the proportion of Western butter sold in Eastern markets increases, while that of home make diminishes. It behooves us then to consider carefully any and every legitimate means which may be suggested looking towards the wider use of Eastern dairy products.

A general in planning a campaign seeks to learn the nature, extent, location and disposition of the enemy's forces, and the advantages he possesses; he measures against them his own resources; and, finally, he studies wherein he may lessen his opponent's chances of battle and improve his own. Let us, similarly, in surveying the field of strife for supremacy in the dairy trade observe:

(1) What marked advantages over the East are possessed by the West.

(2) Wherein has the East advantage over Western rivalry.

(3) How may Eastern dairymen more successfully meet the competition of the great West.

## I. WESTERN ADVANTAGES.

Several circumstances conspire to favor Western success in dairying, among which may be mentioned

1. Cheap feed.
2. Large territory and large numbers.
3. Ready use of new methods.
4. Educative agencies.

(1) *Cheap Feed*—This advantage is of stupendous importance. The Western dairyman raises silage and hay as cheaply as does his Eastern competitor, and his mill stuffs and by-products

cost him usually not more than two-thirds to three-fourths of Eastern prices. This difference in the cost of production is naturally a great factor in his success. The difference in freight rates on a ton of bran and on the butter which a ton of bran will make is large. Such a handicap as this is indeed difficult to overcome.

(2) *Larger Territory and Numbers*—I think that I have said enough under this head when considering the statistics given a few minutes ago to suffice, except to call attention to the surplus of production over consumption in the West and the reverse of this condition in the East, and to the fact that the volume of the West's production gives it a standing in the commercial world not accorded to smaller outputs.

(3) *Ready Use of New Methods*—Dr. Jordan this morning spoke of the ultra-conservatism of Eastern farmers. This mental attitude is very characteristic of our State. We are so conservative in Vermont that we cannot change our State Constitution, which has not been amended or changed, except, perhaps, in a few minor details, since 1790. Conservatism is, in many ways, wise, but the Eastern farmers certainly tend to be overwise in this respect. Western creamery and factory proprietors or managers, as a class, excel Easterners in similar positions in their study of newer methods and appliances, and in adopting the same wherever feasible. For example, the following statement was made from the platform at a recent meeting of the Vermont Dairymen's Association by a prominent commission merchant of Boston, one who has large acquaintance with Vermont goods: "I have been told by good authority that last year about 90 per cent. of all the butter from the West shipped into New York was shipped in parchment-lined tubs. I do not know of a single creamery in Vermont that is lining its tubs with parchment paper." The statement was not denied. The first skim-milk weigher in Vermont was put in but recently; they have been used in the West for years. It is common remark among commission men and the dairy supply trade that the West promptly meets new demands—anticipates them, perhaps; that while sometimes investing in new apparatus of doubtful utility, or adopting methods of questionable wisdom, it leads in new ideas. We may well imitate the West in this matter, remembering that he who makes no mistakes generally makes nothing.

(4) *Educative Agencies*—With all due respect to the good work being done along agricultural lines by the various Colleges, Experiment Stations, Farm Institute systems and the press of the Eastern States, I submit that the agricultural educative agencies in the West average higher in efficiency, in imparting dairy knowledge to the people than do those of the East. And, more important yet, as has been already indicated, the eyes and ears of their constituencies seem to be more open, their minds more receptive and their hands and energies more active to apply the dairy gospel than is the case in the East. They are "built that way," they hustle more. They deserve to succeed. Let us emulate them.

## II. EASTERN ADVANTAGES.

There is, however, a reverse side to this picture. The dairying of these regions possesses certain advantages, which have been helpful in the past and which may be useful in the future. They may be enumerated as follows:

1. Better cows.
2. Proximity to markets.
3. Special goods.

1. *Better Cows*—Census returns show that New England and New Jersey cows average better than do those of other sections of the country, and that the production per cow is larger there than elsewhere (New England cows, 540 gallons; New Jersey cows, 494 gallons; Northern Central States cows, 425 gallons yearly). The cow is the fountain source of all branches of dairying; hence this is an important advantage—one not to be underestimated, one which should in every possible way be increased. Of this more anon.

2. *Proximity to Markets*—Time was when the nearness to markets was an important factor in the trade, but refrigerator cars, cold storage, frozen butter, low freight rates and the like have made this advantage a broken reed, upon which none can lean with safety.

3. *Special Goods*—Thus far the West has not been able to compete in Eastern markets in the milk or cream trade. This industry is a large and growing outlet for New England dairy products,

particularly in New Hampshire, Massachusetts, Rhode Island and Connecticut. It is presumedly the main way in which New Jersey milk is sold. When, however, we consider what is accomplished by pasteurization and freezing; when we think of what liquid air has done, and may yet do, in economic fields; when we note the near solution of the dried milk problem—surely it is far from safe for us to assume that the great West will not before long be placing frozen bricks of milk and cream, pasteurized cream and milk powder and the like in Eastern markets on an equal footing with home-made products.

Let us now balance accounts.

Against the cheaper food, larger area and numbers and modern methods of the bustling West may be placed a somewhat better grade of Eastern cattle and a milk and cream trade thus far not threatened by competition. The candid observer must confess that they have the best of it. The difficulty of competing with the cheaply-made butter and cheese of the West is yearly increasing. No protective tariff can avail, legislation is to be invoked to no purpose. The ways of to-day are unlike those of our forebears and will so remain. It is folly to bemoan the high prices of earlier years, and useless to combat modern business conditions with out-of-date methods or ancient prejudices. I know of no easy way to success, no royal road to competency, no sure cure to the ills of this dangerous competition. Our sole resource lies in the awakening of our energies. We may most surely stem the tide of Western rivalry by a thorough study of the dairy business, by the application of business methods to our vocation, by the adoption of such modern ideas as seem applicable to our conditions.

The dairyman of to-day, to be successful, must work with his head quite as much as with his hands. Call upon his brain as well as upon his muscle and cultivate his mind as well as or better than his soil. He may well recollect the remark of one of the famous painters of the last generation whose coloring was the despair of his fellow artists, who, when asked with what he mixed his paints to produce such wonderful effects, replied, "With brains."

### III. HOW TO MEET WESTERN COMPETITION.

In my judgment those engaged in Eastern dairy husbandry, in order to hold their local markets against the rapid inroads of Western competition, need to consider three fundamentals, to study, if you will, three courses in the school of dairy experience.

1. Economy of manufacture.
2. Markets.
3. The dairy business.

I freely grant that this triad is not stated in a logical order, that in putting the dairy business last I seem to have placed the horse after the cart. Yet I wished to make a distinction under headings 1 and 3, laying stress on the economic phases of the subject on the one hand and on the educational ones on the other.

#### (1.) ECONOMY OF MANUFACTURE.

Under this heading one needs to consider means of economizing, either by lessening the cost or improving the plant. I have divided the matter for convenience and clearness of discussion under four sub-heads:

(a) Machines.
(b) Crude stock.
(c) Nature of products.
(d) Character of products.

(a) *Economy in Machines—i. e., Cows, Apparatus, &c.*—Some dairy authorities look upon the cow as a machine only, and speak of the food as fuel to run the engine and of the milk as the product of machine work. This view is one-sided and, in many ways, ill-conceived, yet it has some merit. The cow may well be considered as a part of the dairyman's plant or machinery for manufacturing finished products. I have already said that Eastern dairy cows average better, that is to say, they produce

more, than do Western cows. So far, so good, but better is not best. When the odds are so heavily against us, every effort needs be made, and here endeavor is readily directed.

Let us turn once more to Vermont statistics. Some years ago, when I was a member of the Vermont State Board, statistics were taken showing the butter productions per cow in each of the sundry towns of the State. The average annual yield was found to be 156 pounds. The recent census confirm this figure, making it 160 pounds for 1899, a larger production, I believe, than that of any other State. When, however, we come to scan the data and to note the difference betwen townships, the figures become extremely illuminating. We found one town where the average cow made but 92 pounds of butter in the course of a year; and another where she made 259 pounds in a year. There were several in the "under 100" class and half a dozen in the "over 200" class.

I have attended now some thirteen or fourteen meetings of our Dairymen's Association—and we have grand meetings; had one last week in Rutland, with an attendance of nearly 500. Several dairymen and dairywomen were present from the towns which make 259 pounds of butter per cow. I see several of them every year at such gatherings, whether convened near or far from their mountain homes. They realize that they have yet much to learn. I have never met at such a meeting a resident of the towns in the "under 100" class. They know it all, and need no enlightment. There are different sorts of cows in Ryegate; and the men are, also, of different types. And those men knew a good cow; knew how to feed her, knew how to breed her, knew how to handle her. Ryegate is inhabitated by the Scotch, of whom it is said that they "keep the Sabbath and everything else they can lay their hands on." The Scotch are a canny race, and these Scotchmen know a cow; how to feed, breed and handle her, and to make dairying pay despite Western competition.

Before the Babcock test was devised, when ready, cheap and accurate methods of estimating the dairy worth of individual animals were lacking, there was valid excuse for keeping bovine deadbeats. But no man of even ordinary intelligence can plead inability to-day. A simple test is at hand, one that requires but a minimum outlay of time, money, skill or brains. Many a man who has used

the Babcock test in a proper manner to test the merits of his various animals has made more money with half his herd than formerly when the barn was full.

Some years ago the dairyman of the Vermont Experiment Station became dairyman on the Long Island estate of Mr. W. K. Vanderbilt. Soon after entering upon his new employ he wrote me as follows: "The Babcock test has killed a dozen of our cows. Mr. Vanderbilt says he cannot afford to keep cows which do not pay their way." If we may judge by the doings of dairymen (and actions speak louder than words), there are thousands who can afford to keep cows which W. K. Vanderbilt is not rich enough to own. The very first step which should be taken by every dairyman, whose average production per cow is under 200 pounds, is to grade up his herd, by buying or breeding, or both, as seems most expedient. The purchase of a good bull is usually the first move, followed by good care and judicious feeding of such cows as are worthy of it. If more of our dairymen would make use of the Babcock test to determine the dairy abilities of their individual animals, and would raise calves from such cows as prove to be the most successful milkers, it would go far towards elevating the standard of excellence in their herds.

The class of cows and their adaptation to the particular kind of dairying in view is of importance. I do not desire, however, to enter into the quarrel of the breeds, but am simply suggesting the wisdom of looking into this matter, and the folly, as Governor Hoard aptly puts it, of hunting for birds with a fox hound or for butter with a beef animal. Mr. Van Dresser, who follows me, however, will take up this matter in a far better manner than I could do, so I leave this phase of the subject without further comment.

The matter of dairy appliances merits careful study. The market for all classes of dairy goods becomes yearly more critical, and margins of profit are apt to grow continually more narrow, particularly if modern apparatus and methods are not used to meet these demands. Mill owners discard machinery which cost tens of thousands of dollars, machinery but little worn, and replace it with other apparatus, perhaps yet more costly, which, in its turn, in a few years, with its value hardly impaired by use, is cast aside for yet another lot of machines. Why? To save a fraction of a

cent in the cost of making a yard of cloth, to lessen the expense of labor, to reduce power bills—in short, to economize in manufacture. Similarly, the wasteful shallow pan or deep-setting creamer of earlier days must, for greatest profit, be superseded by the centrifugal separator; the eight-quart can by the sealed glass bottle. Whatever class of dairying is pursued, it is the part of wisdom to adopt such apparatus as will lessen waste and improve quality. It is not my wish to recommend this or that piece of apparatus, but, in general, to urge the wider use of modern machines for dairy purposes.

(b) *Economy in Crude Stock—i. e., Home-Grown and Purchased Feeds*—This, as Rudyard Kipling says, "is another story." The discussion of economical dairy feeding in all its phases would take far more time than can be given to it here.

In the brief space which can be allotted to this section of the general subject, I can hardly do more than allude to the salient points and to call attention to what seem to me to be economical roughages and concentrates for New Jersey dairymen to use, and what at ruling prices are probably uneconomical.

This morning's speaker (Director Jordan) has well said that in Northern latitudes the "proper function of the farm in dairy feeding is that of a carbohydrate factory and the proper function of the market was that of a protein supply."

What did he mean by this epigram? He meant, I think, three things:

(*a*) That in northern latitudes carbohydrates are grown with relative ease, but that it was difficult and usually impossible to grow enough protein to provide a large number of dairy cows with a balanced ration.

(*b*) That since the by-products of several industries are notably rich in protein and are often sold at fairly reasonable prices, it was sometimes, indeed, generally cheaper to buy protein than to raise it.

(*c*) That while the farm-growing of protein is to be encouraged, yet it is usually in the line of economy to grow carbohydrates in as large amounts as possible, and to buy protein in order to supplement this growth, thus properly balancing the ration, provided the cows to which the ration is to be fed are of the proper grade.

This statement is, I believe, correct for New England feeding

practice; but in how far it is applicable in South Jersey I am not clear.

In my judgment the more common roughages and concentrates may be classified as economical and uneconomical in dairy feeding, as follows:

ECONOMICAL ROUGHAGES.

1. Early cut hay.
2. Silage from matured corn.
3. Corn fodder (for him who has no silo).
4. Apple pomace.
5. Clovers, alfalfa, &c.

UNECONOMICAL ROUGHAGES.

1. Late cut hay.
2. Silage or forage from immature corn.
3. Roots.
4. New and untried crops.

ECONOMICAL CONCENTRATES.

1. Cottonseed meal.
2. Linseed meals.
3. Gluten meals and feeds.
4. Dried brewers' grains, dried distillers' grains, malt sprouts, &c.
5. Bran middlings, &c.
6. Corn meal (sometimes).

UNECONOMICAL CONCENTRATES.

1. Corn meal (usually.)
2. Oats.
3. Oat feeds.
4. Mixed feeds or provenders.
5. Condimental foods, &c.

In the amount of time at our command, it will hardly pay to indicate why I have listed some of these materials as economical. It may not be amiss, however, for me to spend a brief moment in giving the reasons why I have classified some of these as uneconomical. Late cut hay is relatively indigestible, its quality notably inferior, and its service as a milk maker unsatisfactory. Silage or forage from immature corn contains but from one-half to two-thirds of the feeding value that may be obtained if the kernels are allowed to reach the glazing period. Roots, while valuable for dairy feeding, are relatively expensive sources of digestible carbohydrates as compared with the corn crop. New and untried crops are better tested at the stations than by farmers. Of the purchased concentrates, corn meal is usually uneconomical, because it is rich in carbohydrates and it is protein rather than carbohydrates which should be bought. Oats are usually uneconomical at the prices asked, in that a unit of digestible food costs more than in other grains. Oat feeds are generally made up of oat hulls, refuse or light oats and the like, fortified sometimes with richer feeds, and at prices asked are generally expensive. Much the same may be said of many of the mixed feeds and provenders. As to condimental foods, it may be said that they seldom if ever increase production or materially better the condition of healthy animals.

I want to refer briefly to two roughages—apple pomace and alfalfa. Now, it is not exactly a new discovery, but it is a comparatively novel proposition up our way, that apple pomace may be put into the silo just as corn is. It makes an admirable food for cows. We have fed our cows largely with ensiled apple pomace for three winters. We are feeding several as much as thirty-five pounds a day. We find it almost as good a milk-maker as is corn silage. We get it for fifty cents a load at the mill and haul about a ton and a half a load. One year we gave the mill owner a box of cigars for about twenty tons. It is a waste product, ordinarily thrown out behind the mill and left to ferment and rot. It is worth what we pay as a fertilizer; and its fertilizing properties are not materially diminished by its passage through the cows. Lots of Vermont farmers have taken advantage of this notion this year. We had a wet season and a short corn crop, and there have been thousands of tons of apple pomace ensiled in Vermont this year for feeding cows. I have heard of just one complaint: one

man said it "made his cows drunk." I have known of cows that have gained access to a pomace pile and gorged themselves. They did not get drunk, but they did have digestive difficulties, and appeared to be drunk. This is not, however, a case of alcoholic intoxication, but another difficulty. This was due, however, to the abuse, instead of the use, of apple pomace.

You can grow one crop here in New Jersey which is worth all the apple pomace in Christendom, and that is alfalfa. You ought to grow ten, perhaps a hundred, acres where you produce one, however. You can hardly grow too much. It more surely exempts the dairyman from the necessity of grain purchase than any other crop. Would that we could raise it in Vermont; but we are too near the North Pole in latitude and to Heaven in altitude.

One should not forget, in selecting fodders and feeds and in making up the ration, to consider, not only the digestible nutrients, but, likewise, the effect which the various materials may have upon the health of the animal, upon the quality of product, upon the quality of manure, the relation of cost to value and the dairy character of the herd. This latter point, in particular, is worth considering. It is folly to feed high-grade feed to low-grade cows.

(c) *Nature of Products—i. e., Milk, Butter, Cheese, Cream, By-products, &c.*—Thus far Western competition has been felt in butter and cheese alone. Eastern dairymen have only had to compete with each other and to wrestle with the contractors in the matter of milk and cream supplies. The consumer now takes dairy products in several forms—milk, butter, cheese of a dozen kinds, cream, condensed milk, dried milk powder, certified milk, modified milk, ice cream and the like; while the by-products—skim-milk, buttermilk and dried curd—are made into a number of materials of dietetic or industrial use. Did time permit, I would like to call attention to the considerable income which may yet be obtained through a more reasonable and economical use of dairy by-products. This, however, is of the future rather than of the present. Milk, cream, butter and cheese bid fair to remain the principal dairy products. Many individuals may solve for themselves the problem of competition, both of Western and of home origin, by undertaking, alone or in combination with neighbors, the manufacture of certain dairy specialities, such as special brands of cheese, of fancy butter, of certified milk, of extra clean milk, or things of like character. I doubt whether, for in-

stance, the certified milk business is likely to be overdone in the vicinity of our large cities for some years. Many of the foreign cheeses, for which fancy prices are paid, may be closely imitated on this side of the water. Indeed, a few New York and Wisconsin factories are to-day making several cheeses practically identical with the imported article.

(d) *Character of Products—i. e., Quality*—The best of cows, be they fed ever so well, their milk sold as such or made into butter, cheese or what not, avail not in the struggle to meet Western competition if the milk be dirty, the butter off flavor, or the cheese bitter or made from grassy curds. The final product must be good to command a high price. I know of no one thing more potent for good or for ill in this matter than the bacterial content of the milk furnished by the different patrons of a creamery, cheese factory or milk car. Other considerations, such as character of feed, stage of lactation, method of handling, &c., enter in to affect the quality of the product; factors which would be well worth our attention did time and space permit. I should distinctly fail in my duty, however, if I neglected to refer to the vital relation of the germ content of milk to its usefulness in dairy operation.

I need not tell this audience the now trite story of the bacterium; how its growth and multiplication in milk causes the familiar souring, how sometimes desirable aromas and sometimes disagreebale flavors are developed by its growth, how certain diseases may be at times communicated through its presence in the milk. Beyond doubt the control of the bacterial content of milk is the great desideratum of modern dairy management. Exclusion, destruction and retardation should be the watch-words. Keep them out, kill them out, check their growth! How may this be most certainly, yet simply, accomplished? Cleanliness and sanitation tend to keep them out; live steam, sunlight, sterilization, pasteurization, disinfection, kill them out, and refrigeration serves best to check their growth. In proportion as stock, barns and feeds are kept clean and healthy; in proportion to the free use of live steam on dairy apparatus and utensils, the sunniness of cow barns and milk rooms, and the free use of ice; in proportion, in short, as dairymen study economic dairy bacteriology, and put its precepts into practice, there should follow an improvement in the character of their dairy products, be they milk or milk derivatives.

Such procedure will tend to make them more uniform, more attractive to buyers and lead to larger consumption.

Mr. Dye mentioned this afternoon the spread of tuberculosis in the herd which was stabled in a dark, damp basement. I would rather have our cows kept in a greenhouse of glass than in a basement. Sunlight is nature's great germicide, aiding in killing, not only the bacteria of disease, but likewise those which cause milk souring and kindred troubles. I would have our cows have sun baths every day; and most of them do get one. We have lots of windows in our barn. Where the cold is extreme, shutters may be used to keep the cold out, or, rather, the heat in, in the nighttime.

Some time ago the head of the Dairy Division of the United States Department of Agriculture, at Washington, wrote a number of creamery proprietors the country over, asking them what one thing, if it could be brought about, would help them in their work. Almost every man made one reply: better care of the milk from the time it leaves the cow until it reaches the factory. It is the man, rather than the cow, that spoils milk. A healthy cow gives almost germ-free milk, after the first few streams are ejected. The dairyman himself is principally at fault in the matter—a fault which may be, to a large extent, remedied by a not unreasonable amount of care. The discouraging feature of the matter, however, so far as it pertains to associate dairying, is that one bad mess of milk drags down the entire lot to its low level; it leaveneth the lump.

Now, up our way and in the West, where the creamery system is largely in vogue, they have two or three ways in which they strive, at any rate, to better this condition of affairs.

In the first place, it is quite a common thing for a creamery management to have a patrons' meeting; to get someone from the Experiment Station, or some member of the State Board of Agriculture, or some commission man from Boston, to come and preach the gospel of dairy cleanliness. Sometimes the management needs to take the lesson to heart quite as much as does the patron; but it is a good thing to stir up the patrons and keep them thinking. A campaign of education, in short, is started, and, once started, is generally pushed to a successful finish. Then, secondly, to some extent—less than I wish was the case, the alkaline tablet test is

being used as a detecter of dirty milk. This, with the curd and fermentation tests, may be used as a means of ferreting out the mischief-making deliveries at creameries and cheese factories. If these be used before the erring or unfortunate patron, if he be shown the effects of care and of lack of care on the product, if he is shown how increasing nearness to sourness calls for more alkaline solution, how milks with incipient taints are detected by the curd test and by the nose test, how unerringly the batch of milk which caused that bitter taste, that off flavor, is discovered by these secondary tests—he ought to profit by the lesson. Such procedure may force the indifferent and careless to better ways. It has done so in the past. The tablet test may be made at the weigh-can in ten seconds, and, when backed by moral suasion and tact, may do much to better milk delivereies.

I have spent full long a time upon the consideration of manufacture and must now turn to those of sale. It matters not how much or how good one's products, if they are not sold to advantage. Hence markets become very properly the next division of our subject.

### (2.) MARKETS.

It will be recollected that I stated at the outset of this discussion that what I did not know about marketing dairy products would fill a book. It is a phase of the general subject with which I have no practical acquaintance. The propositions I am about to advance under this heading are entirely of a second-hand nature, and any lack of proper stress laid upon this important matter should be attributed to my unfamiliarity with the subject. When to this consideration be added my lack of information as to the method of dairying obtaining here, I feel the more like gliding gently over this plank of the subject, allowing my sins to be more that of omission than of commission.

If I were in New England I should want to consider the matter of markets under four sub-headings:

(a) The general domestic market.
(b) The private domestic market.
(c) Foreign markets.
(d) Is not dairying in danger of being overdone?

(a) *General Domestic Market*—The bulk of New England butter and cheese is sold on the general market and competes there with Western-made goods. While this is true, each year a larger proportion of the total New England make is sold in the smaller markets and direct to private customers. There is much to say in favor of this trend of trade, yet there is another side to the question, one which appeals particularly to the dealer, who, wishing to handle the near-by goods, finds his inability to count on them with regularity, a serious handicap in his trade. It is of advantage to the dealer to advocate only such goods as he can feel reasonably certain he can furnish to his customers in such amounts and at such times as they desire. Hence it is that the large markets now quote prices and establish values in reference to Western goods only. Whether the maintenance of the position of Eastern goods as a controlling factor in Eastern markets is a sufficient offset to the immediate financial advantage often gained by direct sales to "private customers" and to small markets, is a question I am not able to decide. I am inclined to think, however, that the latter consideration will usually rule.

(b) *Private Domestic Market*—This market does not cut much of a figure in the public eye, it makes but little show in the general returns, yet it is yearly becoming a more and more important factor in New England dairying. I imagine what butter and cheese are made here, and I think they are almost entirely dairy-made, are sold right in the home markets and do not go to any extent to Philadelphia or New York.

A good private trade is very much the best way to dispose of dairy products, and I should not feel worried about Western competition if I had such an outlet. We have at the Vermont Station some sixty or more cows. We have a private trade for our butter and get from twenty-five to thirty cents a pound for it. We could, no doubt, get more than this, for we could easily sell twice or three times as much as we make.

I believe many dairymen in our vicinity could work up a similar trade and do as well or nearly as well Simply make good goods, put them up in attractive shape and get a reputation for it.

The average dairyman and the average creamery, however, are not, as a rule, in such a position to avail themselves of this chance, a fact which ought to act as a spur to their energies.

(c) *Foreign Markets*—American cheese was formerly sold in large quantities in British markets, but the trade has for some time dwindled to relatively small proportions for two reasons: First—The manufacture and sale of filled cheese, a fraud which fatted a few dishonest pocketbooks and well-nigh ruined a nation's dairy trade; second, the rapid increase in the volume and in the quality of Canadian cheese. The national law controlling the manufacture of filled cheese, as well as State enactments, have enabled us to partially recover the lost ground, yet our former trade can never be regained. More than this, the fraud has prejudiced the British mind against all our dairy products, a feeling which it is difficult to allay. American butter has been offered in the English market to but a slight extent until recently. That great consuming nation has relied largely on Denmark, Holland, Canada and Australia for its dairy supplies. The present Secretary of Agriculture early in his administration shipped considerable amounts of American butter to England with a view of learning the demands of that market as well as of working up somewhat of a trade. This action has not only acquainted English consumers with the merits of American goods, but has served to teach our butter makers the needs of English markets. We have, however, a hard proposition to meet. Great Britain is naturally prepossessed in favor of her own colonies. Danish and Dutch butters, moreover, grade higher on the average than those of any other country (and it may be stated parenthetically that this is due to the general adoption in these countries of modern methods, cleanliness and particularly of the teachings of dairy bacteriology). This combination is difficult to meet in competition, yet good goods will sell well there. Certain Vermont creameries have already established a London trade, which promises to prove remunerative. In 1893 the United States exported to England 2,293,000 pounds of butter, and in 1897, 15,419,600 pounds of butter, an increase of nearly 700 per cent. The increase in the same time in the exportation of Canadian butter, however, has been even greater. Whether or not foreign markets are resorted to will naturally depend largely on home prices. As butter has ruled the last two years, there has been but little incentive to ship high-grade goods abroad.

(d) *Is There Not Danger of Overproduction?*—This is a very pertinent question. The old, yet ever true, answer may be made,

that while there are always too many inferior goods made, there has not yet been a surplus of the best grades. There is always "room at the top." I do not believe there is any immediate danger of overproduction. Census returns show that the increase in human population more than keeps pace with that of the bovine population. The consumption per capita, both in this country and in Europe, of the various dairy products has greatly increased within the last generation, and particularly within the last fifteen years. These two factors—larger numbers of consumers and larger per capita consumption—are likely to be sufficient, for many years to come, to take care of the increase in production due to the greater number and enhanced efficiency of the cows of the twentieth century. The increase in the number of consumers has come as a matter of course. The increased consumption per capita, however, has been the direct result of the marked improvement in the quality of the various dairy products; a betterment which has been brought about by the educating effect of constant agitation upon the minds of dairymen and creamerymen. This education from press and platform, from laboratory and class-room, is resulting in the making of better milk, from which better butter and cheese can be made. It has taught the food producer the money value of palatability and attractiveness.

Let creameries multiply, cheese factories dot the landscape, the milk trains penetrate yet farther from the metropolis, the cattle on a thousand hills cover ten times a thousand, and farmers the country over turn to that most rational system of husbandry whose foundation lies in dairying—let all this happen, yet I fear not overproduction, the bugaboo of timid souls for generations past; I fear it not so long as a high grade of dairy products is made to tempt the appetite to their larger use.

### (3) THE DAIRY BUSINESS.

I stated at the outset that in formulating my scheme of division I seemed to have interchanged the locations of cart and horse; also that much which might be said under the head of "Economies of Manufacture" could very properly be considered under the present heading; that, in short, the two were closely alike and not capable of clear differentiation. I made the distinction, however,

deliberately, as I wanted, under the one heading, to lay stress upon the economic side of the problem, and, under the other (that now under consideration), to place the emphasis upon the educational side. The remainder of my appeal will be addressed to the mind rather than the pocketbook, and in many ways, but with far less elegance of diction, repeat what was said by Director Jordan this morning, but with particular application to dairying.

Under this heading I want to consider—

(a) Dairy education.

(b) The use of the Babcock test on the farm.

(c) Dairy sanitation.

(a) *Dairy Education*—With dairy papers, Dairy Institutes, Dairymen's Associations, Dairy Schools, Dairy Bulletins, State and National, with dairy information and dairy education on tap for the asking, all free, most of it reliable and much of it worth having, it does seem as if there was little need for ignorance touching the better methods of dairy husbandry. Yet, if one may judge by conditions as found, there is still lamentable lack of information on every hand regarding the essentials of modern dairy practice. Many farmers have made great advance along this line, but hosts still stand aloof, and by their actions proclaim that ignorance is bliss. There is still need of missionary work. The great difficulty, however, is how to get at those who will not help themselves, who refuse to read, who will not grade up milk or product, who decline to inquire, who are wedded to their idols, whose sluggishness and indifference affect primarily their own welfare, and secondarily injure that of their neighbor and associates in business. Narrow minded, prejudiced, carping, dissatisfied, suspicious, behind the times, they will not see the light even though it be flashed in their very faces. It is this class of men who growl at the tariff, who complain that dairying don't pay, who think the creamery proprietor or the milk contractor a thief, the Babcock test a fraud, to whom it never occurs that the fault lies in their own inability or unwillingness to study their calling and to apply business principles to their work. No sense of their personal responsibility for their ill success appears to oppress them. Instead of seeking to imitate their prosperous neighbor, successful because of the application of modern ideas in dairying, they too often are angry with, and jealous of, him. They will

not see that just as success in other lines of business demands study and application of new economic ideas, dairying, to be profitable, must be studied.

I was amused at correspondence published some time ago in a prominent dairy paper. The writer urged the editor to "let up on those shiftless farmers who haven't intelligence enough to read such a paper, nor energy enough to profit by it if they did read it. Publish a paper for intelligent men, and let the stupids go." In response to the editor's query whether he ought to stop trying to reach these farmers who refuse to make of themselves intelligent dairymen, he replied that the paper's course was "not wrong, but blamed foolish." I fear that I have been "blamed foolish" in spending so much time and rhetoric upon this phase of the subject, but this dead load of inertia is to me the most discouraging feature of all, the more so because I see no way of remedying the evil. "Keeping everlastingly at it" will diminish its numbers, but can never do away with the tribe as a whole.

I think I need not remark that I do not fail to appreciate the high intelligence and the business ability of thousands of our American dairymen. My strictures do not apply to them. Yet I plead even to these to make the widest possible use of dairy literature and dairy education, not only for their own benefit, but that by their study and their practice they may be "a light to lighten the Gentiles." Many a man will believe a neighbor's say-so who would laugh at the idea if found in a book. Many scorners of Experiment Station and Farm Institute work are unconsciously practicing the precepts they deride, getting them at second-hand from some townsman. In proportion as we apprehend dairy knowledge we better our own chances of success and indirectly aid our section to cope more successfully with competition.

(b) *The Use of the Babcock Test on the Farm*—I have already spoken to some extent of the Babcock test. It is now over twelve years old and may be thought by some to be getting a stale subject. As a matter of fact, however, there is more of good in it for dairying every year. It is above every other invention of the American Experiment Station enterprise, a general educator and eye-opener to the dairy world.

Director Jordan said this morning that this test had done much to improve the ethics of the milk business. Now, it has

done and may yet do a great deal to improve bovine ethics, so to speak, to better the grade of farm cows.

It is worth far more as a detecter of cow cheats than of human cheats. I look to see the time when it will be the common rather than the uncommon thing for the Babcock test to be used on the farm. I believe it has a greater potentiality for good there than at the factory. I believe that it will kill more cows than has tuberculosis, and that each year will make it more clear to the farmers that it is one of the greatest of boons which have been given to our dairymen.

It is an easy thing for a man with gumption to determine whether his cows are of good or of poor grade, and to sort out from his herd those which are of inferior quality. The Babcock test and the scales and the observant eye are the three pieces of apparatus needed. I think it is best to weigh the milk every milking throughout the year; but weights just thrice a month will serve fairly well if one does not feel like putting more time into it. Multiply weights by ten for month's yields. Samples for analysis taken but twice a year, taken the right way and at the right time,* will suffice to give an idea of the quality. Quantity multiplied by quality gives butter fat, which, multiplied by one and one-sixth, gives butter.

The observant eye should be open all the time. Thus with a herd of twenty cows, not making an expenditure of time more than four or five hours the entire year, one can determine with sufficient accuracy for the farmer's purposes which, if any, of his cows are not paying an adequate return for the money invested in them for their keep.

---

* Cows vary considerably in the quantity of their milk at different stages of lactation. If only infrequent samples are taken, most nearly accurate results (that is, such as will most closely indicate the average quality for the year) will be usually obtained if samples are taken approximately as follows:

*Cows calving in the spring.* One composite sample six weeks and another six and a half to seven and a half months after calving; or two composite samples, taken about two weeks apart, six months after calving.

*Cows calving in the summer.* One composite sample eight weeks and another six to seven months after calving; or two composite samples, taken about two weeks apart, from three to five months after calving.

*Cows calving in the fall.* One composite sample eight to ten weeks and one five and a half to seven months after calving; or two composite samples, taken about two weeks apart, from five to seven months after calving.

Samples taken at other times may give satisfactory results. Prolonged experience has shown, however, that greater likelihood of getting a correct average for the year is attained by sampling at these times.

Now, you say, "Well, that may be all right, but I don't want to own a Babcock. I don't care to learn how to run it." It is not necessary that every farmer have a machine; but I do think it would be right well worth while if a Babcock machine were located in every community where dairying is an important industry.

It has got to be quite a common custom in our State for some young man or young woman who owns a Babcock machine, and who is skilled in its use, a graduate of our Dairy School, for instance, to advertise that for, say, five cents a sample, he or she would test milk for anyone who cared to have it done. There is a bright young girl I know in a large dairy town in Central Vermont who has picked up a good many dollars in the last few years in this manner.

Granges and farmers' clubs in those localities where dairying is an important interest might well own machines, some member being instructed in their use, and serving his neighbors to their advantage as well as his own.

Creameries are so plentiful up our way that much cow testing centers there. Farmers are quite generally encouraged at certain creameries to bring in just as many samples of the milk of their several cows as they please and have them tested without charge. This helps them grade up their herd, helps to keep the farmers thinking and means more money for the creamery as well as for the farmer.

(c) *Dairy Sanitation*—I may be treading upon dangerous ground if I touch upon the relation of bovine tuberculosis to the dairy industry and to Western competition. Yet it seems to me that a word is necessary. I have no hesitation in saying that eradication is proving the wisest policy in Vermont. About a third of its entire bovine population (over 105,000) has been subjected to the tuberculin test. It has cost about a quarter of a dollar per head to test them, and only a small percentage of disease has been found. There are whole townships in which only tested cows are kept. Several creameries receive milk from tested cows only, and some advertise the fact in the sale of their goods. It undoubtedly helps in competition, and I should presume would raise the price in certain markets. Similarly, a knowledge that the animals are kept under sanitary conditions and in cleanliness aids in the sale of the product, especially if it

be milk, and if these facts be called to the attention of a discriminating constituency of consumers.

My hearers will recollect that I told them at the outset that I had no startling news to declare, no certain remedy to propose for the ills of Western competition. You now realize full well the truth of my statement. I am not sure, however, that I feel sorry that there is no easy way to meet this rivalry. Were there such, incentives to earnest work would be lacking. There is now every reason to study, to strive, to progress. I have simply reiterated and emphasized those things which I doubt not were known to you before. It may be, however, that in this far too imperfect survey of the dairy situation I have dropped hints which may be of service to some in bettering their practice and enlarging their experience. In some direction perhaps your outlook may have been made more clear by words of mine. I surely hope so, for what are reading, study, practice and experience worth except as guides to future and to better endeavor.

Coleridge (whose work we of the University of Vermont, in particular, prize, since the foremost American student of Coleridge was in years past our President) says: "To most men experience is like the stern lights of a ship, which illumine only the track it has passed." Let us remove our light of experience from the stern to the prow; let us rather liken it to the headlight of an electric car, illumining the path before; let us as dairymen walk in the light of past experience, our own and that of others, if it be trustworthy and applicable to our circumstances, to a higher plane of achievement in the varied phases of our calling.

President Voorhees—Gentlemen, you have heard this very comprehensive address. It may be of benefit to you to discuss it. It is now open for discussion for any member of the Board. Are there any questions you desire to ask of Mr. Hills? I am sure he will be glad to answer them.

Mr. Gillingham—I would like to ask concerning the foot and mouth disease in his State, of which we have heard so much.

Mr. Hills—The question is asked whether we have the foot and mouth disease in Vermont. Not to-day; but we had it three weeks ago. A shipment was made from Massachusetts into Vermont, just about Thanksgiving time, of one carload of infected cattle. This infected about twenty herds. The Veterinarian of the Vermont Experiment Station was detailed to see to the sup-

pression of the disease by the National Department of Agriculture. It has been stamped out. The last infected animal was killed about three weeks ago. He told me Monday that there had been no new cases for the last three weeks. I presume a quarantine against Vermont will be maintained for some weeks, for prudential reasons. Our main future danger is that our wild deer—we have many—will catch and spread the disease. It is a most wicked malady. The dairymen of this section will do well to fight shy of Massachusetts, New Hampshire and Vermont cattle for some time to come. This disease has existed in Canada, more or less, for some time, and Canadian cattle have been debarred from landing in England for many years on account of this difficulty.

# Conformation of the Dairy Cow, and How to Select Her.

BY HENRY VAN DRESER, ESQ., COBLESKILL, N. Y.

# Conformation of the Dairy Cow, and How to Select Her.

BY HENRY VAN DRESER, ESQ., COBLESKILL, N. Y.

MR. PRESIDENT AND BROTHER FARMERS—I take great pleasure in being with you this afternoon. I am equally interested with you in the dairy cow and in dairying in general. I appear before you as a farmer. That has been my business from my early boyhood to the present time. I never have engaged in speculation. My business has been agriculture.

Every man has a hobby. I have mine, and that is the dairy cow.

It is said that no human being receives credit for more than two original ideas during his natural life. The mind is developed by an interchange of thought, by an interchange of ideas, by coming together, as we have this afternoon, for the purpose of talking over matters pertaining to our business, and in that way new avenues of thought are developed, new enterprises engaged in, and we are better prepared to fight the battle of our life as the days come and go.

I have the utmost confidence in the dairy cow, because she paid for a home for my brother and me. She is the foster mother of the human race. Her milk is perfect food for the support of human life. Her milk, her cream, her cheese, her butter and her meat, every portion of her body you can utilize for a purpose. Through the dairy cow the poor are remembered, the gospel supported, our children clothed and educated.

She is a mortgage lifter, she is a public and a private benefactor.

Now, how is she treated, as a rule, for what she is trying to do for humanity?

Why, even in the month of November and December she is allowed to go out upon the cold, frozen sod and lie there till morning, dwarfed in her milk flow and put into winter quarters thin and neglected, and even allowed to lie upon the cold floor during the winter months without bedding.

That is wrong, and I remember when I first began institute work in my own State that the average milk production during the year for the average cow, in the State of New York, was only three thousand pounds.

That is too bad. So many cows are kept at a loss, simply because our attention is not called to it, and, by common consent, we have allowed that condition of things to exist.

But look, if you please, at the mighty strides they have made in the State of New York in regard to the milk production in the past eight years.

Mr. Dawley, the Director of the New York State Institutes, has had delivered 2,100 lectures upon the "Conformation of the Dairy Cow" within the past seven years. What are the results?

In seven years we have increased the milk production in the State of New York over 1,600 pounds per cow per year, and we have now 1,700,000 dairy cows in the State. I feel proud of the results.

The thoroughbred breeders of the United States have done more to develop the dairy cow in the last fifteen years than the breeders of the Old World did in a hundred years.

Mary Ann of Saint Lambert, that well-known Jersey cow, was one of the first to go to the front and make 963 pounds of butter in 365 days.

The news struck old England like a thunderbolt, and the vibrations were felt upon the Jersey Islands.

Pauline Paul, too, that well-known Holstein cow—the Queen of the Earth! No other cow, living or dead, has ever produced 1,153 pounds and 15 ounces of butter in 365 days.

And when the news of this yield struck the breeders of old Holland they lifted up their hands in holy horror, and exclaimed, "America is ahead; breeding is in its infancy, and the end is not yet!"

So, do you see, brother farmers, here, at the opening of the twentieth century, there is something for dairymen to do—and that is to develop the dairy cow, and develop her intelligently.

God, in His wisdom, created the lower animals in a crude state, for us to develop, and if we do not do it intelligently, we do not fill the mission that God designed us to fill.

But why has this condition of things existed in the Eastern and Middle States to this extent? There has been very little progress made along this line; and Professor Hills spoke of the Western States and Western competition. In reality, you have no competition in the dairy line, because you can grow more bushels of corn to the acre in the State of New Jersey than they can in any State in the Union.

I know whereof I speak. I have traveled from Maine to California repeatedly, and have been meeting farmers of different States, and I want to say to you to-day that the largest crops of corn I ever saw have been grown upon ground of Jersey State this fall. (Applause.)

So, you don't need to fear any competition. You take the prize from the competitior, and you do it by common consent.

And, then, right here you can grow your alfalfa. We do not want the Western meal or the Western bran. We can grow alfalfa, and a ton of alfalfa is equal to a ton of wheat bran to feed to our domestic animals. Richer in protein, don't you see. The evolution of the silo has solved the dairy problem of to-day, and with ensilage and alfalfa, that you can grow here in your own State, you can just say good-bye to the West; we ask no odds of you in a commercial way.

Now, sir, that is the reason we want to be so particular and look at the formation, the breeding, the character and the development of the dairy cow. It is acknowledged that by so doing we can get more pounds of milk, and richer in butter fat.

But the trouble with the farmer of to-day is, we pass those thoughts by and we say, "Farming don't pay." But we should just stop and consider and ask ourselves the cause of this condition.

Why, do you know what is the matter, my dear brother farmer? As a rule we are worked off our feed and feet. We go to bed tired, and we get up before we are rested, and when a man is physically exhausted his mind is impaired, and you know it is true. Haven't you been completely exhausted, and could you then put your thoughts into operation and manage your business as well as if you were rested, and with a clear brain, with clear ideas. You remember, years ago it required muscle to swing

the scythe or to lay a nice swath with the cradle; but now, with all the improved agricultural implements and with all the dairy appliances of the hour, farming is made comparatively easy.

What, then, should we do under the circumstances? Let us exercise the muscles less and the brain more (Applause), because it is brain that touches the button that lifts the lever that moves the machinery of the world.

The Professor said the dairy cow is a machine. I acknowledge the fact. The dairy cow is a machine. She was made for the purpose of transforming food into milk and butter, and the dairyman's aim should be to transform the largest amount of food into milk and butter with as little waste as possible.

Now, in order to run that machine successfully, we should be familiar with its mechanism. We should study her conformation, and we should study her well.

A dairy cow stands before man innocent and subject to criticism. How different with humanity?

We have the power to conceal our imperfections, the dairy cow has none. She is an open book. Let us study her conformation, her general characteristics, and see if we cannot be benefited by knowing her well.

What are the characteristics of a good dairy cow? Why, her head should be symmetrical. She should be broad between the eyes; the eyes should be full and expressive; her head should be slightly dishing. She should be slightly of a nervous temperament. The ears should be of a medium size; the hair plentiful. The inside of the ear should be filled with oily secretions, the indications of butter fat that is contained in the animal's body. The bridge of the nose should be flat. The facial veins should be prominent. That is an indication of high breeding and good circulation. The nostrils should be large and the mouth and lips should be broad and heavy. That is an indication that the animal has power to digest what she eats. It is an indication of constitutional vigor.

She should be of a wedge shape. Her neck should be thin. She should be low on the ground. The ribs from the shoulders should be well sprung, each and every rib better sprung till it reaches the hip. That gives ample room for storage capacity. That is what is needed in the dairy cow.

She should be broad across the hip, and still broader across

## POINTS OBSERVED IN JUDGING DAIRY CATTLE.

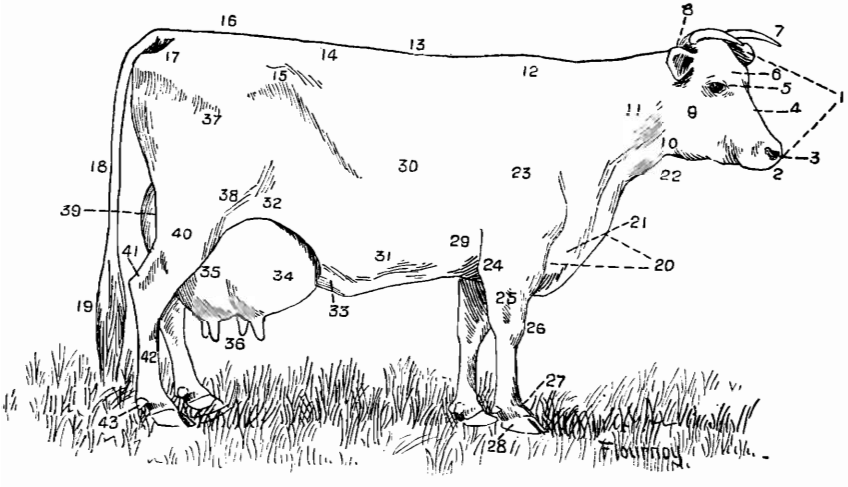



FIG. 21.—Diagram of cow, showing points.

| | | | |
|---|---|---|---|
| 1. Head. | 12. Withers. | 23. Shoulder. | 34. Fore udder. |
| 2. Muzzle. | 13. Back. | 24. Elbow. | 35. Hind udder. |
| 3. Nostril. | 14. Loins. | 25. Forearm. | 36. Teats. |
| 4. Face. | 15. Hip bone. | 26. Knee. | 37. Upper thigh. |
| 5. Eye. | 16. Pelvic arch. | 27. Ankle. | 38. Stifle. |
| 6. Forehead. | 17. Rump. | 28. Hoof. | 39. Twist. |
| 7. Horn. | 18. Tail. | 29. Heart girth. | 40. Leg or gaskin. |
| 8. Ear. | 19. Switch. | 30. Side or barrel. | 41. Hock. |
| 9. Cheek. | 20. Chest. | 31. Belly. | 42. Shank. |
| 10. Throat. | 21. Brisket. | 32. Flank. | 43. Dew claw. |
| 11. Neck. | 22. Dewlap. | 33. Milk vein. | |

The above cut is printed by permission of the United States Department of Agriculture, from the Fifteenth Annual Report of Bureau of Animal Industry—Dr. D. E. Salmon, Chief of Bureau; Henry E. Alvord, C.E., Chief of Dairy Division.

It is reproduced here from our Twenty-Seventh Annual Report, in the belief that it will be of much value to dairymen and students of dairy stock, in connection with Mr. Van Dreser's address.—(Secretary).

the huckle. If they are narrow across there, their hind legs close together when they are out at pasturage; carrying that large udder, it becomes chafed as it swings from one side to the other, and they are so hampered that they do not give nearly the amount of milk they would had their legs been wide apart, so that they could carry the udder more comfortably.

For that reason, when we breed our cows we select those that are broad across the huckle, with their legs wide apart.

The tail should be large at the setting and should drop below the gambril with a long, soft switch.

Now, an open organization for the milk cow, a close organization for the beef cow. One pulled apart, the other driven together. Just the opposite.

What we want is a cow for dairy purposes. Let us look over her organization.

Now, I will put my hands right here upon the vertebræ, upon the backbone. If those joints are loose and wide apart, and so organized that you can put your fingers right into those indentations, it is an indication of an open organization. The more open they are, the larger the flow. We put our fingers right here upon the point of the shoulder. If that indentation is very pronounced or perceptible, so perceptible that you can find it without any trouble at all, that is another indication.

Now, we will lift the flank, and right under it is the thigh pit. If that is very pronounced, it is another indication.

Right here is the udder cord that holds the udder to the body. That is made in proportion to the capacity of the animal. You take a little calf in its calfhood, and when you push your finger back and forth you detect the size of the udder cord. If that udder cord is heavy, very pronounced, that is an indication that when the calf becomes a mother she will carry a large udder, because it requires a heavy udder cord to hold a large udder to the body. Do you see the common sense principle connected with it?

Now, we will suppose we are examining this little calf. Passing our finger back and forth, we find a little, tiny cord, about the size of a lead pencil or not so large, very slightly developed. When that calf is developed into cowhood and becomes a mother, she will only carry a small udder, because it only requires a little, tiny udder cord to hold a small udder to the body.

Examine the udder, if you please. Now, I love to see the udder capacious, the teats of medium size and the udder well balanced. Avoid an exceedingly fleshy udder in the cow. No doubt, in your experience, you have seen a good many cows with the udder nearly as large after she was milked out as it was before you milked her.

I love to see an udder, when we have drawn the milk, that will collapse, come right together, so that you can take hold of the rear of the udder and draw it back and tie it in a knot.

I want to tell you my experience in that matter. I made cheese twelve years in my own home. We had a cheese factory for the public at large, and for eight years, without a skip, I took the milk in at the door every solitary day, Sundays not excepted; and I want to say to you, if there is any man on earth that wants a seat higher on the throne than any other person that exists, it is the cheesemaker, because he takes the sins of the neighborhood, Sundays not excepted, upon his own shoulders; and I quit the business because I did not have Christian fortitude enough to stand the storm. But every cheesemaker who exists has my prayers. And I want to tell you what I noticed. It was more perceptible in May than any other month of the year, when the cows were first turned to grass, the nights being cold and the mornings frosty, and the consequence was that these people shook their heads pretty hard when I told them they were fifty or seventy-five, or, at some large dairies, a hundred and fifty, pounds short, and they asked me to come and see if I could find out what the trouble was; and I went, and found just this condition to exist:

Where the udder of the cow is exceedingly fleshy, when you draw the milk from the udder you will see the fleshiness of the udder.

Now, do you see, some of these cows had garget, sometimes three or four in each dairy at one time. And cows of that description are more susceptible to garget, and for that reason we never keep calves of a cow that is troubled with garget, because they get that largely by inheritance, and if you raise that calf you will likely have trouble with it. And for that reason we discourage it, and we never raise a calf from a gargetty cow. But when we draw the milk from a cow and her udder collapses, as I have said, as a rule she is not susceptible to it.

Now, let us examine the milk veins.

The larger and longer and more pronounced the milk veins, and the greater number of holes at the ends of those veins, the better the cow.

I will show you a cow owned by Mr. Dawley, of Fayetteville, N. Y., known as Dot's Lilly. I visited him in June a year ago.

You will notice that cow is wedge shaped, eyes expressive, nostrils large and lips heavy. There she stands before us, so intelligent; look her over. Now, I said the longer and more crooked the milk veins, and the greater number of holes at the ends of the veins, the better the cow. Here are the veins, very perceptible; there is a hole, there is another, and here is the chest extension, that buries itself under the muscles of the chest.

Now, we will just examine this incurved thigh, so characteristic of the dairy cow; the beef breed has an outcurved thigh. Now, we will look at the arched flank, so characteristic of the dairy breeds; the beef breed has a full flank.

I asked him how much that cow was capable of making. He said, "Last year she made 10,000 pounds of milk—5 per cent. butter fat."

Why did she do that? Why, she was bred that way, and blood tells. Under good conditions she could not help herself—that is, if she is properly treated, you gain her confidence, and that will increase her motherly instinct, understand, and she will give you a larger flow, richer in butter fat. And for that reason it is noticeable to me, when I go into a home of thoroughbreds, or high breds, or whatever they may be, I can judge of the man's temper by visiting his cow stable. His wife don't need to say a word to me about it, nor any of his hired help. It affects the temper of those animals. The moment I step into that stable I know his temper by the action of those cows.

A cow naturally loves her owner if he has got sympathy for her. You know it is so with the human race. The day comes with the human being when he feels the necessity of friends, whether he has them or not. And the cow is always looking for a man to protect her on all occasions, and if he shows sympathy she will respond, every time.

Now, the secretions of the skin should be oily and abundant; and for the purpose of purchasing, in order to detect the quality of that animal, we put our hand upon her coat, *shove it toward her head,* and hold it there a little while. If moisture is

created under the hand, it is an indication of quality. Then you want to turn the hair back from the shoulder. If it is filled with yellow dandruff, that glistens in the sunlight like specks of gold, that is, also, an indication of quality.

The ribs should be wide and well apart, and the skin should neither be too thick nor too thin. Always avoid a paper hide in a dairy cow, because it is an indication of slack constitution.

Examine the skin, take hold of it with your thumb and finger and pull it up and let it snap back against the ribs. If it is life-like and elastic, soft and mellow, and has that peculiar oleaginous touch, that indicates butter fat; you can make no mistake. What is possible for me to do is possible for you to do; just give this a thought and put it into practice, and it will be of great financial good to you.

I am not here to mislead you. I am not here to state to the farmers of the State of New Jersey that they cannot succeed in the dairy business without they purchase thoroughbred cattle. And if I say anything that is not reasonable, call me down. You have a right to. One thing you can do—that is this: select your best grade cows and weed out the scrubs, then purchase a thoroughbred sire, and it will be much better for you.

The sire is more than half the herd, for he is the progenitor of so many calves in one season, whereas a cow can only transmit her poor qualities to one calf during a whole year.

Now, you see the great necessity of a sire that is made rich by breeding—rich in flow, rich in butter fat—where the type is fixed and you can breed to a certainty.

The sire is what we want to take into consideration. If half the dairy cows in the United States were led to the butchers' block and butchered, there would be more solid money in the balance that is left than there is in the entire number at the present time.

As I go through the country and see the scrub cattle that exist and put men in debt, when even millionaires cannot afford to have them in their company, it makes my heart sad. That is where the trouble is; we have no right to keep the animal that doesn't pay for her keep. Her place is the butcher's block.

I will tell you how we came to make up our minds that it did not pay to keep scrubs. This scrub business came near ruining my brother and me, and it is just so with the human race. I want to say to the fathers and mothers here to-night, if you have got a

son or daughter going in scrub company it means their moral ruin. It is just as certain as that God lets the sun shine. It may take a little time, but they will get there. And if you have got a herd of dairy cows of scrubs that don't pay their keep, the more you have got of them the sooner you will come to the conclusion that you will lose the money that you have invested.

Here is the remedy. We have the privilege of repenting even at the eleventh hour. Let us go to work and weed out the scrubs and get a thoroughbred sire.

Well, now, we should familiarize ourselves with the breed that we want and the characteristics of the breed and the purpose we want them for. That is the commencement.

I have known men who felt the necessity of breeding better stock, that have written to my brother and me just in this way: "We want a thoroughbred sire." If it is a Jersey they want they will say, "He must be registered; we want him solid in color and with a black tongue and switch." Just as if that covered it all.

An animal may have a pedigree reaching over into the Old World; if it is not accompanied with individual merit, it amounts to nothing.

Let us then go to work and study the characteristics of the sire we want to purchase.

Now, what are the characteristics of a good dairy sire? We will look him over. His head must be symmetrical, must be a little shorter than that of a dam, and it should be dishing; he should be chock full of nervous energy, but not ugly. He wants to be low on the ground; deep through the heart. The ribs should be well sprung; the secretions of the skin oily and abundant. He should be well crested and clean in the throttle. And I would not breed from a sire unless he had double extension milk veins. You cannot afford to do it. Life is too short.

Some time ago there was a gentleman in our State attending an institute I was addressing. The house was crowded, and this gentleman said he had been farming for twenty-two years. His father had purchased him a farm and paid two-thirds down on the value of it and took a mortgage for the balance. He was keeping a dairy, and he said farming did not pay. He was absolutely discouraged. He had only paid up the interest on his

mortgage for over twenty years and had not paid a cent on the principal. And, after I gave this dairy talk, he got up in the audience and said that he wanted me to go home with him, eight miles away. I felt sorry for the man; he looked so faint hearted and careworn and tired. He had no confidence in the dairy business. He said he had eight two-year-old heifers, and they had become mothers and their udders were very dwarfed; and one in particular became a mother and she only had two teats. That struck me very forcibly. He wanted a man who knew particularly about this business to go down and study this matter.

Well, I went with him to his home and I looked those heifers over carefully. There was hardly any vein development and the teats were so small I could hardly get hold of them. I said, "I would like to see the sire of these calves." He said, "I purchased a thoroughbred Jersey sire in the State of Pennsylvania; I paid $150 for him. He is a dandy. Solid in color. Got a black tongue and switch." Well, he fetched him out on to the barn floor, and I examined him. His coat was bristling, and I went to the milk veins, and there was not a hole in his abdomen, not one. I lifted the flank and looked for the rudimentaries, and it was just as smooth as the inside of my hand.

I said to him, "My dear sir, that animal has done you justice; he simply reproduced himself. He is a thoroughbred scrub, and that is the dirtiest company any human being was ever with, and don't you forget it." (Applause.)

There is the trouble now; when you select an animal for your own breed, be very careful to manipulate and touch the rudimentaries, and see if they are very pronounced. It is the sire that puts the udders on to his offspring. You don't want to forget that.

You see so many dairy cows whose udders are out of balance, the hind-quarters dropped down and the fore-quarters up. Now, if you select a sire whose front rudimentaries are the longer, when the offspring is dropped it will balance up the udder, and when those cows develop into cowhood and become mothers you will be favorably surprised in the character of the results.

I want to impress this upon your mind: I believe the destiny of the calf is sealed previous to its birth, while it is carried by its mother, and I can prove it.

You see, therefore, the necessity of making good selections and studying the characteristics and paying attention to the constitutional vigor.

Now, we will say that we have already purchased this thoroughbred sire and discarded the scrub. What does that mean? Why, you are going to give it more thought, you are going to begin to study everything and see the difference. Just as soon as we infuse some good, clean, fresh blood, there is something about the change that is animating.

Well, now, we will see. This sire is put in the stable and we will await earnestly the result. And bye and bye a calf is dropped. We look the calf over, and we are perfectly satisfied with the results.

When a calf is dropped at my home the first thing we do is to turn that little one on its back and examine its udder. If it has four well-placed teats and two rudimentaries, all the better; it is an indication of milk force. Then we let the little thing get up, and we open its mouth; and if it has eight well-developed milk teeth, that calf is well-born, and a calf well-born is more than half raised.

That calf is hungry. We will draw the milk from the udder into a bucket, and set the bucket down. That calf will cautiously come up towards the bucket, smell of the milk and then cautiously turn its nose down into the bucket and begin to drink, wink its eye and wiggle its tail and look for more. That is the kind of a calf to raise.

Now, we will examine this other calf, dropped the same morning; we examine its udder. It suits us fairly well, but we open its mouth and we see only two little, tiny milk teeth, hardly through the gums. That is a fool calf and you cannot afford to raise it. To-day it will drink, to-morrow it is indisposed and troubled with indigestion. But, don't you see, we have before this been breeding simply to procreate the race; just because the calf was alive and had a being, we would feed it; so we will feed this calf. We will draw the milk from the udder into the bucket and set the bucket down; but this calf don't come cautiously towards the bucket; it hangs back, and you pull it up and it hangs back more; and you lose your Christian fortitude and jump astride of its neck and catch it by the ears and turn its nose down into the pail, and the milk goes all over you. Well, then, you curse that calf, but you

should never have fed that calf at all. You should have rejected it. What was the matter with that calf? It was born with a slack constitution. That mother did not have vitality enough during the period of gestation to fully develop that calf and give it constitutional vigor.

Such calves are troubled with indigestion, and they are so susceptible to all the diseases that the bovine race is made heir to by inheritance and otherwise.

What we want to do in breeding calves is to keep only the calves with good digestive powers. Then be careful and feed them regularly and watch their digestion, and then when the time comes just take this young calf out in the stable and go over it very carefully by manipulation and touch; turn the ear right back and see if the secretions are oily and abundant. See if the teats are well balanced; and if it suits you, put such calves by themselves in the stable. And those other calves, whose characteristics don't come up to your requirements, put them into another stable near the roadside. And, then, you know, there is a certain class of people known as chronic kickers. If they were in Heaven they would kick themselves out. Misery likes company, always did and always will. If such men don't succeed they will lay it to their wife or politics or frisky boys, or something of that description. They denounce everything that is progressive. That is the reason I speak of it, because they are not here. When such a man drives past the road, call him in, and don't let that man go away before you sell him those calves. That is a good business transaction. Because you don't want them. He will be perfectly satisfied with them. So I advise you to always keep the best, and, in that way, you can develop the dairy cow so that she will astonish you and be of good value to you.

Now, the question arises, what breed of cattle is best to breed from?

That question answers itself. You trace a man's lineage and I will tell you what breed of cattle he is in love with.

You ask the Scotchman what breed of cattle he is in love with and he will tell you the Ayrshire cow, a native of Scotland; she is bred with open organization, and out upon the highlands of Scotland they are bred for the purpose of giving a large flow of milk.

Ask an Irishman what breed of cattle he is in touch with and

he will tell you that little Irish Kerry cow; when she is fully developed she will weigh about 350 pounds. I have seen so many of them at the different shows in the United States. She is very sensitive, her eyes are snappy, and she is called the poor man's friend. She carries a large udder. She is so sensitive that if you kick her, she will kick back. Just like an Irishman, that's why I love her.

I said an open organization for a milk cow, a close organization for a beef cow. Just the opposite.

Now, for comparison, if you please, take the Ayrshire cow, bred for dairy purposes, with an open organization; that type is fixed and you can breed to a certainty.

Then for a beef breed, take the Hereford, bred for beef for hundreds of years; the type is fixed.

Let her drop her calf this morning, if you please; put her into winter quarters, give her a grain ration that she can nicely asimilate; what will she do? She will put her nose to the bottom of the trough and will apply that grain to her own system and deliberately starve the calf she gave birth to; she was bred that way, and breed tells.

Take this Ayrshire cow, with an open organization, that has been bred for hundreds of years and the type is fixed; what will she do? She will go to work and give you from 10,000 to 12,000 pounds of milk during the year, and at the expense of her system, she will give up her all to please her owner. If there is a Scotchman in the room he knows it is true. Ask me what breed of cattle I am in love with, and I will tell you. It is the Holstein. She has a warm place in my heart, and she got it by inheritance. My grandfather was born in Friesland, Holland. He was educated there for the ministry. After preaching there he moved to New York State and settled in the city of Schenectady, and he preached there for seventeen years; and in my boyhood days I used to sit upon his lap and look up in his face, and he would tell me of the beauties of Holland, its nutritious grasses and its wonderful dykes and its wind-mills and its black and white cows; and he also told me what pretty girls there were in Holland, and the moment he said that I wanted to see something from Holland besides my grandfather—and I did. (Applause.) And among the many things was a Holstein cow. I shall never forget, my brother and I went to Albany

to our State fair, and there we saw a herd of Holstein cattle, and from impulse I rushed right up and put my arms around the neck of one of them and hugged her.

In the town of Cobleskill, Schoharie county, my brother and I purchased a farm, for which we were to pay $14,250, and there was a mortgage on that farm of $6,500. In my boyhood I worked for twenty-five cents a day. As I grew older I got more, and when I was twenty-one years of age, from the fourth day of September to the first of April I worked for $21 and an overcoat. My brother taught school, and we put our little amounts together for a few years and worked a farm on shares. We made a little money and then purchased the farm named.

We had thirty-three head of scrub cows. We took our milk to the cheese factory and we did without the necessities of life in order to get along; but with all our economy, when the year came around, we did not have money enough to pay our interest.

You see, we bought that farm when the products of the farm were low, and they brought less every year. So we were in a terrible frame of mind. If we put the farm on the market we could not get the purchase-price, and then we thought we would go through another year. Our wives were just as economical as they could be and helped us in the dairy and so on, and when the year came around my brother and I, on the first day of April, took our money and went down to the cow stable and counted it. We could not pay our interest.

There was that mortgage staring us in the face. My brother cried, and I was so mad I would not and could not cry. That didn't do any good. There had to be a revolution of things. Something had to be done, and, don't you see, our going to Albany, and then those stories that my grandfather told us about cattle was so vivid in our minds, an idea suggested itself. As we talked it over, he and I thought the best thing we could do was to have an auction, advertise those scrubs and sell them—the scrub sire and the young cattle—get them all out. And we did. We made an auction and sold every living hoof on the place. Then we put another mortgage on the place of $1,050, and we took some of the money that those cattle brought and paid the back interest, and, although there were two mortgages on the farm, we quietly went away to purchase a herd of thoroughbred cattle. We had to sneak off, as it were. In a few days, how-

ever, the neighbors found it out, and I will never forget in the world what our wives said when we came home.

There were two of our neighbors, old gentlemen, very considerate men, who had farms paid for and coupons in the bank, and were really capitalists, came to our house in our absence just to sympathize with our wives and to tell them that we two boys were fit subjects for the lunatic asylum.

Now, was not that mighty interesting for us? When we came home with the cows our wives came out and helped us put the cattle in the stable. During the supper hour they told us who had been there and what had been said, and it didn't set good. We took a lantern, went to the barn and looked over the investment, and we were more pleased with it, and had more confidence in it then than before. And I am mighty glad that those old gentlemen made those predictions. Because it increased our determination to succeed. And before we left that stable we promised God if He would spare our lives and we had our health we would lift that mortgage before those old men died. And before leaving that stable we named the farm the Eureka Stock Farm, owned by Van Dreser Brothers, Cobleskill, New York, with two mortgages on it.

Why, brother farmers, the earth is ours. We got it by inheritance. We go back into the earth and we are a portion of the earth, and every man that hears my voice, if he has his health, he may own a portion of it if he will. There is no place like home for true happiness, when love lights the fire and spreads the board. All there is of life is home. After that, eternity. It becomes every man to look well after his spiritual interests, but he needs a home on earth among respectable men as well.

And I want to say to you farmers right here in the State of New Jersey, with plenty of nutritious grasses, and where the elements of the soil contain the material to grow the strongest bone and soundest muscle, milk of the best, and butter that tickles the palate; where here upon every plain you have planted a city and upon every hillside is nestled a village, and with the mighty increase in population, there is a greater call for more milk and more butter. And as the tidal-waves roll in from the ocean and kiss the shores of the New Jersey State, you don't realize your own facilities, neither do you realize your privileges. It could, and should be, the breeding center of this country. I hope you

will take advantage of your opportunities. Life is a battle. The glory is in the victory every time. I thank God there is dignity in labor. Labor develops all the good there is in man.

Now, I am not here in behalf of the man who has had large sums of money bequeathed to him. You know an easy pathway makes a weak mind. But I am here in behalf of the man who hardly knows how to keep the wolf from the door. God knows that man has got a tender place in my heart. It is not a disgrace to be mortgaged, but it is a disgrace not to try and lift the indebtedness.

Now, in the old way my brother and I could not pay our interest. In the new way, in nine years, we lifted the indebtedness and we paid off the mortgage before those old men died, thank God! (Applause.)

I am here to encourage the man who has a debt to carry. Be of good cheer. Don't become discouraged.

Now, the boom is on; the products of the dairy fetch good prices, the products in general from the farm fetch good prices. We have got everything to encourage us, and every man has plenty to do, don't you see. The hum of the spindle and the click of the hammer are being heard throughout the nation. The golden sunbeam is gleaming, and we see prosperity from ocean to ocean. Let us go to work with intelligence and with a will, and our farms will blossom as the rose, and we can put the products of our farm upon the markets of the world at a profit.

So, farmers, be of good cheer. Fathers, give your sons of to-day the right hand of fellowship. Encourage them in this great dairy work, for the product of the dairy is food for angels. In the early ages, on a certain occasion, Abraham entertained three angels and he put before them butter and milk.

The enterprise is ancient and, thank God, it is honorable. God has guaranteed to bless the tiller of the soil if he tills it intelligently. Let us take Him at His word, and let us read and think and act accordingly, and God will bless us financially.

Now, my dear brother farmers, I want you to so care for the little ones of your flocks that your farms may be picturesque, with large herds of cattle feeding upon the hillsides and grazing in the valleys; that your barns may be filled with plenty, your storehouses overflowing with milk and butter; that you may be blessed in basket and in store, and the children gathered around your

hearthstones and playing upon your green lawns may, in years to come, rise up and thank God that their ancestry did exist.

I am very much obliged to you for your kind attention. (Applause.)

President Voorhees—Gentlemen, I am sure you have all enjoyed this intensely practical and comprehensive address on the dairy cow. Mr. Van Dreser will be glad to answer any questions you may ask him concerning the formation of the cow or other points in connection with her. If there are any questions, we should be glad to entertain them at this time.

A Member—Did you make a success in the selection of your Holstein herd?

Mr. Van Dreser—That was the great secret of our success. We purchased of Mr. Hoxey, of Whitestown, N. Y., near Utica. He was very conscientious. We told him how much money we had and wanted him to give us the equivalent, and we told him our condition. We did not want to misplace confidence in the animal or the man we purchased of, and I want to say to you our foundation stock was the secret of our success; it was splendid. And, as we developed them, we put them on the market, as we had the opportunity, and sold what we could spare to pay our debt. I remember taking a lot of two-year-olds to Montgomery, Alabama, to the State Fair. There were nine head, and we sold the nine of them for $2,700, and that lifted the last indebtedness. I was so happy I could not sleep, and I telegraphed to my brother, and he thought there must be a mistake in the telegram, and he slept. (Laughter.) I was not mad a bit. I did not know how to keep my feet on the ground. I tell you, boys, there is nothing like persistency. I know the worth of a home, and I know what it means to pay for a home, and I know what it means to be so in debt that you have not the comforts of life. And, oh, how I pity such a man!

A Member—You were very fortunate in having an honest man to deal with?

Mr. Van Dreser—Oh, you have got lots of them. I have met lots of honest men in New Jersey. Right here is one. (Pointing to President Voorhees.) (Applause.) I am not looking for any dishonest men; and I want to tell you, if a man just simply looks for trouble he will find it; he will always find it if he looks hard. Now, it would not take more than fifteeen

minutes if I should go out in the street looking for trouble before I would get it between my eyes, and they would carry me in somewhere. If you look for something you will find what you are looking for.

President Voorhees—Are there any other questions on this subject?

Mr. Knapp—I would like to ask if he had a bull calf good aside from the rudimentaries, and you knew he came from a good milking dam, would you discard him on account of those poor rudimentaries?

Mr. Van Dreser—No. You see those points in combination cannot fail. One point may fail, but it is impossible that they all should. You take a cow with those characteristics I spoke of, or a sire; if they are uniform in conformity they cannot fail. It is contrary to the law of breeding. While, for some unknown cause, one point may fail, the others will be there. But an animal should have rudimentaries set well apart. If you should have a cow where the teats were so close together, you would rub the skin off your knuckles every time you milked her. You don't want that kind, and if you breed from them you would breed that kind just as certain as the world.

Take the thoroughbred breeders; they want to do this; they want to carefully observe the formation and the qualities of the animal; that is personally. Every thoroughbred breeder is anxious to go to the front, and it behooves him to look well after those qualities which are so requisite; and if I were you and had no thoroughbreds and was going to keep up breeds, I would not take that calf; I would not be satisfied with it, because I could get another one. There are lots of them on the market. Let the other fellow have that one; the man who is not here.

Mr. Crane—Would the breed make any difference, whether it was a Jersey or a Holstein?

Mr. Van Dreser—No; not a bit.

A Member—If you are breeding out stock, in order to preserve or increase the vitality, are you careful not to breed at a too young age?

Mr. Van Dreser—Yes, sir; not too young. I don't like to have a calf become a mother until it is two years past, and then they can grow. And you see you can increase the milk-supply.

A Member—How about the age of the sire?

Mr. Van Dreser—Well, I want him to go past a year old; eighteen months is all the better.

A Member—You would raise the first calf at two years, would you?

Mr. Van Dreser—Not as a rule; I would not advise it on any account.

A Member—Do you inbreed?

Mr. Van Dreser—Yes, sir. I will tell you how we inbreed. We take all the grade cows and breed from them; then that is half-breed; and then we breed from those calves again with the same sire; that makes them three-quarters breed. Then he has pretty well spent his force. That intensifies the qualities, and that is what we are after with breeds. But to inbreed thoroughbreds, it takes a man who knows more than I do, because I would not feel safe in doing it. Some people have done it to their sorrow, and occasionally it is done with wonderful effect; but on grades you get an intensifying effect and develop the milk, for we have done that at my home, and made a good many sales of grade cows that made prizes for the Albany market milkmen in that way.

# Profit in Sheep and How to Get It.

BY FRANK D. WARD, BATAVIA, N. Y.

# Profit in Sheep and How to Get It.

BY FRANK D. WARD, BATAVIA, N. Y.

*Mr. President and Gentlemen:*

In coming before you at this meeting I wish to express my appreciation of the invitation to meet with the farmers of New Jersey. As many of you know, I have made annual visits to your State for quite a good many years past, either as an exhibitor or as a judge of livestock at some of your largest fairs, and I have become quite well acquainted with very many of the farmers of New Jersey, men whom it is always a pleasure to meet. Much as I love my own State, and believing as I do that it is in fact the Empire State, my second love is for New Jersey.

It has always seemed to me that the farm conditions in New Jersey are very similar to those of New York. In each case we have varieties of soil. We have the rough mountain farms, the rolling hillside and the level bottom-lands. We are in close touch with the same markets which are the best in the world, and which are more and more demanding the highest product of the farm, and for which the wealthy residents of these cities are willing to pay a price that must mean for all time a good degree of profit to the purchaser. Another case in which farming conditions are similar is that we have all been guilty of the same process of depleting the soil, of robbing it of its original fertility, until to-day we are face to face with a soil which fails to respond, as it should, for the labor we expend upon it. I well remember the time in my boyhood days when the farms of our own State, and I believe the farms of New Jersey were well stocked with cattle, which were reared and fed on the farms to supply the needs of our city markets. The horses that we used to till the land were bred on the farms, as well as the horses that went to

supply the demands of our cities for the purpose of both heavy draft and pleasure driving. The farms were also well stocked with sheep, which produced large amounts of wool and later on were fed and shipped to our city markets. At that time the States west of the Missouri river were very largely unknown, unexplored regions, wholly given up to the red man and the buffalo, without means of communication or conveniences that made them at all adapted for agricultural purposes. Soon after the close of the Civil war our government began a policy of expansion in which railroad building played a very important part, since which time several trunk lines have been built across this fertile region, and people began stocking the virgin prairie which had grown up with the luxuriant growth of grass and which was admirably adapted to the production of beef, of horses, of wool and mutton. Land which was practically free for forage purposes.

Another factor in bringing about this change in our livestock interest was the fertilizer agent. I well remember the first fertilizer agent that I ever met—a good-looking, oily-tongued fellow, who came out to the farm one day and told me of the mammoth crops that we could grow by the use of commercial fertilizers. "Why," said he, "you can sell your hay, your straw and your coarse grains, and I will sell you fertilizers that will enable you to grow better crops than you are now growing, and it won't cost you as much as it has been costing you to draw out and spread the fertility that you have been making on the farm." The trouble with me was that I believed too much of the story this fellow told me. At that time the farm was heavily stocked with cattle, horses and sheep, and we thought if we didn't make about a thousand large two-horse loads of manure every year we were not doing very much farming, and that meant a lot of hard work; and this fertilizer agent was going to sell me these elements of plant-food at such low prices that for me the future looked bright and rosy; and thousands of other farmers have fallen into the same trap and have believed too much that the fertilizer agent has told them. I do not know how you feel about it, but I think that in our State it is true that if the farmers had never heard of such a thing as commercial fertilizers they would have a larger bank account to-day than they have. Now, understand me, I do not wish to discourage the purchase of plant-food by any means, but in too many instances we have purchased it in such a reckless manner,

buying without knowing what it contained, buying without knowing what the soil required, that, in the main, it has been an unprofitable investment. Following out the new policy that I had adopted, it was only about a year before we sold several carloads of pure-bred live stock, which went to one of the far-Western States. We began selling the hay and the straw and the coarse grain and buying commercial fertilizer, and farmers all over the country did that until, as I say, to-day we are face to face with a soil that fails to respond as it should for the labor we put upon it, for the capital we have invested in our business. It seems to me the growing of grain, of potatoes, of cabbage, or the extensive truck farming, as you do it here in New Jersey, is not farming—it is simply mining; and in managing the farm in this way we are as truly mining the wealth of the soil as the man who takes from it the coal, the iron, the lead and the precious metals, selling off from the farm all that it contains that is of value to it. True, we have potash, we have phosphoric acid, we have nitrogen in abundance, so the chemists tell us, but without the vegetable matter, without the humus, that soil never can be tilled successfully by the farmer. The man who robs the soil, robs his children of what is rightfully theirs. The man who tills the soil intelligently, and maintains or builds up its fertility, gathers a bank account for the benefit of generations who are to come after him. To my mind there will be, there can be, no great agriculture in these older Eastern States, except so far as the breeding and feeding of livestock on the farm plays an important part in the farmers' work. In breeding any kind of livestock it seems to me the first requirement is that we shall know that stock intelligently; that we shall know their characteristics; that we shall know what they are best adapted for, know how to care for them intelligently and the kinds of food that will develop the most there is in them.

I have been breeding sheep all my life, from the time I was a boy until the present. Within that time I have sold sheep to go across the Atlantic, across the Pacific, into South America and into nearly every State east of the Mississippi river. This has meant a great amount of correspondence. I have been surprised as well as disgusted sometimes in receiving letters from men to find that they had such an incorrect idea of the kind of stock that they wanted to buy. Men, for instance, who wanted to buy sheep of the mutton breeds, and never say one word about the qualities

of mutton sheep, simply asking how much wool will they shear. Men who never say a word about a good back, not a word about constitution, nothing about a good leg of mutton, but rather asking if they are wooled all over the head and face, thus ignoring entirely all that goes to make up a good mutton sheep.

So I say, we must have a high standard, we must know what constitutes a profitable animal, and then always insist on having the best and nothing but the best. If a man should undertake to erect a valuable building without constant reference to the architect's specifications, we would call that man an idiot. The painter, before touching the brush to the canvas, has in his mind a clear and well-defined idea of all the beauty of the landscape. The sculptor sees in the rough block of marble before him the finished statue in all its beauty. But how often it is true of the farmer; the breeder, dealing with the most subtle influences, goes about his work in a careless, indifferent manner, trusting to luck, not expecting that he will succeed in breeding what he wants to, but simply taking what comes; and this indifferent kind of breeding is the curse of our Eastern farmers. What we want and should have, is an intelligent idea of just what the animal should be, and then breed in a way that the product will be just what we might be led to expect. The laws of heredity, the laws of breeding, are definitely, absolutely fixed, so that any man may produce just what he desires to, just the same as the man who grows a crop of wheat; if he sows one variety he knows the product will be of that same kind. If he plants a certain kind of potato he knows that the crop will be of the same kind, and I believe it is every man's privilege to be just as certain as to what the product will be along the lines of breeding any kind of livestock. But your Secretary has asked me to confine myself to just one line of breeding, and that is the breeding of sheep, and I am very glad to do so, because I believe, and I want to say to the farmers of New Jersey, that there are hundreds of thousands of acres of land in this State that will pay a greater profit for capital and labor invested if the farms are well stocked with sheep than with any other method in which the farms can be managed. I believe more profitable than the dairy, more profitable than the production of beef or the raising and selling of horses. The demands of the market are so liberal, the prices at which the best mutton is selling are so high, that I

am sure that we can make a larger profit in growing sheep on many of the New Jersey farms than we could in any other line of work.

While I am talking about sheep I wish you would keep your mind on three subjects—First, sheep; next, corn; and next, alfalfa, because we cannot grow sheep profitably, as we should, without keeping our mind on the kind of crops or food that it will be necessary to supply them with if we would develop them to their highest condition.

As I have traveled through your State for years past I have always admired your fine conrfields. Your crops of corn are as good or better than those I have seen in any other State in the East, and as I have gone through your State, over the railroads, I have always thought that the conditions here were favorable for the growing of that best of all forage plants—alfalfa. With those two foods grown, as I believe you can grow them, on the New Jersey farm, and with sheep of the right kinds, properly cared for, I am sure you can succeed here in New Jersey in producing as good mutton as is produced in any part of the world. But the first thing, chief of all, must be a love for our work. A man always succeeds best in a work that he is interested in. With me there has been no sentiment; much as I have always admired a fine flock of sheep, I have bred them simply for the dollars and cents there was in it, and I believe that that is the standpoint for any man to take. We will always be interested and feel the most satisfaction along some line of work that pays a large income.

We had a school teacher up in our part of the State who always had a faculty of interesting the boys in his school, and he took great interest in them. Studied history with them, and politics as well, until he had some pretty bright politicians among his pupils. One morning, in one of the classes, he told the boys he had a proposition to make to them. He says, "You know, boys, that I have a pet woodchuck out home, and I propose giving that woodchuck to the boy that will give me the most intelligent idea of why he belongs to the particular party that he belongs to." Calling on the boy at the head of the class, he said, "Charlie, what party do you belong to?" Well, Charlie said, "I am a Republican." Says the teacher, "Tell me why you are a Republican." Charlie said, "In the first place, I am a Republican because my

father was a Republican, and then I believe that party has always stood in the lead in the work of reform, in education and advancing the best interests of the people. The Republican party liberated a million slaves from the most cruel bondage the world has ever known, and," said he, "my sympathies are all with the Republican party, and I believe I shall always vote that ticket." "Very well," said the teacher. Calling on the next boy, he said, "Willie, what party do you belong to?" Willie said he was a Prohibitionist. The teacher said, "Good for you, but tell me why you are a Prohibitionist." Willie said, "I am a Prohibitionist because I believe the liquor traffic is the greatest curse we have ever known. The liquor traffic has filled our jails, our prisons, our reformatories. It has made home a hell, it has driven children into the streets, half clothed and barefooted, begging for something to eat, and just as long as I live I shall use all my influence to do away with this cursed traffic." "Well," said the teacher, "I don't blame you for being a Prohibitionist." Turning to the next boy, he said, "Mike, what party do you belong to?" "Oh," said he, "I am a Democrat." "Well," said the teacher, "you have heard what these other boys have said, and now if there is any good reason why you should disagree with them and be a Democrat, I would like to hear it." Mike answered, "If you please, sir, I am a Democrat because I want that woodchuck;" and it is needless to say that Mike got the woodchuck. (Applause.)

So it must be in our business. We should breed sheep for the dollars and cents there is in the business, not because father was a sheep breeder, not because of any sentiment, but simply because it will pay better than any other line of work.

In the second place, we must make up our mind, first of all, what the product shall be, whether it shall be wool or whether it shall be mutton, for I am here to-day to tell you that the man who breeds a general purpose animal of any kind, whether cattle, horses, sheep, swine or poultry, is a man who is doomed to failure, because some other fellow will have a special purpose animal whose product will be so much superior to ours, so much better, that he will get all the profit there is in the business. It is easy to understand why the growing of wool has occupied such a prominent place in our minds, from the fact that wool has sold within the memory of nearly all of us for so high a price. Many of you will remember, in the '60's, when wool was selling at $1 a pound

or a little more, and certainly at that price there was nothing that a man could do on the farm that would pay as well as that; and so the farmers raised sheep, with the single idea of the production of wool, without paying any attention to the mutton quality of the animal. I remember having ridden many a day trying to buy sheep three years old, or, if we could find them four years old, so much the better. Those sheep had been shorn of good fleece during the time they were growing and becoming fully developed, and then we finished them for market by feeding them corn; but that wouldn't be very good meat, and we didn't get a very high price for it, and the demand for mutton of that kind was altogether a limited demand; but as the demand for better qualities of mutton became greater, people began importing the mutton breeds of sheep from Great Britain, and sheep of those breeds have been used to cross on the native stock we had in this country; and we have been building up a class of sheep that produce a quality of mutton that is very much superior to what was produced from the strictly wool-growing breeds of sheep; and the demand for mutton and the consumption of mutton in this country within the last twenty years has increased ten times as fast as the population has increased. Our people are learning that it is one of the best kinds of meat food, and the demand to-day for the best quality of mutton is very active, and will be still more active in years to come; and I think that, under conditions as they exist to-day, with the cheap pasture of the West, with the range system of Australia and Argentina, that there is not much encouragement for the man of New Jersey or New York State to grow sheep merely for the fleece of wool. We must keep our mind on the mutton side of the question, and produce that, and that alone, always remembering that in sheep breeding the general purpose animal is, and always will be, a failure.

Perhaps there is no man in the history of all breeding who succeeded in accomplishing as much as Robert Bakewell, who lived 250 years ago. Bakewell bred horses, cattle and sheep, but his principal work was in breeding sheep. How well he succeeded we may judge from the fact that while in 1768 Bakewell was only able to realize $4 each for his best rams of that year, twenty-five years later he sold his entire crop of rams of that year for an average of $500 each, and in 1798 Bakewell sold three rams for $6,000 and seven more for $10,000. Pity it is that this great

breeder never left a written record of his work, so that some other men could have had the benefit of his experience and carried it on, from where he left off, to perfection. But Bakewell left just one idea. In a letter written to a friend, he says: "In all my experience I never have found the best feeding qualities and a heavy fleece of wool on the same animal;" and there are multitudes of farmers, with the boasted intelligence of this twentieth century, who have not yet found out what Bakewell knew 250 years ago.

And our success will depend very largely on our skill in selection of a suitable breed or type of sheep. On a rough, hilly farm, it would be folly to select some of the larger, heavier breeds of sheep that have been brought up to their present condition of development under conditions that are so different, but rather trust to some of the lighter breeds of sheep for success on rough mountain farms, where they must necessarily climb more or less for their food, while on the level farms or those near towns or cities, we will be able to succeed much better with some of the larger, heavier-fleshed animals. So much in a general way.

Getting down to the details of the work. If a person is situated in a way that he can follow that branch of work I think the greatest profit will be found in growing and feeding what are known as hot-house lambs. That is, lambs that are dropped in October or the early part of November and fattened and shipped to market between the middle of December and about the 20th of February. Such lambs properly fed always sell at very high prices, and the demand for them is very keen. For this purpose, if a man would succeed as he should, I think it is absolutely necessary that he should have a breeding flock that is particularly adapted to that work, and I don't think any man will succeed without a strong infusion of Dorset blood in the breeding ewes. Preferably, I would have a Merino foundation with at least two crosses of pure Dorset blood. There are characteristics of that breed of sheep that make them better adapted to that work than any other, and the sire should be one of the larger, thick-fleshed, dark-faced mutton breeds, preferably Southdowns or Shropshire. I believe that combination will produce most favorable results. But in that line of work, after the selection of proper breeds of sheep, very much will depend on the feeding. The greatest success will only follow liberal feeding. Of course

it is always understood that the principal food of young lambs must be the mother's milk. I have experimented in years past with different methods of feeding, to see which method would produce best results, and I have found nothing more suitable than alfalfa or a fine quality of clover hay for a morning feed, with as much good corn silage for night ration as they would eat up clean. For a grain ration for the ewes, we have succeeded best with a mixture of three parts coarse winter wheat bran, three parts whole oats, one part nutted oil-cake. But after feeding the lamb through its mother, it must still be fed by itself and fed liberally, because lambs shipped to market at that time of the year must be very fat, if we would get the best prices for them. In feeding young lambs I have had best results from beginning to feed a grain ration when they were about a week or ten days old. Adjoining or in the sheep barn there should be an apartment where the lambs may be fed by themselves. It should be separated from the apartment where the breeding flocks are kept by a lamb-creep, made by nailing narrow strips or bars with rounded edges, perpendicularly, and having them just far enough apart so that the young lambs can readily pass through, but through which the old sheep cannot pass. We hear a great deal about the affection of sheep, but this is all a mistake. A sheep is not capable of affection. If the sheep has no milk for the lamb, three times out of four she will care nothing for the lamb, and if a lamb is not hungry it will care no more for its own mother than for any other sheep in the flock; and the lambs will always do better if this feeding room, separated from the main flock, is large enough so that they can spend a large part of their time by themselves. This feeding apartment must be warm, light and dry. They should be fed in a flat-bottom trough, so arranged that they cannot get into it with their feet and thus soil the food, and the grain ration should consist of equal parts of coarse winter wheat bran and oat flakes, just such as we buy at the groceries for use in the house. When bought by the barrel you can get them for a very reasonable price, and they are better adapted for the use of young lambs than any other kind of food I know of. The digestion of the lamb at that age is not strong enough that it can eat oat hulls and thrive, so we feed them bran and oat flakes, mixed with a little fine-ground old process linseed meal. And when feeding lambs at this time of year for the market it is wise, also,

to add a little brown sugar, as the lambs are very fond of it, and it is very fattening; but a lamb must never be fed sugar under any other circumstancess, because if you feed them sugar long enough you will kill them, and if you take the sugar away from them they will die; but feeding lambs of this kind with sugar for a few weeks will prove very profitable, as it makes them very fat. Some of you may be thinking that with the expense of feeding a flock of sheep so liberally in the winter with high-priced grain there will be no profit in this business, but we should remember that lambs of the best quality at this time of year are worth in New York and Boston from $8 to $14 dollars each, and I am well acquainted with men in our own county who are growing them extensively, selling their best lambs at prices that net them $12 each, after paying all expenses and commissions; and the leading commission merchants of our large cities have assured me that the demand for lambs of this kind is unlimited, but that they must be of the very best quality, for, while lambs of the best quality sell at prices ranging from $8 to $14 each, the second quality sell for just about one-half as much, while the culls will sell for barely enough to pay freight and commission, so this is a case where the best always wins.

I remember hearing of a boy who wrote to Daniel Webster asking his advice as to whether he considered it wise for him to start out in his education with the idea of becoming a lawyer. Webster's reply to him was something like this: "Of course you know I am not acquainted with you. I do not know as to your ability. I do not know how ready you are to work, work long and hard, but I will say this in a general way, if you are ready to begin down at the bottom of the ladder and work hard, study hard and be persistent, some time you will get up to the top. You will find the air there is always good, but it is always pretty crowded around the bottom."

So it is in this work. It is a case where work and merit wins, but there are always a lot of farmers around the bottom of the ladder who will be complaining that it does not pay.

Just a word of caution. Remember that a lamb dropped in October and fattened for the market in January is an unnatural product. It is not the time of the year when lambs are naturally born. The natural time is just when the grass begins to grow, when conditions are favorable, but in this instance we have a

lamb dropped just at the time of year when natural food is lacking and when the weather is coldest, when food is high; and the man who succeeds with this unnatural product, under such adverse conditions, must be a man adapted to this kind of work, and the surroundings must be the best. The barn must be light; it must be well ventilated; and then there are a thousand and one details that a man must be master of; and this is one of the kinds of work that can never be done by proxy. It is the place where the man himself must be in the harness, superintending all the details of the work, and he must be clear headed and intelligent if he succeeds as he should. There are a great many farmers who will succeed with sheep, fattening of lambs at some other time of the year, but will utterly fail here. It is a place where we must have a master hand at the wheel. I think, with the little knowledge I have of machinery and of locomotives, I could get on to an engine and run a train of cars twenty miles an hour with perfect safety, but if it came to running the train fifty or sixty miles an hour it would need a keener and better man at the throttle than I am. So it is with breeding hot-house lambs. I heard a story of an Irishman who came over to this country a few years ago, and after having been here a year or two and becoming accustomed to our ways, he made up his mind that it was a great deal better place than in the old country. He had a brother Pat over in Ireland and he induced him to come over here, telling him that America was a better place for a poor man than Ireland was, and so Pat came over. Mike met him at the wharf in New York City, and, after showing him some of the sights in the city, they went to Mike's home in the country, which was on the east bank of the Hudson river, along the line of the Central railroad. Mike thought Pat had not seen America until he had seen the Empire State express. He lived just above one of those tunnels along the Hudson river division of the Central railroad, and one day when the train was nearly due he took Pat down to the track. After waiting a few minutes they heard the great train coming thundering along, and, running over the crossing at sixty miles an hour, shot into the tunnel a short distance down the track. Pat, standing there, hat in hand, exclaimed, "Oh, Mike, she is a great one, but, phawt in de devil would become of her if she handn't hit that hole?" (Laughter). So it is with this business. It must have the best of men,

and they must keep their eyes on the details of the business. They must be able to run the train at seventy miles an hour if necessary, and let the common man breed sheep at some other time of year.

Next, perhaps, comes the growing of summer lambs—that is, lambs that shall be dropped in the month of March or April and fattened for the market during the summer; and it seems to me that in your State especially there is room for great profit in this business. Surrounded, as you are, with markets that are the very best in the world, having not only New York, Philadelphia, Trenton, Newark and cities of that size, which are demanding the best the farmer can produce, but you also have the seaside summer resorts and your inland boarding places, that are all the time requiring the very best products of the farm; and if these lambs are of the right quality, fed liberally and sent to market in good shape, it will always mean a good profit to the farmers of New Jersey. But for this purpose I would have a different breed of sheep, depending always on some of the large, thick-flesh, dark-faced mutton breeds—the Southdown, Shropshire or Hampshire—and if well bred and well fed there must always be a liberal profit following this branch of breeding and feeding. The expense of raising lambs at this season of the year is not nearly as great as in raising the winter lambs. Of course, they must have liberal food from the time they are born until grass grows, so that they will thrive without extra food. Even after they are turned to pasture in the spring I have found it always wise to have a good supply of supplementary forage crops to feed them during the summer. For this purpose I have never found any single crop that is as valuable as dwarf Essex rape. We have grown it quite extensively, beginning about fifteen years ago with a small area of about one-half acre, but as we learned its value we increased the area, until we have usually grown twenty-five to thirty acres each year. Usually it is sown alone, but we have also sown it in oats, where the land was not to be plowed and seeded in the fall, going ahead of the drill with a broadcast seeder, and sowing about one and one-half pounds of seed per acre. The seed is covered by the drill-tubes in sowing the oats, and there has never in any instance been any damage to the crop of oats; but after the grain is cut and taken from the ground and the rape has full use of the land it grows very rapidly, and in three or four weeks will look like a field of cabbages. That

makes a very large amount of the very best kind of food, and a food that, I believe, will grow more pounds on a young lamb than a single food I ever used. In buying seeds care should be taken to buy the dwarf Essex rape, because, ordinarily, if you simply call for rape seed, you will get what is known as German or Birdseed rape, which is altogether worthless for feeding and, at the same time, one of the worst weeds you can get in the soil. Dwarf Essex rape does not yield seed until the second year, and, as it always winter kills in this section, there is no danger of getting seed into the land. We have grown it for the past fifteen years without ever having the least trouble of that kind. Another crop which we have fed quite extensively is cabbage. I believe we can grow an acre of cabbage about as cheaply as an acre of corn, and, with the heavy tonnage we can grow on the land, we get an amount of food that will pay well for the expense of production. In our own county some of our best feeders, who are fattening carloads of lambs which are shipped from the West, claim they can realize more profit from their cabbage crop fed to lambs than they usually get when sold for shipment to city markets. These lambs must be kept growing steadily and improving constantly all the time from birth to the time of marketing, and feeding those kinds of foods which will produce the highest quality of mutton, a kind which is superior to that which is ordinarily found in our markets. A great deal has been said about the size of sheep that are best suited for our best markets, and from a perusal of market reports we would often be led to conclude that a lamb weighing from seventy-five to ninety pounds was the size in greatest demand; but I think a great deal of misunderstanding is due to ignorance of the characteristics of breeds and proper methods of feeding. If the sheep are of suitable breeds (some of the thick-flesh varieties of mutton sheep), and have been kept growing steadily from the time they are born until they go to market, the size will make no difference in the price per pound, as some of the highest-priced sheep in our best markets are sheep of extreme weight. We must not only discriminate as between breeds or varieties of sheep, but must, also, bear in mind that if we would produce the highest quality of product the food must be such as will produce that quality, and the growth of the animal must be steady and constant, always avoiding any periods of standstill in growth. A great deal is said in regard to the quality of mutton that

is produced on the other side of the water, and the general impression seems to be that it is better than can be produced here. I have eaten mutton chops in England many a time, and while they were delicious, they were no better in any way than I have eaten here, and the farmers of New Jersey, with the best breeds of sheep and suitable methods of feeding, can secure mutton chops fully equal to the best of the English chops we hear so much about.

Another thing in regard to these summer lambs that is too often neglected, and that is in regard to docking and castration. How often when I have been in the markets of Jersey City, or Buffalo or Chicago, I have seen large flocks of lambs with long tails. This is a wrong thing. You can never get the highest price for a lamb unless the lamb is nicely docked and castrated, and there need be no loss at all from either operation. One argument against docking is that there is too great loss of blood and an occasional loss of the lamb itself, but if the docking is properly done there need not be a loss of a drop of blood or any check whatever in their growth. I have docked fifty lambs at a time that ran away and began eating, and not a lamb in the lot knew it had been docked until it turned around and saw its tails was missing. The old method of using a knife or a chisel is altogether wrong, and I was never able to perform the operation in either way without occasional losses. The only humane way, the only safe way, is to take the tail off the lamb with docking pinchers heated to a white heat. In this way there is not a drop of blood, but every vein and artery and nerve is instantly seared over. There is no check in the growth, and after trying nearly all methods I think this the only safe and humane way.

Another very profitable branch of sheep breeding is growing wethers, which go to city markets at from a year to a year and a half old. There is a strong demand for sheep of the best quality at this age. Our best hotels and club-houses in the large cities are paying very high prices for sheep of this kind. One farmer in our own State has made a specialty of raising and feeding pure-bred mutton sheep for our city markets for some years past, and the prices are always very satisfactory, in some instances, single sheep selling as high as from $30 to $40 each, and one and a half years of age. Of course such prices as this are never quoted in market reports, as there are not enough sheep of that kind produced to establish a market price, but the fact is

that such sheep are being sold for such prices every week in the year. This man, in the first place, has sheep that are bred right. There is a vast difference in the quality of the mutton, whether the sheep is bred right or not. This breeding flock is pure bred, descended from some of the best imported flocks, and from the time those lambs are dropped they are grown steadily, being fed everything they will eat until they are ready for market, thus developing a good, lean, juicy carcass.

I recently had a conversation with a gentleman, who as a boy and young man worked in a butcher's shop, who at the present time sells more sheep than any other dealer in this country, and annually feeds from 5,000 to 10,000 sheep on his own farm. We were speaking of a lot of wethers that were recently sold in market at Christmas time at a very high price. I asked this man what was the limit of the demand for such sheep as that, and whether the demand would justify a man in producing sheep of that quality for market at any other time of the year. His reply was: "Give me Christmas mutton and I will give you Christmas prices any month in the year." He says there are always people who want the best and will have it, and they will pay the highest price if we only furnish the goods. The trouble is the quality of the supply is usually not such as the best buyers demand.

We must work on a well-defined plan, we must know what markets we are going to breed for, what markets we are feeding for, and then sell sheep in that market. Do not ever try to grow the winter lamb, being dropped in the fall months, and feed it through the winter, and think if you don't get a satisfactory price for it you will keep it for sale the next summer, because you are bound to lose money on that lamb. If grown for the winter market sell at that time. On the other hand, if you grow a spring lamb and the market is unsatisfactory during the summer months, you can still keep that lamb and grow it for sale in the late summer or winter as a matured sheep, and there will be no loss on account of the early feeding of the lamb. And always avoid a coarse carcass. A great many sheep bred in this country are too coarse, not at all what the best buyers want. Our people do not like mutton tallow, but they do like good, lean, juicy meat, and we can grow one kind just as well as the other.

Some of the Western Experiment Stations have been conducting experiments to determine the difference in the various breeds of animals as to quality of the product. One experiment that has interested me was carried on at the Wisconsin Station, where they put three each out of five litters of pigs, making fifteen in all, and feeding them precisely alike, weighing all the food, under conditions that were perfectly similar, to determine which breed would grow or develop the greatest proportion of lean meat, to find out, if they could, which breed of swine was best adapted for producing what is known as export bacon. I saw this lot of hogs at the fat stock show in Chicago and they were slaughtered at that place, and a careful investigation showed that one breed of hogs had made two and a quarter times as much lean meat as some of the other breeds.

Another experiment that was interesting was carried on at the Iowa Station, where steers of different breeds were fed under similar conditions to determine which was the best suited for feeding purposes. In the lot was a pure Hereford and a pure Jersey. These steers were fed side by side for several months, and Professor Curtis told me that he was surprised to find that each steer had made practically the same gain, as they were weighed each week during the feeding period. They were fed the same quantity and the same quality of food, and at the end of the feeding period were shipped together to the Chicago market, where the Hereford sold in the open market at 37½ cents per hundred pounds higher than any other steer in the yards during that week. While the Hereford sold at an advance over any other steer, the Jersey sold for $2.12½ lower than the next highest price below the Hereford, making a difference in the selling price of the two steers, which had been fattened side by side, of $2.50 per hundred pounds. Professor Curtis said that he was sure some injustice had been done, that there was some prejudice of the commission salesman or of the purchaser that made the difference in the selling price of the two steers. But after they were slaughtered he said the whole thing was perfectly plain, for the Hereford steer had been eating the food and putting it into lean cuts of beef, which were worth in the Chicago markets twenty cents per pound, while the Jersey steer had taken the same quantity of the same kinds of food and had made it into rough tallow, which was only worth four cents

per pound. So we need to study the characteristics of the different breeds of animals and select such as are going to make the quality of product that will sell for the very highest price, and the difference between various breeds of sheep is as marked as the difference between those of cattle. I have seen carcasses of mutton hanging up in our city markets that would not tempt the buyer of the cheapest grades of meat for a minute. They were simply mutton tallow, and the American people do not demand anything of that kind.

In feeding sheep for market avoid feeding corn in excess. I think that is one of the great faults of our sheep feeders, that they feed too much of the carbonaceous ration. It is perhaps true that you can put a flock of sheep into the barn and you can make a greater gain per day for a reasonable time with corn than you can with any other kind of food, but you are not making lean meat. You are simply making mutton tallow. A much better food will be oats, bran, oil-cake—something of that kind which will produce a better quality of meat.

Some of you may be thinking that some of the prices that I have referred to are pretty high. You may perhaps think I am prejudiced in favor of this branch of breeding, that I am drawing too rosy a picture. You may perhaps think that competition is so keen that we are not justified in investing money in a flock of sheep and fitting up quarters for them, but I think we need not fear competition. We hear a great deal about the sheep bred in the West, or in Australia, but I will tell you that we have nothing to fear from the West; we have nothing to fear from Australia nor from Argentina. I will trust to the intelligence of the New Jersey farmer to compete with the Western man, or with the Australian or South American. The Western man and the South American farmer have been more liberal in buying the best kinds of blood than we have, and this is one instance in which we have failed to do our best, but with good blood and surrounding conditions, we have nothing to fear from any section of the world in breeding sheep. The droughts of Australia of the last seven years, droughts as severe as Egypt ever knew, have proved conclusively that the great sheep ranches of Australia cannot be depended upon to produce the best quality of mutton. We may judge something of the results of the drought there when we read of one of the largest flocks of New

South Wales, which originally contained almost 1,500,000 sheep, but which is reduced at the present time by death from drought to only about 300,000; where lambs by the hundreds of thousands have been killed simply because their mothers in their weakened condition were not able to raise them. Those of us who have studied the conditions as they exist in the West to-day, realize that the best effort there has exceeded what it will be in the future. The lands are being taken up by actual settlers, the range business is being crippled and the tide moving backward. I want to tell you that the sheep of the future, the best sheep, the best mutton, will be grown, not in the Far West, but in the older, settled States of the East. A small flock of sheep is always a good flock, is an old saying, and it will always prove that the best quality of mutton, the sheep that will sell at the highest price, will be grown on the settled farms of the East. In this readjustment of conditions that is going on to-day, we will find that it will prove true for all time with the rapid growth of our States, with the accumulation of wealth that our people demand more and more the very highest products of the farm. The time will never come when a good carcass of mutton will fail to sell at good prices, and will bring the farmers of the State of New Jersey a profit which will pay greater than that which any other kind of meat will sell for.

In looking over last week's market quotations I find that in four of the five largest markets in this country the best lambs sold higher than the best export steers, and that has been true, usually, for quite a good many years past. With our rapidly-increasing population, with our great increase of wealth, with the growth and multiplication of our cities, the time will never come when it will not pay the New Jersey farmer to breed the best class of mutton sheep. (Applause.)

(Vice President Cox in the Chair.)

The Chairman—Gentlemen, we have listened with a great deal of pleasure, I am sure, to this able address on this question. This matter is now before you for discussion. If any member would like to ask any questions of Mr. Ward, I know he will be glad to answer them.

Mr. Roberts—I would like to ask the gentleman in reference to the breeding of sheep, how he manages to have this flock come

in time, say in November? It has always been one of the difficult questions to me to thoroughly master.

Mr. Ward—Without going into details in answering that question, I will undertake to cover it by saying that there are characteristics of the particular breeds of sheep that I mentioned that make them better suited for that purpose than any other. You know, the Dorset sheep, originating in Dorsetshire, that hotbed of England, produce lambs twice a year, and it is natural for them to breed lambs in the fall. The Merino breed of sheep, also, inclines more in that direction than any other breed of sheep we have. A combination of the two breeds will produce a ewe that will breed pretty regularly in the fall, whereas with other breeds of sheep, some of the best breeds we have in the world to-day, it is impossible to do that. You must remember, if you would succeed in raising lambs, having them dropped in October and November, you must depend on the crosses of Dorset and Merino blood. With that you can succeed; without it you will fail.

A Member—I should like to ask which breed of swine produced the best meat in the experiment spoken of.

Mr. Ward—The small Yorkshire.

Secretary Dye—Mr. Chairman, I hope this subject will be discussed fully. I have been of the opinion a long time since I have been traveling about the State, and particularly in the times when prices were so low, that the farmer did not know what to do, but asked the question—I remember once in the Institute in Morris county, for example, "What are we going to do, oats are low, corn is low, hay is low, and we buy fertilizer in the spring of the year, and we are not able when fall comes to pay the bill?" I remember suggesting to them, "Why don't you turn this all into something else—into poultry, into pork, into sheep, and lambs and wool—and thereby get a better price for your produce, besides retaining so much more of the plant-food at home?" And it seems to me there are localities, a good, large section in the northern part of the State at least, that could to-day be more profitably utilized than it is at the present time, by the introduction of the sheep interest.

If we can utilize clover and hay and corn and oats at home when they are selling at low prices, and keep the plant-food there (and sheep manure is some of the best manure that is made) my experience is, that we will find this a profitable business.

Mr. Vanderveer—Sheep growing used to be a very profitable industry in Monmouth county some thirty or forty years ago. My wife's father kept about a hundred sheep, and he always made $700 clear out of the sheep; if he did not do that, he would not think he was doing much. Wool used to sell then for about sixty-two or sixty-three cents a pound. I remember one year he had 11,000 pounds. I don't think there are a hundred sheep in the whole county now. There are only one or two small flocks. Every farmer had sheep then, and they were very profitable.

Dr. Phillips—What kind of pasture do you consider the best?

Mr. Ward—There is nothing so good as clover.

A Member—How many sheep will an acre feed?

Mr. Ward—That depends on the sheep and on the character of the grass. Some acres will produce four times as much as others. Blue-grass and clover are the best of pasture grasses.

A Member—Is it possible they would die if they had too much rape?

Mr. Ward—Yes, sir. I am glad that question has come up, because I did not say anything about it. In turning any kind of livestock into rape there is danger from bloating. But in the fifteen years that I have grown rape, and used it constantly, I had but one loss. One night we had a severe wind and rain storm, which blew down the fence between the sheep pasture and the rape field, and a flock of about a hundred breeding ewes got into the field when the rape was wet. The next morning I had plenty of veterinary work to do. One sheep died, and that is the only sheep I ever lost from rape. The others recovered, under prompt treatment; but care should be taken in turning any kind of livestock into it. Feed them liberally and have them in a condition so they would not care to eat anything, and then turn them into rape, when it is dry. And when they are once in the field, and are used to eating it, there will be no danger from overeating.

Mr. Lane—Speaking of feeding lambs, I would like to ask if the gentleman ever tried cracked corn, and its effect?

Mr. Ward—We have fed lambs cracked corn, but not until they are several weeks old. It must be done with caution, as it is a very strong ration for young lambs. One day one of our neighbors came to our place, and when going into the sheep barn said, "Do you feed your young lambs grain?" I said, "Certainly, we always do." He said, "I will feed mine, too." Without saying anything

more he went home. In about a week he drove into the yard one day, with a very long face, and said, "I want you to go home with me." I jumped into the wagon and went home with him, and went into the sheep barns, supposing, of course, I would find some difficulty there. I found the worst-looking lot of lambs I ever saw, and found that the trouble was feeding them clear corn meal. The digestion of a young lamb is not strong enough to eat corn in any large quantity. Oat flakes, bran and oil meal make a combination of grain food that will be better than corn. I would not give a lamb under three weeks old any corn; but when it is older I sometimes give corn, but ground fine and mixed with oat flakes, bran and oil-cake. That makes a good combination.

Gentlemen, I thank you for your attention and interest, but I want to say that it means responsibility on your part. Go home and breed some good sheep, and I am sure that if you do it along the lines I have indicated to-day you will find that it will prove profitable to invest in the work.

# Poultry and Egg Production.

BY HENRY VAN DRESER, COBLESKILL, N. Y.

# Poultry and Egg Production.

BY HENRY VAN DRESER, COBLESKILL, N. Y.

*Mr. President and Brother Farmers:*

I am to talk upon a very small thing this morning—something as small as a hen—usually beneath the dignity of the farmers at large in the different States.

Solomon said, "In multitude of counsel there is safety." Now, that is just as true to-day as it was centuries ago.

Here this morning we have a multitude in counsel. The different counties of this State are represented, and I understand that they are all farmers or that way inclined.

Now, as we pay a little attention to poultry, do we realize the fact that there is more money in poultry, for the amount invested, than in any other business along the line of agriculture? Yet it is the most neglected.

In my boyhood I was made happy by administering to the wants of the little pets of the farm. My father was very lenient to my brother and me. We kept chickens, rabbits, squirrels, &c. As a rule, on Saturdays, when there was no school, the boys in the neighborhood would come over to our place to have a good time. They had to go away from home to have a good time, you see, and they came to our house. We enjoyed those Saturdays at home. Our surroundings were pleasant, and I know it made us better boys—it gave us thought along those lines that were beneficial to us.

But as I grew into manhood I had an idea it took something as large as a cow to make a dollar out of. Although we paid for a home through the dairy cow, we are now engaged in poultry, also.

There was no culture in the poultry department then, and there was no money in the business. We kept between 200 and 250 hens, but we never gathered in the eggs in the winter—because there

were none to gather; that is a mighty good reason. And we never watered a hen until about nine years ago. We never thought that a hen got dry. I know men do, for I have been dry myself.

We never set a hen—she always set herself. If she changed her mind, it was all right; that was her privilege.

Then, when we were doing our hay harvesting, we were so busy that we would not gather the eggs for a week, and sometimes two weeks, and only then when our wives would call our attention to it, saying they wanted some groceries. Well, we would take a basket under our arm and would go over into the garden, into the barn, or over into the meadow, and there, under a burdock leaf, find a hen sitting and just shoo her off, put the eggs into the basket and go to the grocery store. We had them in unknown quantities, but they were not to be relied upon, and the groceryman realized the fact. Sometimes we had eggs, sometimes we had chickens, and sometimes we had—something else. And the price was accordingly.

So, you see, there was not a dollar in it for us.

But I want to tell you how I became interested in poultry. I became very much interested in a little boy—no kin to me—who lived about three miles away. That boy had grand prospects. He was earnest in purpose and honest in heart; chuck full of vim; such a boy that is nearest my heart. We became so much interested in each other that he came to our house every day, and he finally concluded he did not want to go home at all.

So, I saw his father—he had nine children, and this was the baby—and I told him that I wanted the boy with me, and he said, "Take him, and do as you please, and it will be all right with me."

And it was all right with me, too. The better I knew him the more I loved him. And one morning I said to him, "My dear boy, if you will furnish the brains I will furnish the money and give you a course at Cornell University." And the boy went.

During his absence I purchased the interest that my brother had in the home farm and my brother purchased another farm and moved five miles away.

My wife and I, having no children, were lonely; and I want to say to the people here to-day, there is no household complete without children, music and flowers. That has been thoroughly demonstrated at my own home. My wife and I talked the matter

over, and we wrote and told the boy we would like to have him come and stay with us. He left the university and I drove down to the station to meet him, and on the way home I saw at once he was very enthusiastic in regard to poultry.

Returning home we sat down for the purpose of reasoning together, as Paul says. Fathers, you should respect the opinion of your sons. You should encourage thought. Thought is the power behind the throne. Thought rules and governs this nation to-day. You don't know the possibilities of a boy, except—when he presents an idea that is feasible, pat him on the back and encourage him, and he will develop a love for agriculture and become the pride of your heart in your declining years, and will love the homes and the farms that you have worked so hard to pay for.

Well, the subject seemed feasible. We talked the matter over, and at once we went into the poultry business.

The first thing we did was to purchase a Prairie State Incubator; two-hundred-egg capacity. We put it in the cellar of our dwelling-house, but the insurance company took our insurance away. I said to the boy, fire or no fire, we will go into the poultry business. The first thing we thought it was necessary for us to do was to start with thoroughbred stock, because the chickens that we had on hand were of all ages, all colors, all denominations; they were not to be depended upon; they were scrubs. So we sent away for 200 such eggs, for which we paid $20. When they arrived we put them on the table to give them a rest. Whenever you send away for a sitting of eggs, when they arrive you should give them a rest of twenty-four or thirty-six hours. It will bring them together and you will have a better hatch.

When the eggs were ready he opened up the incubator. It is very easily adjusted; the thermometer would go to 103 when it would blow off; and he put those eggs into the tray, closed the incubator, and at the end of the fourth day he examined the eggs; he took a tester and just took the eggs off the tray and held them up to the light. If they are fertile there will be a pronounced zone of very fine blood vessels there. He put those eggs back into the tray, and the eggs that were not fertile he laid aside to feed to the little chicks after they were hatched.

The eggs were turned twice a day, and then on the morning of the nineteenth day, there was a beautiful sight; those little chicks just threw off their shells and opened up into new life. There was a wonderful transformation.

Nine years ago was the first hatch I ever saw by an incubator, and it was one of the best hatches we have ever had. Ninety-seven per cent. of the fertile eggs hatched.

The next thing we did was to leave those chickens in the incubator thirty-six hours.

Now, when we took the little chicks away from the incubator we tried to have the brooder from 97 to 100 degrees heat. We took those chicks out of the incubator and put them carefully into a basket lined with cloth, so as not to have a circulation of air, lest those little chicks should catch cold. You want to be very particular about that. If you take the chicks out of the incubator and put them into the brooder, and that brooder is a little bit cold, and they catch cold, it will cause indigestion and cholera infantum, and that means death every time.

Now, the first thing he fed those chicks was the shells the little chicks came out of. He put them into the oven, and when they were perfectly dry rubbed them together in his hands, and sprinkled them in front of the chicks. That is just what is required to promote digestion.

On the brooders he sprinkled some sand and gravel, and that puts the system into action, gives them a good appetite and power to digest their food.

Then stale bread, moistened with skimmed milk, was sprinkled in front of the chicks.

In a few days he gave them plenty of clean water. You want to be very careful about the water. If the water is distasteful and insipid, and the vessels become slimy and nauseous, that causes indigestion, and that makes a great difference in regard to the death-rate.

What they want every hour of the day is clean, pure water. Never allow a chicken to get dry, but at all times have it so arranged that they can go right up to the little water vessel and take a sip.

We use granulated charcoal, put into a small box; they can go there and help themselves. That, also, is a great bowel regulator—it cleanses the system.

In a few days we began to feed golden millet, and that is the most growthy food and the best bowel regulator that we know of; and every farmer can raise it. You can raise a good many bushels to the acre, but if you purchase it, it will cost you from $1.50 to $1.60 a bushel. We always raise it for our own use.

When the chicks get a little larger, we begin to feed cracked wheat and cracked corn, and Johnny cake. The first few years we make the Johnny cake the same as we would make it for our own family, with the exception of working those infertile eggs into the mixture and stirring it up with a spoon, raised it and put it in the oven and baked it. We could feed the inside of that Johnny cake, but the crust was hard and we had to put it through a grater, which made additional work. Now, we mix up the batter and put in the soda and eggs and then put it right into a large jacket in the cooker and steam it. And there is no crust to contend with; it is more digestible; every bit of it is eaten and there is no loss connected with it.

We give them for succulent food, beets cut up. Just as soon as they get large enough so we can distinguish the sex, we put the cockerels in one department and the pullets in the other. We put all the cockerels in a brood-house; the pullets we put out in a fourteen-acre orchard and allow them free range.

The cockerels we feed with a little more of the Johnny cake, and a little cottonseed meal with the cornmeal, for the purpose of giving color to the flesh, which makes the chicken look so much more attractive, because we wanted to put them on the market for broilers; and it gives a beautiful tinge to the meat.

And we fed them with a rush, but were very careful and watched their digestion; we fed them plenty of buckwheat, as it is very fattening.

I want to say to you, now, of all the breeds I have ever seen, a White Leghorn will make the first pound as soon as any breed of chickens I have ever had anything to do with. Just as soon as ours weighed a pound to a pound and a half, we dry-picked them and sent them to New York.

Now we are sending them away alive when they weigh a pound, and chickens never fetch a better price than they do when they weigh one pound, because, as they go up in weight, they go down in price, usually.

This year we sent to New York early in the season, and then when the season opened at Saratoga we shipped there. Now they want us to ship them in a crate alive, when they weigh a pound or a pound and a quarter. We have gotten from thirty-five to fifty and fifty-two cents apiece, and I think that is a very good price. As they want them without picking, we are willing to get rid of all the work we can.

Now, the pullets were fed on meat scrap with the Johnny cake, and some oats ground with the chaff sifted out; that was put in with the corn meal. We gave them buckwheat, also, and a variety of food. They had free range, which gave them plenty of muscle; and they were very healthy, and we were very much elated over the results.

While this business is very attractive, I don't want you to go into it without consideration, and I don't want to mislead you, but I want you to do as we did; go into the business in a small way, and as you increase your knowledge of the business, enlarge your plant.

With the mighty increase in population there is a greater call for eggs constantly; and when you realize the fact that upon the average only sixty eggs per hen is laid in the United States, that is a mighty small record. Why, the farmers of the State of New York do not produce eggs enough to feed Greater New York.

Eggs are being imported into the United States—millions of dozens a year. With the price that exists to-day, and which is constantly going up, don't you see we are victims of lost opportunities, and we should be benefited by the mistakes we have made; and I am so sorry that my attention was not called to this business earlier in life.

Now, don't you see, poultry and dairying go hand in hand. One is an adjunct of the other, and you can pull in on this as a side industry, a dollar on a hen, above all expenses, at the present price of eggs as you sell them to the grocery store; and I know whereof I speak.

So you see it would make a great difference in regard to our finances, and you might just as well have that amount of money that you do without now.

Well, now, one morning I was out in the orchard admiring those pullets, and the boy came to me and said, "I would like to

have you come down to the barn." I went down there, and what do you suppose he wanted of me? He told me he would like to have me step into the poultry house. I had not been in there for fifteen years. I never thought of such a thing as cleaning the poultry house. Our business was altogether on different lines. We were taking care of the dairy, you see, and I reluctantly opened the door and went in, and to my surprise, there were a couple of dead hens, and the place was neglected and broken down, ill-smelling and bad-looking.

He said to me, "What are you going to do about it?" And I looked him square in the face, and said, "You tell." "Well," he said, "if I were you I would just go to work and take the interior out of this house, put it on a wagon, draw it down into the lot, pour on some kereosene and set it on fire." No quicker said than done. It was right after breakfast, and I off with my coat and hitched the team, and when I drove up the boy had the interior of the house out, ready to put on the wagon. You see, he was afraid I might change my mind. We loaded it on the wagon and drove down into the meadow and put it on a pile, poured on some kerosene and set it on fire, and it went up like a rocket—a hundred thousand lice to the square inch! Then we refitted the house by running tar paper right up along the studding; then began ceiling, and stuffed between the ceiling with soft meadow hay, to make the room dry—and I am going to tell you moisture in the hen-house means death every time.

The great secret of success in poultry raising is a dry room.

When our house was finished we had a room fifteen feet square, with a southern exposure, two windows in it, and made frost-proof by stuffing between ceilings; with a wallowing box and a nest box, a roosting device and a watering device, making the home very attractive and pleasant.

But we didn't dare to put those old hens back into the new department—we did not even introduce them to the pullets. Those old hens had something on them besides feathers! So we let them roost in the old orchard, out of doors, and the pullets we kept in the young orchard, away from the old hens, till fall, and then they were taken into the new department.

Well, when those little pullets were four months and nine days old we got the first egg. And I will never forget how delighted

the boy was. I was plowing at the extreme southern part of the farm, when he opened the stable door, swung his hat over his head and gave a couple of cheers, and then came running down the hill to where I was working. He astonished me. I was frightened; I did not know what was the matter. And when he got up to me, to my surprise, he says, "There is an egg." I tell you he was interested in the business. He watched it closely. And that is what a man has to do. He has got to look after the details of the business if he would succeed.

Those chickens did pretty well; they began to lay, and they were kept in the orchard till just before Thanksgiving, when they were put into their new winter quarters. There they were made happy; their home was congenial, had plenty of sunlight, they were very comfortable, and they did not decrease in their laying at all, but went on all through the winter. We got more eggs that winter than we did before in twenty years, during the winter months all put together.

Then a serious question arose: As to what we should do with those nearly 300 old hens and roosters?

So we talked the matter over. I always like to have a boy in the game, because they think more quickly than a man that is past the meridian—I know that by experience. "Now," he says, "I will tell you, Thanksgiving is drawing nigh, the business men and millionaires of the city of New York will have a day off—that is, a day of feasting. Let us go to work, just before Thanksgiving, butcher those hens and put them up nicely in attractive packages—they are fat, sleek and neat—that, I think, will be a good idea." So, just before Thangsgiving, we got ready for the butchering. We heated some water, and, after killing them by sticking them in the mouth, we picked them very carefully—every pin feather was picked off cautiously. After we finished picking we dipped them into a kettle of hot water long enough to count four slowly, and then, reversing the order, put them into water with ice in it long enough to count four slowly.

Why did he do that? Well, you see, putting them into the hot water drew the secretions to the surface, and then into cold water with ice in it checked and held the fat over the surface of their bodies, and it puffed them right up. Say, they looked fine—just like pullets—tender, mellow and fat. Then the boy went to the village and got a roll of blue ribbon—very pretty—an inch and a

half wide, and after drawing their legs close up to their sides, tied it around their bodies, with a nice, double bow-knot across the breast, and laid them on their backs, so they would not get out of shape during the night.

The next morning we got some nice, clean barrels and packed them with a little straw, placing them in there with the blue ribbon staring us right in the face. When he finished packing them we took them to Cobleskill and shipped them to New York by express.

In a few days we got a check. I opened the letter and, to my surprise, there was a check much larger than I had expected to receive, and it astonished me. But the boy said, "That is just as I expected; they were fat, nicely dressed and put up in such an attractive way."

So, you see, we had disposed of the scrubs, and then we were in better company. We are now taking care of thoroughbreds. I will tell you how we are feeding now: We put straw on the floor, about four inches thick, and in the morning we feed some peas, oats and wheat. These are the best all-around foods for laying hens I know of. We raise Canada peas and oats together; the Canada peas, you know, are small, and they can eat them whole. The peas are rich in protein and the oats have got the gimp in them. Oats will make a horse trot, a hen cackle or a rooster crow.

Then next we feed the mash. Take seventy-five pounds of wheat bran, a hundred pounds of wheat middlings, one hundred pounds of corn meal and twenty-five pounds of meat scrap or meat meal, and mix them together. We cut up some alfalfa hay, put that into the cooker and pour some skimmed milk on it and bring it to a boil, then stir in enough of above mixture to make the whole crumbly, and feed just what they will eat up in about fifteen or twenty minutes, in V-shaped troughs. You have got to use your own judgment in feeding; after you have fed them a few times you can do it without the least bit of waste.

Then, in the evening, if the weather is cold, we feed them corn, wheat or buckwheat, providing nice, clean, pure water to drink constantly. In the wallowing box we put South Carolina rock for them to wallow in. That is a lice exterminator, as it contains phosphoric acid from 14 to 16 per cent., and no lice can live on a hen when she gets into that wallowing box and takes her bath.

You see we are very particular in regard to the care; we study their nature and make them comfortable and contented.

The question has been frequently asked in the institutes I have attended during the past two years, especially, what is a good ration for a laying hen? Because farmers are paying more attention to poultry than they used to.

What is a good ration for a laying hen?

That question answers itself, if you give it a thought. We will ask ourselves this question—what is an egg composed of? Seventy-four per cent. of the egg is water. Now, how necessary it is that a hen should have water every hour of the day—nice, clean water. Because it is impossible for a hen to lay many eggs without water.

Now, when the housewife opens an egg in a saucer and examines it, the egg is not so nice as she would like to see it; the white of the egg is watery, the yolk is pale and she thinks the hen is sick, but that is not so.

When the white of the egg is watery, it shows that we are not feeding a good, balanced ration. The lack of protein in feeding causes it. Fourteen and a half per cent. of the egg is protein. That is the white of the egg.

Now, we must find a ration rich in protein. That we can do by feeding plenty of clover and wheat bran and wheat middlings. What is the result? The white of the egg is thick and attractive.

Ten and a half per cent. of the egg is fat; that is the yellow. If the yellow is pale we can color it by feeding.

If you feed too much buckwheat the yellow of the egg will be pale. We feed yellow corn and wheat, two glutens, and in that way we give a beautiful hue to the color of the yellow.

We also feed quite a good deal of corn, to produce fat.

How often do we pick up an egg in the winter with the shell so brittle that it won't stand shipping? Sometimes you find an egg with nothing but tissue—no shell at all. What is the matter with that hen?

The shell is composed of lime, and it is a mighty drain on the hen's system, laying an egg every other day, to produce the shell; they must have lime enough to cover the egg with a shell.

Clover is rich in protein and it is rich in lime, but, in addition to this, we slack a little lime and put it into the shell-box, and the

hens will go there if they require it; and you will be surprised, if you try it, at the difference in the results.

What is the result of this kind of food? We will break an egg in a saucer and see. The white of the egg is thick, heavy; it is attractive, nutritious; the yellow of the egg is the golden hue that was desired, and the shell is firm and strong and will stand shipment. There is the perfect egg, just brought about by thinking the matter over carefully and feeding intelligently.

In this way, you see the business becomes more profitable to us. Furthermore, it is just as essential for us to breed hens of the laying type, if we are going into the business, as it is for the dairyman to have a cow of the milk type if he wants her for milk purposes.

Now, as to the laying powers of the hen. I visited Professor Gowell, who told me that it took him fourteen years to develop the laying functions of the hen so that he produced 241 eggs per hen. He has hens right there of the same breed that laid only forty eggs per hen during the same year, and some hens were barren.

I there studied the type of the hens; I noticed their characteristics. They were very perceptible. You could see it at once in their general make-up.

The best investment that we ever made in the poultry business was when we purchased our foundation stock. We bought thirty hens and three cockerels from Mr. Wyckoff.

It took him about twelve years to develop the laying functions so that he got 197 eggs per hen from 600 hens. I have already passed the meridian of life, age is crawling on, and life is so short that I wanted to begin where Mr. Wyckoff left off, and I was willing to pay him for the knowledge he had in the business. So our foundation stock was up to snuff. They are very intelligent, as well as very strong; they are the fashionable styles, up to date in every respect. I brought them home, and for eight years we have been further developing the laying functions of that stock.

You see, what you want is to select a hen something of a wedge shape, a little long over the back, and deep through the heart; that gives plenty of room for the ovaries, and that insures heavy egg production.

We are studying it very closely, and last year we had 950 hens in one house that produced us 201 eggs per hen.

But, we are not satisfied with that. We want to increase the egg production still further. But, don't you see, just as soon as the hen puts on fat it dwarfs her egg production. When a dairy cow puts on fat it dwarfs her milk production. Just upon the same plan. There is the difference between success and failure in the business.

I will tell you how we do. About the middle of August we shut our hens up in order to reduce their flesh. We have one house, 367 feet long and 15 feet wide, with two windows in each department; we put those hens into those rooms, which are 15 feet square. One window has wire netting in front of it; this we open to give plenty of circulation of air. We give them a scant ration and plenty of water, and it takes about two weeks. At the end of the two weeks we open up the windows of the house and let them out, so they can range out into the sunlight in a fourteen-acre lot, and they look like so many balls of snow. It is a very attractive sight.

Then we begin to feed richer food and more of it, but we want to use some caution and watch their digestion. We give them sunflower seed, peas, oats, wheat and corn, a variety. We raise the sunflowers ourselves, and this seed is very nourishing and oily. Just as soon as the chicken begins to put on flesh the oil in the sunflower seed, don't you see, works upon the feathers, and that will make them begin to shed, and they will throw off their old plumage until almost in a state of nudity. They will then go to work and replume early in the season. They don't suffer any inconvenience, as the weather at that season is mild and they do not get chilled. You don't see them standing around shivering and looking sick, forlorn and disheartened, for they are happy.

They will soon put on their new plumage, and as the feathers begin to come out, their eyes will begin to sparkle, their combs will turn red and they will begin to cackle. That is the time to gather the eggs.

When you are in the poultry business in the way I have pointed out, you can pick up eggs when they are profitable, the finished product; and it is just like picking up the money; you feel as if you were doing something.

I want to be in a business that I can realize that I am on earth for some purpose. We have no use for a dead man. And I tell you,

if you cannot do anything else, get out in the street and begin to shout and crow—that will make your blood circulate; you will feel happier and have a better appetite.

If you have plenty of confidence in this business, and look after all the little details, you are sure of success. That is the beauty of it.

You want to keep your hen-house dry, and avoid disease in that way. We clean our roosts every Saturday.

After the droppings are taken off we put on South Carolina rock, which we buy by the carload, and it absorbs the moisture, and this gives us a fertilizer that is astonishing. A hen will produce a bushel of manure a year. This means a better farm and better crops, don't you see.

Just as soon as the roosts are cleared we paint them with a mixture, made as follows: Take a pound of carbolic acid crystals (and you can get that for forty cents), put it in a crock and set it in a pan of warm water and let it melt; then pour the contents into a gallon jug and fill it up with kerosene; then take another gallon of kerosene and put about four tablespoonfuls of that combination into that gallon of kerosene. And I want to say to you that, with that South Carolina rock and wallowing box, with just a little care every Saturday, you will never see a louse nor a mite on your premises. We are very particular. We fight the lice before they are born; that is the best time to fight them.

There is no more valuable fertilizer than hen manure mixed with a little South Carolina rock, and the crops we raise with it would astonish you.

Two years ago we raised 960 bushels of wheat. We had forty bushels to the acre. And there was one acre there we thought we would experiment with, and we put 560 pounds of South Carolina rock and hen manure on that acre and cultivated it nicely, putting it in good tilth; and we raised fifty-nine and a half bushels of nice, clean wheat on that acre.

And this year we put eleven acres to alfalfa. We gave it a coat of hen manure and South Carolina rock. On the 4th of July we finished cutting it for the first time and left it on the ground, because we wanted to put more force in the roots (it was then about seven inches high); and in five weeks from that time we cut it again. Professor Wing, of Cornell University, came to the place when we had it nearly cut—there was about thirty feet the whole

length of the field still standing—and he went down to look at it. He said he never saw a better stand of alfalfa.

We drew from the second cutting forty-one large loads. When we cut it the third time it was about eight inches high, and that we drew in for the poultry for the winter.

So, you see, that it is not just the eggs that are profitable; but, also, the manurial value of the poultry. If you have a little farm of your own you can enrich your soil; you can have the eggs and the broilers, the birds for breeding and everything along that line, and there is something in the enterprise.

Now, you see, we began with only 200 eggs, and then as we grew in the knowledge of the business we increased our plant, so that we now have over $8,000 invested in buildings and appliances, and the hens have paid every cent of that amount, and more, too.

I say to you people here—and I want to speak within safe bounds—you can just as well, at present prices of eggs, bring in a dollar a hen, after paying all expenses, and you can do it with your other work, and it makes a big sight of difference with regard to our finances, as I said before.

Now, I just want to tell you how my wife cans chickens, and then I will be through.

After they have been nicely dressed she cuts them up and puts them into the kettle and stews them down, seasons them to taste, just as if she was going to have them for dinner that day—and all the difference is she doesn't eat them that day. And after they are properly cooked, according to her idea, she gets two-quart, closed fruit cans, takes the top right off, and placing those chickens into the cans, presses them down firmly and fries the water out of the stock and fills the can with the pure oil, or, if not enough, butter will answer the purpose. Screw cover on firmly and keep in cool cellar.

Mr. Roberts—In speaking of South Carolina rock, do you get the dissolved rock or the undissolved rock?

Mr. Van Dreser—We get the dissolved rock.

Mr. Roberts—With acid phosphate?

Mr. Van Dreser—Yes, sir.

Mr. Roberts—How large a proportion of cockerels do you use?

Mr. Van Dreser—One with twenty hens.

Mr. Goble—That depends upon the breed a great deal, does it not?

Mr. Van Dreser—Yes, sir.

A Member—Do hens get lime to produce shell from the oyster shell itself?

Mr. Van Dreser—Well, they get some; there is quite a percentage of lime in it.

A Member—What breed of hens do you recommend?

Mr. Van Dreser—We keep White Leghorns, single comb; just one breed.

A Member—When you feed oats, do you find it necessary to have them ground?

Mr. Van Dreser—No, sir.

A Member—Do you place much value on skimmed milk?

Mr. Van Dreser—We keep a dairy of twenty cows for the skimmed milk for the chickens; that is all we are keeping it for, because we can make more money out of the hens than we can out of the dairy. The cow eats the coarse feed or fodder on the farm and we want that skimmed milk. And no man can afford to be without it, who keeps poultry.

A Member—If you had to buy it, how much would you pay for it?

Mr. Van Dreser—I would be willing to pay fifteen cents a hundred, and it would be the cheapest food if we got it at that price.

A Member—I noticed last year in our locality there was a disease among fowls that creased their neck and closed up their eye.

Mr. Van Dreser—That is the roup, I guess.

Secretary Dye—I guess it will close both eyes if it is allowed to continue.

Mr. Van Dreser—That is because of draughts when the birds are roosting, or something of that kind. We have not had a case of roup in four years. And last winter we had 2,200 hens in winter quarters, and we only lost one hen in four months. That is true, and that I consider good sanitary conditions.

A Member—In inbreeding, how long do you run on the same stock or inbreeds?

Mr. Van Dreser—We change the rooster about once in two years, and we are breeding our hens larger every year. We have got full, thoroughbred hens weighing from five to five and a half pounds, and we have kept up the weight and vitality and consti-

tutional vigor. We are breeding all the time for more vigor and more nervous energy.

A Member—Have you got any White Leghorns weighing five pounds?

Mr. Van Dreser—Yes, sir, and five and a half. We shipped some out to the Experiment Station at Utah last year, hens weighing five and a half pounds. We got a letter about a month ago from the Professor of Agriculture in Utah, saying that those hens in eleven months had gone over the 200-egg mark. What do you think of that, from the Professor of Agriculture? I feel proud of that letter and I am going to publish it to the people.

A Member—Do they lay larger eggs than the unimproved White Leghorn?

Mr. Van Dreser—Oh, yes, much larger, and just as soon as we find a hen that lays inferior eggs we simply take her out. We weed them out.

# Pruning and Marketing of the Peach.

BY J. H. HALE, SOUTH GLASTONBURY, CONN.

# Pruning and Marketing of the Peach.

BY J. H. HALE, SOUTH GLASTONBURY, CONN.

*Mr. President, Ladies and Gentlemen:*

I have been asked to come here this evening and talk to you a little while and show you some of the pictures in relation to peach culture.

There has been a marvelous devlopment of the peach industry in America within the last quarter of a century; then there were what was supposed a few "favored peach regions" in America—the Peninsula of Delaware, your own State of New Jersey and a little section of Western Michigan were supposed to be about the only peach-growing sections of America. But within the last fifteen or twenty years there has been a wonderful development of the business and study of the peach and its habits, so that it has now come to be a settled thing, commercially, that the peach can be grown in almost every State of our Union, except the northern sections of the New England States and a little of the northwest country; but, with those exceptions, peaches are being grown in every State of the Union—north, south, east and west—and there are no more "favorable peach regions;" and, instead of the short peach season—a portion of August and September—as was the case twenty-five years ago, the "peach season" now begins early in May and extends into the autumn.

In fact, from my own farms in Georgia and Connecticut, I have been eating peaches for nearly eight months. We began in May, in Georgia, this year, and up to Christmas we had our Connecticut-grown peaches, which had been kept in cold storage.

The ripening season of peaches is from May, in the South, until November, in the North and in the west of Maryland and Pennsylvania; and there are in commercial orchards to-day nearly

50,000,000 trees—almost a tree for every man, woman and child in the country.

Now, with our pictures, we will talk a little about the business, and if there is any question you are particularly interested in I will be glad to answer it at any time during the address or at the close.

The first picture has no particular reference to the peach business. It shows where I began as a laborer, and finally started on my own farm operations. My push-cart had cost a dollar, and as the fruit made me a little money I kept increasing my investment by degrees, and I felt right along that there was a chance in agriculture, and I feel that there is now. I want to say to-day to you that I believe the opportunity for the enterprising young man and woman on the lands of the United States is as grand and great to-day as any other business opportunity there is before us.

My Connecticut farm has some rolling, hilly land, which we have to work on. My home is located in the Connecticut valley, on the level, about seventy-five feet above the river, and at that elevation we can seldom grow peaches at all—the winter frost is bad for them. We can, perhaps, get a crop once in five or six years; but climbing back towards the hills, one-half a mile away and 100 feet higher, we can get crops, perhaps, two years in three; and climbing the hill still farther, which is 300 feet above the valley, we can get about nine crops in ten years. The conditions of elevation have very much to do with the production of this fruit. I can start from home on a winter's morning with a thermometer and it will continually rise, and at the top of the hill it will be eight or ten degrees warmer than at the house, 200 feet down in the valley—that is, at different times, on a cold, winter's day or night.

The hills furnish air drainage. We have rocky farm land, and hence have "got the rocks" which you are after in business. Cultivated peaches are now growing on these rocky lands, which seven or eight years ago was a mass of wood and brush, and we are now removing stones, pulling and cutting out the brush for more orchards. One pile of rocks and stones there cost us $3,000 to get them off a twenty-acre field. We will sell the rocks for thirty cents. We have trees there eight to ten feet high with spreading head, showing that it is worth handling such land.

About midsummer we do our summer pruning. The strongest shoots in the central head clear to the base of the season's growth are all cut away—cutting out all that summer's growth of upright, strong leaders, sending all the strength into the smaller, side branches. Why is this necessary? The winter-pruned tree, with its strong, new growth keeps climbing and climbing, then each spring it is shortened in again while the new central branches keep on growing upward.

The spring pruning stimulated more wood growth and it kept climbing higher each year until altogether too high: a fair sample of the average peach tree anywhere. When trees get such high heads that a man standing on an eight-foot ladder can't reach the top, they have very little fruiting wood except on top—contrast with the orchard that is so low that a man can stand on the ground and work it, pruning, thinning, spraying and harvesting. I have an orchard of 10,000 such trees and not one step-ladder in the orchard to gather fruit last year.

The high trees I spoke of a moment ago got so high we thought it best to "sit down on them;" and so, one year, when there was no crop of fruit on them, we sawed the tops all off, so as to bring the head down to the ground. There were one or two small branches left to pump sap to stimulate the new growth, but the main branches were cut entirely away. The next year after this severe pruning we had a solid mass of wood nearer the ground; then by summer pruning we will be able to make those trees fruitful, with low, broad-spreading head.

In one of our orchards of tall trees, instead of cutting off the entire tops at one time, I went along the rows and cut every other tree in each row, and every other tree was left to bear while this was putting on a new head; and as soon as there was a head on this tree, the next year, we cut the tops off of these. So that process was adopted and now we have a magnificent orchard with new heads.

We sawed the entire tops off in this way. About 5 per cent. of them failed to sprout, and we lost about 5 per cent., so that next year when we cut those that were left uncut the first year, we left on a few of the side branches and got a very much better result and without the loss of any trees. After this treatment a magnificent growth took place in one season. It shows what a splendid head can be put upon an old tree, and it is well worth

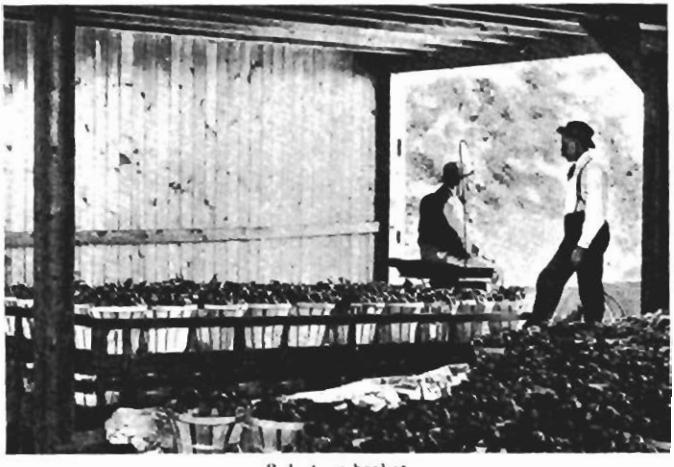
while to do it. You lose but one year of fruiting, and fruit on these new heads is extra large and fine.

The great cost of pruning high-head trees and of thinning fruit and of spraying and finally harvesting, is wonderfully reduced by having the fruiting head down near the ground, where you can do the work without step-ladders. It reduces the cost of all those expenses so enormously that it is well worth the while. We can pick fruit in our low orchards for one-quarter of what we could pick it in the higher trees, where we have to use a step-ladder, and then it does not require so much handling, and they are better handled. We pick more frequently, because the long limbs are so low, as you go along standing on the ground you can get all over the orchard daily with about one-third as much help as would be required to get the same amount of fruit from high trees. This picture shows the style of basket which I used generally. This is a heavy, oak-stave basket, strong enough so that we can turn it upside down and a heavy man stand on it without breaking it.

One of the essentials of handling tender fruit is a rigid basket or package to gather the fruit. Anything that is rigid—has a backbone—is the best package to gather fruit in. A basket that is thin, so that there is any elasticity in it, so that it springs a little with the fruit, is a dangerous package to handle tender fruits in. It wants a stiff, rigid basket. And while a heavy, stiff basket like this is rather expensive, costing twenty cents apiece in large quantities, it carries the fruit in fine condition and is cheapest in the end.

A Member—How do you cultivate under those low trees?

Mr. Hale—We use the modern extension head harrows; we use one that is called the California Senior, which is a harrow with the pole set away to one side, so that the man and horses are out, away from the tree, and swings the harrow under the tree. In other words, the horses are out in the middle of the row, while the harrow has one side working under the tree, and coming back down the row, breaks the other side of the opposite row; then there is nothing but the middle to be broken up. With the modern employment of the extension harrow or cutaway harrow, with an extension head, the Acme, that is made with this extension, you can get right close up under the trees with any one of these named. The trees are not so low headed but that they can be thoroughly cultivated if the right implements are used.



Oak stave basket.

View of peach and plum orchard.

these six or eight acres. I don't know, when we come to strike a balance-sheet, where I shall stand, but I rather think I am a little ahead in plums and fun and a little behind on peaches.

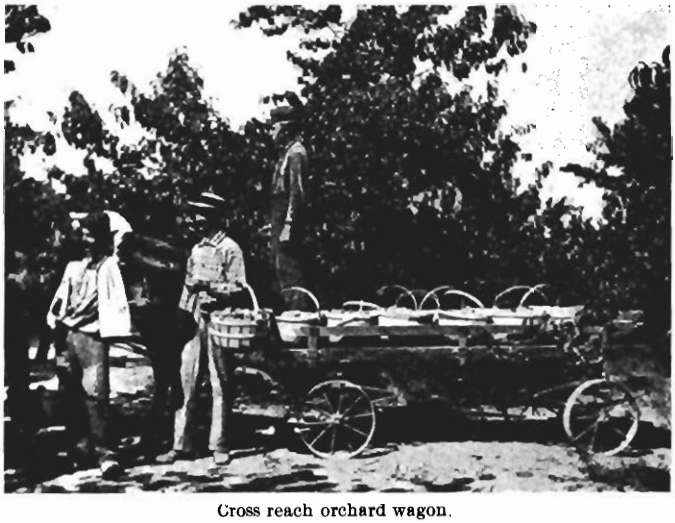
Here is a view of this orchard. There is Professor Powell, Assistant Pomologist of the United States Department of Agriculture, at Washington. There is the white horse. "The red-headed girl" is somewhere in the distance.

This shows the style of orchard wagon used to haul the peaches out from the trees in the main avenue of the orchard or the side of the orchard, where they are loaded on larger wagons and hauled to the packing-house. This is a cross-reach wagon that does very well anywhere; you can drive the horse and keep the forward wheel clear of trees, the rest will follow—the rear wheels and the body take care of themselves. If you do not hit the tree with your forward wheel, you cannot possibly hit it with the hind ones; and there is a decided advantage in turning a corner if it is pretty short. It holds more than the old-style, one-horse, orchard wagon —you can put about twenty-five half-bushel baskets on it.

The large wagons then take seventy-five or a hundred baskets at each haul to the packing-house, where they are carefully sorted and graded according to size, &c.

This is the interior of the packing-house in the Connecticut orchard, showing the different styles of packages. Here is the ordinary half-bushel basket, which we use very largely, and the six-basket carrier which we use. Because with a cover on it is a convenient package to handle. This old-style, half-bushel basket that we use here on the Atlantic coast, with a small bottom and a big top, is a top-heavy thing; it is always upsetting, hard to handle in the cars, it tumbles over in the warehouses; you cannot pile them one on top of the other. The six-basket Georgia carrier is best package for fine fruit.

We find by using girls to assort and pack the peaches we can be far more successful than by using men. Man at heart is a dishonest creature. Women at heart are honest. And you might hire a man at $1, $3 or $5 a day and tell him how you want him to pack the peaches, and then you will find the basket coming out with the big, nice peaches all on the top and not so good below. But you tell a girl or a woman what you want done, and she has a better conscience and is a good deal more able to carry out orders exactly as given; also, she will do the work faster



Cross reach orchard wagon.

Connecticut, orchard packing house.

see them in quantities around the farm. More and more we are planting some of our most hardy flowers all about the farm.

And I want to call your attention to three trees we are very careful of—there is a scarlet maple, and a white pine and a white oak my ancestors saved out of the old forest when they settled there in 1639. I love grand old trees and I hope you do.

We have our experimental rows of raspberries, currants and gooseberries, Japanese plums and chestnuts; and very choice friends they have come to be. We planted specimen rows, new and choice fruit, close to the house, so that the family might have a chance to get acquainted with them and so that our visitors who did not want to wander on the farm might taste these different fruits as they grew. So we keep on growing a great variety of new things, and if they prove worthless we root them out in a few years, but we get some nice things out of it all.

We have an experimental strawberry bed just back of the house, of some 300 varieties, sub-irrigated. Instead of irrigating on the surface as the other is, this has a three-quarter-inch iron pipe fifteen inches under ground, perforated with very small holes every two feet. The water, being under strong pressure, comes out in the ground and works up to the surface. We get wonderful results by the use of this water.

You should see our strawberry bed in blooming season with the flower beds adjoining.

I want to say to you brother farmers and those who are interested in outdoor life, we are planting more and more flowers and less potatoes.

One back-country Yankee, who worked for me this year for the first time, had a little farm of his own. This fall we were enlarging our floral grounds by quite an extensive tract, and we had to put in all the time we could on it. And he said to me, "I swear, Mr. Hale, I was telling my old woman, you are spending more on this flower garden than most fellows would on growing two acres of potatoes. I don't see how you can afford it." I said, "My friend, I cannot afford not to do it. I do this to keep you fellows at work." And he said, "What do you mean?" I said, "When you come over the hill in the morning and get in sight of the home grounds and this flower bed, doesn't it feel good to see this beautiful land and see these beautiful flowers? And when you go home at night, doesn't it feel good

to know that you can take home a handful to your wife?" "Yes, by golly," he says, "I do feel good every monring." "Then," I said, "you work better. I do this because you can work better." Said he, "I never thought of it that way before. We do work better and we get better results on this place than anywhere I ever worked."

One of the old trees I was talking about a while ago, I get out every morning of my life and worship and have a talk with it. You know, I think the trees have souls, and live and feel and know a whole lot human beings don't know; and, understand, I love a great tree. This tree is nineteen feet six inches around the trunk, three feet above ground.

In 1638, when they laid out the old highway, the first settlement in Connecticut, that was left as a boundary tree. At a curve in the road that was the boundary tree, put down as "the great oak" in 1638; and my ancestors for many a generation have lived under that tree, and I live under it, and I am glad to preserve it.

And the old white pine! I spent the night with a business man of New York not long ago. After breakfast we hurried off, got aboard the elevated cars on a perfect jump, standing in a crowded car, and I thought it is no wonder that people break down in such a crowd and rush. I thank God I can live in the country, can go leisurely to my work in the morning, and, as I go, look at that magnificent old house, turn around and worship this grand old white pine, "the great oak" and the old scarlet maple.

Why, those fellows have so much money they don't what to do with it. They pay an artist $10,000 or $100,000 for a painting that is the same old thing—yesterday, to-day and to-morrow—unless it is growing worse all the time. Our beautiful trees change all the time, and with shrubbery and flowers we have a beautiful, freshly-changed picture about our homes all the time—and we have them so by only paying just a little attention to the simple things of growth and culture from day to day.

In front of my office is a chestnut tree, one of the beautiful, Japanese varieties, and in the fall we gather the large, beautiful nuts and take them into the house and eat them during the winter evenings. So, you see, we have fun as we go along.

The scarlet maple affords us magnificent, delightful shade all the summer. It is a thing of beauty. Under its shade a meeting of our Connecticut Pomological Society was held. We have there our Board of Agriculture and our Grange, the same as here, and we also have a Pomological Society, made up of nearly 600 of our leading fruit growers; and here we held a summer meeting on the farm, and sat around the tree talking about things interesting to us. We came right to the business end of it, right there in the field and orchard, and about plant and vine will discuss problems that interest us. And there is a good deal in those field meetings; there should be more of them in every State. I have an Italian who works for me. He is a bright fellow and interested in all the work of horticulture, and I finally had him join our Pomological Society. He went to one or two winter meetings; and last year, when the annual meeting came around, I asked him about going to it. "Oh, no; no go any more to those meetings," he says; "the trouble with you American people is you talk, talk, talk, talk all the time; but I want to meet in the summer, in the field, and see what you do." And that is right. We want to "see what you do." And that's why the field meeting is so popular in Connecticut.

Here, as this picture shows, was a field meeting of our Pomological Society, and there were representatives of Agricultural and Horticultural Societies of thirteen different States. We held an after-dinner meeting. We had a little speaking, and the Chairman of it was your worthy Secretary of the New Jersey Board, Brother Dye. And we had a glorious, good time.

And I want to tell you something about this meeting. Perhaps you won't like it, but at either this meeting or the one the year prior, and I think it was this one, we entertained a crowd of from 300 to 400 fruit growers; and I had an old uncle, who has been with us, and he wanted to do something to help along the entertainment; so when he was in town he stopped at a cigar factory on the way home and bought three or four boxes of cigars, and after lunch he came to me and told me, "There are a few boxes of cigars in my carriage; you go and get them and pass them around to the crowd." I said, "I have not time; you had better do it yourself." And he went up and got his boxes of cigars, and got someone to help him; and in the crowd of over 300 people he passed the cigars all around everywhere, and he had just eight

View of the Georgia orchard.

cigars taken out of the box. The rest of them didn't smoke. (Applause.)

Now, we jump from the Connecticut farm to Georgia.

The land was so rough, so hard, in Connecticut, so hard to clear that we could not clear the land as fast as we wanted to plant the peaches on it. It takes a good while to dig out those rocks. So we jumped down to Georgia and bought a few hundred acres down there for a little orchard. The land was cheap and good, and the conditions were favorable for early fruit; and the best farm labor in America lives in the Southern States.

Here is a view of the orchard looking down from the top of the packing-house. The rows here were originally a mile and a half long; and then we got working in the opposite direction, and made them a mile and a half long that way, so that at the present time those rows are three miles long north and south and about a mile and a half east and west, in the widest part of the orchard.

Those rows, as you see, are pretty nearly straight. When I first bought this farm I wanted it laid out in proper order, so that it would be easily cultivated; and I secured a surveyor and he ran lines for the streets and avenues through the whole farm, and then began blocking out the field for the trees, making the blocks 1,000 feet by 500. After those were blocked out I got an engineer to put in stakes for the lines of trees, when one of the old negroes on the place came to me and said, "I think you are paying that man a good deal of money with that machine." I said I was. And he said, "Lulu and I could do it just as well." I said, "Lulu, who is Lulu?" "Why, my old mule." Well, I said I wanted them in good, straight lines, and I told him I wanted it to look good and wanted it so we could work it easily. "Well," he said, "I can do just as well as that man can with that machine." And he persuaded me; so finally I put him way down in one corner on one of the blocks and let him try what he could do. He cut three stakes out in the woods and put one down at the end and another one 500 feet away, and headed the mule around and got a sight between the mule's on those stakes; and I watched him lay out the first row, and was pretty straight. I watched the second row and it was straight; and as soon as he got in the third row I got over to the civil engineer was, and I was not losing any time to

to quit. And the negro and the mule did it all alone, and they are as straight as a string, 100,000 trees of the first planting. That will show what a darkey will do in laying out a straight row. I cannot do it myself, and at home never found a white man who can.

Of the variety called Triumph, we picked one crop when they were three years old, and they were so inferior I said, "I never will have another one of them," so after we finished picking we sawed the tops off those trees, early in June.

Early in August we budded those over with a new variety, and the following summer we grew a new head on those trees; and the second year we had an entirely distinct variety to harvest from that lot of trees. We only lost one year in turning from an inferior variety to a good one.

Those are Japan plums. It shows how good they are growing. We fed up our land there by the use of fertilizer and cow-peas—one of the most valuable crops for the land—and we put our Japan plums in rows. We get a little better results in this way. We cultivate them once or twice, after which we let them grow at will.

In 1899 we had a warm, early spring. About the middle of February the trees were in full blossom. We had a temperature of eighty for a week, and then came a terrible, cold spell. It fell to zero, and killed, on the entire southwest side, the trunks of 100,000 trees. There was a little live bark left on the northeast side of the tree. We decided at once to saw the entire tops off the trees, except a few branches near the ground. This we did. Then, when growth began again, what little life there was in the opposite side of the tree worked sap enough to build a new head and a fair growth, and by liberal cultivation and liberal care all through the summer we were able to build new heads on those trees in one summer. But I will tell you the way we did it: largely by faith. When those trees were so badly damaged we examined the grove all through. Everybody was mourning the loss of the crop. My superintendent and I were mourning the loss of the trees. As soon as we decided what should be done we telegraphed to Philadelphia and New York, and we sent out sixty or seventy-five men sawing off the tops of those trees, so that what little tops were there might at least pull the trunks through and build up new tissue if possible. The sawing had not been going on more than half a day when one of the old negroes—the same

The beheaded trees with new tops.

one who marked the rows—came to me and said, "Captain, I don't believe it is worth cutting those trees, but ever since you have been planting those trees we have seen your money go out every Saturday—and where it came from I don't know—year after year, and there comes in a good many years' work in that orchard. Now, we are going through with this work, and you will lose all your trees." And then he says, "Captain, I am sorry for you, and I have been talking with the boys on the place this morning, and I will tell you what, Captain, I want you to cut our wages down one-half and we will work for you till the orchard gets into fruiting again." Think of a man working for sixty or seventy-five cents a day coming and asking voluntarily for a cut in his wages down to one-half! Isn't that the kind of sympathy that would make trees grow?

I tell you the tears came to my eyes when I said to the negro, "There will never be a cut down in the wages of the men of that sort. Just stay on your work and the wages will come along all right, and the trees will come along all right; just stay here and work with that spirit." And I believe that spirit stimulated those trees, so that in one year they had good, new heads on them, and the next year they had the finest crop they ever had.

The picture shows those trees one year after the tops were cut away—and all that head was made in one year. You will see they have got some vigor. There are plenty of peaches, and the men are gathering them in one year after they were practically dead. The trunks are weak, but the new heads are fine.

In the neighboring orchards, where they said they guessed they would wait and see what our sawing off would do, 60 per cent. of the trees were lost, while we did not lose 5 per cent. of the trees in that orchard. The fruit is all brought into the packing-shed in those large, strong, oak-stave picking baskets I told you of in Connecticut, and they go to a long, canvas tray, that runs down the center of the packing table. They are all hand sorted and put into those trays—the largest ones in one section of the tray, and the second size in another section, and the third size in another. On the opposite side from the graders stand the packers, who pack them in the six-basket crates, under very careful instructions, and after it is packed it is brought over to the inspecting and nailing table, and one of the foremen looks over each crate. If it is found perfectly satisfactory, the cover is put on and nailed fast. When

a packer packs a crate he puts his numbered ticket on the top of the crate, so that when it is examined, if there is any bad work, we get to the bottom and find that it is his work, and he has to straighten it out. If there is anything wrong, it goes back to the packer and has to be packed over. In that way we keep track of every crate that is packed.

Now, in the packing-shed there are professors, doctors, lawyers, thieves, ladies, gentlemen, hoboes and all classes of people. A majority of them, however, are very respectable. Very many of them are bright, young men and women from the better homes in the South, young women who have never done work before, and would not go into the factory or store work; but there is something fascinating about the peach work and a sort of picnic to those folks to go in the peach business for six weeks and work every day at it, from morning till night. A very nice lot of people; and they soon weed themselves out—the inferior cannot long hold out against the good. They make long days of it, and after the first year or two operating there I saw them come out of the packing-shed, the young girls especially, very tired, and go over to their boarding-houses. I did not like to see them so tired, so I played a Yankee trick on them. I found, years ago, that when work was hard in the fields and I would come in sometimes so tired at noon from exhaustion of the field work that I had not ambition enough to wash myself, that Mrs. Hale would slip over to the piano and play some sort of easy music for a few moments and then rattle off into a jig or two, and in ten minutes I was rested enough to dance a jig,wash myself and was ready for dinner and the business of the afternoon. I thought I would play that same trick on those laborers, so I went and hired a band of music—a little string band—to come in every afternoon. I rigged up a small place overhead, so they could give us some music to rest these tired workmen. I hired them to play, from two o'clock until four, some soft, slow music—any soft, slow music they liked; but from four o'clock until quitting time—whenever that might be—they must give us some Hallelujah Betsy all the time—the liveliest music they could get. And that night the boys and girls went out of the shed light-hearted, light-footed, talking, laughing and feeling very rested and happy. I said, "All right; I have got you fixed—you are not tired any more."

The next morning, going to the office where we keep run of the tickets—where the tickets are all figured up, so that my superintendent and myself can know at nine o'clock each morning what everybody did on the place the day before—the young man who had charge of the tickets there said, "Mr. Hale, look here; see how much better the work is getting on." And there was something more said, and I said, "Oh, well, they have got rested." And he said it was the music. "Well," I said, "let us keep tabs on them." We kept tabs on them until, in a few days, we found that the music increased the labor in that shed 30 per cent.; and, as a matter of fact, the increase in labor pays for that music and leaves a profit of about $10 a day on music. A mean, Yankee trick, of course! But everybody is happy.

The removal of the crates from the packing-shed into the cars alongside of the packing-shed is intersting. Some days they have loaded as high as thirteen cars, and they go out of that shed almost in a steady stream of crates from morning till night. They are so packed that there will be no slipping. They build up four, five or six feet high, so that every crate has an air space all around it, which keeps the fruit good and cool until it reaches the market.

The young man in charge of car-loading is young Brumby, a nephew to Lieutenant Brumby, Flag Lieutenant to Dewey at Manila Bay; and as he came to work for us that same year we made him Flag Lieutenant, so that every morning he runs up the flag on top of the packing-house and hauls it down at night. The American flag is flying over my packing-sheds every day in fruit season.

Our icing station, holding 6,000 tons of ice, is not a private enterprise. It belongs to the Armour Car Company, who furnish all our refrigerator cars. Each car holds six tons of ice. They have a tank at each end and they are cooled off before they are loaded and re-iced after the fruit is loaded, and re-iced again at Atlanta and again at Charlotte, North Carolina, and again at Danville, Virginia, and at Jersey City if they are going to any New England parts.

The trains have fifty, sixty, eighty and sometimes as many as 100 or 125 cars sent out from Fort Valley in a single day. We send fifteen of them on a single day from our place. That is the outgrowth from a start with a pushcart.

We spray our orchards. In Georgia 200-gallon tanks are put on heavy wagons, with an ordinary pump with two lines of hose, one man working the pump and guiding the horse, and two men at each line of hose to spray. They put on oilcloth suits and hats, of course. This is the very work they were doing to-day if it was pleasant in Georgia—spraying for scale with oil and water. San José scale there makes us work. It is a serious pest, but with careful attention and spraying it is easily held in check; and while I was there in December last going over the orchard with my superintendent, on one part of the orchard that was sprayed last year I found a little scale, but not enough to warrant spraying again this year. There is considerable spraying now to be done in sections not sprayed last year. And those pumps work only dry, pleasant days. We have to keep one mechanic repairing the pumps all the time. Every fifteen minutes they are tested to see whether it is working right or wrong in sending out the oil and water.

The curculio we catch on a canvas that is held under the tree, and one man gives the tree a quick jolt and we get a good many curculio. We work a gang of seventy people for eight weeks fighting the curculio, and at a total expense of $3,000 to $5,000. But we got a very large crop of practically sound fruit, while our neighbors who did not fight it got their fruit badly stung and of an inferior quality.

We draw a sheet over a light frame twelve feet long and six feet wide, and have two boys or two girls carry them, one each side of a tree, and it makes a square about twelve feet; and one man with each gang carries a large battering ram which is padded with rubber. Each tree is given one quick, sharp blow, and the curculio come tumbling down. It looks like a pretty big job to shake so many trees, but the boys become so expert that each gang will shake 1,000 trees a day, and they get over the ground pretty rapidly, and get thousands and thousands of the insects.

This work was spoken of last year by our State Entomologist, and a report made and printed in a bulletin by the United States Department of Agriculture.

I looked for paying results, and at the harvest season got it when I found that in our orchard we had less than 4 per cent. of stung fruit in our entire orchard, while the adjoining orchard,

where no such work was done, had more than 60 per cent. of stung fruit.

This work is in the early morning; that is the best time to catch the curculio. No other time of the day is so good, though at times we do keep up the work all day long.

We have a hotel there right in the orchard, where we furnish rooms, good, comfortable beds, running water and the foundation of a good living without charge. Then, if they want to arrange their own board, they buy their own provisions and board around at different cabins. Some of them have a place to cook for themselves; others dine in a tent which we have there. But we furnish them good, wholesome quarters without charge, with good, cleanly surroundings.

In a dining-tent, back of the hotel, we board those who want boarding, and we board them at actual cost to ourselves—for just the cost of the food and the labor in serving it, nothing for the general service. But some of them want board cheaper than that. A group of boys from the college at Athens, Georgia, buys all their provisions. They have a kitchen and a little log cabin, with a darkey woman to keep it in shape, and they made an agreement with her to cook for them at twenty-five cents a week apiece—that is, they pay her $1.50 a week to cook for a company of six.

At the head of all is a bright, young man, who was a New Jersey boy.

I am also glad to say to you that the first 100,000 trees planted in this orchard were raised in New Jersey. They were New Jersey trees, from our old friend, David Baird. More than that, I am glad to say that one of the best men who ever served me—one of the most faithful men—is this same New Jersey boy, John Baird, from Baird, N. J.—a young man of sterling character, education and of ability. His assistant is a southern boy, of good character and a good workman. Those young fellows are in the saddle at four or five o'clock in the morning. They are up and away all day, and if I am there or away it does not make any difference—I know every single day that every man there is doing his work, and that the work is being done well, because they love the business. And any man who loves his business and respects himself makes a good worker, without the reward of any kind you may have for him.

A Member—What is the instrument you prune your trees in the summer with?

Mr. Hale—Any pruning shears, like the Wiss shear, made over here in Newark, or any one of the single-hand shears. We cut back all of this year's growth of wood, if we cut at all, never more than an inch in diameter; it is usually from a half to three-quarters of an inch in diameter.

A Member—At what time do you do that?

Mr. Hale—That is an open question—a valuable question—it is variable; but we try to do it just about as the season's growth is over, which would be in your latitude from the last of July to the 10th of August. Before the growth has stopped—and if you do it at the right time you will get wonderfully good results—if you cut out the strong growth entirely, the strength goes into those side branches and small fruit spurs.

A Member—You don't allow any new growth?

Mr. Hale—No, sir. If you cut them early in July, or, perhaps, the middle of July, you would force the second growth. You have got to study the time. Keep your eyes open. Use your own senses. A stranger who was not acquainted with the tree would probably do it in the wrong time, but a man who lived with his trees, and was acquainted with them as he ought to be, would know when is the right time—not so early as to start new growth, or so late as not to assist bud development.

A Member—At what time do you cease cultivation?

Mr. Hale—In Georgia we cease cultivation usually about the middle of June, which would be equivalent to the first of August in New Jersey. In Connecticut we cease the last of July or early in August.

A Member—In what part of the State is this farm located?

Mr. Hale—This farm is in the southwestern portion of the State, thirty miles southwest of Macon and a little north of Andersonville.

A Member—Are you bothered with borers down there?

Mr. Hale—Yes, we are bothered with borers, and bothered with everything that attacks the peach, except the yellows. We don't have that. I am glad we are bothered with all those things. There are blessings in poverty and blessings in troubles, and pests of all sorts keep you hustling and thinking, and finally lead to greater success.

A Member—How long will a tree live?

Mr. Hale—I don't know. With proper care they will live twenty-five or thirty years. I have not got that far, but am judging from surface indications. The trees that were injured by that frost are just as fine in their tops as ever, and they are twelve or fifteen years old, and I believe many of them are good for eight or ten more.

A Member—When peach orchards get what they call the yellows, is that any indication of starvation?

Mr. Hale—The genuine yellows is the yellows, and no starvation about it. Many trees that have the so-called yellows have good life in them. Because a tree is yellow is no sign that it has the disease known as yellows. A greenish tree in your orchard may be affected with the yellows, and a yellowish tree in your orchard may be all right. Yellows is a specific disease.

A Member—Tell us how to detect the yellows?

Mr. Hale—There are many ways of detecting the yellows. It is not in the general appearance of the tree, not in the shade of its color as a whole, in a vigorous tree especially; but a few, strong shoots in the central head will begin to set the leaves closer on the branch; they will set them a quarter of an inch apart, and those leaves sometimes will be larger than any others on the tree, and be a peculiar green; and yet you can see, with the sun through them, a very slight, crinkling wave of yellow. That is the first sign, and one seldom noticed. That is usually two or three years before most people know there is any yellows there. Another sign, of course, is the premature ripening of a single specimen fruit of the tree. One single specimen will swell up and go ahead of the rest, and will be of high color and have little, fine streaks of red through the flesh. The next year a good many will prematurely ripen. And then, of course, throwing out sprouts from the body or main branches slender stocks, with small, yellow leaves upon them—pennyroyal sprouts we call those—that is a tree in the later stages of the disease. There is one thing sure about the yellows, and that is this: it is contagious and incurable. And if you discover it on a Sunday morning, while on your way to church, pull it up. It is like a case of small-pox in the neighborhood—it will poison the other trees. In Sussex county I traveled around some distance and saw orchard after orchard breaking down with yellows; yet at a peach growers' meeting three-quarters of those

present told me they had no yellows and many said they did not believe there was such a disease. So far as the peach crop in your State is concerned, you have got to wake up. If you get the yellows in your peaches, be vigilant in rooting out promptly any trees affected with it.

A Member—What fertilizer is it best to use to produce the finest fruit and get the best price?

Mr. Hale—Any fertilizer rich in potash and phosphates. We use ground bone mostly for the phosphate. Sometimes I use acid phosphate, but not very often. Hard wood-ashes, if I can get them, furnish potash in its best form. Also some lime, or sulfate of potash. If you use muriate of potash, use lime.

Mr. Black—Do you find the Japanese plums a profitable crop?

Mr. Hale—Yes, I find it very profitable.

Mr. Black—What variety?

Mr. Hale—Red June, Chobot, Abundance, Burbank and Satsuma. The Red June is early and not so good a quality, is a sure bearer, very beautiful and a good seller. The Chobot is later, handsome and is extra good quality.

Mr. Black—Do you have any rosett?

Mr. Hale—The rosett that Mr. Black asks about may be in some respects like the yellows. Nobody knows what the yellows is. Eight or ten years ago in the South there was a disease known as the rosett. It never reached as far south as Macon, within thirty miles of it on the north, but in a section of the State about Griffin it was quite prevalent ten years ago and killed many trees. From time to time an instance of the disease is reported, but it is dying out; it is practically all out. I don't know of any. I have not seen a case of it in four or five years.

A Member—Is it as bad as the yellows?

Mr. Hale—No, it never was as bad. There were one or two years when it was quite serious, but never as destructive as the yellows.

Mr. Roberts—The yellows is not as bad in New Jersey as it was forty years ago?

Mr. Hale—I was not here then.

Mr. Roberts—I was. And my recollection is we saw more of the yellows forty years ago or fifty years ago than we do now.

Mr. Hale—Have you been up in Sussex county within two or three years?

Mr. Roberts—No, not for some years. But I don't think it is as bad down in Burlington county. I remember it clearly sixty years ago; we did not know what it was—why we had those single shoots. But we have been raising peaches ever since, more or less, and we do not see one-fourth as much of it now as we did sixty years ago.

A Member—Is oil safe to spray?

Mr. Hale—Perfectly safe, if you can be sure of the proper mixture. If you will furnish a pump that will spray not over 25 per cent., it is perfectly safe. The only harm that has ever been done, so far as I know, is where the pumps have not worked properly, and you got a greater percentage of oil on. Crude oil and water and pure kerosene water; in either case I have seen no danger; no damage done where the pumps have been kept in perfect order, and spraying done on a clear, dry day.

A Member—Did you ever use pure, crude oil?

Mr. Hale—Not alone; no, sir; 25 per cent. is the most we ever used. We find we can clean the scale out pretty thoroughly with 20 per cent., or 15 per cent. in some instances.

A Member—What do you think of the lime, sulphur and salt?

Mr. Hale—I think that is a most excellent application, but it is a vile, rotten-egg affair to handle and very troublesome in that way. But, I believe it is nearly perfect as a remedy against scale. It is not very much cheaper than the oil, but is is safer for the tree. The oil and water pumps act so uncertain, as I have said. The lime sulphur must act as a fungicide to some considerable extent, and I believe it is the best spray we have yet, but I would rather be away from home the day they spray.

A Member—Do you use the plow in your orchards?

Mr. Hale—Yes, where we cannot harrow. Each of our orchards is worked each spring by a harrow—one of the modern harrows—and if we can get at it right early in the spring we will work without a plow; but sometimes it gets a little grassy or a little hard for some reason, so that we do plow. My orchards now cover nearly 2,500 acres, and they have to be thoroughly tilled every summer. We break them up all we can with harrows, and where we cannot do this we use the plows. We use the Syracuse, No. 8, three-gang plow, and the small, one-horse Syracuse plow, working close around the tree, and use everything to stir it up well, using such tools as are best adapted to each situation.

A Member—Where you used cow-peas and clover, when did you plow them in?

Mr. Hale—We plowed the clover in just as early in the spring as we could work the soil. I believe in clover worth. I have in Connecticut between 200 and 300 acres of orchard in clover at this time. But I think the clover should be plowed in just as soon as we can work the ground in the spring, because if you leave the clover grow in the spring it may pump too much moisture out of the soil; and to turn under a great body of matter then leaves the ground too dry, and it will take a month or six weeks to get that ground in good condition, and that month or six weeks in early summer is when you want to get an everlasting growth in your orchard. So I want to get the clover down the first thing in the spring. If you let the clover crop in the orchard in the spring you will not get the value out of it. Cow-peas go down with the first frost in the fall, and they are no trouble to get them out of the way when you plow your orchard; but I never like to have any dirt loose in the fall, so I never like to plow in the fall. I want grass, weeds or trash of some sort to cover all my land through fall and winter.

A Member—But you want to cover your orchard with something?

Mr. Hale—We want it covered with something. We want it covered with weeds, if nothing else.

A Member—Did you ever cover it with rye?

Mr. Hale—I did before I knew better; but I do not do it any more.

Mr. Roberts—Did you ever use oats?

Mr. Hale—Yes, before I knew better—before I got something else that did better. They don't gather any nitrogen, they don't add anything to the soil, they don't bring anything from the outside, while the clover and cow-peas do. They furnish free fertilizers, as far as that goes. If you can get a plant to work for nothing, that is the chap I want.

A Member—Do you apply any nitrogen, except what is grown on the ground?

Mr. Hale—Oh, we always keep a little on hand—some nitrate of soda—and when I see trees calling for a little nitrogen I give it to them. There are times when trees in some part of an orchard look weak—where the foliage is a little weak—then we always have

some nitrate of soda on hand to apply; but under ordinary conditions cow-peas and clover will furnish all the nitrogen the trees ought to have.

A Member—How much do you apply to a weak tree?

Mr. Hale—That depends upon the tree—one, two or three pounds. I would give it enough. It pays to be liberal with trees if you want them to be liberal with you.

A Member—A liberal supply of lime or salt might kill the tree.

Mr. Hale—Salt would, in excess; lime would not.

A Member—Do the trees in Georgia ever get bare of foliage, as they do here?

Mr. Hale—Yes; they get the foliage off six weeks before they do up here. The foliage usually, in the majority of the orchards in Georgia, is off by the middle of September. I suppose on our orchard it is on a little longer than any other, because they get a little better food and they are a little better cultivated; but the foliage comes off there before the 1st of October, always.

A Member—It does not remain off as long as it does here, does it?

Mr. Hale—Oh, no. It starts in the spring early—and there is a point. I told you a while ago I thought trees have souls. Now, I will tell you a little story to show you how trees show that. I have the Old Wilson strawberry in Georgia, that some of you are acquainted with here. It will have ripe fruit in forty-one days from the time of bloom. In Delaware it will be about thirty-four days. And here in New Jersey it will be about thirty-one days, while in my home in Connecticut it will be twenty-eight or twenty-nine days; and in Vermont, up next the Canada line, twenty-one days from the flower to the ripe berry. The same plant will do the same amount of work in just half the time up in Vermont that they do in Georgia. And why, except the season is short, and the plant *knows* it has got to hustle?

In order to show you some of the peculiar things in plants and trees: Knowing that trees taken from Connecticut began to hustle early in the winter down there, and trees from Georgia would not start in Connecticut until late in the spring, I got some peach seed from a tree in the city of Washington and raised seedlings—some in Connecticut and some in Georgia. When they were one year old I went into the garden of a friend of mine in Washington and cut a single little branch from a Late Crawford tree; cut that

branch in two, and budded the one-half on the Georgia trees and the other half on the Connecticut trees. When they were a year old I had these brothers and sisters of the same family, of the same stock—both seedling and bud—coming from the Middle South, half-way between Connecticut and Georgia. Then I took one of the Georgia trees to Connecticut and planted it opposite his brother up there; and I took one of the Connecticut trees and planted it opposite his brother down in Georgia.

The first winter down there that Connecticut, Yankee-grown tree, when it got a little warm on a day in January, began a slow growth, and when it got a little warmer it began to sprout faster; and the Georgia tree beside it said, "Hold on; you are getting up too early." But the Yankee kept on growing. Well, it got cold after that—about freezing—and the Georgia tree said, "I told you so; you don't know much about this country; you Yankees are too soon. Wait till I get up—wait till along the middle or last of February." And about that time the Georgia fellow began growing, and said, "Come on, Yankee; it is time to get up." The Georgia one kept on growing, while the little Yankee had to recover from his early chill.

Now, about the Georgia tree carried up to Connecticut. In April the native trees began to grow and kept growing, and the Georgia fellow says, "It ain't spring; it ain't just right. I am going to lay low for a while." And that Georgia fellow went to sleep until along the middle of May, and the Yankee fellow had got sprouts on it two or three inches long and hustled; and then that Georgia fellow began to pick up and began to grow. But the Yankee tree had such a start it could not catch up all that season.

What happened the next year? That Yankee did not start off to grow in January; did not wake up and begin to grow until February, along with the rest of the Georgia trees. And what happened in Connecticut? The Georgia tree began to grow early in April with the rest.

Who told them all that? I don't know.

# Pleasure and Profit in Honey Production.

BY MR. D. EVERITT LYON, PH.D., BELMAR, N. J.

# Pleasure and Profit in Honey Production.

BY MR. D. EVERITT LYON, PH.D., BELMAR, N. J.

The subject this evening is "Pleasure and Profit of Honey Production," and I will give you the pleasure and profits that I have found as a result of a number of years' experience in the keeping of bees.

It has only been in recent years that we have been able to secure from the honey-bee the greatest possible amount of honey, and this has been due to the invention of the movable-frame hive, that was invented by the late Dr. Lorenzo Langstroth, who was called the father of American bee-keeping.

We find that there has not been a time, however, when the honey-bee and the honey have not been known to mankind. On the ancient monuments of Egypt and in the classic writings of Rome and Greece we find frequent reference to the honey-bee, which shares with the silk-worm the distinction of being the only insect that has been kept in a semi-domesticated state by man for his benefit. While investigations in the habits of life of the honey-bee were made by mankind for some time back, yet it has remained for the invention of the movable-frame hive to enable us to see what was taking place in the interior of the hives, and to get from it the greatest possible amount of profit.

In traveling through the rural sections of Great Britain you will frequently see such constructions as the old straw hive, commonly known as a "skep," and it was utterly impossible, with those hives, to undertsand the habits of the bee and their method of life, and thus manipulate them intelligently.

Crossing the channel and going to the continent we find, on passing through Switzerland, that the conditions that prevailed there were, until lately, as bad as those that prevailed in England. They had old-fashioned box hives; and those hives are frequently seen in the gardens in the rural districts of our own State, and showing how primitive this manner of keeping bees was, compared with our modern and progressive methods.

Five to eight or ten pounds of honey from a hive of this character was considered a fair yield, whereas with the introduction of the movable-frame hives it was made possible to do so much more. By way of illustration, I have been able to secure as much as 100 pounds of extracted honey from a single hive, and from fifty to sixty pounds from a single hive as the yield.

Under the difficulties which they labored in England, in the use of the old-fashioned hive, it became necessary to transfer bees from one hive to another, or "drive" bees, as they expressed it. You see how difficult it was and what great obstacles confronted them, not only in this branch of apiculture, but we find, when it became a question of hiving bees, the difficulties were just as great.

But, with the introduction of the movable-frame hive, it has been possible for us to literally take the hives apart, and to understand all that is taking place in this up-to-date, movable-frame hive, from which we secure large supplies of honey.

It is a familiar scene, in the rear of some farm-houses on some progressive farms, to see these double hives and their chambers for storing the surplus honey. As we see these hives, how few of us realize that each one of these hives, or colonies, as they are called, has a population variously estimated at from 30,000 to 40,000 inhabitants.

The queen bee is the mother of the hive, and her presence is absolutely essential to the health and continuance of the hive. If she dies or is killed in her flight, the bees are without a mother, and in time all the bees die off and the population becomes extinct.

The average life of a queen bee is from three to four years, while the average life of a working bee is about five weeks. The population of a hive of bees is made up of thousands of working bees, who are imperfectly-developed females, and a few drones, that are hatched in the early spring for the purposes of propagation.

The queen bee is a large bee, with a long, tapering body. The working bee is the little bee, and the drone bee is the large bee. The queen is the only perfectly-developed female; she lays all the eggs that are laid, and she will lay, under favorable conditions, anywhere from 2,000 to 3,000.

When the above statement was once made an old lady in the audience exclaimed, as she gave a sigh, "Oh, if we could only get a cross between the queen bee and the hen we would have no trouble with the production of eggs."

We have not time to-night to dwell upon the various organs these bees possess, but I can, speaking generally, tell you that the little working bee has an eye on each side of the head, and so strong and so keen are their powers of vision that they go very long distances, going often five miles in quest of honey, and so straight can they fly that you have no doubt all heard of the proverbial "bee-line."

It is necessary that the little fellows shall have furnishing to their homes, and so they build the honey-comb, as we call it, made of beeswax. This wax is made from honey, taking, as it does, from nine to twelve pounds of honey to produce one pound of beeswax. The little bees hang in clusters, having first gorged themselves with honey, and thus generating heat, little particles of wax form in the wax scales which can be plainly seen upon the abdomen of a worker. As these little wax scales are formed they are taken and carried up by these bees to be put in the proper shape in the cells. These little cells are hexagonal, and the bees build in this form only; the apparent purpose is that they can get the greatest possible structural strength in the least space.

A gentleman some years ago took a piece of honey-comb and found that in a certain given space there were sixty of these hexagonal cells. Not telling what he proposed doing, he wrote to a celebrated mathematician, a friend, and asked him how many hexagons, given dimensions, could be gotten into a space of a given dimensions. (He had found that the little honey-bee had actually built sixty of these cells in that space.) And in a few days he received word from his friend, who declared that upon examination he had found that just 59.9 of these figures could be placed in that given space. Well, the gentleman was very much surprised, and he wrote to his friend and told him that the little bees had improved upon nature—that they had actually

crowded sixty of these hexagonal cells in the given space; and in a day or two he received a letter from his friend saying that he had made a mistake—the table of logarithms he had employed in doing the problem had been defective, but that with a perfect table he had found just sixty, and no more, of these cells of given dimensions, could be placed in that given space.

So we see these little workers had lost no time, and had utilized every possible particle of space.

Taking a piece of the comb from the hive and cutting it in half, we find the little cell or room is occupied by the egg, and that hatches in three days into a larval worm, and that goes on into the pupal state, and finally, on the twenty-first day, the matured bee emerges from the cell, ready to take its place as a nurse bee.

Now, we must not forget that these hives are fully systematized. They have a queen bee, and she rules them all, and as she moves majestically from cell to cell, is followed by a retinue of attendants who fulfill her every wish.

Then there are the sentinel bees standing at the entrance to the hive to watch against enemies, and they are relieved at certain times.

Then there are the young nurse bees taking care of the brood while the old bees range the fields in quest of honey.

In this development there is the egg, and the larva, and the fully-matured bee.

In a frame taken from a modern hive, a movable frame, you can see the honey on the upper part of the frame. And, by the way, the bees store their honey just over the brood nest; the surplus honey they put in the upper story, and this is why we get surplus comb honey. There you can see the worker brood, and the drone brood and the queen cells, and those queen cells for the bringing out of new queens. You can see the bees appearing as they are hatching, in the center of the frame.

In order to overcome many of the difficulties of bee-keeping we have what is known among bee-keepers as "foundation." We take the beeswax and melt it and run it out into thin sheets and then run it through a machine, and in pressing upon that sheet it makes the cells; and taking that sheet of wax we put it into the frame, and are thus able to make the bees build worker-comb instead of drone-comb, which is very undesirable; and in this way

we are able to meet the demands of the times and keep fully abreast with the progress that is being made in apiculture.

On taking a frame out of the hive on the sixth day we find that they have taken the foundation and have begun to work, drawing it out; and if left in there for a few days longer they would eventually have that whole frame filled with honey-comb, and it would be literally all worker-cells instead of drone-cells, as they might otherwise make.

The bees produce wax by hanging in clusters and generating heat which produces wax.

Where we let the bees do the work without furnishing them the foundation, we come up against certain difficulties in the matter of crooked combs, and it is the use of foundations in these movable frames that has made it possible for us to get straight combs, and thus make it easy to manipulate the bees.

By removing the side of a hive you can see how the bees do their work in frames that have not been supplied with foundation. But you may observe that they are building large numbers of drone-cells.

When wax is first made it is a beautiful snowy-white, but in time it becomes black from the little fellows constantly running over it, and yet those combs can be used for years and years. And this is the secret why, in running bees for extracted honey, you get more extracted honey than comb honey, because in running for comb honey the little fellows have to use large stores of honey to produce comb every time, as it takes from nine to twelve pounds of honey to make a pound of comb, whereas in running bees for extracted honey we use the combs over and over again.

If you will examine a worker bee closely you can see its abdomen very plainly, and you can see the wax scales on each side of its abdomen, and the little piece of wax protruding from the body. And, as we stated a little while ago, they take this piece of wax and place it on the cell which is being made. The walls of these cells are as thin as tissue paper, the outer rim being made much thicker, so that they will not break down as the bees run over their surfaces.

Bee-keeping has a very important relation to the subject upon which you will be addressed by the following speaker, that is, fruit raising, for this reason: In examining the little bees we find that the bee is divided into three parts—the head, the thorax

and the abdomen. The thorax is the center of locomotion, and on each side there are three legs. The first leg, the second leg and the hind leg, that has a little pollen basket in which they carry the pollen from the flowers to their hives.

In examining the legs of the working bee we find they are covered with stiff, black hairs, and it is in this respect that the little bee becomes the great benefactor of the fruit raisers—fertilizing blossoms by carrying pollen on these hairs on their legs. It is literally true that honey-bees increase the output of fruit.

While it is true that fruit blossoms would be more or less fertilized by the pollen being carried by the wind, yet the fact remains that the honey-bee, carrying the pollen from one blossom to another on these stiff, black hairs on their legs, insure larger quantities of fruit.

There is an adage among bee-keepers that bees bring fruit, and this has been demonstrated again and again.

In a certain locality in California the fruit raisers produced fruit in large quantities, but the bee-keepers of that section got into quarrels about bee pasturage, and as a result bee-keeping was abolished from that section; and, in the course of two or three years, the fruit growers became very much alarmed. They found their production had dropped off fully one-half, and called attention to the fact and discussed the question, and they found that the dropping off of fruit production had been coincident with the abolition of bee-keeping: and so they at once brought bees again into that locality, and found that the fruit output, in a couple of years, went back to its normal capacity.

Every fruit grower should keep a number of colonies of bees around the place, to insure proper fertilization of his fruit blossoms, and he will find, even if he is not interested in the production of honey, that great benefits will accrue to him in the mere matter of the fertilization of fruit. For the sake of his trees and for the production of fruit it would be a paying investment.

If you will notice the honey-bee at work on a gooseberry blossom you can see the method by which it carries pollen from one blossom to another.

You will notice particularly the hind leg of the bee, how its little basket is filled with quite a store of pollen. I have stood beside the hive time and again and seen them coming in with

pollen—sometimes it was red, and then again as green as grass, and then it was just as yellow as it possibly can be, indicating the various kinds of blossoms on which they were at work.

Then, there is what is sometimes called the business end of the bee—a point of interest—otherwise known as the sting.

Now, a great many people refrain from keeping bees on that account. Some people have the idea that bees are naturally vindictive, and some people they will sting without cause, while others will be received into their favor without any effort. And yet that is not true.

When you consider that the average life of a working bee is but five weeks—that is, during the working season—you see that it does not live long enough to become acquainted with any particular person.

The only reason why one person is stung frequently and another is not, is because the person who is not stung simply understands the habits of the bees and does not irritate them.

You know they are very curious little things, and in this respect they are like some men I know—I was about to say they are like some women—but I think that might be unkind. So then they will come flying in front of you in this curious way, and the temptation is to strike at them and then you are stung, and then you will say, "Well, you say bees are not vindictive; well, he stung me."

There is absolutely nothing in this. Any person with a little care and a little study of the habits of the honey-bee can learn to manipulate them without fear, and the experience the speaker has frequently been that of going around bees and working among hives and not being stung for weeks at a time.

If a person, however, still is fearful, he can, by the use of a veil and rubber gloves, reduce stinging to almost an impossibility.

It may be encouraging to those engaged in bee raising, and I see some present who are engaged in apiculture, to know that a person frequently stung by bees will never suffer from rheumatism. Rheumatism comes from an excess of uric acid in the blood. A bee's bite injects into the system formic acid, and that acts as a counter irritant; and a person who works among bees continually will not be a sufferer from rheumatism.

I told an old gentleman that one day who was suffering from

rheumatism, and he said he preferred the disease to the cure, and he went on with the disease; but the above is a statement of fact.

A modern hive, with the side removed, will show the brood chamber and the upper chamber, in which the surplus honey is produced and stored. How easy it is to manipulate those hives in comparison with those old straw hives, or old-fashioned box-hives that were used a few years ago.

With this method we have been able to increase the honey production of our hives tenfold, and the speaker has had no trouble in securing anywhere from fifty to seventy-five pounds of comb honey with the use of these modern hives. And if we desire to make bee-keeping a source of profit, we will never succeed unless we adopt the modern hive, with these various compartments, which makes them easy to manipulate.

Comb honey has one advantage over strained honey: while you can produce more strained honey than you can comb honey, the comb honey sells for more per pound. In certain sections they will not take strained honey, but want comb honey; and if you buy a little box with comb honey in it, you know you have the genuine thing. Strained honey may be imitated, but such a thing as artifical comb honey has never yet been produced.

We read every once in a while that some fellow has produced combs, and then filled them with syrup of glucose and capped it over, and sold it as comb honey; but the first pound of comb honey has yet to be produced artifically. There is a standing offer of $1,000 for the first pound of such, and that offer has been standing for years and has never yet been taken.

Honey is always salable; and if we would only realize the large source of revenue it would be to us, in addition to the other profits of agriculture, I think that apiculture would be more largely engaged in, in our State, than it has been in the past.

Honey is a pre-digested food, and will always be in demand.

A great many object to bee-keeping because of the question of swarming, but we can control swarming by giving our bees room and by cutting out the queen cells; and by keeping an oversight over the colony the question of swarming can be reduced to a minimum.

The reason bees swarm is because they are crowded. They are bringing in large stores of honey—in the season a colony will bring in as much as fifteen pounds of honey a day—and that will use

up their combs, and the result is they get crowded and swarm. And we want to keep our bees from swarming, because that is the secret of large honey production—the more bees swarm the less honey you get, whereas if we can keep them in the hive we are able to get larger supplies from them than we would if they swarmed.

In the method of running bees for extracted honey, we go to the entrance of the hive and we throw in a little smoke from the smoker, and then rap on the side of the hive, and the bees, becoming alarmed, fill themselves with honey; and then you open the hive, and you can do just about as you please with them, for a honey-bee cannot sting you unless it can contract its abdomen, and when it fills up with honey it is impossible for it to sting.

In running for extracted honey we put our frames in the upper part of the hive and put a perforated zinc between the two hives. The holes are large enough to permit the entrance and exit of the working bees, but keeps the queen in the lower part of the apartments, as brood would be in the way when it comes to the question of extracting.

After the bees have filled these frames we take them out and carry them to another part of the premises, and then take a sharp knife, which must be constantly dipped in hot water, to keep it warm, and cut off the cappings of the cells; then we put those frames in a honey extractor, and, by whirling it around, we throw the honey out by centrifugal force; and then we give the combs back to the little fellows again. They use those combs over and over again. The only damage that has been done has been to cut off the cappings, and that is very easily and very readily repaired by the little fellows.

In the matter of comb honey the method is somewhat different. The object is to take it out as soon as capped and put on new sections as needed. When they fill up the sections we take what is known as a bee escape board and put it between the hive body proper and the upper stories, and in the course of twenty-four hours, or thirty-six at the most, all the bees practically will have left the chamber, through this escape, and you are free to take it off and take the honey out.

There is absolutely no advantage in leaving honey in the hive. There are some who think that it ripens it to a certain extent,

but I have no faith in that theory. When that honey is put there and sealed it is ripe and ready for use, and if left on the little fellows travel over it constantly and soil it.

The best time to take the honey is just as soon as it has been capped over.

Another proverb among bee-keepers is, "Don't let the bees starve."

I had a gentleman say to me the other day, "Look at the hive." I lifted it, and found its stores were very low. And he told me that he was going to kill them and take what little honey they had, rather than let them starve. I told him he could use ten pounds of granulated sugar and a gallon of boiling water, mix it and put it in a feeder and put it in the top of the hive, and thus save the colony. He was very much surprised. But you see they had not sufficient stored away to carry them through the winter, and they would have starved. Many times bees starve in winter from lack of feeding, but the necessity for feeding is rare.

In feeding bees—but this is a question that does not confront bee-keepers very often—the best plan is, when a colony is weak, and you have two colonies, to put them together and make one strong colony.

Then, when the bees are fed, their hives should be put in a sheltered place, or even leaving them on their original stand; and I have gone frequently among the hives in the winter when actually the snow was so deep you could not see where the hive was located, and yet, in the hives, you could hear the little fellows buzz just as happily as could possibly be. And so the question of wintering bees is not a serious problem after a little study and proper preparation of the hive.

We should never kill bees. When we remember how faithfully they work for us and the altruistic spirit they display—literally working themselves to death to produce honey for us—we should never be guilty of killing them.

A swarm of bees may be easily handled, especially at swarming time. That is due to the fact stated a little while ago, that they have so thoroughly gorged themselves with honey that it is impossible for them to sting you in that condition.

I have frequently had experiences similar to this as I have stood in front of a hive from which a swarm had flown, and we

did not get things fixed just quickly enough, and they began to come back. I have been literally covered from the crown of my head to the soles of my feet with bees and yet not stung.

One of the most profitable branches of bee-keeping to-day is queen-raising, and that can be done artificially; and the income from that source is practically unlimited.

I will not have time to make a detailed statement of it this evening, but will simply say that you take a piece of wax and a piece of wood, usually the tooth of a wooden rake, shaped on end like a queen cell. The wax is melted and you dip this wooden tooth into it and let it cool, and keep dipping constantly and constantly until it is the right thickness, and then place these little cups on a piece of wood running through, across the frame. Then take a little larva worm and put it into one of these cells, then a little royal jelly from a queen cell about as large as a BB buckshot, and put it alonside of the larva into the hives. The little fellows will go to work, and after they have worked a number of days take out those frames and we will find that they have built a number of beautiful queen cells in which are new virgin queens.

They have taken the artificial cups we have given them and have developed them into the cells, and in each one of those cells is a queen. We now take these cells out when they are fully developed and put them in little cages. These cages are nothing more than little blocks of wood with holes bored through them, with a piece of wire gauze on each side, and several placed in a frame, which is put in a strong colony. After hatching these virgin queens are placed, each in a nucleus hive, and, as bought, are shipped in the little boxes you see before you; and the speaker has again and again received a number of them by mail.

The first cost of bee-keeping is practically the only cost; and if a person has once bought the hives and the appliances necessary to manipulate the bees, why that is practically the only cost in connection with that hive.

The only cost each spring is filing in the section boxes with the foundation wax, and the little fellows go to work and build that up, and you will find it is only a question of about forty or sixty cents each year to fit up those section boxes with foundations, &c.

We should keep Italian bees in preference to the common or hybrid bees, because the Italians are the gentlest and will work

on red clover, which the common black bee will hardly take notice of, and that represents for us a large return of honey from this otherwise neglected source. The little black bee is not able to reach the nectar in the blossoms of the clover, whereas the Italian bee does, thus giving us honey from this source.

Sometimes men hunt wild bees for their stores of honey. This is done by trailing bees in the woods until you find an old tree somewhere in which they have their home, and can take what honey they have stored, beside saving the bees by putting them in a hive and feeding them.

Now, in England, they are doing much for bee-keeping. They are having bee vans travel through all the rural districts and educating the people in the new methods of keeping bees and giving the people an idea of what they can do there; and, at the request of your Secretary, this lecture has been given through this State at the various Institutes, to show how profitable this harvest of agricultural life may become.

# Forestry for New Jersey Farmers.

BY F. R. MEIER, CONSULTING FORESTER, MAHWAH, N. J.

# Forestry for New Jersey Farmers.*

BY F. R. MEIER, CONSULTING FORESTER, MAHWAH, N. J.

*Mr. Chairman, Ladies and Gentlemen:*

The foreigner who recommends ways and means for correcting existing deficiencies in a country often invites severe criticism and the sarcastic advice of a speedy return to his own country. The remarks which you are giving me the honor of listening to, I am afraid, might raise similar feelings.

To begin with, I had better ask you, therefore, to attribute my errors, which you are not unlikely to hear, to insufficient knowledge of English, and my unasked-for advice in forestry matters to the deep interest and love which I bear for this glorious country.

As a practical forester, born and raised on a farm, I have managed small woodlots and large forest tracts for the last fifteen years, and for nine years in all parts of New Jersey, and I am happy to be able to give you the results of my experience. Forestry is a branch of agriculture, and every farmer should have a general knowledge of this branch, which, unfortunately, is so little understood and so much neglected.

Te object of forestry is: First, to furnish wood supplies; second, to furnish protection to soil and water and to regulate and promote water-supplies; third, to furnish pleasure and sport. All three objects may be simultaneously attained in well-managed forests.

* NOTE.—This paper was presented at five Farmers' Institutes during November and December, with the understanding that it should be inserted in the Annual Report of the Board, the Executive Committee considering the subject of sufficient importance for wider circulation at this time.

For the farmer in this section the first object—that is, the furnishing of wood supplies—is of interest only; for him the main object should be to cut his woods in such a manner that valuable successive crops can be raised in the shortest time without injuring the producing power of the forest and paying constant attention to the reproduction and protection of the young crop. Wood crop is the object, just as food crop is the object of agriculture. By doing this he is practicing true forestry. To its real significance, forestry conveys the idea of a continual use of the land for the purpose of producing forests. Thus, when a farmer thins his woodlot intelligently with the idea of sparing the small, valuable, thrifty timber, he is practicing forestry. His methods of work may not be the best, but it is, nevertheless, forestry, just as crude farming is agriculture. When a farmer strips his stump-land and holds it for successive crops of wood—be it heavy timber, cordwood, or poles—or when a lumberman restricts the cutting of timber under a certain size in order to utilize the growth of the small tree, each is practicing forestry. But when a land-owner cuts down a forest with no intention of utilizing the land for future crops of timber, it is no more forestry than it is agriculture when a farmer cuts the grass in a mountain meadow one year and then abandons it.

During the past few years a widespread interest in forestry has been aroused throughout the United States. People are awakened to the fact that the destruction of forest has gone too far, and that the forests which were supposed to be inexhaustible must be handled in a more conservative manner and with a view of future crops.

Yet, in spite of this interest, there still remains a strong impression, even among intelligent farmers, that methods of forestry can be used only by State or by wealthy land-owners, to whom the preservation of the forest is the first and the money returned is a secondary consideration. This is partly due to utter indifference toward the subject, but more particularly to a misunderstanding of the scope of forestry, and still more here in South Jersey to the forest fires. It is true that as long as forest fires are allowed to run over your pineries with such severity, and as long as you have no strict laws to protect the land, you forest owners cannot be expected to invest money in anticipating a future growth.

Original pine forest at New Lisbon, N. J.—Loaned by Geological Survey.

There is no question that practical forestry pays, both at the present and in the long run. Forestry proper does not require any investment of capital; all that is necessary is the judicious use of the axe. The axe is the forester's only tool; he uses the axe to reproduce the forest again; he uses planting tools only to correct the mistakes the axe has made. Any farmer can practice forestry, and if he wants to get advice as to how he should handle his woodlot let him make application to the Geological Survey of New Jersey. This Survey will send him, free of charge, a practical forester who will tell him how to treat his woodlot or his tract so that he may get the highest money returns and at the same time improve the woodlot; the forester will point out or mark out all trees which should be cut and tell you what kinds of profitable ones to plant on your soil.

Just let me say a few words here about the fires in South Jersey. We all know that perhaps the greatest enemies to South Jersey's prosperity are the forest fires. We know that forest fires occur every year; we know that they are set by sparks from stacks, and hot coals from grates, of locomotives; by carelessness in burning land, brush, meadows and burning safety strips around cranberry bogs; by careless hunters, smokers, campers, tramps, charcoal burners, berry pickers, cattlemen; by incendiaries, feeble-minded persons, and so on. We all know the detrimental effect of the fires to the old and young growth and to the soil; we all know that they discourage forest owners in the improved handling of the woodlot; we know the moral effect of fires, that is encouragement of theft and tending to impoverishment, degeneration and depopulation of the repeated burned sections, not counting the destruction to game and birds. We all know that, and people look upon those fires as inevitable. Fires are so common that we do not realize their great harm. With the exception of a few protected small tracts and cedar swamps, the whole of South Jersey pinery, some 1,400,000 acres, has been burned over repeatedly. As soon as a section has recovered somewhat from the effects of fire, as soon as the soil has accumulated enough humus, fires return, burning over the same area again. Every year the fires run over thousands of acres, destroying thousands of dollars worth of timber. This fall I made a careful survey of the burned-over areas of South Jersey and

found that, in spite of the damp year, there had been sixty-three different fires, burning over an area of over 100,000 acres, destroying more that $200,000 worth of timber, not counting in the damage done to the soil. And the year 1902 had less forest fires in Jersey than any year in the last twenty years.

Of course the damage done by fire to the old and young growth as well as to the soil, depends naturally on the severity of the fire. A light surface fire, which simply creeps over the ground, may not injure the trees severely, but it does impoverish the soil by burning the upper layer of the humus, which consists of dried leaves, twigs and so on. Severe forest fires destroy the whole of the humus. Humus is most valuable for the loose, porous, sandy soil of South Jersey. It has been established that humus formed under pines is capable of holding four or five times its own weight of water; and again, it is a fact that forest soil with a good layer of humus will loose three times *less* water by evaporation than forest soil without humus. Humus makes soil; it makes porous soil more binding, and again, binding soil more porous. Humus, therefore, plays a very important part in preventing evaporation, and in South Jersey the drying out of the soil is one of the most serious effects of lack of humus—caused by fires. All forest fires are harmful, and it would be foolish to argue otherwise. I am aware that some forest owners burn their forest land yearly every spring as a preventative from total destruction, claiming, also, that such a process improves the land.

An annual burning of a meadow may or may not, under certain conditions, improve the farm crop, but every fire, no matter how slight it is, checks the growth of the trees to a certain extent and eats up at least the manure of the forest. However, such a precaution is excusable, since it is better to have the growth of the trees checked and the soil somewhat impoverished than to have the trees entirely destroyed by a hot fire, which, at the present time of no protection, is liable to run through it at any time.

Perhaps the most serious injury from fire in South Jersey is its effect on the future reproduction of the forest. It is true that, after a fire, throughout the fire tracts small pines appear in great number, but an examination will show you that these pines are mostly all sprouts from the stumps of the trees which were killed

Badly burned pine with stunted oak sprouts underneath.—Burlington County, N. J.—Loaned by Geological Survey.

vation of the soil can be carried on when forest areas are interspersed. All waste places, the thin soils that produce little, the rocky and wet places, should be left to tree growth; not only does the farm look better with the ugly spots covered, but tree growth is the most profitable crop on them. Trees will grow, thrive and pay good returns without much work. Not that the forest grows best on such sites, but it can grow where no other crop is possible. Next, there should be left a wood growth on all hillsides too steep to plow comfortably, on all knolls, and in patches and belts along all slopes that are subject to washing out. As in agriculture, so with forestry, the first step to improve the land is to take care of the soil. In forestry this is done by keeping the ground densely shaded by undergrowth. I have been requested by some forest owners to advise them as to the proper treatment of their woodland; they point out to me at the same time what improvements they have made by removing the undergrowth. This seems to be a universal idea, which is a great mistake. Underwood plays a very important part in forest improvement; but its great value is very little understood. Undergrowth is beneficial in retarding evaporation from the surface soil, in keeping the soil shaded, in protecting it from hot, drying winds; it fertilizes the ground by keeping and holding leaves, twigs, &c., on the ground; it forms and keeps humus, and humus makes soil.

Our next question, how to treat a woodlot or tract: Practical forestry has several systems or methods. Each way may be adapted to different conditions, but it would lead too far to discuss them all here; however, all have the same object, that is to get the highest money returns from the woodlot and at the same time to treat it in such a manner that your woodlot is improved by the cutting and not made worthless. We should handle the woodlot so that after a cutting more valuable trees spring up and not poorer trees follow the taken-out, valuable ones. We often hear people say that certain kinds of trees must follow others; that, for instance, oak, scruboak or other hardwood must follow pine. This is a mistaken idea. Please do not understand me wrongly. I do not say that after *ordinary, every-day* lumbering, that is to say, after pine has been cut off, oak or other hardwood does not come up; it does, and it is an every-day occurrence, not only

Second growth pitch pine of average quality —Ocean County.—Loaned by Geological Survey.

here in South Jersey, but all over the United States. But I will say this, that it is not a matter of nature that oak must follow pine, and that pine, if we want a second crop of pine, does follow pine. There are ways of cutting off pine so that pine follows, and not oak or other hardwood. There are known reasons why certain trees follow after a clear cutting and why others follow fire, but it is impossible to explain every case intelligently without examining the land. However, under most circumstances, the explanation of the fact that oak or other hardwood follows clear cutting of pine is that there is no stand of pine seedlings when the old trees are cut off, or no pine seed-trees left from which the re-seeding can take place. Under such conditions oak or other hardwood follows, because, as a general rule, oak or other hardwood is found scattered over an area, and which at the time when the pine trees were cut, had but little value, and were allowed to remain, and were thus acting as seed-trees; even if a few pines were left as seed-trees, the hardwoods propagate themselves much more quickly and surely than pines, because oak wants light, while pines require some shading for at least the first two years, which, of course, they cannot get after clean cutting. In Europe, especially in Germany, where the forests have been cared for since centuries, you will find that pine forests are reproduced continuously. And again in Europe, when pine tracts are simply lumbered off as it is done in this country, that is with no view of harvesting a second crop of pine, there as here, oak will follow pine. The right distribution of light and shade in the forest governs what kinds of trees follow others. The right distribution of light and shade is the whole secret of forestry. The trained forester knows how much light and shade each kind of trees requires, and if he desires to foster or to reproduce by seed certain kinds of trees, he simply does this by giving it more or less light or shade, according to the requirements of each kind. All this is accomplished by using the axe judiciously.

One of the most important objects in the formation of a woodlot is to have the area sufficiently stocked, so that a complete cover overhead may be established as quickly as possible. In order to ensure quick closing overhead, nature brings to the ground a much larger number of trees than can find room on it for a prolonged

period. Soon after a complete leaf-canopy has been established the trees commence pressing one against the other. There is not enough growing room for all, and then the struggle for existence sets in. A portion of the trees outgrows the rest, and the domineering ones rear their heads up to the full enjoyment of the light. Between and below them struggle the rest; some of these still enjoy, with their leading shoots, light from above, though they are already dominated trees; others have been left behind and are suppressed; they live on, for a longer and shorter period, according to the species, and then die. This struggle, if not interfered with, continues while height-growth lasts, and it reduces the growing space of each dominant tree to such an extent that the latter cannot develop in the most advantageous manner. Such trees are likely to assume a thin, lanky shape; they are liable to be bent or broken by snow, wind or rime. To obviate such a state of affairs the intelligent forest owner interferes in good time by cutting a portion of the trees; he thins them out. Thinnings are cuttings, which have for their object to provide for each tree left standing that growing space which is best suited for the development of each tree. It is the number of trees that yields the best results, and not the greatest number that we try to keep growing. What the best number is depends, naturally, on the kind of trees and on the soil; it changes, also, with the age, as the trees need more room.

In some sections of New Jersey I would not be far out of the way to require per tree, in the twentieth year, 10 square feet; in the fortieth year, 40; in the sixtieth, 100; in the eightieth, 125, and in the one hundredth, 160 square feet of growing space—or 4,000, 1,100, 430, 350 and 250 trees per acre, respectively. We should leave more trees on poor soil than on good soil, for, as already indicated, a dense growth of trees make humus, and humus makes soil.

The three questions in thinning which always confront the forest owner are: Which trees to take out; when to begin and how often to repeat the thinnings; how severely to thin at a time. These questions, of course, can only be answered according to the special conditions of each case.

Which trees are to be cut may be answered in the following general way: First, all dead trees; second, stumpy and bushy

trees, preventing the development of the neighbor trees; third, stumps that produce more sprouts than they can support, and thinning out the sprouts becomes necessary; fourth, trees that smother more valuable ones; fifth, trees injured by fire or attacked by insects, borers and fungus growth. As a rule, it will be best to begin this series of thinnings when the struggle begins. On strong soils this occurs sooner, and the time for interference is easily determined; but in this case assistance is less urgent than on poorer soils, where more trees are struggling in an even fight, and usually the separation into dominant and suppressed ones does not take place easily and early. In practice a consideration for beginning these thinnings is, also, the possibility of using or marketing the material cut out. As a rule, thinnings are begun with fifteen to twenty-five-year-old trees; that is the time when the greatest height-growth is attained and a diameter development desirable.

In very small lots, where the owner uses the thinned-out material himself, a continuous, gradual thinning is best, while on larger areas it would be best to thin more severely at a time, and repeat it in a few years. The oftener the thinnings are repeated the better for the remaining growth; however, there should be five years between the thinnings.

Do not thin too severely at a time, when the trees are young; later on, when the trunks are clean of branches to a sufficient height, and the formation of clean boles is not any more to be considered, the thinnings may be made more severely. The crown cover should not be interrupted for more than three to five years at a time, nor should be taken out more than one-fifth to one-third of the standing growth. Through the means of thinning the product per acre, in the same time, may be increased from three to five times of what the result would be were the woods left to itself. It must not be overlooked that the light-needing species, as oak and ash, must have more growing-room than the shade-enduring, like maple, beech, and so on.

Unfortunately, comparatively few landowners have taken this important forestry question up, because it was difficult to point out to them woodlots which have been treated according to forestry principles, and where they could see the result of what could be accomplished in this line in New Jersey. It may, therefore, in-

terest you to learn how forestry methods were successfully applied to a 3,000-acre tract of oak and chestnut in Bergen county, N. J., for the last nine years, directed by me.

This tract lies in the northeastern part of New Jersey, in Bergen county, and is composed of oak and chestnut, with some maple and hickory from forty to fifty years old, grown mostly from sprouts. Before the present owner bought the tract the trees were cut down at short intervals of from fifteen to thirty years, the material being used for charcoal, cordwood, posts, poles and hoop-poles, for which there was at that time a steady and profitable market. Owing to fires, which have impoverished the soil, and the continual cutting of the sprouts and other reasons, the trees have degenerated—that is, the timber begins to rot at the heart on attaining a certain age—chiefly when forty to forty-five years old, and the growth becomes somewhat stunted in general. This deterioration seems to have affected a great part of the upland sprout forest. Financial considerations, of course, dictate the methods to be employed for profitable forestry. In this case the market had changed within the last twenty-five years, and the demand for cordwood, charcoal, small poles and hoop-poles was limited and the prices low; moreover, as already stated, the trees had degenerated. I was, therefore, convinced, after a careful study, that the best method would be to foster as many seed-trees as possible, and to allow trees to attain a greater age, so that in this way the coppice would gradually be transferred into a seedling forest. To effect this the following method was employed: The cuttings of each year were restricted to a portion of the area only, so that it would take a number of years to go around the whole tract. The forest was divided into ten sections of about 300 acres each. Every year 300 acres were taken in hand, so that it will take ten years to go over the whole tract; once in ten years the cutting will, therefore, return to the same initial section. In 1894 the first cutting, over an area of 300 acres, began, a tract being selected where the trees were oldest and thinning most necessary. A systematic course of thinning was carried on over the area, the purpose being to improve the future growth; there were cut inferior trees that were crowding out superior kinds; stunted, unpromising specimens; heavy sprout trees that had no future, and trees that had reached

maturity. Young seedlings are found in great number all over the forest; but the growth of sprout shoots is so much faster in early youth than that of seedlings, that the seedling without assistance rarely reaches the upper story of the standing wood. Sprout trees outgrow seedlings for the first thirty or thirty-five years, after which period seedlings outgrow sprouts. It was my aim to foster the seedlings which came up in groups here and there through the forest—as a result of the cutting—since it was more easy to protect these groups against the domineering sprouts than single, scattered seedlings. These new groups are the much-needed new blood, and will be the backbone of the forest. Approximately the same amount as was taken at the first cutting will be taken on the second round. The result of these cuttings, both from the sylvacultural and financial standpoint, is a marked one. The trees which were overshaded by inferior kinds have been set more free by the thinning and have almost doubled their rate of growth in diameter. Seedlings which were set free are thrifty and appear in an increased number, both in groups and singly, the forest is healthier and the sale value of the tract has not been impaired by the cutting, but, on the contrary, it has been enhanced. The financial statement shows a net revenue of $1,406 per year, or a net revenue of 50 cents per acre and per year; this is a trifle over 5 per cent on the investment, not including the enhanced value of the forest.

Now, let me wind up by saying just a few words about tree planting.

As said before, after the ground for farming has been selected, there remain on almost every farm, places which are good for nothing but trees. For profitable tree growth I recommend black walnut, black locust, cottonwood, tulip poplar, black cherry, white and yellow pine and perhaps catalpa. Above all, I recommend to plant basket willows. The finer kinds of willow are imported, for the reason that there is very little material grown here as yet, but they will grow here just as fine as they do in Europe.

*Willow Culture*—The greatest portion of willows for baskets is imported. Experiments have fully established that the same kind and the same quality as the imported ones can be grown and marketed in this country at a great profit. While willows grow

in nearly every country, their cultivation has received most attention in France, Germany, Italy, Belgium and in South Russia. In Germany and France, where their cultivation has received the greatest attention and reached the greatest perfection, farmer willow growers do not hesitate to plant the best of their wheat land in willows; in these countries wheat and willows grow side by side.

Although willows will grow almost anywhere, in order to get the best results it is necessary to be careful in selecting the ground for the plantation. The willow grows on lowlands and on the highest mountains; she grows in marshes and in sand; she is found on heavy, clayey soils, and, again, among the rocks of the mountains; she acclimates, as no other plant, in any climate and on any soil.

The most suitable soil is a deep, rich, moist, alluvial soil; but any good clay land may be planted if sufficiently moist. Moors and gravels are unsuitable, however. Water is desirable, though they will not thrive in stagnant water. The preparation of the soil should be a very thorough one. The land should be cleared during the summer, before planting and before the winter sets in. It must be thoroughly worked or ploughed. The better and the more thorough preparation the better the final result.

The selection of the right kind is, naturally, of the greatest importance. A willow culture stocked with the wrong material is a complete failure from the very beginning. A good, profitable willow must be a quick grower, tough and pliable, with no side branches. There is the greatest variety of willows, of which, for profitable cultivation, I recommend three kinds only, and they are: *Salix amygdalina, Salix purpurea* and *Salix viminalis.* These three kinds are most desired by basket-makers, as they possess all the qualities a good willow should have—pliability, toughness and durability. These three kinds will satisfy the demand of any basket-maker.

The ground being prepared, planting should be done in the fall or spring. The cuttings are taken from willows of one or two years' growth; cuttings should be twelve inches long, and the whole cutting planted.

There is still a difference of opinion as to how far apart to plant. Growers had the best success by close planting. The

rows should be eighteen inches wide, and the distance of plants in the rows five or six inches. This requires 73,000 plants per acre. The planting material—the cuttings—is best when cut a few days before planting. Should this be impossible, same may be kept in a barn which is not too dry and not too wet; but do not keep them in water. Cuttings may be kept for several months if kept under shelter.

The willow culture requires but little weeding in the early part of the summer; they attain their full growth by the middle of September, by which time the shoots will have made a growth of from five to ten feet. The willows are cut every year from November till March. All cuttings should be done before the sap rises in the spring, as the stock bleeds and the new growth is less vigorous if the sap has risen before cutting. Cut close to the ground, without splitting or injuring the old stock.

Willows are sold peeled and unpeeled. In case the willows go on the market unpeeled, the cutting should be done in the time from December 1st to February 1st. If they are sold peeled the cutting is done best in February. In the last case put them in bunches and put them with the butt ends in water four or five inches deep; if placed deeper they will strike root and are then hard to peel. By about May 1st the sap of the willows thus placed in the water will begin to rise and the bark will get loose; the time for peeling has then arrived. By the 1st of June the bark will get dry again and peeling should be finished by that time. For peeling, various instruments are being used. The old-fashioned "jam" or "spring long" seems to be the most simple and practicable one.

The so-peeled willows are placed on racks and dried outside. In a few hours they will be dry; the quicker they dry the better. Do not keep them too long outside or in the sun, otherwise they will lose their white color, which is to be preserved, to get top market prices. Peeled willows may be kept in a darkened room for years. A willow culture will last from twenty-five to thirty years. I have visited a culture in France which was forty-three years old, and still in excellent condition; and I saw one in the same locality, which was on unsuitable soil, that had given out within twelve years. The first cost to establish a willow culture is:

| | |
|---|---|
| It takes 15 days to plant 1 acre with willows, at $1.50 per day..... | $22 50 |
| It takes 73,000 plants per acre at an average cost of 70c. per 1,000.. | 51 10 |
| Total..... | $73 60 |

To this must be added the cost of preparing the ground.

As to the profit, I can give you the following figures, also taken from my personal experience. The average yearly yield of one acre is as follows:

| | | |
|---|---|---|
| 3,400 lbs. Willows, from 4–7c. per lb., average 5c..... | | $170 00 |
| Less cost of cutting, per acre..... | $18 00 | |
| Less cost of peeling, per acre..... | 67 00 | |
| Total cost ..... | | 85 00 |
| Which gives you a yearly net profit, per acre, of..... | | $85 00 |

# Report of New Jersey State Grange.

BY GEORGE W. F. GAUNT, W.M.

# Report of New Jersey State Grange.

BY GEORGE W. F. GAUNT, W.M.

*Mr. Chairman and Members of the State Board:*

In presenting this my third annual report of New Jersey State Grange to this Board of Agriculture, I wish to congratulate you on the very efficient work you have accomplished and the very able manner in which you are conducting the work of the Board.

Surely the farmers of New Jersey should appreciate the efforts made in their behalf. The Farmers' Institutes are bubbling over with knowledge which will enable all to better understand the science of agriculture.

The time has come when agriculture must be looked upon as a science, and not a mere hit-or-miss occupation, as of yore.

It being the greatest of all American industries, it is the duty of those engaged therein to uphold the dignity of their business by using every effort to obtain the highest possible rank in their calling, and to insist that they be given recognition commensurate to the importance of their occupation. I believe the time has come when all agricultural organizations whose primary object is the upbuilding of the great interests of the agricultural toilers should co-operate upon the broad basis that whatever tends to build up agriculture and increase the intelligence of the American people fostering broader social relations and a more fraternal spirit should be the watchword of every person engaged in agriculture. There are many problems now before the American people.

The trust question seems to be uppermost in the minds of the people at the present time more than any other.

It is not my intention to denounce them. As an organization we believe in co-operation and the uniting of forces for the com-

mon good of all. We favor all combined interests that would reduce the cost of the necessaries of life, but we are opposed to every combination, be it called trust or otherwise, that goes to Congress asking for special legislation that will give them a monopoly of the market to control prices.

At the meeting of the State Grange one year ago it was decided to make a special effort to extend the Order, and we believe our efforts have been fairly successful, as we have added eight more Granges to our official list, the Order is more popular in the State, and farmers are beginning to realize the social and educational advantages which it affords; there have been more meetings, they have been better attended, and more members have been added to existing Granges. In all, we have gained about 600 members.

We have the best, safest and cheapest fire insurance there is in the State, and it is very well patronized by our patrons. It is a very important factor in increasing our membership and maintaining the active interest of those who belong to the Order. We have, at the present time, about $6,000,000 worth of property insured in the Farmers' Reliance of West Jersey.

The Grange was the originator and promoter of the free delivery of mail in the rural districts. The Order is to be congratulated on its progress and growing popularity. It has enhanced the value of farm lands and relieved the monotony of farm life through ready access to wholesome literature and knowledge of current events. During the month of August we held a series of field meetings, which were large and enthusiastic gatherings.

# Officers of the State Grange, P. H., of New Jersey, 1903.

*Master*, GEORGE W. F. GAUNT.....Mullica Hill, Gloucester county.
*Overseer*, EDWARD DUDLEY.....Medford, Burlington county.
*Lecturer*, GEORGE L. GILLINGHAM.....Moorestown, Burlington county.
*Steward*, WINFIELD S. BONHAM.....Shiloh, Cumberland county.
*Assistant Steward*, J. H. M. COOK.....Caldwell, Essex county.
*Chaplain*, REV. LEVANUS MYERS.....Alloway, Salem county.
*Treasurer*, CHARLES COLLINS.....Moorestown, Burlington county.
*Secretary*, H. F. BODINE.....Locktown, Hunterdon county.
*Gate Keeper*, E. N. STRONG.....Ringoes, Hunterdon county.
*Ceres*, GEORGIA A. DUELL.....Woodstown, Salem county.
*Pomona*, ELLA VANNEMAN.....Dias Creek, Cape May county.
*Flora*, LOUIE CHEW.....Sewell, R. F. D., Gloucester county.
*Lady Assistant Steward*, LAURA E. STRONG.....Ringoes, Hunterdon county.

## EXECUTIVE COMMITTEE.

GEO. W. F. GAUNT.....Mullica Hill, Gloucester county.
ALBERT HERITAGE .....Mickleton, Gloucester county.
NICODEMUS WARNE .....Broadway, Warren county.
JOHN T. COX.....Readington, Hunterdon county.
A. E. HEDDEN.....Verona, Essex county.
H. F. BODINE.....Locktown, Hunterdon county.

*State Grange meets first Wednesday in December, 1903.*

## POMONA GRANGES.

### MASTERS AND SECRETARIES, WITH ADDRESS.

1. Burlington—*Master*, CRESSMAN DARNELL...Medford, Burlington county.
   *Secretary*, GEORGE L. GILLINGHAM.....Moorestown, Burlington county.
3. Hunterdon—*Master*, W. W. LAMBERT...Sergeantsville, Hunterdon county.
   *Secretary*, SAMUEL JOHNSON.....Quakertown, Hunterdon county.
5. Mercer—*Master*, A. H. ROGERS.....Hamilton Square, Mercer county.
   *Secretary*, W. N. CUNNINGHAM.....Hightstown, Mercer county.
6. Salem—*Master*, C. T. MOORE.....Woodstown, Salem county.
   *Secretary*, ABBIE W. BATTEN.....Woodstown, Salem county.
8. Gloucester—*Master*, BARCLAY D. KILLE...Swedesboro, Gloucester county.
   *Secretary*, JOHN TONKIN.....Aura, Gloucester county.
9. Centre District—*Master*, H. F. HARRISON.....Caldwell, Essex county.
   *Secretary*, CHAS. E. BRYER.....Hanover, Morris county.
10. Warren—*Master*, N. WARNE .....Broadway, Warren county.
    *Secretary*, J. M. MACKEY....Phillipsburg, Warren county, R. F. D. NO. 2.

## COUNTY DEPUTIES.

Bergen—ELLSWORTH M. PELL.....Riveredge, Bergen county.
Burlington—EDMUND BRADDOCK .....Medford, Burlington county.
Camden—JOHN M. GARWOOD.....Haddonfield, Camden county.
Cumberland—DAVID H. BURGE.....Vineland, Cumberland county.
Cape May—A. T. B. HOWELL.....Dias Creek, Cape May county.
Essex—W. W. DECAMP.....Roseland, Essex county.
Gloucester—E. ARLINGTON JONES.....Mullica Hill, Gloucester county.
Hunterdon—JOHN T. COX .....Readington, Hunterdon county.
W. W. LAMBERT.....Sergeantsville, Hunterdon county.
Mercer—THEODORE CUBBERLEY .....Hamilton Square, Mercer county.
Morris—HARRISON QUIMBY .....Parsippany, Morris county.
Salem—LEVANUS MYERS .....Alloway, Salem county.
Sussex—RICHARD M. HOLLY.....Sussex, Sussex county.
Union—J. B. WARD.....Lyons Farms, Union county.
Warren—NICODEMUS WARNE .....Broadway, Warren county.

## SUBORDINATE GRANGES.

| ANGES. | MASTERS AND ADDRESSES. | SECRETARIES AND ADDRESSES. | LECTURERS AND ADDRESSES. |
|---|---|---|---|
| ımonton .. | A. J. Rider Hammonton, Atlantic co..... | A. J. King, Hammonton, Atlantic co..... | Not reported. |
| desboro .. | N. H. Lippincott, Swedesboro, Gloucester co. | Caddie J. Gill, Swedesboro, Gloucester co... | Sue M. Smith, Swedesboro, Gloucester co. |
| restown .. | Leon H. Collins, Merchantville, Camden co. | Caroline B. Zelley, Moorestown, Burl'ton co. | Mary B. Collins, Merchantville, Camden co. |
| dstown .. | Clark Flitcraft, Woodstown, Salem co..... | Carrie R. Atkinson, Woodstown, Salem co... | Lizzie Borton, Woodstown, Salem co. |
| eland .... | Charles Chalmers, Vineland, Salem co..... | Ann Chalmers, Vineland, Cumberland co... | Geo. A. Mitchell, Vineland, Cumberland co. |
| goes ..... | Frank L. Trout, Lambertville, Hunterdon co. | John Q. Holcombe, Ringoes, Hunterdon co. | E. N. Strong, Ringoes, Hunterdon co. |
| ewell .... | Walton E. Davis, Shiloh, Cumberland co.... | Winfield S. Bonham, Shiloh, Cumberland co. | L. Frank Glaspey, Shiloh, Cumberland co. |
| nberland .. | Henry Bacon, Greenwich, Cumberland co... | M. H. Goodwin, Greenwich, Cumberland co. | Anna T. Goodwin, Greenwich, Cum'land co. |
| wick ..... | J. P. Smick, Canton, Salem co..... | Anna E. Harris, Harmersville, Salem co... | Mollie E. Finlaw, Harmersville, Salem co. |
| rrisonville.. | Jos. Cheesman, Harrisonville, Gloucester co. | Saml. S. Conover, Harrisonville, Glouc'r co. | Ella Lippincott, Mullica Hill, Gloucester co. |
| ner ..... | Otis H. Elwell, Elmer, Salem co..... | John M. Woolman, Elmer, Salem co..... | Mary W. Gaunt, Elmer, Salem co. |
| dgeport ... | S. Lewis Kille, Bridgeport, Gloucester co... | Wm. A. Shiveler, Swedesboro, Gloucester co. | Lizzie Hagar, Bridgeport, Gloucester co. |
| dford ..... | Harry Brick, Medford, Burlington co..... | Anna E. Kirby, Medford, Burlington co.... | Anna P. W. Copperwaithe, Medford, Bur. co. |
| ddon ..... | John S. Jaggard, Haddonfield, Camden co... | R. Lewis Shivers, Camden, Camden co..... | Lizzie Stafford, Ashland, Camden co. |
| ntua ..... | Wm. G. Cattell, Wenonah, Gloucester co.... | Hiram S. Leap, Wenonah, Gloucester co.... | Sarah Dilks, Wenonah, Gloucester co. |
| ndsor .... | E. K. Cole, Windsor, Mercer co..... | Charles E. Rue, Windsor, Mercer co..... | Mrs. C. E. Rue, Windsor, Mercer co. |
| pe ..... | W. N. Dubois, Bridgeton, Cumberland co... | P. L. Wheaton, Bridgeton, Cumberland co. | Jos. Atkinson, Bridgeton, Cumberland co. |
| ıcocas .... | Jos. Lundy, Bougher, Burlington co..... | J. Barclay Hilyard, Rancocas, Burlington co. | Charlotte L. Hancock, Moorestown, Bur. co. |
| nberton ... | Geo. W. Lundy, Birmingham, Burlington co. | H. R. Lippincott, Pemberton, Burlington co. | Mrs. John Forsyth, Pemberton, Burl'ton co. |
| llica Hill.. | Wm. H. Colson, Mullica Hill, Gloucester co. | Anna G. Tonkin, Mullica Hill, Gloucester co. | Martha R. Tonkin, Mullica Hill, Glouc'r co. |

## SUBORDINATE GRANGES—CONTINUED.

| RANGES. | MASTERS AND ADDRESSES. | SECRETARIES AND ADDRESSES. | LECTURERES AND ADDRESSES. |
|---|---|---|---|
| erfield ..... | John S. Padgett, Bridgeton, Cumberland co. | Leander S. Padgett, Bridgeton, Cum'land co. | Emily Woodruff, Deerfield, N. J. |
| ntre Grove. | Not reported ..... | Not reported ..... | Not reported. |
| umbus .... | Lewis C. Gaunt, Bordentown, Burlington co. | Bessie E. Bunting, Burlington, Burl'ton co. | Annie S. Bunting, Burlington, Burl'ton co. |
| orofare ... | J. Wood Wyne, Thorofare, Gloucester co... | James Carter, Thorofare, Gloucester co.... | Mary R. Low, Thorofare, Gloucester co. |
| rsesLanding | Jos. H. Webber, Sharptown, Salem co..... | Helen D. W. Richman, Sharptown, Salem co. | Not reported. |
| nington .. | John Fleming, Pennington, Mercer co..... | Ira Stout, Pennington, Mercer co..... | Andrew H. Burrough, Pennington, Mercer co. |
| ntage .... | Christopher Stanaback, Sussex, Sussex co... | Ida Roy, Sussex, Sussex co..... | J. Pierson Fuller, Quarryville, Sussex co. |
| milton ... | C. N. Hutchinson, Robbinsville, Mercer co. | Josiah T. Allison, Yardville, Mercer co..... | Laura E. Cubberly, Hamilton Sq., Mercer co. |
| esburg .... | John D. Horner, Friesburg, Salem co..... | Lidia M. Horner, Friesburg, Salem co..... | Chas. F. Dickinson, Cohansey, Salem co. |
| liamstown. | Harry White, Williamstown, Gloucester co. | James M. Tweed, Williamstown, Glouc'r co. | John R. Downer, Williamstown, Glouc'r co. |
| ktown .... | M. F. Sherman, Locktown, Hunterdon co... | G. J. Fisher, Sand Brook, Hunterdon co.... | E. M. Heath, Locktown, Hunterdon co. |
| ckwood ... | John M. Stetser, Chews, Camden co..... | C. C. Stephenson, Blackwood, Camden co... | R. C. Morgan, Blackwood, Camden co. |
| htstown .. | W. N. Cunningham, Hightstown, Mercer co. | F. A. Updyke, Hightstown, Mercer co..... | Mary J. Mount, Etra, Mercer co. |
| ntown ... | Emerson Yard, Allentown, Monmouth co... | W. B. Burtis, B. 73, Allentown, Monmouth co. | Mrs. E. G. Hunt, Davis Station, N. J. |
| erty ..... | Not reported ..... | Not reported ..... | Not reported. |
| eantsville. | John W. Case, Sergeantsville, Hunterdon co. | Percy W. Bush, Stockton, Hunterdon co.... | Wm. Strouse, Sergeantsville, Hunterdon co. |
| ngston ... | Not reported ..... | Not reported ..... | Not reported. |
| ris ..... | C. E. Bryer, Hanover, Morris co..... | Wm. A. Howell, Florham Park, Morris co... | Mrs. C. E. Bryer, Hanover, Morris co. |
| wood .... | James S. Kerr, Barbertown, Hunterdon co. | E. B. Hoffman, Barbertown, Hunterdon co. | D. K. Fritts, Baptisttown, Hunterdon co. |

## SUBORDINATE GRANGES—CONTINUED.

| ANGES. | MASTERS AND ADDRESSES. | SECRETARIES AND ADDRESSES. | LECTURERS AND ADDRESSES. |
|---|---|---|---|
| ·land .... | Geo. E. De Camp, Roseland, Essex co..... | Hattie May Condit, Roseland, Essex co..... | Mary J. Condit, Roseland, Essex co. |
| ren ..... | John T. Oberly, Broadway, Warren co..... | Mae Oberly, Broadway, Warren co..... | Not reported. |
| ·leton .... | T. W. Hendrickson, Swedesboro, Gloucr co. | Walter Heritage, Swedesboro, Gloucester co. | Esther Rulow, Mickleton, Gloucester co. |
| ns Farms . | Not reported ..... | Not reported ..... | Not reported. |
| atcong ... | D. C. Donnelly, Springtown, Warren co.... | Hattie Donnelly, Springtown, Warren co... | Not reported. |
| fville .... | Thomas B. Kier, Sewell, Gloucester co..... | C. J. Davenport, Sewell, Gloucester co..... | Jennie S. Kier, Sewell, Gloucester co. |
| ksburg ... | John H. Young, Belvidere, Warren co..... | Warren Herman, Belvidere, Warren co..... | Irvin Miller, Phillipsburg, Warren co. |
| shington .. | Samuel T. Bowman, Washington, Warren co. | Mrs. Jos. Bodine, Washington, Warren co... | Henry Race, Oxford, Warren co. |
| : Grove.... | Burris Snyder, Pittstown, Hunterdon co.... | D. H. M. Leaver, Quakertown, Hunterdon co. | Ella Hiner, Quakertown, Hunterdon co. |
| ing Mills.. | M. W. Angell, Holland, Hunterdon co..... | Mary E. Woolfe, Milford, Hunterdon co.... | S. S. Fry, Stewartsville, Warren co. |
| wartsville . | George W. Carhart, Stewartsville, Warren co. | J. C. Boyer, Stewartsville, Warren co..... | Mrs. George Hagar, Stewartsville, Warren co. |
| ra ..... | Joseph M. Carter, Aura, Gloucester co..... | N. J. Black, Aura, Gloucester co..... | Mary A. Tonkin, Aura, Gloucester co. |
| ss Keys... | Edward B. Gaunt, Cross Keys, Gloucester co. | Joseph H. Evans, Sewell, Gloucester co..... | Richard Evans, Sr., Sewell, Gloucester co. |
| nd View... | Wm. Y. Holt, Flemington, Hunterdon co... | Thos. B. Hampton, Croton, Hunterdon co... | Augusta Higgins, Flemington, Hunterdon co. |
| erside .... | D. H. Agans, Three Bridges, Hunterdon co. | J. S. Dilts, Three Bridges, Hunterdon co... | John R. Foster, Three Bridges, Hunt'd'n co. |
| aware .... | Wm. C. Addis, Delaware, Warren co..... | F. Russell Addis, Delaware, Warren co..... | James I. Cook, Mt. Hermon, Warren co. |
| a ..... | F. J. Van Valin, Iona, Gloucester co..... | Mrs. M. I. Marsh, Malaga, Gloucester co... | Mrs. B. F. Bixey, Malaga, Gloucester co. |
| e May.... | Frederick Keins, Dias Creek, Cape May co... | A. T. D. Howell, Dias Creek, Cape May co... | Mary E. Norton, Dias Creek, Cape May co. |
| gen ..... | E. M. Pell, Ridgewood, Bergen co..... | Elmo T. Paxton, Ridgewood, Bergen co.... | Frank J. Batchelder, Riveredge, Bergen co. |
| nklin ..... | Geo. B. Fox, Wyckoff, Bergen co..... | Richard E. Lawlin, Wyckoff, Bergen co..... | Not reported. |
| sthampton. | Tylee B. Engle, Rancocas, Burlington co... | Mrs. Nancy M. Leeds, Rancocas, Burl'ton co. | Not reported. |

# STATISTICAL TABLES—FARM CROPS.

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 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bergen | 100 | 40 | ..... | 80 | 16 | ..... | 100 | 22 | ..... | 100 | 24 | ..... |
| Burlington | 80 | 50 | $0 55 | 110 | 20 | $0 70 | 100 | 20 | $0 50 | 125 | 40 | $0 35 |
| *Camden | 75 | 35 | 56 | 90 | 18 | 70 | 100 | 20 | 50 | ..... | ..... | ..... |
| Cape May | 150 | 40 | 70 | 100 | 20 | 90 | ..... | ..... | ..... | ..... | ..... | ..... |
| *Cumberland | 90 | 50 | 56 | 100 | 18 | 70 | 100 | 20 | 50 | 125 | 40 | 35 |
| *Essex | 75 | 35 | 56 | 90 | 18 | 70 | 90 | 18 | 50 | 100 | 24 | 35 |
| Gloucester | 100 | 36 | 56 | 100 | 20 | 70 | 100 | 20 | 50 | ..... | ..... | ..... |
| Hunterdon | 100 | 32 | 65 | 90 | 15 | 75 | 100 | 15 | 55 | ..... | 35 | 40 |
| Mercer | 75 | 34 | 70 | 100 | 22 | ..... | 100 | 16 | ..... | 200 | 40 | ..... |
| Middlesex | 100 | 35 | 55 | 90 | 18 | 75 | 90 | 15 | 52 | 150 | 30 | 35 |
| Monmouth | 110 | 62 | 55 | 110 | 27 | 72 | 115 | 21 | 50 | ..... | ..... | ..... |
| Morris | 75 | 80 | 70 | 80 | 15 | 80 | 50 | 12 | 60 | 100 | 40 | 40 |
| Ocean | ..... | ..... | 65 | ..... | ..... | 70 | ..... | ..... | 60 | ..... | ..... | ..... |
| Salem | 100 | 40 | 50 | 90 | 15 | 75 | ..... | ..... | ..... | ..... | ..... | ..... |
| *Somerset | 80 | 32 | 56 | 90 | 18 | 75 | 90 | 15 | 52 | 125 | 40 | 35 |
| Sussex | 90 | ..... | 65 | 90 | ..... | 80 | 85 | ..... | 65 | 125 | ..... | 45 |
| Union | 90 | 40 | 50 | ..... | ..... | ..... | 90 | 20 | 60 | 100 | 40 | 40 |
| Warren | 70 | 60 | 50 | 100 | 25 | 75 | 90 | 20 | 60 | 100 | 40 | 35 |
| | | 40.7 | | | 19 | | | 18.1 | | | 35.7 | |

* Estimated. No statistical report sent in.

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—barrels | Average price per barrel. |
| Atlantic | | | | | | | | | | | | |
| Bergen | 25 | | | 85 | 1 | | 100 | 70 | $2 00 | | | |
| Burlington | | | | 50 | 1 | $18 00 | 200 | 70 | 1 50 | 75 | 60 | $2 00 |
| *Camden | | | | 60 | ¾ | 18 00 | 120 | 40 | 1 75 | 90 | 40 | 1 50 |
| Cape May | | | | 75 | | 18 00 | 200 | 40 | 1 50 | 75 | 35 | 1 50 |
| *Cumberland | | | | 75 | 1 | 16 00 | 110 | 40 | 1 75 | 75 | 35 | 1 50 |
| *Essex | | | | 80 | 1 | 18 00 | 100 | 70 | 2 00 | | | |
| *Gloucester | | | | 75 | 1 | 18 00 | 110 | 40 | 1 75 | 100 | 50 | 2 00 |
| Hunterdon | 100 | 25 | $0 60 | 100 | 1 | 12 00 | | 25 | 1 75 | | | |
| Mer er | | | | 33 | ½ | | 200 | 80 | | 75 | 40 | |
| Middlesex | | | | 80 | ⅜ | 19 00 | 110 | 80 | 2 00 | | | |
| Monmouth | | | | 25 | ½ | 20 00 | 185 | 95 | 1 50 | 100 | 50 | 3 00 |
| Morris | | | | 50 | ½ | 20 00 | 50 | 25 | 80 | | | |
| Ocean | | | 75 | | | 16 00 | | | 1 80 | | 90 | 90 |
| Salem | | | | 75 | 1 | 18 00 | 110 | 30 | 1 00 | 75 | 35 | 1 50 |
| *Somerset | | | | 80 | ¾ | 18 00 | 110 | 30 | 1 75 | | | |
| Sussex | 100 | | 63 | 115 | | 15 00 | 120 | | 1 45 | | | |
| Union | | | | 60 | ¾ | 20 00 | 100 | 25 | 2 00 | | | |
| Warren | 75 | 20 | 50 | 75 | 1¼ | 18 00 | 75 | 25 | 1 80 | | | |
| | | 22.5 | | | .85 | | | 46 | | | 48.3 | |

* Estimated. No report sent in.

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 | | | | | | | | | | | | |
| Bergen | 75 | | | 80 | | | 50 | | | 50 | | |
| Burlington | 200 | 100 | $1 00 | 200 | 100 | $1 00 | 75 | 100 | $1 00 | 200 | 3,000 | $0 04 |
| *Camden | 175 | 75 | 1 00 | 200 | 100 | 1 00 | 75 | 100 | 60 | 200 | 3,000 | 4 |
| Cape May | 95 | | | 100 | | 1 00 | 100 | | 40 | 75 | | 2 |
| *Cumberland | 150 | 100 | 1 00 | | | | 75 | 125 | 50 | 200 | 3,000 | 3 |
| *Essex | 175 | 75 | 1 25 | 100 | | | 75 | 100 | 60 | 75 | 2,500 | 3 |
| *Gloucester | 175 | 100 | 1 25 | 100 | | | | | | 150 | 2,500 | 4 |
| Hunterdon | | 50 | 1 30 | | | | | | 50 | | | |
| Mercer | 10 | 60 | 70 | 200 | 50 | 1 00 | | | | 150 | 1,200 | 3 |
| Middlesex | 90 | | 2 00 | 100 | | 2 50 | 90 | | 40 | | | |
| Monmouth | 75 | | | 110 | | 75 | 60 | | | 100 | 8,000 | |
| Morris | 100 | | | 125 | | | 50 | | | 25 | | |
| Ocean | | | 80 | | | 40 | | | 75 | | | |
| Salem | 120 | | 90 | | | | | | | | | |
| *Somerset | 100 | 50 | 1 00 | | | | 100 | 150 | 50 | | | |
| Sussex | 150 | | 1 25 | 105 | | | 40 | | 60 | | | |
| Union | 30 | | 2 00 | 50 | | 1 50 | 75 | | 75 | 100 | | 3 |
| Warren | 100 | 70 | 1 00 | | | | 75 | 60 | 75 | 75 | | 15 |
| | | 64 | | | 83 | | | | | | | |

* Estimated. No report sent in.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

| COUNTIES. | STRAWBERRIES. | | | RASPBERRIES. | | | BLACKBERRIES. | | | WATERMELONS. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Product compared with last year—per cent. | Average yield per acre—quarts. | Average price per quart. | Product compared with last year—per cent. | Average yield per acre—quarts. | Average price. | Product compared with last year—per cent. | Average yield per acre—quarts. | Average price. | Product compared with last year—per cent. | Average yield per acre. | Average price per hundred. |
| Atlantic | | | | | | | | | | | | |
| Bergen | 90 | | | 50 | | | 70 | | | 40 | | |
| Burlington | 100 | | $0 06 | 100 | | $0 10 | 100 | | $0 10 | 100 | | |
| *Camden | | | | | | | | | | | | |
| Cape May | 75 | | 8 | | | | | | | 50 | | $4 00 |
| *Cumberland | 150 | | 6 | 100 | | | 100 | | | 100 | | 4 00 |
| *Essex | | | | | | | | | | | | |
| *Gloucester | | | | | | | | | | | | |
| Hunterdon | | | | | | | | | | | | |
| Mercer | 100 | | | | | | | | | | | |
| Middlesex | 100 | | 10 | 100 | | 12 | 100 | | 10 | 70 | | |
| Monmouth | 75 | | | 75 | | | 50 | | | 100 | 2,500 | |
| Morris | 100 | | | 100 | | | 75 | | | 20 | | |
| Ocean | | | | | | | | | | | | |
| Salem | | | | | | | | | | 80 | | 7 00 |
| *Somerset | | | | | | | | | | | | |
| Sussex | | | | | | | | | | | | |
| Union | 100 | | 10 | | | | 40 | | 12 | | | |
| Warren | 75 | | 10 | 50 | | 8 | 40 | | 10 | | | |

* No report.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

| COUNTIES. | CITRON MELONS. | | | CUCUMBERS. | | | CABBAGES | | | TOMATOES. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Product compared with last year—per cent. | Average yield per acre—baskets. | Average price per basket. | Product compared with last year—per cent. | Average yield per acre. | Average price per basket. | Product compared with last year—per cent. | Average yield per acre. | Average price. | Product compared with last year—per cent. | Average yield per acre. | Average price per basket |
| Atlantic | | | | | | | | | | | | |
| Bergen | | | | 100 | | | 125 | | | 100 | | |
| Burlington | 100 | 300 | $0 30 | 50 | 200 | $0 30 | 150 | 3,000 | $1 50 | 200 | 800 bask. | $0 80 |
| Camden | | | | | | | | | | | | |
| Cape May | | | | | | | 100 | | 2 50 | 100 | | |
| Cumberland | | | | | | | | | | | | |
| Essex | | | | | | | | | | | | |
| Gloucester | | | | | | | | | | | | |
| Hunterdon | | | | | | | | | | | | |
| Mercer | | | | | | | 150 | 3,000 | 1 50 | 50 | 1½ tons. | 80 |
| Middlesex | | | | | | | 100 | 3,000 | 3 00 | 100 | | 80 |
| Monmouth | 25 | 100 | | 100 | 100 | | 100 | | | 100 | 800 bask. | |
| Morris | 20 | | | 100 | | | 110 | | | 75 | | |
| Ocean | | | | | | | | | | | | 40 |
| Salem | 70 | | 20 | | | | | | | 100 | | 25 |
| Somerset | | | | | | | | | | | | |
| Sussex | | | | | | | | | | | | |
| Union | | | | | | | 150 | 2,500 | 3 00 | 50 | | 25 |
| Warren | | | | | | | 100 | | 2 50 | 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 | | | | | | |
| Bergen | 100 | | 100 | | 100 | |
| Burlington | 100 | $150 00 | 100 | $200 00 | 100 | $40 00 |
| Camden | | | | | | |
| Cape May | 100 | 75 00 | 100 | 100 00 | 100 | 50 00 |
| Cumberland | | | | | | |
| Essex | | | | | | |
| Gloucester | | | | | | |
| Hunterdon | 100 | | 100 | | 110 | 35 00 |
| Mercer | 100 | 125 00 | 100 | 100 00 | 105 | 42 00 |
| Middlesex | 100 | 120 00 | 100 | 100 00 | 90 | 45 00 |
| Monmouth | 100 | 150 00 | 75 | 175 00 | 105 | 50 00 |
| Morris | 100 | 100 00 | | | 100 | 40 00 |
| Ocean | | 150 00 | | | | 30 00 |
| Salem | 100 | 110 00 | 100 | 110 00 | 100 | 40 00 |
| Somerset | | | | | | |
| Sussex | 100 | 125 00 | | | 110 | 45 00 |
| Union | 100 | 80 00 | | | 100 | 45 00 |
| Warren | 40 | 130 00 | | | 90 | 40 00 |

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 | | | | | | | | | | | | | | | | |
| Bergen | 100 | | | | | | 110 | | 100 | | 100 | | | | | |
| Burlington | 100 | $0 06½ | 125 | $5 00 | 125 | $6 00 | 125 | $0 08 | 75 | $0 18 | 100 | $0 16 | 80 | 100 | 100 | 100 |
| Camden | | | | | | | | | | | | | | | | |
| Cape May | | | | | | | | | 75 | | 100 | | 100 | 95 | 100 | 90 |
| Cumberland | | | | | | | | | | | | | | | | |
| Essex | | | | | | | | | | | | | | | | |
| Gloucester | | | | | | | | | | | | | | | | |
| Hunterdon | | 7 | | | | | 105 | 8 | | 19 | | 12 | 90 | 80 | 90 | 80 |
| Mercer | 100 | 6 | | | 100 | 5 00 | 100 | 8 | 80 | 17 | 100 | 14 | 100 | 90 | 100 | 100 |
| Middlesex | 100 | 6½ | | | | | 100 | 8½ | 80 | 16 | 100 | 14 | 100 | 90 | 100 | 90 |
| Monmouth | 100 | 6½ | 100 | 4 50 | 100 | 5 00 | 80 | 8 | 70 | 18 | 100 | 14 | 100 | 100 | 100 | 100 |
| Morris | 100 | 7 | | | | | 25 | 10 | 20 | | 100 | | 50 | 110 | 60 | 110 |
| Ocean | | 6½ | | | | | | 8½ | | 12½ | | 11 | 100 | 110 | | |
| Salem | 100 | 6½ | | | | | 100 | 8½ | | | 100 | 17 | 100 | 100 | 100 | 100 |
| Somerset | | | | | | | | | | | | | | | | |
| Sussex | 90 | 7 | 90 | | | | 105 | 8 | 95 | 14 | 150 | 9 | 105 | 100 | 100 | 100 |
| Union | | | | | | | 100 | 10 | | | 100 | 12 | 100 | 85 | | |
| Warren | 100 | 6½ | 60 | 4 75 | 60 | 4 25 | 50 | 8 | 50 | 13 | 100 | 11 | 90 | 40 | 80 | 45 |

# Reports of County Boards of Agriculture.

NOTE.—No report has been received from Camden County and Essex County Boards. Hudson and Passaic counties have no County Boards.

# ATLANTIC COUNTY.

OFFICERS FOR 1903.

*President*, JOSEPH BUTTERHOF.....Egg Harbor City.
*Vice-President*, PETER H. BROWN.....Hammonton.
*Secretary*, VALENTINE P. HOFMANN.....Egg Harbor City.
*Treasurer*, FREDERICK FIEDLER.....Egg Harbor City.

DELEGATES TO STATE BOARD OF AGRICULTURE.

V. P. HOFMANN, for two years.....Egg Harbor City.
L. H. PARKHURST, for one year.....Hammonton.

BOARD OF DIRECTORS.

J. E. HOLMAN, Hammonton Shippers' Union.....Hammonton.
JESSE R. ABBOTT, Hammonton Fruit Growers' Union.....Nesco.
CHARLES KRAUS, Atlantic County Agricultural and Horticultural Association.....Egg Harbor City.
HENRY PFEIFFER, Germania Fruit Growers' Union.....Cologne.
WILLIAM KARRER, At-Large.....Egg Harbor City.

## REPORT.

BY THE SECRETARY.

The combined annual meeting and Institute was held at Firemen's Hall, Hammonton, N. J., on December 20th, 1902.

"Conservation of Soil Moisture and Natural Methods of Soil Improvement," by Alva Agee, of Ohio, was the first subject discussed, which gave general saitsfaction and took up the morning session.

In the afternoon session Professor John B. Smith spoke upon the subject of "Certain Orchard Insects." He explained the

actions of the insect enemies of fruit trees; that every tree has its natural enemies from root to stem, and the time and method to combat them.

"Profit in Poultry," by Henry Van Dreser, of New York, was a very interesting subject, and kept the whole audience for the time being in the best attention and humor.

## GENERAL REMARKS.

The climatology of the year 1902 proved to be exceptionally favorable to farmers and truckers. The annual rain-fall was 57.66 inches, and exceeded that of 1901 by 8.70 inches. In June, 1902, 9.13 inches fell, compared with 1.62 inches for June, 1901. Since 1889 no heavier rain-fall has been recorded. The mean temperature of the year was fifty-four degrees; that of 1901 fifty-two degrees. The latest frost was on May 29th, and the first killing frost on October 25th. During July this region was visited by hail-storms, which, in some localities, inflicted damage.

The yield of strawberries and tree fruits was good, as a rule. The blackberry crop was very short, the canes being injured by the excessive cold of last winter. The grape crop was below the average, from same cause. There was a noticeable freedom from insects and fungi on most crops. The San José scale, which made serious inroads on orchards last season, did not multiply as much this season; the damp weather of late summer and fall probably interfered with their breeding.

Prices of fruits and other farm products ruled high, with exception of potatoes and apples, which were in excessive supply. Many sales were made below cost of production.

# BERGEN COUNTY.

## OFFICERS FOR 1903.

*President*, SAMUEL R. DEMAREST, JR. ..... Hackensack.
*Vice-President*, JOHN HECK ..... Westwood.
*Secretary*, HARRY I. ANGELL ..... Etna.
*Treasurer*, ABRAM C. HOLDRUM ..... Westwood.

### BOARD OF DIRECTORS.

MARTIN J. MYERS ..... Woodcliff.
JOHN CURTIS ..... Harrington Park.
MALCOLM H. ANGELL ..... Etna.
JOHN C. VAN SAUN ..... Maywood.
JOHN F. BOMM ..... Westwood.
WILLIAM BRANDENBURG, JR. ..... North Arlington.
ANDREW J. DE VOE ..... Hackensack.
JOHN H. ACKERMAN ..... Englewood.

### DEEGATES TO STATE BOARD.

ABRAM C. HOLDRUM (two years) ..... Westwood.
JOHN F. BOMM (one year) ..... Westwood.

## REPORT.

### BY THE SECRETARY.

The Board held two meetings during the past year.

The first meeting was held in connection with a Farmers' Institute held at Park Ridge, on February 5th, 1902.

The second was the annual meeting held at Hackensack, on December 10th.

At the annual meeting it was voted that the County Board

should pay the expenses of a delegate to the annual convention of the New Jersey State Horticultural Society.

At the institute held in February, 1902, the following subjects were discussed:

"Experiments in Horticultural Works," by A. T. Jordan, Horticulturist of the State Experiment Station.

"How to Get Rid of Insects and Worms Which Are Destructive to Fruits and Vegetables," by Professor John B. Smith, State Entomologist.

Two local speakers who were also listened to with great interest were F. M. Curtis, of Harrington Park, on "Bee Culture"; and H. W. Collingwood, on "The Production of Fodder, and the Raising of Pigs and Livestock in General."

## CROP YIELDS.

Corn, rye, oats and potatoes have all given about an average crop.

Buckwheat was almost a complete failure, on account of wet weather.

Cabbages very good.

Apples and pears less than the average crop..

Peaches, grapes and small fruits were poor.

Cucumbers and tomatoes, an average crop.

The spraying of fruit trees and vines is being looked after more generally in this section than heretofore.

# BURLINGTON COUNTY.

OFFICERS FOR 1903.

*President*, JOSEPH ENGLE.....Hainesport.
*Vice-President*, EDMUND BRADDOCK.....Medford.
*Secretary and Treasurer*, HENRY I. BUDD.....Mount Holly.

DIRECTORS.

J. HARVEY DARNELL, Mount Laurel Farmers' Club.....P. O., Masonville.
JOSEPH BISHOP, Cooperstown Farmers' Club.....P. O., Beverly.
HENRY BRICK, Medford Grange.....P. O., Medford.
HENRY TAYLOR, Columbus Grange.....P. O., Columbus.
HENRY R. LIPPINCOTT, Pemberton Grange.....P. O., Pemberton.
AARON S. COLLINS, Moorsetown Grange.....P. O., Moorestown.
JOHN M. LIPPINCOTT, Director-at-Large.....P. O., Moorestown.

DELEGATE TO STATE BOARD OF AGRICULTURE.

ISAAC COLLINS (two years).....Moorestown.

## REPORT.

BY THE SECRETARY.

Our annual meeting was held on Saturday, December 13th, 1902. A very gratifying result was the presence of a large number of young farmers, thus showing increasing interest among young men in agriculture.

Although the day was an extremely unpleasant one, with heavy storm of sleet and rain, making the roads and pavements slippery and unsafe for man or beast, yet there was a very good attendance, showing that the farmers of Burlington county take a great interest in agriculture.

The papers and discussions were upon live subjects of vital interest to the whole community. The following subjects were discussed:

"Lessons Learned from Past Years' Experience in Fruit Growing," Horace Roberts, Fellowship, N. J., and N. P. Creeley, Burlington, N. J.

"Hatching, Feeding and Raising of Poultry," Lloyd V. L. Conover, Clinton, N. J.

"The Most Practical and Economical Methods of Fertilizing the Land," Dr. Edward B. Voorhees, Director of New Jersey Experiment Station, New Brunswick, N. J.

"Conformation and Selection of the Dairy Cow," Henry Van Dreser, New York.

"Preparation of Farm Produce for Market," Horace Russ, Delanco, N. J.

## CROP REPORT.

Reasonable prosperity has been the lot of the average farmer of Burlington county during the year 1902. Most of the leading crops have been prolific, and, although few of them have sold for large prices, a larger number of farmers have received better average returns than for many years. Last year a few farmers were blessed with large returns, and where this was the case the demand for those crops was great because they were generally poor crops for the large majority; but this year all farms, except low and badly-drained ones, have had good crops of some varieties; also many farmers have had good crops all along the line of production, and where they have been active in marketing their aggregate sales were reasonably remunerative.

Pork, milk, hay, potatoes, early apples and early fruits of all kinds have, in many cases, been large crops, and the returns from same fairly flattering.

The season has been a phenomenal one, inasmuch as it has been almost uniformly cool—much below the normal.

April was an exceedingly cool and dry month. May opened with plenty of moisture and moderately warm weather, but every night cool; the high winds soon dried the land, and caused the drifting sands, on light soils, to damage plants greatly. Germination of seeds was prevented the whole month by absence of moisture

and cool nights. The month closed with a heavy frost, destroying the largest part of the strawberry crop and doing much injury to vegetation.

June remained dry until the middle of the month, when copious showers broke the drought of many weeks' duration. Then, for several weeks, there were heavy rain-falls, washing fields and seriously injuring plants. After the middle of July the elements seemed to favor all young crops, with the exception of a few sections that, on the 24th, were badly damaged by a violent thunder storm, accompanied by hail. In August severe storms seemed to be the order of the day, flooding the fields and rotting fruits. Heavy rains on the 10th of August destroyed mill-dams and bridges, and caused great general damage.

On the whole the season has been much below the normal in heat, and above it in moisture, favorable on dry soils to crops that flourished best in cool weather and unfavorable to semi-tropical crops. Low, badly-drained farms scarcely paid the expense of cultivation. Crops were late in starting on wet land and were irretrievably damaged by the heavy storms after they had made partial progress.

Hard roads are still in great demand all over the cultivated portions of the county. Under State aid 150 miles have been built in this county during the past nine years; as many more are applied for and as many more badly need improvement. Burlington county will this year add, including the turnpikes bought, about thirty miles to its improved systems, a much larger mileage in one year than has any other county in the State.

That interest in agriculture is not decreasing is shown by the following statistics taken from the last census:

"The number of farms has increased more than 1,000,000, being now 5,739,757, of which 3,000,000 produced corn. The total acreage advanced from 623,000,000 in 1890 to 841,000,000 in 1900, and the total value of farm property from $15,982,-267,689 to $20,514,001,838. The total value of farm products reported for 1900 was more than $4,000,000,000, as compared with $2,500,000,000 for 1899. The Bureau states that the number of farms is now nearly four times what it was fifty years ago, while their value is more than five times as great.

Among the tendencies of the times none are more gratifying

than those that are gradually making rural life less objectionable to the best elements of our society. The tide of rural exodus to the city shows signs of turning in some communities. The rush of rural communities cityward is being stayed by better prices, hard roads, trolleys, telephones, rural deliveries and graded schools, and the country districts show marked signs of being rescued from desertion.

According to the State Board of Taxation the taxable values of this State in 1901 increased $27,000,000; in 1902 they increased $35,000,000; yet Burlington county farms do not seem to have secured much of this advance, largely owing, we believe, to the inability to secure skillful and sufficient help. Although the prices paid for labor are very much in excess of those of previous years, they fail to attract but a small portion of the army that is pushing towards our industrial centers.

Foreign emigration is beyond all precedent, yet the workers for the farms are few. Upon the part of laborers, particularly those native born, there seems to be a growing distaste for either domestic, household or farm work. Foreign help is each year becoming a greater factor in agricultural work. Italians are building our stone roads; in fact, are the majority laborers on all our public works. Our berries and vegetables could not be gathered without them. The majority of our kitchens would have but small service were it not for the immigration of European maids of many nationalities.

The necessity of throwing down the Chinese wall of exclusion is being agitated, in order to secure the services of a people whose aspirations are not above menial or manual labor, and who have proved themselves, upon the Pacific Slope, most intelligent, patient and untiring in cultivation and gathering immense areas of fruit and grain.

*Wheat*—Many late-sowed fields were plowed up. Where wheat made a good stand last fall it has been a good crop—the cool, dry weather favoring its growth. It was little damaged by the angoumois miller, but much damage resulted from the wet weather at harvest time. The prevailing low prices are causing much of it to be ground for feed, and inducing a large area, formerly sown to wheat, to be seeded to grass fallow.

*Rye*—Rye was a good yield, the price fair. The amount realized

from an acre of straw is about the same as that realized from the grain, thus making the money value of a crop of rye slightly exceed that of a crop of wheat.

*Hay*—The average yield of hay was the poorest for many seasons—not more than one-quarter of a normal crop. The cool, dry weather of April, May and early June so retarded the growth of grass that many fields were not worth the cutting. Second crop was, in many fields, larger than the first. The price has been correspondingly high, ranging from $16 to $20 per ton.

*Oats*—Not many oats were sown, but the cool weather favored a good yield; prices high.

*Corn*—Corn was a difficult crop to start in low, wet ground, but eventually all our soils, except lowland, promised a great yield; but much of it, after the ears were partly formed, was damaged by hail, and later on by the excessively moist weather; consequently there is much mouldy corn. The continuous heavy rains bleached and blackened the ripening fooder, so that its feeding value has been fully one-half reduced. The average cost of producing an acre of corn is said to be about $6.

*Pasture*—Pasture has been excellent the whole season, and particularly the late, which was good up to the freezing weather of December.

*Growing Winter Grain*—Growing winter grain is short, on account of the exceptionally late season, but the prolonged mild weather has given much of it a fair start.

*Grass Fallow and Scarlet Clover*—An unusually large acreage has been sown to clover, timothy grass fallow and scarlet clover. The result has been one of the finest stands known in our history. Many cornfields are covered with a green growth large enough for pasturing, which will afford a fine source of fertility, when turned under in the spring, for raising potatoes and other early vegetables. The purchase of many tons of fertilizer could be saved yearly if farmers were always as fortunate in obtaining such good catches of grass.

*Milk*—Dairies have yielded well the whole season and milk has found a steady market at good prices.

*Apples*—The latest enumeration shows there are 210,000,000 apple trees in the United States, an increase of 40 per cent. in ten years. Michigan and Illinois are the leading apple States West.

Next come Missouri, Kansas, Arkansas and Nebraska. New York leads in the East. This year apples were the largest and most perfect fruit crop for a number of years. Early apples, where near to large markets, brought good prices, as much per bushel as later on they brought per barrel. Many thousands of barrels sold from 75 cents to $1 per barrel, while thousands of bushels were not gathered.

*Keiffer Pears*—As so few of other varieties of pears are raised in our county they are scarcely worth mentioning. Keiffers were a large yield, many orchards fairly breaking with the burden of fruit. Early they brought good prices, but later on a large portion of the crop sold for fifteen cents a basket, and many of them for less, while many did not find a profitable market. The fruit this year was large in size, but rotted badly when held both in plates and boxes.

*Peaches*—The San José scale has blotted out nearly all of our orchards; the few left had fair crops, and for these good prices were realized.

*Grapes*—Grapes were an unusually large crop; fruit perfect and remained sound on the vine until late in the season.

*Cranberries*—The heavy frost on the morning of the tenth of May nearly obliterated the cranberry crop; where the growers were fortunate enough to flood with water they realized one-half of a crop, but the average yield was not more than a tenth; prices about $6.50 per barrel.

*Cherries*—Cherries a good crop and sold well.

*Currants*—Currants a fair crop and sold well.

*Plums*—Plums showed a large crop, but some varieties rotted badly; sold for fair prices.

*Strawberries*—Strawberries a moderate crop; sold for good prices.

*Raspberries and Blackberries*—Raspberries and blackberries were a good crop and sold well.

*Tomatoes*—Early tomatoes were a good crop and sold for large prices. Late tomatoes, a moderate crop; were in great demand, both in the market and particularly at the canneries, at higher prices than for many previous packs.

*Melons*—Melons well set with fruit, but vines died before the fruit reached perfection, making the taste insipid; but much was marketed, despite the poor quality, at remunerative prices.

*Watermelons*—Watermelons were a large crop, but immense numbers rotted in the fields for want of a market.

*Pickles*—Pickles were almost a failure on account of the early blasting and scalding of the vines by the excessive rains.

*Asparagus*—Asparagus a moderate crop, and sold for good prices. Rust has again taken possession of the stalks and stems.

*Cabbage*—Cabbage was an unusually large crop, but found a very poor market the whole season at one or two cents per head.

*Boiling Corn*—Boiling corn, a moderate crop; the weather was too wet and cold to produce perfect sets. It sold for good prices nearly the whole season. Prices early and late, very remunerative.

*Sweet Potatoes*—Sweet potatoes were about one-half a crop; the quality not so good as usual; too much wet and cold weather for semi-tropical plants.

*White Potatoes*—White potatoes were a very large crop; many yields of 200 and 250 bushels per acre. The cool season and sufficient amount of moisture favored their development. Many found a market at thirty-five cents a bushel. Later they were in great demand at sixty cents per bushel.

*Peas*—Early peas were much damaged by heavy winds and cutting sand. Late peas a fair crop; during the whole season they sold for remunerative prices.

*Lima Beans*—Lima beans were a large crop and sold for good prices.

*Pork*—Pork, at present prices and active demand, is one of the best-paying animal crops. Large numbers have sold at the railroad station at $9 per hundred weight.

*Sheep*—More sheep are seen upon our farms than formerly, but they do not prove as profitable as other kinds of stock. Stock sheep have sold low, tempting farmers to buy for their own consumption and for the raising of spring lambs.

*Beef Cattle*—The high price of beef is tempting farmers to engage in its fattening. The results are fairly promising. The industry, like fattening calves, is advisable on account of labor saving over the production of milk.

*Poultry*—The price of poultry has not been as large as that of other meats. This, together with the almost continuous high prices of eggs, has resulted in a reduced production of poultry. Very little complaint of disease.

*Squabs*—Squabs are largely grown and are profitable.

*Ducks*—Broiler ducks is a growing industry, and is considered the most profitable part of poultry production. Many have died on account of the prevailing cool and wet weather. Much of the decline in the raising of poultry is due to the inability to obtain sufficient help, either indoors or out, to give the perfect attention necessary to its successful production. The demand for turkeys is large.

*Eggs*—Eggs have been scarce and in great demand nearly the whole season. For a long time they have sold for from thirty to thirty-six cents a dozen.

There have been but few diseases among animals.

CLIMATIC HISTORY OF BURLINGTON COUNTY, N. J., IN RELATION TO ITS AGRICULTURE.

| | TEMPERATURE. | | | Rain and melted snow. Inches. | Snow. Inches. | Number of days 0.01 inches or more of rain fell. | Number of clear days. | Number of partly cloudy days. | Number of cloudy days. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum. Degrees. | Minimum. Degrees. | Mean. Degrees. | | | | | | | |
| January | 53 | 11 | 29.8 | 2.96 | 5.6 | 11 | 11 | 12 | 8 | |
| February | 57 | 9 | 28 | 6.45 | 13.6 | 10 | 12 | 6 | 10 | |
| March | 75 | 19 | 45.3 | 4.22 | 5.10 | 12 | 11 | 9 | 11 | |
| April | 87 | 31 | 51.3 | 3.63 | ..... | 10 | 8 | 14 | 8 | Frost 17th—33°. |
| May | 87 | 38 | 61.2 | 2.45 | ..... | 7 | 13 | 8 | 10 | Only dry period, 1st-26th. |
| June | 91 | 48 | 68.3 | 7.30 | ..... | 13 | 15 | 9 | 6 | |
| July | 92 | 55 | 73.6 | 7.05 | ..... | 15 | 13 | 7 | 11 | |
| August | 88 | 49 | 70.6 | 8.44 | ..... | 10 | 16 | 10 | 5 | |
| September | 87 | 43 | 65.5 | 5.29 | ..... | 12 | 10 | 7 | 13 | No frost. |
| October | 76 | 27 | 56.7 | 7.59 | ..... | 8 | 15 | 6 | 10 | Killing frost, 22d. |
| November | 76 | 27 | 50.4 | 2.50 | ..... | 8 | 10 | 4 | 16 | |
| December | 60 | 12 | 32.9 | 7.34 | 6.4 | 15 | 13 | 7 | 11 | |
| Year | 92 | 9 | 52.8 | 65.22 | 30.7 | 131 | 147 | 98 | 119 | |

Latest killing frost in spring, April 17th, thirty-three degrees; earliest in autumn, October 22d; making 188 days for out-of-door growth of tender vegetation. Very few fruit blossoms were killed by frost in spring. A brief but effective dry period in close of April and early May so injured the grass crop that it was a light one. The balance of season was continuously wet beyond precedent since 1863, the precipitation for year being 65.22 inches by New Jersey Weather Service Gauge.

CLIMATIC HISTORY OF BURLINGTON COUNTY, N. J., FOR 1902.

There were four surface-washing down-pours, that of August 10th measuring 5.78 inches, from 12:30 P. M. to 5 P. M., and removal of soils was very harmful to many fields. The season was very favorable for white potatoes, and the crop was perhaps the heaviest Burlington county ever raised, being good on both light and heavy soils. The cabbage crop was heavy, of fine quality, and so oversized the market that much was sold for five cents per basket, and for seventy-five cents to $2.50 per hundred, and continues low in price to date. The foliage of apple trees was profuse and vigorously healthy throughout the season, and performed their functional worth so well that the light setting of blossoms was developed into a good crop of fine fruit. For some reason the caterpillar devastation of last year did not extend into this.

Conditions were not favorable for highest quality of cantaloupes and melons.

Summer and autumn-sown grass seeds germinated well, grew luxuriantly and the fields are very promising. On lighter soils, second-growth and autumn grasses made a light crop of hay because the heavy rains carried available plant food below the depth of feeding roots.

For the same cause, the crop of corn was light on such soils. There was much mouldy corn and soft cobs. Corn fodder was seriously injured in quality by foggy, wet weather.

Because of wet soil, much winter grain could not be put in until late.

The sleet storm of February 10th has seldom been equaled in its destructiveness to shade, fruit and forest trees.

# CAPE MAY COUNTY.

## OFFICERS FOR 1903.

*President*, DR. E. H. PHILLIPS.....Cape May City.
*Vice-President*, JESSE D. LUDLAM.....South Dennis.
*Secretary*, J. W. PINCUS.....Woodbine.
*Treasurer*, VOLNEY VAN GILDER.....Ocean View.

### DIRECTORS.

HARRY LEAMING, Lower Township.....Cold Spring.
HOWARD HOFFMAN, Lower Township.....Cold Spring.
FRANCIS HARRIS, Middle Township.....Rio Grande.
WINFIELD COOMBS, Middle Township.....Goshen.
HON. F. LUDLAM, Dennis Township.....South Dennis.
HON. T. D. LUDLAM, Dennis Township.....South Dennis.
H. P. MICKLE, Upper Township.....Petersburg.
A. STRATTON, Upper Township.....Beesley's Point.
J. SPECK, West Cape May Borough.....Eldredge.

### DELEGATES TO THE STATE BOARD.

DR. E. H. PHILLIPS (two years).....Cape May City.
J. W. PINCUS (one year).....Woodbine.

## REPORT.

### BY THE SECRETARY.

Two meetings were held during the past year by the Cape May County Board of Agriculture.

The first, at Woodbine, December 16th, 1901, was held at the Agricultural School building, and was principally conducted by the State Board of Agriculture as a Farmers' Institute. The

program of this Institute was as follows: Mr. John Gould, of Ohio, spoke on "The Cow for Dairying, and How to Treat Her for Greatest Profit;" also on "Birds on the Farm." Mr. A. T. Jordan, of the New Jersey Agricultural Experiment Station, spoke on the "Horticultural Experiments Conducted by the Station." Professor John B. Smith, State Entomologist, spoke on "Insects Injurious to Agricultural and Horticultural Crops, and Methods of Control." The Agricultural School Band rendered several selections. The attendance at this Institute was the largest in the history of the Cape May County Board. The farmers were invited to examine the dairy, poultry, greenhouse and other practical departments of the Agricultural School, and they took the opportunity of spending several hours in examining the modern methods of agriculture, as taught to the embryo farmers at the school.

Owing to the early spring and the push of spring work, the spring meeting was omitted this year.

The second meeting was held on October 23d, 1902, in Cape May Court House.

The officers and delegates to the State Board of Agriculture and the State Horticultural Society were elected at this meeting. The delegates who attended the annual meetings of the Horticultural organization made brief reports, accompanied by practical remarks.

An address was made by R. M. Washburn on "Western Conditions of Agriculture;" Mr. R. M. Lipman spoke on "Vegetable Gardening in Cape May County;" Mr. J. K. Shaw on "Cross Pollination of Fruits," and Professor H. L. Sabsovich on "City and Country Modern Tendencies."

## GENERAL STANDING OF AGRICULTURE.

The season of 1902 was very favorable to all garden, fruit and field crops. The drought in early summer injured the yield of hay and some of the early forage crops. The white potato crop was very good, and was quite a contrast to last year's crops. The sweet potato crop, however, though very good in quality, did not come up in the yield to last year's crop.

All garden crops, particularly onions, beets and carrots, have

yielded fine crops. Late tomatoes were slow in ripening, owing to frequent rains in early fall. This cool spell also checked the growth of late forage crops, such as cow-peas and several other crops. Crimson clover has not yielded as well as in previous years; but the crimson clover fields sown for next year are very promising, as they are five to six inches high now, and cover the ground completely as a green carpet.

Of fruit, Keiffer pears were very abundant, and at the time of picking were sold very cheap. The farmers in this vicinity have no cold storage building; and, owing to the very warm weather prevailing during October and November, the pears put away for winter rotted badly. A great necessity is felt here for a cold storage plant, built by farmers on a co-operative plan. Many farmers have decided to send their pears and other fruit next season to the Philadelphia cold storage houses, as good prices are obtained for fruit in winter.

Apples were abundant in some parts of the county and in others they were scarce. Strawberries are not grown here as much as in previous years, owing, probably, to poor prices. This year, however, farmers received good prices, but the crop was short.

Dairying is not practiced a great deal in the county, although near the summer resorts; quite a number of farmers attempt to fill part of the demand for milk.

Dr. Phillips, the President of our Board, grew Whippoorwill cow-peas with his corn, harvested them with a corn binder and put them in the silo. This is an attempt to grow protein on the farm. The high price of concentrated feeds compels the farmer to look for cheaper means to feed his stock.

All the canning factories report good packs.

A large poultry plant has been established at Dennisville.

If the plans of improving and enlarging some of our summer resorts are carried out there will be opened a splendid market for the farmers of our county. There will be great opportunities for establishing dairies, on modern plans, to supply the needs of the summer visitors; there will, also, be greater opportunities for our market gardeners, fruit raisers and poultry men.

# CUMBERLAND COUNTY.

OFFICERS FOR 1903.

*President*, A. H. WILSON.....Vineland.
*Vice-President*, WALTON C. DAVIS.....Shiloh.
*Secretary and Treasurer*, H. O. NEWCOMB.....Cedarville.

EXECUTIVE COMMITTEE.

W. S. BONHAM.....Hopewell.
FRANK GOODWIN.....Greenwich.
MORGAN R. SMALLEY.....Stow Creek.
D. H. BURGE.....Landis.
JEREMIAH CHAMBERS.....Maurice River.
CHAS. DUNSAFE.....Lawrence.
JOHN T. WHITAKER.....Fairfield.
ARTHUR SEABROOK.....Deerfield.
BUTLER PAGE.....Downe.
J. S. TURNER.....Commercial.

DELEGATES TO STATE BOARD.—W. S. Bonham, one year; A. H. Wilson, two years.

## REPORT.

BY THE SECRETARY.

The Board has held one meeting this year, at which time the above officers were elected. We had a very large attendance. The Board was addressed by D. H. Burge, of Vineland, on "Grange Work Throughout the State and the Advantage to Be Gained by Co-operation."

F. S. Newcomb, of Vineland, spoke on "Grape Culture."

The President called for discussion on the subject, "Can Tomatoes Be Profitably Grown for a Less Sum than Eight Dollars Per Ton?"

The discussion was very animated and resulted in the adoption of the following resolution:

*Resolved*, That it is the sense of the Cumberland County Board of Agriculture now assembled, that farmers, looking to their interests, will not contract to grow tomatoes for a less sum than $8 per ton, but in case of getting that price will not put in larger acreage than in former years.

(Will add that the farmers got $8 for their tomatoes, and in some parts of the county as high as $10.)

## REPORTS OF CROPS.

*Corn*—Crop was good, but not quite up to last year, but considerable above the average.

*Wheat*—Crop about the average. Cumberland county grows very little wheat, especially in the lower section.

*Oats*—Only fair crop; very little grown in the county.

*Hay*—About one-quarter crop first cutting, but second crop was good.

*White Potatoes*—Good crop both early and late.

*Sweet Potatoes*—Crop only fair.

*Apples*—Enormous yield.

*Pears*—Very abundant.

*Strawberries*—Fair crop and prices far above the average. More money was made the past season on strawberries in Cumberland county than ever was known before.

*Citron Melon*—Crop good; prices only fair.

*Cabbage*—Crop good both early and late.

*Tomatoes*—Crop poor; while some have had an average yield; the majority of the late growers will average from three to four tons per acre. Early tomatoes were seldom as good a yield as this year.

The Institutes held in the county are always well attended, and the farmers seem to appreciate the labors of the State officers.

# GLOUCESTER COUNTY.

OFFICERS FOR 1903.

*President*, JOHN TONKIN.....Aura.
*Vice-President*, JOS. T. CARTER.....Mickleton.
*Secretary*, A. C. GARDINER.....Mullica Hill.
*Treasurer*, WM. H. BORDEN.....Swedesboro P. O., R. F. D.

EXECUTIVE COMMITTEE.

WESLEY B. GILL.....Swedesboro.
LEWIS M. SHOCH.....Swedesboro.
ESTHER RULON.....Mickleton.
BELLE KIRBY.....Harrisonville.
GEO. H. HORNER.....Jefferson.

DELEGATES TO STATE BOARD.

FRANK KIRBY (two years).....Harrisonville.
THEODORE BROWN (one year).....Swedesboro.

---

We have held four meetings during the year with the usual attendance, and see some new faces with us occasionally.

The annual Institute, held November 19th and 20th, was well attended, with the usual interest manifested and considered a success. The display of fruit was excellent and other products up to the average. The annual Grange picnic held at Alcyon Park two days was well attended, weather conditions considered. The display of farm products was extra nice. One new feature was added in the way of livestock, which was a credible beginning, there being on exhibit Guernsey cattle, swine and horses.

White potatoes, very large crop, prices low.

Sweet potatoes, small crop, good prices. Corn not over two-thirds crop. Hay, one-third crop. Apples, very large crop, fruit fine. Watermelons, fair crop. Citrons paid well. Asparagus, short crop. Tomatoes paid well, as a rule.

Pork has paid this year October prices, $9.50 per hundred weight.

Poultry and eggs have been remunerative.

# HUNTERDON COUNTY.

## OFFICERS FOR 1903.

*President*, E. M. HEATH.....Locktown.
*Vice-President*, JNO. T. COX.....Readington.
*Secretary*, WM. W. CASE.....Baptisttown.
*Treasurer*, F. J. TOMLINSON.....Pittstown.

### DIRECTORS.

H. F. BODINE, Hunterdon County Pomona Grange.
JNO. Q. HOLCOMBE, Ringoes Grange.
WM. B. HOCKENBURY, Locktown Grange.
JAS. HAGERMAN, Sergeantsville Grange.
ELLIS B. HUFFMAN, Kingwood Grange.
WM. SCOTT, Oak Grove Grange.
M. W. ANGELL, Spring Mills Grange.
JOSIAH PRALL, Grand View Grange.
JAS. LANE, Riverside Grange.
URIAH SUTTON, New Jersey Fruit Exchange.
A. B. ALLEN, Hunterdon County Peach Exchange.

### DELEGATES TO STATE BOARD.

E. M. HEATH (two years).....Locktown.
JAMES LANE (one year).....Readington.

COMMITTEE ON PEACH STATISTICS AND REPORTER TO STATE BOARD—Wm W. Case, Baptisttown.

## Other organizations in county:

### NEW JERSEY FRUIT EXCHANGE.

*President*, JOHN T. COX.....Readington.
*Secretary*, R. T. HEATH.....Locktown.

HUNTERDON COUNTY PEACH EXCHANGE.

*President*, A. B. ALLEN.....Flemington.
*Secretary*, P. M. MECHLING.....Pittstown.

---

## REPORT.

BY THE SECRETARY.

Two regular meetings of the County Board have been held—in August and November. Several business meetings of the Executive Committee were also held during the year.

The August meeting, at Baptisttown, was well attended. The address was by Professor E. B. Voorhees on "Crops for the Dairy." It was greatly appreciated by the audience. Much more interest is shown in advanced agriculture than formerly. The annual meeting was held at Flemington, the session being mainly devoted to crop statistics and plans for the future usefulness of the Board.

Farm values, as indicated by selling prices, are too low, considering the prevailing prices of farm produce. The combination of pork, dairy and egg farming should place the business upon a very profitable basis, and begin to give farm land a truer and more stable value.

The following clipping from the Newark *Daily Advertiser,* of a late date, is pertinent to the present conditions in this county:

"The steady decline in the value of farming lands in the North Jersey counties is shown in the recent sale of a tract of 537 acres in Sussex. The best farm in this tract was bought in 1856 for $14,000. Eleven years later it was sold for $20,000, and at the recent sale it brought only $7,548. From $100 per acre in 1867 the value has shrunk to $37 per acre, about 60 per cent.

"This great loss of value is due, principally, to the railroads, which have brought the great machine-worked farms of the West and Middle West close to the Atlantic seaboard by quick transportation and freight discrimination. It is cheaper to bring agricultural products from the agricultural West than from Northern New Jersey, while the cost of production in the West is necessarily

much lower than in this State. But for the near-by city markets in our State the farmer in the middle counties would have to go out of business, for he could not profitably work his farm.

"The great trouble with our northern counties is, however, the apathy and lack of enterprise of its agriculturists. Sussex, Hunterdon and Warren have stood stock still. The idea of public improvements has been foreign to them, and also the adoption of methods by which their land could be turned to good account. There is a future, however, for Northern New Jersey. It has an unrivaled climate and scenery, and is destined to be the home of a large urban population, to make a demand for the products of its soil, to give employment to its labor and to give high values to its real estate. It will not be long before the tract of land just sold at a great sacrifice in Sussex will have a market value far in excess of the figure it was purchased for forty-six years ago."

For this decline in farm values the remedy lies, to a great extent, with our people. The permanent improvements of our public roads, under State aid, should be encouraged. To date this county has not a mile of macadamized road within its limits.

## WEATHER CONDITIONS.

The weather during late midsummer and early autumn was a succession of heavy rainstorms, making the season one of the wettest on record, ruining much second-crop hay and late buckwheat, much of which had to be left in the field, being too badly spoiled to be of any value. Fall seeding was badly interfered with by a very heavy rainstorm which caused much grain already sown to rot before germinating, and preventing further seeding until late into October, some seeding being done little before November 1st. Owing to such conditions the present prospects for next year's wheat and rye harvests are not flattering.

Late fall, however, was pleasant, but owing to lack of sufficient farm help, corn-husking and similar fall work was not done before winter set in.

## GENERAL FARMING.

In general the past season has been a very satisfactory one from a crop standpoint, notwithstanding midsummer and early fall being one of the wettest on record.

Wheat, owing to lack of rain during the fall of 1901, fell off slightly in yield, averaging fifteen bushels per acre for the entire county; rye, a full crop, with like average yield.

The corn crop, generally speaking, excellent, many fields yielding sixty to seventy bushels of shelled corn per acre. The average yield, however, falls to thirty-two bushels per acre, caused by adverse weather conditions in many sections.

Oats better than for several years past, yielding thirty-five bushels per acre, of fine quality.

Early buckwheat yielded extremely well, but late was mostly ruined by wet. General average, twenty-five bushels per acre.

Hay of all kinds, one ton per acre, generally the second crop being more abundant and of better quality than the first.

The potato crop yielded much better than last year, although the product of many patches was destroyed by rot. Average yield, eighty bushels per acre.

## TOMATOES.

The tomato crop was very promising, a very large pack being in sight until the rainy season commenced, which ruined fully 40 per cent. of the fruit. Messrs. Everitt & Scarborough, of Lambertville, packed 187,500 No. 3 cans, against 126,000 last year, and Ringoes Canning Company, 35,000 cans, against only 18,000 last year. Packers were compelled to pay growers $8 per ton of 2,000 pounds for fruit—the highest price paid in several years.

There is room for several more canneries in the county. The advancing price of tomatoes by the ton points to the future as being very favorable to their production.

## FRUIT.

In general, fruits of all kinds yielded fairly well, and was generally of good quality. Small fruits, while not extensively grown, yielded fair returns.

The apple crop was one of the largest on record, many orchards yielding above 300 bushels per acre, the general average for the county being fully 150 bushels per acre. They sold readily, delivered at the railroad stations in bulk, at prices ranging from seventy-five cents to $1 per barrel.

Peaches were again a light crop, the shipments aggregating only about 350,000 half-bushel baskets. Prices were slightly better than last year, the crop averaging about fifty cents per basket net.

The New Jersey Fruit Exchange handled at their Flemington salesrooms 20,189 baskets, at an average price of fifty-two and one-half cents per basket, against 5,000 baskets at forty-seven cents last year.

The Hunterdon County Peach Exchange, at Pittstown, sold 5,320 baskets, at an average of sixty-four and one-half cents, against 12,086 at forty-nine cents last year.

## INSECT PESTS.

Less damage is reported from the Angoumois miller than last year. The Colorado beetle is generally much less common than a few years ago, nature having rallied her forces to hold the pest in check, although she has been greatly hampered by the poisons used to destroy the beetles.

The tent caterpillar, which so thoroughly denuded the trees for several years past, was scarcely seen after the first brood, being practically exterminated by her parasitic enemies.

The San José scale is here, and is spreading rapidly to all parts of the county. Heroic means must be resorted to at once if our fruit industry is to be retained. In the eastern part of the county it has already devastated and ruined many valuable orchards, and has spread nearly, or quite, to the Delaware river on the west.

## BEE-KEEPING.

The bee industry seems to be slowly advancing again, the honey crop of the county reaching from nine to ten tons. The extremely good prices prevailing in the city markets give promise of a brighter future for the industry. Foul brood and other brood diseases have lost, to a great extent, their former virulence, and seem gradually disappearing, in accordance with the unswerving laws governing "Nature's balance." Scientists have heretofore classed "*bacillis alvei*" separate from all others, and found only in the brood of the honey-bee. Now Dr. W. Lambotte, of the University of Liege, Belgium, comes out with the assertion and proof that it is nothing more nor less than the ubiquitous "*bacillis mesentencus vulgaris,*" which is very bountifully distributed throughout nature, especially in the vegetable kingdom, and is the same fellow that causes stringy bread dough and other disagreeable conditions for cooks and bakers.

This discovery fully accounts for the apparently spontaneous appearance of the disease in apiaries, and only proves what I have maintained for years—that foul brood is never entirely out of the country, but only awaits proper conditions for its manifestations, when its bacilli enemies are no longer numerous enough to hold it in check. When the counteracting bacilli become numerous enough, of course, the disease runs out, and partially, or, for a time, completely, disappears; but which is equally certain, in the future, to reappear sooner or later.

## POULTRY.

Turkey production continues to decline, and they were never scarcer at the Christmas holidays than the present season. Lambertville merchants were compelled to pay nineteen cents per pound for birds to supply their holiday trade. Ten to fifteen years ago flocks of 100 birds, or even more, was a common sight; of late years a flock of forty is considered large.

The duck and goose are being dropped from the domestic stock of most farms, but their loss is not felt to the same extent as is that of the "national bird," the turkey.

The hen is gaining rapidly in popularity each year, and the

output of eggs, under more scientific knowledge and care, is steadily increasing.

Mr. S. O. Heath, of Kingwood township, from a flock of 400 hens for the year ending September 30th, sold 3,961 dozen eggs, realizing therefrom $761,26. The exact cost of feed cannot be closely estimated, as Mr. Heath raises some of the finest corn grown in the whole county.

The report of Mr. James E. Farmer, of Flemington, of his flock of thirty-five Wyandotte hens for year ending September 30th, seems worthy of a place in this report:

*Dr.*

| | |
|---|---|
| Feed bought | $43 45 |
| Repairs, &c., to hen-house | 12 45 |
| Eggs set | 3 20 |
| Total | $59 10 |

*Cr.*

| | |
|---|---|
| Eggs retailed | $92 69 |
| Eggs sold for hatching | 3 50 |
| Poultry sold | 25 50 |
| Poultry killed | 8 20 |
| Droppings sold | 3 30 |
| Inventory, 84 head | 42 00 |
| Total | $175 19 |

Leaving net balance, $116.09.

These thirty-five hens, besides hatching and raising eighty-three white Wyandotte chicks, laid 4,793 eggs—an average of 137 eggs for each hen.

## DAIRYING.

Dairying is still advancing, both in price and quantity. All creameries reporting show substantial gains in milk receipts and price paid for butter fat or price per hundred weight.

Cherryville reports receiving 1,105,563 pounds of milk for year ending October 31st, a gain of over 300,000 pounds over last

year. Oak Grove Creamery reports receipts of 883,015 pounds of milk against 747,573 pounds last year. Both paid $1.07 per hundred, against ninety cents last year. The creamery at Everittstown received 1,220,915 pounds, against 838,246 pounds last year—a gain of over 382,000 pounds—and paid twenty-five and one-half cents per pound for butter fat, against twenty-three and one-half cents last year.

A new creamery has been built at Barbertown the past summer, and the erection of another is contemplated at Milford in the near future.

Locktown has furnished the usual complete and comprehensive report, which is, as heretofore, appended in full.

REPORT OF THE WORKINGS OF THE LOCKTOWN CREAMERY FOR THE YEAR ENDING OCTOBER 31ST, 1902.

Compiled by Geo. W. Hockenbury, Secretary and Superintendent.

| | Number lbs. milk received. | Number lbs. butter made. | Butter sold for | Skim-milk sold for | Average test of all milk received. | Price per lb. paid for butter-fat. | Average price paid per 100 lbs. milk. |
|---|---|---|---|---|---|---|---|
| 1901. | | | | | | | |
| November | 142,434 | 7,449 | $2,014 04 | $74 83 | 4.59 | $0 29 | $1 33+ |
| December | 124,083 | 6,657 | 1,880 41 | 65 45 | 4.52 | 31 | 1 41— |
| 1902. | | | | | | | |
| January | 127,422 | 6,528 | 1,763 39 | 66 13 | 4.50 | 29 | 1 30+ |
| February | 115,994 | 5,872 | 1,763 37 | 54 75 | 4.38 | 32 | 1 40+ |
| March | 136,469 | 6,655 | 1,954 89 | 68 10 | 4.23 | 32 | 1 35+ |
| April | 138,230 | 6,484 | 1,966 10 | 71 15 | 4.16 | 33 | 1 37+ |
| May | 166,945 | 8,042 | 1,939 83 | 85 45 | 4.04 | 27 | 1 09+ |
| June | 170,739 | 8,603 | 1,932 74 | 89 20 | 3.98 | 26 | 1 04— |
| July | 155,935 | 7,935 | 1,782 84 | 82 10 | 4.13 | 25 | 1 03+ |
| August | 156,242 | 7,815 | 1,663 85 | 82 50 | 4.13 | 24 | 99+ |
| September | 166,560 | 8,412 | 1,928 76 | 87 07 | 4.18 | 25 | 1 05— |
| October | 153,468 | 7,823 | 2,015 22 | 80 25 | 4.30 | 28 | 1 20+ |
| Total | 1,749,521 | 88,275 | $22,565 44 | $906 98 | ..... | ..... | ..... |
| Average | ..... | ..... | ..... | ..... | 4.26+ | $0 28 6/10 | $1 21+ |

# MERCER COUNTY.

OFFICERS FOR 1903.

*President*, D. C. McGallyard.....Trenton.
*Vice-President*, John V. Green.....Wilburtha.
*Treasurer*, I. J. Blackwell.....Titusville.
*Secretary*, Franklin Dye.....Trenton.

Directors—J. W. Hendrickson, Wm. D. Hill, D. C. McGallyard, Charles Black, I. J. Blackwell, Fernando Blackwell, A. H. Rogers, J. T. Allison, W. N. Cunningham.

DEEGATES TO STATE BOARD.

J. M. Dalrymple (two years).....Hopewell.
S. B. Ketcham (one year).....Pennington.

## REPORT.

BY THE SECRETARY.

The farming interests of Mercer county are equally prosperous with other counties engaged in similar branches of agriculture. This county may be said to be typical in soils and products of the entire State, as here both general farming and truck farming are carried on, with soils well adapted to both branches.

Hopewell, Ewing, Princeton and West Windsor townships are especially fitted by nature for the production of grass, grain, potatoes and orchard fruits, and are, also, well adapted for dairying. East Windsor, Washington and Hamilton townships, while possessing much land also adapted to the above-named crops, has more soil calculated for the profitable production of what is termed "market garden and truck farm" crops; both branches are pursued with credit to those engaged in their production. And for such

crops a large demand exists in the city of Trenton, with a local demand in the smaller towns.

Owing to the location of the Village Nurseries near Hightstown, with their interesting experiments year by year along special lines of market gardening and small fruit production and the large annual output of nursery stock, there is no doubt a stimulus given to farmers in proximity to Hightstown to engage in similar experiments, where soil conditions are favorable.

The northern and western parts of the county being, as stated, well adapted to dairying, more attention each year is being given to this branch of the farming business; more attention, not only in increasing the number of cows comprising the dairies, but also in carrying on the business in a more intelligent way—*i. e.*, according to the requirements and laws of successful dairying.

There is large room for improvement at this point. Better stock, or stock adapted for milk production in the highest degree, with such conditions of stable life as will insure both healthy animals and a healthful product, should be the growing ambition of our milk producers. Furthermore, there is an increase in commercial dairying, one new enterprise having been established in the vicinity of Ewingville, Ewing township, and known as the Purity Milk Company.

Crop yields for the year past have been above the average annual return, with the exception of hay. The table given herewith is considered a conservative yield:

| *Crop.* | *Acres.* | *Bushels per Acre.* | *Total No. Bushels.* | *Average Price.* | *Total Value.* |
|---|---|---|---|---|---|
| Corn | 22,000 | 34 | 748,000 | $0.70 | $523,600 |
| Wheat | 12,000 | 22 | 264,000 | .76 | 200,640 |
| Rye | 4,000 | 16 | 64,000 | .60 | 38,400 |
| Oats | 10,000 | 40 | 400,000 | .39 | 156,000 |
| Hay | 23,000 | ½ ton | 16,500 | 16.00 | 264,000 |
| White Potatoes | 1,800 | 80 | 144,000 | .55 | 79,200 |

The County Board maintains its organization, although interest in its meetings is not so great as it was a few years ago. We do not ascribe this lack of interest to indifference of the farmers to the advantages to be derived from meeting together for discussing their business, so much as to ignorance of the advantages to be gained.

It is true that, to maintain such organizations, continuous and special work must be done by the officers of such Boards. Where this is lacking, they do not maintain such active conditions as are justified by the assistance given by the State.

The best County Boards are usually found in those counties where local Granges and other farmers' organizations are most numerous. Such organizations maintain their County Boards and make them a very valuable aid in elevating and improving the farming interests.

The Mercer county Board has held two meetings during the year. At the annual meeting, held March 28th, the officers for the year were elected, as given at the head of this report, which was followed by a very profitable discussion, growing out of President Hale's address on "Co-operation, Freight Transportation by Trolley Roads—Advantages and Disadvantages," which was followed with an address by J. S. Turner, Esq., of Bridgeton, on "The Canning Industry." This paper elicited much interest, as was manifested by the discussion following it. The address was comprehensive and practical, as the speaker has been engaged in the business for years.

A question as to which is better—the co-operative cannery, or, independent management—was answered: "Every business must have a head. In a co-operative concern, each one wants to be boss."

He recommended not too much nitrogenous manure in growing tomatoes. He has produced tomatoes successfully on the same ground for twenty years.

The canning industry of this county is not large—local markets for the product being, as a rule, more profitable. There is, however, a factory at Hopewell which reports a pack of 81,000 cans of tomatoes for the year 1902—$2,000 paid out for labor—200 tons of tomatoes received at factory—$1,560 paid to the farmers for tomatoes.

Another at Titusville, which reports as follows: "Received about 6,400 bushels of tomatoes from seventy-five acres produced from seed which we distributed. Canned about 83,500 No. 3 cans, or about 3,458 cases of twenty-four cans each. The season of 1902 was one of the worst on record here on account of the heavy and continuous rains and low temperature."

Another cannery at Pennington reports an acreage for 1902 of 112 acres—yield per acre, two and one-half tons. The company have packed 70,000 cans. Unfavorable weather conditions prevented a full yield of tomatoes.

# MIDDLESEX COUNTY.

OFFICERS FOR 1903.

*President*, DAVID J. PERRINE.....New Brunswick.
*Vice-President*, D. C. MERSHON.....Prospect Plains.
*Secretary and Treasurer*, WM. FITZ RANDOLPH.....New Market.

DIRECTORS.

D. C. MERSHON.....Prospect Plains.
LEWIS D. WALKER.....South Plainfield.
W. H. GILES.....Dayton.
H. B. HERBERT.....New Brunswick.
DE HART VOORHEES.....Franklin Park.
WM. H. DEBOW.....Cranbury.
W. T. WOERNER.....New Brunswick.
WALTER GREEN.....Browntown.
GEO. W. MOUNT.....Kingston.

DELEGATES TO STATE BOARD—Wm. Fitz Randolph, one year; R. F. P. Von Minden, two years.

## REPORT.

BY THE SECRETARY.

The Middlesex County Board of Agriculture has held but three meetings during the year. The fourth one, arranged for February 22d, being a failure, owing to the severe ice storm of that date. On May 31st Secretary Franklin Dye was present, and gave an interesting talk on "Farm Economics." At the meeting on August 31st the question, "Does it Pay to Mow Wheat Stubble Fields in the Fall?" was discussed; also "What Kinds of Wheat Shall We Sow?" Judge Woodbridge Strong, who is much interested in fruit culture, and has made many important dis-

coveries in grafting, &c., showed several varieties of fruits grown from seedlings, the result of his experiments.

The annual meeting was held on November 29th, at the New Brunswick Court House, and was better attended than any meeting of the year. After hearing the reports of the Secretary and Treasurer and the election of officers for another year, Professor E. B. Voorhees gave a very instructive talk on "Clover and Other Legumes as Green Manures." It was listened to with much interest and profit. At the afternoon session Mr. Edwin Beekman, of Middletown, N. J., gave a lecture on "Thirty Years' Experience with Apple Trees." Mr. Beekman is a large grower and understands every phase of the business. He emphasized the point that apples should be properly and honestly sorted, and that farmers should stand together in the prices asked for their products.

## CROP REPORTS.

The year has been a fairly prosperous one for farmers. Dry weather in May and June shortened the hay very materially, and the amount of first-class hay is very limited and hard to find. The second crop, in many instances, was better than the first. Wheat and rye were also far below that of last year. The newly-seeded fields are looking well, notwithstanding the late sowing. Oats, a fair crop; much better than last year. Potatoes were a fairly good crop. Corn, a good crop, but owing to the scarcity of help and the abundance of fall rains husking is much delayed.

Milk production does not equal the demand, and prices are higher than in many years, in some cases five cents being offered at wholesale. Silos are growing in favor, and several new ones have recently been built. Our county has good schools, good roads and good markets; new industrial plants are being constantly erected, and our population is rapidly increasing. There is no reason why farming should not be a profitable calling in this county.

# MONMOUTH COUNTY.

## OFFICERS FOR 1903.

*President*, GEORGE W. PATTERSON, JR. ..... Ardena.
*Vice-President*, DANIEL JONES ..... Freehold.
*Secretary*, D. AUG. VANDERVEER ..... Freehold.
*Treasurer*, JOHN B. CONOVER ..... Freehold.

### EXECUTIVE COMMITTEE.

JOHN H. DENISE ..... Freehold.
WM. H. REID ..... Tennent.
H. V. M. DENNIS ..... Freehold.

### DIRECTORS.

JAMES H. BAIRD ..... Marlboro.
JOHN H. DU BOIS ..... Freehold.
GEO. L. DU BOIS ..... Tennent.
EDGAR H. SCHANK ..... Holmdel.
E. A. SEXSMITH ..... Wall.
H. E. HULSHART ..... Lower Squankum.
H. D. MOUNT ..... Hightstown.
JOHN STATESIR ..... Colts Neck.
C. C. HULSHART ..... Matawan.

### DELEGATES TO STATE BOARD OF AGRICULTURE.

C. C. HULSHART (two years) ..... Matawan.
E. A. SEXSMITH (one year) ..... Wall.

## REPORT.

### BY THE SECRETARY.

The annual meeting of the Board was held in the Court House, Freehold, on November 22d. The attendance was not as large as it should have been. Officers were elected for the ensuing

year. An address was delivered by Professor E. B. Voorhees on "Clover and Other Legumes, as Green Manures." Other topics discussed were: "Should Keiffer Pear Orchards be Renewed, Pruning, &c.," by Hon. D. D. Denise; "The Future of of Apple-Growing, and Varieties," by Hon. William H. Reid.

The Farmers' Institute of two days, held at Keyport, by Secretary Franklin Dye, of the State Board, is of great benefit to the farmers and fruit growers of that part of the county. The past year has been a very prosperous one for all classes throughout the county. Most crops have yielded large returns, particularly corn, wheat, rye, pears, grapes, melons and potatoes, tomatoes and other vegetables.

Apples, peaches and some small fruits were a fair yield. The yield of hay, cranberries and huckleberries was very light. All crops were unusually free from blight and insects. The weather during April was much cooler and dryer than usual. The rest of the season was fine for growing crops, with plenty of moisture and mild conditions during summer and fall. Caterpillars, so abundant during 1901, were very few this season.

## CONDITION OF CROPS.

Asparagus was a good yield and sold for a good price. This is one of the most profitable crops to grow, where it receives good cultivation, is highly fertilized and properly packed for market. The leading varieties grown here are the Colossal and Palmetto. A large quantity is also canned in the county. Strawberries and raspberries, 75 per cent. yield. Early varieties of strawberries were injured by a late frost; prices good. Blackberries, yield, 50 per cent; not as many grown in the county as formerly; good prices. Cherries, yield, 100 per cent; fine quality; sold well. Currants and gooseberries, 100 per cent. yield. Most of the small fruits are now grown in small patches of a few acres, and picked by members of the family. Formerly they were grown in large tracts of many acres, and one grower would employ as many as 75 to 100 pickers; the difficulty of getting enough pickers now, has made the change. Grapes, yield, 100 per cent.; quality fine, prices low; not many grown for market, some used for wine for

home use. Japan plums, 80 per cent. yield; prices fair. Cranberries badly injured by late frost in spring; yield, 15 per cent.; prices high. Huckleberries, very light crop; damaged by frost. Peaches, yield, 60 per cent.; prices good. Apples, yield, 75 per cent.; some varieties very full and others having no fruit; quality very good. Pears, the yield of the Keiffer, which is the leading variety grown, was 110 per cent. The average price, seventy-five cents per barrel, sold from fifty cents to $1 per barrel, according to quality. Much of the fruit was small and rusty, and had to sell for fifty cents. Good fruit, highly colored, would readily sell for $1. Some large growers here intend to take out some of their old trees where they are planted too close and are on too heavy land. It needs a light, rich soil with plenty of room. Watermelons, yield, 100 per cent.; 2,500 mellons per acre. Citron melons, 25 per cent. yield; quality poor. Cucumbers, 100 per cent.; 100 barrels small and 200 barrels large per acre. Cabbages, 100 per cent. Tomatoes, yield, 100 per cent., 800 to 1,000 five-eighth baskets per acre; for canning, ten tons per acre. Sweet potatoes, yield, 100 per cent.; price, $3 per barrel. Corn, yield, 110 per cent.; an average of sixty-two bushels of shelled per acre.

The largest yield reported in the county this year was by George W. Patterson, Jr., of Ardena. He grew on three acres of ground, 366 bushels. Corn was cut up and husked from stack, and weighed, allowing seventy-two pounds per bushel—nothing but sound corn weighed. Corn planted in rows four feet apart, two and three grains in hill eighteen inches apart, on timothy sod; 357 pounds fertilizer on the three acres. The average price here for new corn is fifty-five cents. Much of the corn grown in the county is sold in the ear to the large seashore trade. Wheat, yield, 110 per cent., an average of twenty-seven bushels per acre; price, seventy-two cents. Rye, 115 per cent.; average yield, twenty-one bushels per acre; price, fifty cents. A large part of the rye crop is sold in the sheaf without being threshed by the grower. The price paid by the presses is $14 per ton for grain and straw combined. Hay, 25 per cent yield. The hay crop was almost a failure, the cold and dry weather in early spring retarding its growth until too late to make a good yield. Late grass and pasture was good, second crop hay selling for $20 per ton here. Potatoes, yield, 135 per cent.; average per acre, ninety-

five barrels of three bushels each. The season was most favorable to the growth of the potato, cool and moist during the whole season; free from blight, and very few potato bugs; quality very fine and smooth in appearance. The leading varieties are the Giant and World's Fair. The Giants sold from seventy cents to $1 per barrel. The most of the crop for about seventy-five cents. The World's Fair, from $1 to $1.50 per barrel. The yield of the Giants is greater than other varieties. Freehold is the great shipping point. More potatoes are grown and shipped from here and near-by stations than any other place in the country of the same area. The amount grown the past year (1902) was 130,000 barrels. One railroad, the Pennsylvania, handled about 92,000 barrels. It is estimated that there are 300,000 barrels grown in the county. Following are some of the best yields from different growers, all within two and one-half miles of Freehold:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3,531 | barrels | on | 34 | acres | 104 | barrels | per acre. |
| 355 | " | " | 2¼ | " | 158 | " | " |
| 1,260 | " | " | 9 | " | 140 | " | " |
| 4,000 | " | " | 40 | " | 100 | " | " |
| 3,947 | " | " | 30 | " | 131 | " | " |
| 572 | " | " | 4 | " | 143 | " | " |
| 1,620 | " | " | 16 | " | 101 | " | " |
| 1,100 | " | " | 9 | " | 122 | " | " |
| 3,000 | " | " | 30 | " | 100 | " | " |
| 2,633 | " | " | 18 | " | 146 | " | " |
| 5,150 | " | " | 50 | " | 103 | " | " |

## THE CANNING INDUSTRY.

There are four canning factories in the county. Stout's, at Shrewsbury, and E. C. Hazard, of the same place, can the different kinds of vegetables and small fruits. Hazard also makes a specialty of mushroom and tomato catsup. Bucklin's, of Atlantic, puts up quantities of tomatoes, &c. Mr. Joseph Brakely, of Freehold, makes a specialty of peas, lima beans and spinach. His plant has been greatly enlarged the past year by adding new buildings and more machinery. He rents the land of the farmers in most cases, but has lately purchased a few farms. He had the past year in peas, 1,300 acres; lima beans, 1,300 acres; spinach, 200 acres; has 468 men and women on the pay-roll; employed seventy teams,

at a cost of over $30,000; used 800 tons of fertilizer. During the busy season has canned as high as 177,000 cans of peas in one day. He makes his own cans, and has a machine that can turn out sixty cans per minute.

### LIVESTOCK.

Very few horses or mules are raised in the county for general purposes. There are a number of stock farms, where horses are bred for speed. Horses and mules are higher than last year—$150 for farm horses and $175 for mules. Cows are a little higher; average price, $50. Swine and turkeys higher.

# MORRIS COUNTY.

OFFICERS FOR 1903.

*President*, LYMAN J. FISH.....Afton.
*Secretary*, W. F. ELY.....Madison.
*Treasurer*, WESLEY D. HOPPING.....Hanover.

BOARD OF DIRECTORS—John S. Goldberg, Wm. H. Littell, W. B. Lindsley, S. E. Young, W. James, James Cook, Edgar C. Hopping, Frank P. Cook, B. S. Condit, John J. Mitchell, John Oliver, N. D. Goble.

DELEGATES TO STATE BOARD—S. E. Young, one year; Wm. H. Littell, two years.

## REPORT.

FURNISHED BY W. F. ELY, SECRETARY.

At the twentieth annual meeting of the Morris County Board of Agriculture, W. F. Ely, who has held the office of Secretary since its organization, gave a brief history of the work of the Board, after which he stated that he wished to call the attention of the Board to a few startling facts in regard to how farmers and others who consigned produce to some commission men, as they term themselves, were swindled. He then proceeded to read an article from a Sussex county paper, relating how a farmer at Hamburg, who had purchased five barrels, paying thirty cents apiece, and after filling them with choice apples had shipped them to the city. In return he received the whole of eighty cents, being seventy cents out for his barrels, besides the apples and all his work and trouble. This man was probably a granger, and wished to save the middelman's profit.

To show that this was not a mere newspaper story, Mr. Ely then produced a letter written by John Henry, of Branchville, giving him permission to use his name. In the letter was a check for

twenty-five cents, the proceeds of a shipment of five barrels of apples. He had bought the apples, paying $1 per barrel for the apples and thirty cents for each barrel, making a total of $6.50. The apples were the finest Kings and Pippins Mr. Henry could buy, and his returns, after freight charges, commission and robbery had been deducted, was the check for twenty-five cents.

The *Rural New Yorker* frequently publishes complaints of those who have been swindled. Now, the question is, What can be done to protect the farmers and those who ship their produce to be sold? No one will prosecute these swindlers, and throw away more money, when the result will do no good. The wholesale merchants have their list of men, showing their financial standing. The retail merchants throughout the State, a few years ago, formed a league, and had all bad debtors placed on a list, so that dealers would know whom not to trust. The beef combine has a list of any butcher who does not pay within a certain time, when down goes his name and none of the combine will give him a pound of meat on trust. Every farmer and produce buyer who ships to commission merchants should have a list showing irresponsible dealers. This can be done by asking the farm and country papers to publish an article inviting their readers to write a letter, giving whatever experience they have had in shipping produce, so that these men can be shown up.

WHEREAS, It seems to be a common occurrence that the farmers and others who ship or consign produce, &c., to men calling themselves commission men, that they will dispose of the same at the best market prices for 10 per cent., are without doubt, in many cases, being defrauded by these men, and it seems as if there is no law by which persons shipping their produce can have any remedy but in a law suit, thereby taking their time and good money to be thrown away.

*Be it Resolved* by the Morris County Board of Agriculture, That as the merchants (wholesale and retail), the meat combine and others have what is known as a list of men whom to trust or not, that we would respectfully ask the farmers' papers and others to assist in showing up these frauds, for the protection of all who make consignments, by asking all of their readers who have been swindled in shipping produce of any kind to make a statement of

all the facts, for the purpose of seeing if a list of these fraudulent commission men can be had, and avoided hereafter, and mail the same to the Secretary of this Board.

*And be it further Resolved,* That our Secretary have printed the above and send them to the county papers throughout the State, also any other he may chose to do, asking them to print the same for the benefit of their readers and all others interested.

# OCEAN COUNTY.

## OFFICERS FOR 1903.

*President*, C. M. Rorer.....Cassville.
*Vice-President*, Patrick Davitt.....Toms River.
*Treasurer*, H. R. Wills.....Toms River.
*Secretary*, C. R. Graham.....Red Valley.

### DIRECTORS.

Joseph G. Leming.....Clarksburg, Monmouth county.
Alfred Jenkins.....Cassville, Ocean county.
Enoch Lemon.....Cassville, Ocean county.
A. B. Clute.....Toms River.
Ebenezer Applegate.....Toms River.
H. R. Wood.....Lanoka.

### DELEGATES TO STATE BOARD.

C. M. Rorer (one year).....Cassville, Ocean county.
C. R. Graham (two years).....Red Valley, Monmouth county.

## REPORT.

### BY THE SECRETARY.

We have held six meetings during the year with satisfactory results. At our September meeting, held at Toms River, Secretary Dye was present and gave us an address which was appreciated and was very instructive. Our October meeting was held in the Leesville school-house. Professor Voorhees and Secretary Dye were present with good advice and encouragement to the tillers of the soil. Co-operation and more intensive farming is the key to success, with honesty in packing and marketing of our products of the farms.

Professor Voorhees came by the way of Lakewood, part of the route through the district burned over the past three years, and Secretary Dye by the way of Imlaystown, through where the fire of May 5th to 8th, 1901, destroyed between 4,000 and 5,000 acres of woodland, causing a great loss. While some of the young growth was worth $5 per acre, the most was worth $50—some as high as $75—and they were of the opinion that there should be better protection for our forests against fire. These fires cause a great loss to our county in the way of taxes, as they reduce the value on the land, and to make up the amount necessary the improved land has to bear the burden. The loss of building material for future use is great. The land burned over in some instances is valueless, as the vegetable matter is consumed in some places when dry; the peat, also, is burned, so that no soil is left to grow any kind of crops, except in few places the huckleberries thrive. The soil of Ocean county varies from the light, drifting sand to heavy clay.

The light soil, which will not produce hay or grain in paying quantities, produces the finest Keiffer pears, blackberries, strawberries and apples, while the next grade of land produces peaches and truck; our heavier lands, good hay and grain. Near our larger towns bricks are manufactured by the thousands. Lakewood, the well-known winter resort, contains some of the largest hotels in the United States, and many small ones. It is situated in the northern part of the county on the Central railroad, surrounded by some of the finest pine forest in the State; has miles of good gravel and some macadam roads. Large numbers of boarders during the winter make this one of the best markets for the poultry growers. Farmers, as well as dairymen, give employment to hundreds of men and women. There are several summer resorts within our county with an overflowing population that must be fed here during the summer months, making a good market for all kinds of truck and fruit. There are thousands of acres of land in this county waiting for settlers to cultivate it and have the advantage of good summer markets.

Barnegat bay, in this county, abounds in fish, clams, oysters, and in fall and spring with wild ducks and geese, attracting the pleasure-seekers as well as the sportsmen. This bay brings in a large revenue to the nearby residents. The cranberry crop is a

paying one; thousands of acres of natural as well as artificial bogs are in our county, and thousands of acres more can be brought into production that will average 10 per cent. on investment. Our crops the past season have been good, bringing good returns. A freight railroad from Trenton to Lakewood or Point Pleasant would help the northern part of this county, and it would increase our crops, as moving them so far by horse power is slow and expensive. We have several miles of improved roads, and several miles more are contemplated. Land along the good road advances in price and the forests give way to modern homes. We have seven free mail routes and more are needed, as it brings the farmer in touch with the world; it is an encouragement for our boys and girls to stay on the farm. Our schools in the sparsely settled districts are not what they should be, as the wages that are paid gives a poor grade of teachers. This could be overcome by shortening the term one or two months and a little more help from the State. Then compulsory attendance, and a law should be enacted prohibiting the use of tobacco in or about our schools, as it is injuring our children, making them mentally, as well as physically, dull.

# SALEM COUNTY.

OFFICERS FOR 1903.

*President* ..... GEO. KIRBY.
*Vice-President* ..... SAMUEL FLITCRAFT.
*Secretary* ..... CLARK FLITCRAFT.
*Treasurer* ..... JOEL BORTON.

DIRECTORS—Edgar C. Moore, C. French Moore, Chas. C. Loveland, Empson Atkinson, Jessie Colson, Benjamin F. Straughn, M. D. Dickinson.

DELEGATES TO STATE BOARD—Samuel Flitcraft, one year; Edgar C. Moore, two years.

SOCIETIES REPRESENTED.

Salem County Pomona Grange, No. 6.
Woodstown Grange, No. 9.
Fenwick Grange, No. 20.
Courses Landing Grange, No. 60.
Friesburg Grange, No. 81.
Naturalists' Field Club, Woodstown.

## REPORT.

BY THE SECRETARY.

The Salem County Board of Agriculture held three meetings the past year. The annual meeting was held in the Borough Hall, at Woodstown, on February 11th. Reports of the Secretary and Treasurer were read and accepted. New officers and a Board of Directors were elected. C. Flitcraft, Secretary of the County Board, gave a full account of the State Board's meeting, held at Trenton. Edgar C. Moore made a report of the State Horticultural Society. The question of "Management and Profits of Poultry on the Farm" was opened by Mrs. Minnie Alderman and freely

discussed. Dr. Leonard Pearson spoke on "Health of the Dairy," which was very instructive as well as interesting.

The second meeting was held at Woodstown on April 23d. M. D. Dickinson read the law on birds; remarks were general on the law. Henry W. Ridgway gave us a talk on "Asparagus Culture." On June 28th a few of the Directors met and decided, on account of the busy season, it would be best to hold no meeting in July. The meeting of October 22d was held at Woodstown. Emily R. Kirby gave a very interesting reading on "Culinary Affairs." J. Walter Pancoast gave us a paper on "Falling Prices of the Products of the Farm," which was followed by "Corrupt Use of Money at the Polls and in Politics."

Referring to your request to give an account of the output of various crops, would say that it would be extremely difficult, also expensive, as it would require a thorough canvass to get anything definite. The dairy interest is increasing in Salem county. Woodstown, as near as we can ascertain, ships 9,000 quarts of milk daily. We also have two creameries, that use large quantities of milk. It is said we average two carloads of bran shipped to this station every month. A large amount of other feed is also shipped to the station. Potatoes were a fair crop; I suppose 100 carloads were shipped from this point. Apples were an abundant crop this year; about sixty-five carloads shipped from here. Fifty carloads of canned tomatoes were shipped. Most of the products are shipped. Very much of the butter made at our creameries here is used at home. Salem county farmers have had a very prosperous year.

# SOMERSET COUNTY.

## OFFICERS FOR 1903.

*President*, E. E. COOPER.....Plainfield.
*Vice-President*, L. H. SCHENCK.....Neshanic Station.
*Secretary and Treasurer*, ARTHUR P. SUTPHEN.....Somerville.

### DIRECTORS.

| | | |
|---|---|---|
| Bedminster..... | C. M. WYCKOFF..... | Bedminster. |
| | WM. C. LANE..... | North Branch. |
| Bernards..... | JOHN HAAS..... | Liberty Corner. |
| | FREEMAN STELLE ..... | Millington. |
| Branchburg ..... | DR. J. D. VANDERVEER..... | North Branch. |
| | HON. L. H. SCHENCK..... | Neshanic Station. |
| Bridgewater..... | WILLIAM J. LOGAN..... | Somerville. |
| | BERNARD MEYER ..... | Finderne. |
| Franklin..... | ARTHUR F. RANDOLPH..... | South Bound Brook. |
| | GEO. B. RANDOLPH..... | Weston. |
| Hillsborough .... | HENRY S. VAN NUYS, SR..... | Millstone. |
| | JOHN S. AMERMAN..... | Neshanic. |
| Montgomery..... | STEPHEN S. VOORHEES..... | Skillman. |
| | HENRY W. HOAGLAND..... | Griggstown. |
| Warren..... | WILLIAM H. ROGERS..... | Plainfield. |
| | MARK STOLTZ ..... | Gallia. |
| North Plainfield.. | HERBERT P. PHILLIPS..... | Watchung. |
| | CHARLES F. DEBLE..... | Plainfield. |

### REPRESENTATIVE TO STATE BOARD OF AGRICULTURE FOR TWO YEARS.

GEORGE B. RANDOLPH.....Weston.

# REPORT.

BY THE SECRETARY.

The County Board of Somerset has held five meetings during the past year. Increased interest has been manifested, and the membership has nearly doubled. We have now nearly 120 contributing members.

Our first meeting was held December 21st, 1901, at which officers were elected, and an admirable address was made by President Cooper. This was published in the county newspapers and largely distributed.

Professor J. G. Lipman, of the New Jersey Experiment Station, delivered an interesting and instructive address upon the subject, "The Place and Importance of Bacteria in Agriculture," which elicited considerable valuable discussion.

It was determined by resolution to hold six meetings during the coming year. A committee was appointed to prepare a short address to farmers, and the Secretary authorized to mail the same to them. This resulted in a large increase in both membership and attendance.

The next meeting was held February 8th, 1902. At this meeting Secretary Dye favored the members with his interesting and instructive address, "Encouragements to the Business of Agriculture," followed by short addresses by Charles Howell Cook, Hon. A. A. Clark, Joseph Fitzga, Hon. L. H. Schenck and W. H. Rogers. This was a profitable meeting, and it was resolved that a special committee be authorized to provide a social entertainment at the next meeting. This was held April 19th, and Charles Howell Cook earnestly addressed the Board upon the subject of "The Importance of Organization and Practical Education."

Professor E. B. Voorhees, whom we delight to honor and feel proud of, because Somerset is his birthplace, gave us an address on "The Importance of Forage Crops"—instructive, practical.

At this meeting it was demonstrated what the farmer can accomplish in the matter of legislation. The following resolutions were adopted: "Whereas, the 'Oleo' bill having passed the United

States Senate, and being now in the hands of the joint committee, where it lies dormant; therefore, resolved, that we request our honorable Senators and members of Congress to give the said bill their support, to the end that it may become a law at the present session."

The Secretary was authorized to forward a copy of the resolutions to our Senators and members of Congress, and an acknowledgement and favorable reply was received from both Senators and a majority of Congressmen.

At the close of this large and interesting meeting refreshments were served, and many new members were added to the Board.

The next meeting was held June 14th, at which Mr. B. C. Mitchell, of Brandamore, Penna., gave an exhibition on the Court House grounds with Kemp's manure spreader. This was followed by an address by Mr. Mitchell on the subject, "Manures and Their Proper Application."

Alva T. Jordan, Esq., of the Experiment Station, delivered an address on "Horticulture at the College Farm," which was well received and warmly appreciated. This meeting was largely attended, and with increased interest.

The next meeting was held August 23d, at which Grant Davis, Esq., of White House, Hunterdon county, addressed the Board on the timely subject of "Wheat Culture from Practical Experience." Mr. Davis is a practical farmer. His address was interesting, and was followed by questions and remarks from members. This was particularly an educational meeting, and was largely attended. Refreshments, consisting of ice cream and cake, were provided, and a social time was had by the members. This meeting was more largely attended than any previous, thus emphasizing the fact that farmers enjoy getting together socially.

Inasmuch as the Farmers' Institute was held in the Court House December 3d and 4th, it was deemed best to invite the members of the Board to attend those meetings, and our expected meeting was not held in October.

Farmers in Somerset county are encouraged—they are doing much better, getting better prices, improving their farms. One of the principal drawbacks now is the scarcity of farm hands, alhtough few farms are for sale.

Crops have been above the average, with apples and pears in abundance, and peaches a fair crop.

We shall continue the social feature, thereby increasing our membership and attendance, and we recommend it to other County Boards.

# SUSSEX COUNTY.

OFFICERS FOR 1903.

*President*, THEODORE M. ROE.....Branchville.
*Vice-President*, B. K. JONES.....Beaver Run.
*Secretary*, GEO. A. DICKERSON.....Augusta.
*Treasurer*, WM. H. LEPORT.....Sussex.

DELEGATES TO STATE BOARD.

B. K. JONES (one year).....Beaver Run.
THOMAS C. ROE (two years).....Augusta.

## REPORT.

BY THE SECRETARY.

The above officers of the County Board were elected at a meeting called by President Jones, which was held in connection with the Farmers' Institute, at Branchville, November 13th, 1902. Although the meetings of the Board have not been very successful and the Institutes have failed in some townships from lack of interest, yet in other sections great interest is shown in the Institute meetings, and we feel encouraged to go on.

The leading branch of the agricultural industry in this county is the production of milk for the Greater New York and suburban city markets.

In fact, a very small amount of other farm products find their way to market from this county. The grains raised are usually fed to the stock, excepting a small amount of buckwheat and occasionally a little wheat. While there is yet plenty of room for improvement along the line, there are now to be seen certain evidences of progress in the manner of conducting this business.

More attention is yearly given to the growing of such crops as can be most profitably converted into milk. We see more clover and see it more carefully handled. A few enterprising men are striving to get a stand of alfalfa, and we believe success will crown their efforts in the near future. Corn is recognized as the leader among the cereals for the dairy farmer, and the silo is gaining popularity, several new ones having been erected during the past year. Each year also witnesses improvements in stables and stabling methods. Prices for milk have ruled a little higher this year than last, due, in some measure, to competition in the market. The Borden Condensed Milk Company, of New York, has purchased a creamery near the center of the county, and, with their basis of payment, it was found that their patrons were receiving considerably more for their milk than their neighbors selling to companies paying according to the plan of the New York Milk Exchange. The increase is not great, but the outlook is somewhat brighter.

The peach industry, recently so extensively and successfully carried on here, is now rapidly declining. The trees no longer thrive, and no new orchards are being set, and the old ones are being taken out and the land given back to grass and the dairy.

The past season has been an unusually wet one, without the customary high temperature, being at once beneficial and detrimental to farmers. The winter of 1901–02 was the hardest known to many of our oldest residents, causing some loss in winter grains. Spring seeding, and, in fact, the work of the whole season, has been delayed on account of the wet weather. Hay was a good crop, more second crop having been cut than ever before. Our grass lands are in much better condition this fall than they have been in many years. Rye and wheat were badly damaged, and in some instances entirely lost, through continuous rains at harvesting time; but goods yields are reported by those who were successful in gathering the crops before the rains came. Oats were an excellent crop. The season was against corn, so the total crop is light, though some good yields are reported. Potatoes were a good crop, but have rotted badly. The soil of the Flatbrook and Delaware River valleys is nicely adapted to the culture of this staple, and it is receiving more attention each year.

Poultry is receiving more attention. We see more and better stock than in former years, also more comfortable quarters being provided for the fowls. Much enthusiasm is shown in the poultry talk at the Institutes, and farmers are coming to realize the importance of this industry.

Sussex county is fast becoming popular as a summer resort for the city folk, and we believe we shall soon see more boarding-houses in our midst, which will furnish a first-class home market for products of the garden, orchard and poultry yard.

Gardening and fruit raising are rather neglected at present, but we hope to see them in a more favorable state within a few years.

Nearly all sorts of fruits flourish with us, though we only see them grown in small quantities in gardens near the towns.

Apples, however, receive general attention, and the crop this year is the largest known in many years.

Certain facts go to prove that Sussex county farmers as a class are more alive to their interests than in former years. We see improvements in almost all lines. In the way of dairy stock we see more herds headed by full-blooded sires, and the young animals show that they are more highly valued than the scrubs whose places they have taken.

Next year will show more colts on our farms than have been seen in many years. Our farmers have had an opportunity to breed to a French coach horse which has made the season at the county seat, and has been substantially patronized, and I believe that when the merits of this valuable stock are well known, it will be very popular with us.

Our leading hardware, seed and fertilizer dealer informs me that this has been a very prosperous year for him in his trade with the farmers.

Twenty-five McCormick corn harvesters were sold in this county this autumn, and the trade in other improved implements shows a good increase over last year's output. In farm seeds and fertilizers the trade also shows a substantial increase. These facts go to show that our farmers are thinking in the right direction, and we hope to see this county among the first of the State within a few years.

# UNION COUNTY.

OFFICERS FOR 1903.

*President*, JAMES L. HEADLEY.....Union.
*Vice-President*, D. G. FINK.....Westfield.
*Secretary*, F. E. WOODRUFF.....Cranford.
*Treasurer*, OGDEN WOODRUFF.....Elizabeth.

DIRECTORS.

E. P. BEEBE.....Elizabeth.
D. G. FINK.....Westfield.
D. T. MAGIE.....Lorraine.
AND THE PRESIDENT AND SECRETARY.

DELEGATES TO STATE BOARD—F. E. Woodruff, two years; Ogden Woodruff, one year.
ALTERNATES—J. O. Magie, G. E. Ludlow.

## REPORT.

BY THE SECRETARY.

The Union County Board of Agriculture has held five meetings during the year. There has not been much interest shown and the attendance has been small. The past year has been a very profitable one for most farmers. There have been no severe droughts nor floods. With few exceptions, all crops have yielded well. Rural free delivery of mail has been established in several districts, which is of great benefit to farmers. It gives them an opportunity of receiving a daily paper and knowing what is going on in the outside world, and of receiving and sending letters whenever necessary. It makes country life more attractive. Th

telephone is also being established to some extent, which is of inestimable value. We think that if farmers more generally avail themselves of this modern convenience, it would not only save them time, but money, and bring the markets to their very doors. Factories are being built to a very large extent in the county. The exceptionally fine water-front at Elizabethport and the four or five lines of railroads running through the county, and being close to New York City, are great inducements to manufacturers. The little town of Garwood, situated in about the center of the county, on the line of the Central railroad, has some very large factories, which include the Eolian Company, which has an immense plant and headquarters here, also the Hall Signal Works. Very little, if any, of the country produce of this county is shipped by railroad, it all being carried to market on wagons. Newark, situated just over the line in Essex county, is a great distributing point. Farmers from three or four counties cart their produce to that market. Our farmers feel that they should be better protected against trespassers, who overrun our farms, from the near-by cities during the summer and fall, stealing anything that is of value to them. A great many of them seem to think that it is not stealing to help themselves to anything on the farms. One or two members of our Board, who live at some distance from their farms, have suffered a great deal from this cause. As the law now stands, the farmer must have a warrant for the arrest of a trespasser, and by the time he gets it the trespasser has disappeared. We think the law should be changed, so that a farmer can arrest anyone caught stealing on his premises, without delay of getting a warrant.

## CROP REPORT.

The corn crop was not quite so large as last year, and yielded 90 per cent. The very cool summer retarded the growth and made it very late ripening. Rye was 90 per cent. of a crop. Oats yielded a very large crop, there being plenty of rain when needed the most. Hay was a short crop, only 60 per cent. of last year's. The potato crop was the best that has been raised in years—100 per cent. The frequent rains in June and July were just about sufficient for the needs of the crop. Apples were the smallest

crop in years, there being scarcely any in the county. Pears were about 50 per cent. of a crop. Peaches, 75 per cent. Grapes and strawberries, 75 per cent. Cabbages, 150 per cent., the largest crop in years. Tomatoes, 50 per cent., the weather being too cool for ripening. Farm help continues to be scarce, and we fear always will be. The work is hard, day long and pay small. We have lost but one member by death during the past year, Mr. N. W. Parcell, of Elizabeth, who had been a member of the Board since its organization. Mr. Parcell was a prominent figure at the meetings of the State Board in years past and a large strawberry grower. He was widely known, and a very careful farmer and a recognized authority on potato growing. We have, also, elected three new members during the year. We look forward to an increase in attendance and a larger interest in our meetings during the coming year.

# WARREN COUNTY.

## OFFICERS FOR 1903.

*President*, WM. C. ADDIS.....Delaware.
*Vice-President*, N. WARNE.....Broadway.
*Secretary*, EUGENE OBERLY.....Broadway.
*Treasurer*, OWEN OBERLY.....Stewartsville.

DIRECTORS.

HENRY PURSEL .....Phillipsburg.
DANIEL FITTS .....Washington.
SAMUEL READ.....Mount Hermon.
A. D. ROSEBERRY.....Belvidere.
FRANK HANSEL .....Broadway.
IRWIN MILLER .....Harmony.
ALBERT FLEMING .....Stephensburg.

DELEGATES TO STATE BOARD.—Samuel Read, two years; Henry Pursel, one year.

## REPORT.

BY THE SECRETARY.

We have held four stated meetings the past year.

An address was delivered by Franklin Dye, Secretary of the State Board, on "The Intensive Farmer."

In business as old as agriculture we should be holding meetings to discuss soils, stock and methods of farming, with a view of making the business more profitable. Changes are constantly taking place; the old is supplanted by the new.

Henry I Budd, State Commissioner of Public Roads, made an address on "Improved Road-making." Professor John B. Smith spoke on "Insects that are Injurious to Fruit Trees."

Wheat, corn and oats each gave an average crop; prices too low for any profit. Hay rather a short crop in some sections; price from $16 to $18 per ton. Winter grain, wheat and rye look very promising. Milk somewhat higher than last season.

# CONTENTS.

# CONTENTS.

## A.

H.



I.



L.



M.



O.



P.



R.

S.



T.