

STATE OF NEW JERSEY.  
SIXTEENTH ANNUAL REPORT

OF THE

State Board of Agriculture.

1888-89.

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Printed by Order of the Legislature.

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J. S. ROGERS, Official Stenographer.

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CAMDEN, N. J.:  
S. CHEW, STATE PRINTER,  
1889.

*To the General Assembly of New Jersey :*

In accordance with the provisions of the act creating the State Board of Agriculture, adopted April 22, 1884, I have the honor to present the annual report for 1888.

FRANKLIN DYE,

*Secretary.*

TRENTON, Mercer county, N. J., Feb. 15, 1889.



## STATE BOARD OF AGRICULTURE.

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### OFFICERS FOR 1889.

PRESIDENT,

HON. EDWARD BURROUGH, Merchantville, Camden County.

VICE-PRESIDENT,

WILLIAM R. WARD, - - Newark, Essex County.

TREASURER,

D. D. DENISE, - - - Freehold, Monmouth County.

SECRETARY,

FRANKLIN DYE, - - Trenton, Mercer County.

EXECUTIVE COMMITTEE,

DR. GEORGE H. COOK, - New Brunswick, Middlesex Co.

MORRIS BACON, - - Greenwich, Cumberland Co.

WILLIAM R. LIPPINCOTT, Fellowship, Burlington County.

ALSO,

THE PRESIDENT, VICE-PRESIDENT, TREASURER AND SECRETARY.

# BOARD OF DIRECTORS

## New Jersey State Board of Agriculture,

### 1889.

#### CLASS A.

NAME.	ADDRESS.	ASSOCIATION.
*EMMOR ROBERTS. ....	Fellowship. ....	Geological Survey.
*WM. M. FORCE. ....	Newark .....	
I. M. SMALLEY. ....	Roadstown. ....	Board of Visitors Agricultural College.
*JOHN I. BISHOP. ....	Columbus. ....	

#### CLASS B.

		Acting President Experiment Station,
ABRAM W. DURYEA. ....		instead of John De Mott, Middlebush,
		( President Experiment Station.
DR. GEO. H. COOK. ....	New Brunswick. ....	Director Experiment Station.
JOHN STATESIR. ....	Colts Neck. ....	Master State Grange, Patrons of Husb.
M. D. DICKINSON. ....	Woodstown. ....	Secretary State Grange, Patrons of Husb.

#### CLASS C.

P. T. QUINN. ....	Newark .....	Secretary State Agricultural Society.
*E. A. WILKINSON. ....	Newark .....	President State Agricultural Society.
E. WILLIAMS. ....	Newark .....	State Horticultural Society.
J. B. WARD. ....	Newark .....	Secretary State Horticultural Society.
*DR. J. H. BRAKELEY. ....	Bordentown. ....	Pres't Am. Cranberry Growers' Ass'n.
*A. J. RIDER. ....	Trenton. ....	Sec'y Am. Cranberry Growers' Ass'n.
URIAH SUTTON. ....	Locktown. ....	Hunterdon Pomona Grange.
DAVID S. ADAMS. ....	Mickleton. ....	Gloucester Pomona Grange.
H. I. BUDD. ....	Mount Holly. ....	Burlington Pomona Grange.
.....	.....	Mercer Pomona Grange.
JOS. HAGEMAN. ....	Sergeantsville. ....	Hunterdon County Board.
E. L. BORTON. ....	Woodstown .....	Salem County Pomona Grange.
J. N. BALDWIN. ....	Livingston. ....	State Poultry Association.

# STATE BOARD OF AGRICULTURE.

NAME.	ADDRESS.	ASSOCIATION.
H. F. BODINE.....	Locktown .....	Hunterdon County Board.
JESSE S. BROWN.....	Mickleton .....	Gloucester County Board.
B. R. BLACK.....	Mullica Hill .....	Gloucester County Board.
V. P. HOFFMAN.....	Egg Harbor City.....	Atlantic County Board.
*HERMAN FRISCH.....	Egg Harbor City.....	Atlantic County Board.
JOHN W. DICKINSON ..	Woodstown.....	Salem County Board.
RICHARD M. DU BOIS..	Salem.....	Salem County Board.
J. M. WHITE .....	New Brunswick.....	Middlesex County Board.
D. C. LEWIS.....	Cranbury.....	Middlesex County Board.
WM. FRITTS.....	Washington .....	Warren County Board.
*WM. SILVERTHORN....	Belvidere.....	Warren County Board.
JOHN LOOMIS.....	Deckertown.....	Sussex County Board.
JAS. F. MARTIN.....	Unionville.....	Sussex County Board.
JOSHUA FORSYTHE.....	Pemberton .....	Burlington County Board.
A. SATTERTHWAITE....	Crosswicks .....	Burlington County Board.
THEO. CUBBERLEY .....	Hamilton Square....	Mercer County Board.
J. M. DALRYMPLE.....	Hopewell.....	Mercer County Board.
JOHN H. DENISE.....	Freehold .....	Monmouth County Board.
DAVID BAIRD.....	Manalapan.....	Monmouth County Board.
J. C. BENEDICT.....	Union .....	Union County Board.
D. C. CRANE .....	Roselle.....	Union County Board.
O. E. FREEMAN.....	Orange Valley .....	Essex County Board.
WILLIAM DIECKS .....	Livingston.....	Essex County Board.
A. W. CUTLER.....	Morristown.....	Morris County Board.
W. F. ELY .....	Madison.....	Morris County Board.
ELWOOD EVANS.....	Marlton.....	Camden County Board.
JOHN A. MEREDITH....	Haddonfield .....	Camden County Board.
THOS. E. HUNT.....	Bridgeton.....	Cumberland County Board.
W. O. GARRISON.....	Bridgeton .....	Cumberland County Board.
WILLIAM S. POTTER....	Somerville.....	Somerset County Board.
D. C. VOORHEES.....	Somerville .....	Somerset County Board.

SIXTEENTH ANNUAL SESSION  
OF THE  
NEW JERSEY STATE BOARD OF AGRICULTURE.  
TRENTON, N. J.

January 30th and 31st and February 1st, 1889.

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FIRST DAY.

MORNING SESSION.

The Board was called to order at 10.30 A. M. in the Supreme Court Room, State House, Trenton, N. J., January 30th, 1889, by the President, Hon. Edw. Burrough.

The President: Gentlemen, the hour for the meeting of our convention has arrived.

The first business in order will be the calling of the roll of delegates, which the Secretary will please do.

The following gentlemen answered to their names:

[See list of Directors. Those marked (\*) were not present.]

Both Houses of the Legislature were invited to attend the annual meeting of the Board, and a request for the use of the Assembly Chamber for Thursday evening was made, in response to which the following communication was received:

*Mr. Franklin Dye, Sec'y New Jersey State Board of Agriculture:*

DEAR SIR:—I have been directed by the Speaker to inform you that your communication was duly received, and your request for the use of the Assembly Chamber granted.

Respectfully,

(Sig.) J. J. MATTHEWS,  
Clerk.

The Chair: The next business in order will be the adoption of the order of business.

Mr. Nicholson: I move that the order of business be changed so that the Chairman may be allowed to name the time for the report of the Committee on Weights and Measures.

Mr. Rogers: In seconding that motion, I would state that members of the Committee of the State Grange have been examining into the question of weights and measures, and find them very conflicting. There is another association in the State, known as the Retail Merchants of New Jersey, which comprises the Retail Butchers and Grocers of the State. I attended their annual meeting, and they appointed a committee of three, to confer with the State Board of Agriculture and a committee of the State Grange, with a view to regulating our weights and measures. They would like to have a committee appointed, and be given a time for the joint committee to report back to this Board.

The Chair: It is not desirable to change the order of business any more than can be helped, inasmuch as many of the members have come here to listen to some special feature, but if it is the wish of the Board, the Chair will designate seven o'clock this evening.

This question being on the motion of Mr. Nicholson, the Order of Business, as amended, was adopted.

The Chair: Our next business will be the reading of the minutes of the last meeting.

On motion, the reading of minutes is dispensed with, inasmuch as the annual report containing the minutes has been printed and distributed among members.

The Secretary: There is one error in the minutes I would like to call your attention to. On page 52, (Report of 1887-8), Mr. Demott is represented as saying that "the State furnishes the farm and pays all the expenses." This should be that the "College furnishes the farm and pays all the expenses."

The Chair: Will the Secretary please read.

[See Report.]

Mr. Ege: I move that the report be received and referred to

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the Committee on Officers' Reports, when appointed. So ordered.

The Chair: Will the Secretary please read the synopsis of the reports of County Boards?

[See County Board Reports.]

On motion, the County Board Reports are referred to the committee on the same, when appointed.

The Chair: I will announce the committees as follows:

### COMMITTEE ON CREDENTIALS.

M. D. Dickinson,	Salem, N. J.
J. H. Baldwin,	Essex.
D. C. Crane,	Union.

### ON RESOLUTIONS.

Ralph Ege,	Mercer.
J. H. Denise,	Monmouth.
D. C. Lewis,	Middlesex.

### ON LEGISLATION.

Thomas Borton,	Gloucester.
Alfred Satterthwaite,	Burlington.
Elwood Evans,	Camden.

### ON REPORTS OF OFFICERS.

D. C. Voorhees,	Somerset.
W. F. Ely,	Morris.
Thomas E. Hunt,	Cumberland.

### ON COUNTY BOARD REPORTS.

J. W. Dickinson,	Salem,
H. F. Bodine,	Hunterdon,
V. P. Hoffman,	Atlantic.

Mr. Dye: We have here the resolutions sent up by the different County Boards, as follows:

The Chair: The Secretary will read them: (See reports of Committee on Legislation and Committee on Resolutions.)

The Chair: Col. Pearson, of Vineland, has here a fruit spraying machine which he would like to explain to the Board, if there is no objection.

Col. Pearson: I will not undertake to make an extended explanation here, but will be glad to give a practical exhibition of its working, immediately after adjournment, in the yard.

On motion adjourned until 2 P. M.

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### AFTERNOON SESSION.

The Chair: The first business on the programme is "The Poultry Interests of New Jersey." Col. Curtis is with us, and states that his arrangements are such that he cannot be with us to-morrow. If there is no objection, we will ask Mr. Jacobs to give place to Col. Curtis.

At the close of Col. Curtis' address he will be glad to answer any questions the members of the Board may wish to ask, but he does not wish to be interrupted while speaking.

Mr. F. D. Curtis, of Kirby Homestead, was then introduced to the Board and spoke as follows:

[See Address.]

A vote of thanks was tendered Mr. Curtis for his valuable address.

The Chair: The next business in order will be the reading of the President's address.

[See Address.]

On motion, a vote of thanks was tendered to the President for his interesting and instructive address.

The Chair: The next business will be an address on "Our State Weather Service," by Lieut. E. W. McGann, U. S. A.

[See Paper.]

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A vote of thanks was tendered Mr. McGann for his able and instructive paper.

The Chair: Our next business will be the appointment of a committee, consisting of one from each county, duly represented, to nominate officers for the ensuing year. (The members present from each county naming their representatives upon this committee.) We are ready to hear nominations.

The nominations made are as follows :

Atlantic,	V. P. Hoffman.
Burlington,	Chas. Collins.
Camden,	R. L. Shivers.
Cumberland,	T. F. Baker.
Essex,	J. H. M. Cook.
Gloucester,	Thomas Borton.
Hunterdon,	Uriah Sutton.
Mercer,	T. B. DeCou.
Middlesex,	J. M. White.
Monmouth,	J. H. Denise.
Morris,	William F. Ely.
Salem,	H. C. Perry.
Somerset,	D. C. Voorhees.
Sussex,	J. F. Martin.
Union,	D. C. Crane.
Warren,	William Fritts.

Mr. Blish : I have here a bill which I would like to offer before the Board if it is in order.

A further supplement to an act entitled "An act to incorporate the chosen freeholders in the respective counties of this State," approved April sixteenth, one thousand eight hundred and forty-six.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That each of the several boards of chosen freeholders in the counties of this state shall consist of three members only, and that each of said chosen freeholders shall receive annually as full compensation for his services \$600 in every county whose population shall not exceed 50,000 ; \$800 in every county whose population shall exceed 50,000 and shall not exceed 75,000 ; \$1,000 in every county whose population shall exceed 75,000 and shall not exceed 100,000, and \$1,500 in every county whose population shall exceed 100,000. Which said compensation shall in every case include all traveling expenses incurred by the said chosen freeholders respectively in the discharge of their duties, and said chosen freeholders shall be entrusted with all the powers and shall



perform all the services that now are and hereafter may be required to be performed by chosen freeholders, by the act to which this is a supplement and by the several supplements thereto and by any other law or laws; and whenever by any other law or laws the action of a greater number than three chosen freeholders is required, the action of the said number of three chosen freeholders shall be legal and sufficient.

2. And be it enacted, That at the first election to be held under this act in every county, one of the said chosen freeholders shall be chosen by the electors of said county for the term of one year, one for the term of two years, and one for the term of three years, and thereafter there shall be elected annually one chosen freeholder who shall in every case hold his office for the term of three years from his said election. But not more than one of such chosen freeholders shall be elected from any one ward or township, nor shall more than two in any county be taken from the same political party. And such first election shall end the official term of every chosen freeholder in such county, holding office at the date of such election under any preceding election.

3. And be it enacted, That all acts and parts of acts, both general and special, inconsistent with this act, be and the same are hereby repealed, provided, however, that none of the foregoing provisions shall take effect in any county until the acceptance thereof shall have been submitted to a popular vote and affirmatively determined at a regular spring or fall election hereafter in any year, to be held in such county.

4. And be it enacted, That upon the application by a petition signed by at least one hundred of the legal voters of any county in this state to the judge holding the Circuit Court in and for such county, asking that the acceptance or rejection of the provisions of this act be submitted to a popular vote in said county, at any such election, such judge shall order the same to be so submitted at the spring or fall election next ensuing the said application, provided that said order shall be made at least thirty days before such election, and shall be published once a week for three weeks successively next preceding such election in two newspapers printed and published in such county, that now are or hereafter may be designated by law for the publication of the laws of this state, and the legal voters of such county in every case may at any such election so ordered, decide upon the acceptance or rejection of this act, by ballots, upon which shall be printed or written the words "for the new law reducing the number of chosen freeholders to three," or "against the new law reducing the number of chosen freeholders to three," or some like phrase expressing assent or dissent to this act, which ballots shall be cast and received as other ballots are at such elections, and may be printed or written upon the same tickets upon which are the names of the candidates to be voted for. And said ballots so cast for or against this act shall be counted and the result thereof shall be returned by the election officers, and a canvas of such return shall be had in the same manner, and at the same time, as in case of ballots for candidates voted for at such elections, and if there shall be a majority of such ballots in favor of acceptance of this act, then, but not otherwise, this act shall take effect in every such county so accepting the same immediately. And the acceptance of this act, or its rejection, in case of its rejection at any such election, may, upon like proceedings and in like manner, be submitted again in any county at successive elections until the same shall be accepted.

5. And be it enacted, That in any county in which the provisions of this act shall be thus accepted, the chosen freeholders herein designated shall be elected at the time that now is, or hereafter may be established by law for the election of members of the General Assembly of this state.

6. And be it enacted, That this act shall take effect immediately.

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Mr. Blish : I move it be taken up and discussed, without reference to a committee. So ordered.

This bill was discussed quite at length by Messrs. Blish, of Middlesex, Mr. Bodine, of Hunterdon, Mr. Voorhees, of Somerset, Mr. Loomis, of Sussex (while he favored the main features of the bill, thought it would work disastrously in his county), Mr. Brown, of Hunterdon, and Mr. Strong, of Middlesex, favoring ; Mr. Fritz, of Warren, Mr. Crane, of Essex, Mr. Rogers, of Essex, Mr. Bacon, of Cumberland, Mr. Martin, of Sussex, Mr. Collins, of Burlington, opposing. The question being called for, to adopt or reject the bill, it was lost.

On motion adjourned until 7 P. M.

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## EVENING SESSION.

The Chair : The Committee on Weights and Measures is ready to report, and we will hear from them, if there be no objection.

Mr. Nicholson :

“ Early in the time of our appointment, a copy of the resolution of our appointment was referred to the Produce Exchange of Philadelphia, with the proposition, if they thought well of it, and would name a time, your committee would meet a committee of their body. Having failed to receive a reply, there was nothing for your committee to do in that direction ; presumably this was the case in New York, as the chairman has reported nothing to us. Complaints have reached us of the different measures used in the municipalities of this State. By reference to the statute it is found that the capacities of a bushel and gallon are definitely defined. The former shall contain 2150.46 cubic inches, and the latter 231 cubic inches, with the penalty for the violation of this law, of not less than twice the value of the article, nor more than five times its value. If this law is violated it is the fault of the purchaser, together with the municipality, for allowing other measures to be used. Your committee are of

the opinion that more legislation upon the bushel and gallon measures would be likely to lead to confusion.

"In regard to the weights, if no weight or standard has been adopted by the State for a bushel of the different commodities named in the act, your committee believe it would have been for the best interest of the agriculturist, as the articles named are influenced by climatic changes, above the control of men; besides, these standards are so very different in the different States.

"Again, is there any reason why an article sold by the bushel, when manufactured, should be sold by the hundred weight, except for convenience, and would not the same apply to the unmanufactured article? Your committee believe it would.

"And further, your committee believe that at no very distant day, it will be for the interest of this body to advocate the repeal of the Standard weights of a bushel of the different articles named in the statute, and allow them to be bought and sold by the hundred weight.

"By such legislation, there will be a greater concurrence with our money value of the country.

Signed,

JOSHUA FORSYTHE,  
I. W. NICHOLSON,  
Committee."

On motion, the report is received and ordered to be included in the minutes.

Mr. Rogers: Mr. President and gentlemen of the State Board. Some years ago the State Grange appointed a committee to formulate a plan to sell produce in the State of New Jersey. Living, as I do, among the consumers and retailers, shortly afterwards I began to examine the question of weights and measures in connection with the Cranberry Growers' Association.

The Retail Butchers' and Grocers' Association wanted cranberries sold by weight or by a uniform system of measures, so that the measures they used to sell by would conform with the measures by which they bought. They said that they could not, out of the cranberry crate then in use, measure thirty-two quarts of berries. The Cranberry Growers' Association claimed they

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could measure thirty-six heaped quarts, and from thirty-eight to forty level quarts, known as the Winchester measure.

The Cranberry Growers had a law passed in this State making their crates hold nineteen hundred and seventy cubic inches. this was the measure they used. The retailers in New York said that the measures they used would not measure out the same amount of berries. And here we have the two measures that started the examination into this subject. Without spending time on preliminaries, we will enter at once into the merits of the case.

There is no National Standard of weights and measures in the United States, save the Troy pound weight, which Congress legislated should be used. Now, we started off with the proposition that there is no National Standard. There is one decision, made by the Circuit Court in the circuit comprising New York, Pennsylvania and New Jersey, which is to the effect that no State can establish a standard, and that Congress has not taken any measures looking towards laws for a national measure, and no State can establish a standard. This throws doubts on the question, which doubt still remains there.

Before the year 1836, when the measure was sent out to the several States by the United States Government, the State of New York had as its standard the measure called the Imperial. At the time the measures were sent there were two sets sent; one the liquid measure of 231 cubic inches; the other standard was the dry measure.

Some three weeks ago, the retail grocers of Newark commenced to measure and weigh certain articles that I had been partially over, and they found a diversity of measures extending to Newark, Paterson, Somerville and New Brunswick. My impression is that in this part of the State you will find a diversity just as great. Why? The States south of New Jersey had always had the smaller measures. They never had the Imperial measure to bring the larger measures in conflict with the wine or Winchester measures.

We adopted the method of taking certain articles at so many pounds to the barrel, and as we found one measure in one of the articles, I will take that up first. In beans, the State standard is sixty pounds to the bushel. We got the standard measures from

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the Essex County Clerk's office, filled it with beans and struck it, and found that it contained sixty-five pounds of beans to the bushel. We found others sold by the city of Newark that hold just one pound and fourteen ounces of beans, and hence this measure corresponded with the standard. But another thing was found. We measured this measure here and found its cubic capacity sixty-two and one-half cubic inches, the standard being sixty-seven. How came that? That was the question, and it was a puzzling question. When I went to school, my arithmetic told me that eight quarts made a peck and four pecks made a bushel, but very much to my surprise I found, on investigating, that there was another standard of ten quarts to the peck, and four pecks to the bushel. How did this come? The Imperial measure in water holds eighty pounds, or two thousand two hundred and eighteen cubic inches, or two and one-half pounds to the quart. The liquid quart weighs just two pounds of water, so that we find forty of these quarts of fifty-seven in two thousand two hundred and eighteen. Investigating we find forty of the sixty-seven in two thousand seven hundred, so that here is a measure of forty. Now, there is a measure used in the markets of Newark what they call there a "snide" quart of forty-three. Adding an inch or two and we find that there are just forty of those in the wine measure of one thousand eight hundred and forty-eight pounds. So that, very much to the surprise of all, we found measures used corresponding to the forty quarts to the bushel.

Examining the reports of the Horticultural Society, I find that several of the Fruit Exchanges have forty quarts to the bushel. If it is in all except the forty-three, it comes into the heaping bushel. Now, how is a heaping bushel made? Here is a standard which is for a bushel. If I had a bushel measure you would find in the Winchester measure that the diameter is just eight and one-half inches. You would fill that and take enough to put a cone upon it regularly from the surface six inches, and it would give you two thousand four hundred and eighty-five inches, or in common language two thousand five hundred inches. If you took the Imperial measure and built the same thing you would find it coming a few

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cubic inches short of 2,700. That was not the worst. We have a law on the statute book now that each County Clerk's office in the State shall have a set of standard measures in their respective offices, furnished by the State, and if any person desires, he may go to the County Clerk's office to have his measures adjusted to that standard, and this is a defence against suit.

But in all the cities of the State we have a sealer, and where the sealer comes in, the ordinances of the city are such that if sealed outside, the parties using them may be fined by the city. The producer cannot come into the city from the county to sell his produce unless he has his measures sealed by the city; but when he goes outside the city into the country, he can sell from any measure he chooses.

I have here a table, which will appear in the report, in which we have the County Clerk's standard of Essex county, a measure gauged by the County Clerk and Sealer of Essex county. I got a two quart measure in Middlesex county and this little measure here.

We found in buckwheat that this measure here holds forty-nine pounds.

In Essex county the same holds 53; legal standard, 54; Indian corn,  $47\frac{1}{2}$ ; of the county, 52, and very strange to say, the one gauged by the County Clerk, which should be the same, holds  $49\frac{1}{2}$ , the legal standard, 56; in amber sugar cane, 52, the legal, 57; in oats, 32, legal standard, 30; in rye, 31, legal standard, 55; sealed by the Sealer of Weights in Newark, 54; rye, 51, standard, 55; State standard, 56; weight, 54; county standard, 58; sealed by County Clerk, 60; State standard, 60.

For beans you have to come down to the one-fortieth of a bushel—quart—to make your measure.

In beans, not having anything to go by, we take two quart measures, both sealed by the City Clerk, and we find one holds 3 pounds 10 ounces, and the other 4 pounds 1 ounce.

We then got some four-quart measures and filled them with beans—one held 8 pounds 4 ounces, or at the rate of 66 pounds to the bushel, and the other held 7 pounds 5 ounces, or 58 pounds to the bushel. What safety is there for you? What do you sell by and what do you buy by?

Finding these facts, the Retail Merchants' Association of this

State, at their annual meeting, passed a resolution appointing a committee of three to come down and see if we, as a State Board, and this committee of two, could formulate a plan, and they and the State Grange would confer together and see if something could be done to relieve us of the great diversity of measures.

Mr. Rogers: I would like to make a motion concerning the Committee on Weights and Measures—that the matter be referred to the Legislative Committee of this Board, and for them to draft some law concerning it to present to the Legislature.

The motion of Mr. Rogers was agreed to.

The Chair: The next in order is an address on "Chemistry, and what it has yet to do for Agriculture," by Hon. H. W. Wiley, Chemist of the Department of Agriculture, Washington, D. C.

I take great pleasure in introducing Prof. Wiley to this Board.

[See Address.]

On motion, a vote of thanks was tendered the professor for his excellent and valuable paper.

Mr. Cook: Before the session closes, I would like to ask Mr. Wiley a question. I have seen the statement published that science is now so far advanced that artificial comb honey could be manufactured, the cells and all. I would like to have some knowledge on that subject, and ask if it is true?

Mr. Wiley: Some eight years ago, a friend of mine in New York City told me there was a factory where this comb was produced, and it had been made in a small way, but never for commercial purposes. It was on the basis of this statement that I published the article referred to. It was published in "The Science Monthly." It has caused a great deal of discussion, and has been familiarly alluded to as "Wiley's lie." Some time ago I saw another gentleman who said he had seen this made. I have never seen it myself, though I have seen plenty of glucose honey.

Mr. Cook: I wished to know whether the statement could be contradicted. The statement has gone far and wide, and I thought that a public announcement by the professor would do a great deal of good towards setting the matter right.

Mr. Wiley: I have never seen the article, and do not think it has ever been a commercial article. I do not think there is any



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untruth about its being manufactured, because I do not think my friend would tell an untruth. There is almost a universal adulteration of honey, and if the beekeepers were to examine in the matter they would be surprised to find the extent to which this is carried. Even the honey which you sell you will find very largely adulterated between the time it leaves your hands and the time it reaches the consumer.

Mr. Cook: We understand that in times past, when honey was higher, that it was very freely adulterated, but we have thought that the manufacture of comb honey was impossible.

The Chair: The next thing on our programme is an address by one with whom we are all familiar—Prof. W. O. Atwater, Chief of the Division of Experiment Stations, Department of Agriculture, Washington, D. C.

[See Address.]

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SECOND DAY.

MORNING SESSION.

The Chair: The Board will remember that yesterday Mr. Jacobs consented to give place to Col. Curtis; what is the pleasure of the Board now in regard to hearing Mr. Jacobs

On motion, Mr. Jacobs will be heard now.

*Mr. President and Gentlemen:*

My duty on this occasion being to point out to you the importance of promoting the poultry interests of our State, I will endeavor to call your attention to several well known facts and also urge upon you to give the subject your careful consideration.

It has already been demonstrated that the poultry interests of New Jersey can be made to bring enormous wealth into the State, and that, with a limited capital, opportunities are offered that have been for years overlooked. As many of you are already familiar with that which has been accomplished at Hammonton, I will but briefly allude to the poultry industry of that town, and I trust that you will not suppose me guilty of exaggeration if I



call your attention to the efforts of those who have built up a great industry, and on capital so limited as to make it a matter of surprise that success has been attained.

I can tell you that we now have about forty broiler farms, on which young chicks are hatched and marketed before they are ten weeks old, by artificial methods, some of the operators having only town lots, and not an adult fowl on the place.

We have broiler establishments with a capacity as high as five thousand chicks every ten weeks, and the visitor, in his travels, finds the town almost given up, in the winter season, to poultry. Here the conversation is of the latest quotations of poultry, and the whole community is drifting into that industry. The trains bring visitors from every section of the United States, and our town and State receives advertising from that source which is greater than may be supposed. Settlers are coming rapidly, nearly all of whom are making poultry raising their object.

We have a total capacity of over 100,000 chicks every ten weeks, and if all the brooder houses were placed in a line it is estimated that they would reach one mile. We have hundreds of incubators in operation, and only use hens for laying. Eggs are difficult to procure, owing to the demand, and all methods are artificial, so far as hatching and raising the chicks are concerned.

I do not wish to again cause surprise by stating that it is our practice to raise one hundred chicks on the small space of 5x8 feet in the brooder house, with a little yard of only 5x16 feet, for once they are placed therein they never leave it except to be sent to market. This is at the rate of as many as 32,000 chicks per acre every ten weeks, and it is actually being done. I mention this to point out to you the small area of land required, and the advantages of concentrating the efforts on as little land as possible. We have solved the problem of the meat supply. While the western farmer requires from three to four years to mature his meat for market, devoting a great range to that purpose, and exposed to all the vicissitudes of the seasons, we work under shelter, produce a choicer kind of meat, on less land, and at better prices. While the farmers of our own State are giving up pastures to cows, and selling milk at almost cost prices, we, with our light sandy soil,

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unadapted to cereals or stock, and which is considered of but little value, so far as fertility is concerned, are realizing larger profits from one acre than some farmers, in more favored sections, do on one hundred acres. In the face of this fact I ask if the poultry interests do not deserve the greatest consideration of this Board.

We also have a few poultry farms upon which as many as one thousand hens are kept, and one operator is making arrangements to keep six thousand hens, while others are also contemplating the keeping of large numbers. This branch of the industry will be in connection with fruit growing, the fowls serving as insect destroyers, to a certain extent, manure the ground and occupy no extra ground. In other words, it is a combination of two industries—raising poultry and growing fruit—that cannot fail to return large profits.

The poultry industry is the only one that cannot be monopolized. Trust companies cannot reach out and control it. The poor laborer, who cannot aspire to cattle raising, has a means at his command in the poultry business to lay a foundation upon which to elevate himself. It is the industry of the people, so many being engaged in it that a census is impossible, yet I believe that I am correct when I state that even with our present crude methods the production of poultry and eggs exceeds that of anything else produced on our farms, especially in the matter of profit, compared with labor and capital invested. I use the term "crude methods" because we in Hammonton know the value of breeds, which is not the case with some other sections of our State, and we know that, in order to secure eggs, we cannot pick up a dozen hens from anywhere, put them in a pen and expect them to lay, any more than will a dairyman collect dry cows, heifers, old cows, lean cows and fat cows. He prefers fresh cows, that have recently calved, and we prefer hens that are in a laying condition. We are even studying the tables of feeding values, and calling chemistry to our aid. Every advantage is being taken of the opportunities that may be thrown in our way. We have a paper published by Mr. M. K. Boyer, who is present, called the *Poultry Guide and Friend*, which, though printed in Hammonton, circulates in every State, and it is doing grand service for New Jersey. With the exception of a

fruit journal at Little Silver, I know of no other paper devoted to the agricultural or stock interests of any kind in this State.

I wish particularly to call the attention of the Board to an important matter, one that may add thousands (I may truly say millions) of dollars to the wealth of our State. It is to adopt some method of promoting the poultry industry. I received a letter a few months ago from your energetic secretary, Mr. Dye, requesting Mr. Boyer and myself to attempt the organization of a State Poultry Association. We have endeavored to comply with that request, and believe we are in a fair way of accomplishing the desired object. The only poultry association in this State is the "South Jersey Poultry Association," which has recently had a fine display of poultry at Bridgeton. That association has already passed resolutions, which I am asked to submit to you. Any poultry association in this State should be under the auspices of the State Board of Agriculture, and a large poultry show should be held every year, first at Jersey City one year, Trenton the next, and Camden the next. No halls need be built, as they can be rented for the purpose. The difficulty in the way of a poultry show, in connection with State and county fairs, is that in the fall of the year the birds are usually moulting, and are consequently not in full plumage. There should be a poultry show every year, and during the winter season. We can then not only display our productions in poultry raising, but educate and encourage our people. I hope the Board will at once take hold of this work. So interested am I in the matter that I personally requested His Excellency the Governor to be present, in order that I may perhaps impress upon him the importance of the State aiding in the enterprise. I am satisfied that with the small appropriation of \$2000 annually, placed in the hands of this Board, for the purpose of promoting our poultry interests, the State will realize one hundred fold the value of the assistance given. We have the workers ready but not the financial ability. Willing hands are eager to join in this enterprise but can do nothing. If Hammonton can derive a large revenue from poultry, amounting to thousands of dollars, I see no reason for doubting the success of similar enterprises elsewhere. All that is asked is an opportunity to show what *can* be done.

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At your state and county fairs poultry receives but little encouragement, yet the poultry department is always an attractive feature. Any kind of an old building seems to do for chickens and the prizes offered do not, in some cases, amount to much more than the cost of expressage to reach the show grounds. The poultry department should be encouraged in preference to anything else. Commodious buildings, free from draughts, and liberal prizes, with fair entry fees, will bring together the birds from every portion of the State. A little of the money lopped off from the trotting horses and placed in the poultry department will work wonders.

I have endeavored to be brief, gentlemen, as time is valuable, but I wish you to take some action in this matter. Gentlemen who are interested in poultry, from nearly every county, have requested me to urge this matter. Give us a large poultry show every winter, and aid us in offering liberal prizes in order to bring out our full capacity in the line of poultry production. The old hen could keep our learned professors at the State Agricultural grounds busy with experiments, and with benefit to our people. Small as she is she has more admirers than the horse, sheep, cow or hog. She gains in numbers that which may be lost in size, and she has kept the wolf from the door of many families that have lost all by too much faith in larger stock. The well-filled egg basket has been the solace of the widows, and the early spring chick has added to the storehouse of the poor man, whose capital would not permit him to hope for but a limited supply. It is an industry almost despised. Our agricultural reports are silent on poultry matters. Our experiment stations have given no time in that direction, and the farmers, as a class, are not even familiar with the different breeds.

It is time to begin anew and to recognize this industry. A visit by your body to the broiler farms of Hammonton will convince you that more meat, more manure, more fruit, more money and with less labor and capital, can be secured from less land, by poultry raising, than from anything known to farmers, and I believe that, if properly encouraged, it will add as much wealth to our State as our manufactures. With New York, Philadelphia, Brooklyn, Newark and the numerous watering places, the markets are numerous. It is a good work and an im-

portant one, and you have more power to encourage it than any other association within the State.

I trust that my appeal in behalf of our poultry interests will not be in vain.

Mr. Taylor: What breed of fowl do you prefer?

Mr. Jacobs: Unfortunately for us, we have so many broiler farms, we are unable to use any particular breed of fowl. The competition is so great that in the busy season the eggs are bought up all over the country, without regard to breed.

The proper breed, or cross, is a matter of discussion, some preferring Plymouth Rock and Brahma, and some preferring Wyandotte and Brahma, and some preferring the Brown Leghorn. It is wise to select fowls with plenty of wing, as this indicates muscular power on the breast, and consequently more breast meat. The Brahma is very deficient in breast meat. It is very difficult at times to tell whether a broiler is fat or not. We must sometimes decide by running the fingers down the backbone.

These broilers grow very rapidly, and they also develop very rapidly, so rapidly that I may surprise you when I say that these little hens lay eggs when only three months old, and when they do not weigh over two pounds. It often happens that you can pick up a basketful of these eggs prematurely developed.

Mr. Vanderveer: Have you any trouble with chicken cholera?

Mr. Jacobs: I do not think I have heard of a case of cholera or gapes in that section, although I have lived there about twelve years. Nature favors us in that respect. You will remember, in my paper, I mentioned the fact that the soil is very light and sandy. I do not care how filthy your yard may be, when you have a rain the filth all goes down below and leaves it just as nice as if it had been scoured out. The causes of disease being removed by natural methods, we do not have cholera or gapes.

In regard to the production of these broilers: The house you will find illustrated in the "Poultry Keeper" is taken from a photograph, and the cost is about \$600. You will notice there, also, a small space, five by eight, where, in winter time, in very severe weather, we keep these chickens. It often happens that for eight or ten weeks a hundred chickens are put in and kept

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there. We have, sometimes, put in as high as one hundred and fifty when we have been crowded for room.

There is another question. It costs about five cents per pound for food ; that is, it costs about five cents to produce one pound of chicken. This we have found to be true by actual experiment and careful observation. This is not all it will cost you, for there is the labor, the money invested, and a great many other expenses, but the actual cost of food to produce one pound of broiler, is five cents.

Mr. Voorhees : Allusion has been made to a State Poultry Society. There is a State Poultry Society, which has been in existence for about twelve years. It is not very active, for the reason that the last exhibition held was rather disastrous, and we have not seen the time since that we could hold an exhibition. During this present winter it was decided not to hold one, but we talk of holding an exhibition next winter which we hope will be successful.

I am the secretary of the association, and we should be pleased to have the poultry men in all parts of the State unite with the society and make it strong, and aid in holding a successful exhibition.

Mr. Jacobs : What I wanted to say to this Board to-day was not so much in telling you what we have done, but to talk to you about the poultry industry, because I believe this industry deserves greater recognition at the hands of the State Board than it has received. It is a bigger thing than any other farming industry in this State can be made. It has been shown that it is a very successful industry. It has brought \$100,000 into our town. Our people all have small farms, and are able to do very well from them.

In regard to the State Poultry Association, I was not aware, at the time I wrote my paper, that there was such an association in existence. I have discovered since I came here that there is one, and I would like to see it taken hold of and built up. I think the State Board of Agriculture should use its influence to secure aid for it in some way, to foster it.

I want to see the State of New Jersey ahead of any other State in the poultry industry. I believe it can be done. I believe the farmers of New Jersey can derive a revenue from this

industry which now seems almost impossible. I have seen what has been done, and I know what there is in it. The "Rural New Yorker's" twelve hundred barrels of potatoes to the acre is nothing to this poultry industry.

Mr. Forsythe: If this thing is as profitable as represented how long will it be before the people inside and outside of the State of New Jersey will go into it and overdo it, like every other agricultural industry is being overdone.

Mr. Jacobs: We have had all that in consideration, and we had that terror before our eyes for some time. We still find that the raising of poultry is on the increase, and the prices have also increased instead of decreased. I do not think the time will come when we can produce more poultry than we can get a good market for, but if the time ever does come that there is an excess of poultry raised, there will be a falling off in the amount of Western beef shipped to our markets. And we will give you a better meat supply. The market has never been overcrowded with the choice article, and whenever you can make your customers believe that your article is better than any other, the price is no object at all.

You can come into Trenton to-day and buy a dozen eggs, and when you have done so how many of you can swear they are fresh, and how many of the grocers selling the eggs will be willing to swear they are selling a fresh article? The grocer don't know, and you can't tell whether you have a fresh article until you open them. When you can go to any family in Trenton with your eggs, and they know you are offering them a perfectly fresh article, they will give you double price. They will give you fifty cents a dozen when the market price is only twenty-five cents.

We receive for our broilers five cents a pound more than the regular market price in New York City, and they are an article greatly in demand. Why? Because we aim to send good stock. We may not send as good a stock as we desire, because, unfortunately, we have been unable to breed the kind we ought, as the houses are springing up so fast.

Mr. Ward: I move that a vote of thank be given Mr. Jacobs for his entertaining and instructive address.



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The question being on Mr. Ward's motion, it was agreed to.

Mr. Dye: I have here a letter which I will read to the Board at this time, if there is no objection.

THE SOUTH JERSEY POULTRY ASSOCIATION,  
220 ATLANTIC STREET, BRIDGETON, N. J.,  
JANUARY 24th, 1889.

*To the officers and members of the State Board of Agriculture:*

At a meeting of the South Jersey Poultry Association, held January 24th, 1889, the following resolution was adopted:

*Resolved*, That the State Board of Agriculture take into consideration the organization of a State Poultry Association, for the purpose of promoting the poultry interests in this State, and that the State Board of Agriculture will receive the assistance of this Association in the promotion of so worthy an undertaking.

(Sig.) W. N. HEWITT,

President.

WILLIAM H. HAINESWORTH,

Secretary.

I wrote to some prominent gentlemen connected with poultry raising during the past summer, and asked them if the poultry interest in this State was not sufficient to start such an organization. It seems we have such an organization but it has done so little as to be scarcely known.

The Chair: If there is no objection, the resolution will be received and referred to the Committee on County Board Reports. So ordered.

Mr. Dye: I have a resolution which has just been handed me; it is as follows:

*Resolved*, That the New Jersey State Poultry Association be admitted to membership of this Board, with the same rights and privileges as other State societies that are auxiliary to "agriculture."

On motion, the resolution was adopted.



REPORT OF THE

NEW JERSEY STATE POULTRY SOCIETY.

OFFICERS :

President.....	T. FARRAR RACKHAM.....	East Orange
Vice President.....	CHARLES SCHOONMAKER.....	Syngack.
Secretary.....	J. H. BALDWIN.....	Livingston.
Director to State Board of Agriculture.....	J. H. BALDWIN.....	

Since our last public exhibition, held in Newark, in the month of January, 1881, but little has been done beyond maintaining an organization; the interest has been, during this interval, nothing, compared to what it was for the four years preceding the date above given, and there is no difficulty in accounting for it. During the period between the years 1877 and 1881, there was no great interest because the exhibitions then held made frequent meetings necessary. Many and warm were the discussions, and a great amount of business was transacted. There were many efforts made to create an interest among the people in thoroughbred fowls, and among the farmers, who, after all, are the greatest poultry men, in the improvement of the barn yard stock. In a measure these efforts were successful. Hundreds, if not thousands, of flocks of fowls throughout the State are to-day worth many hundreds of dollars more than they would have been had it not been for the knowledge disseminated through our society. Previous to the existence of our society, the chickens of the farmers were strictly "dunghills," light in weight and tough in flesh, rendering them wretched as a table fowl, while as layers they were mediocre. For both purposes, then, they were failures, and unprofitable. The impetus given by us to the introduction of the "Plymouth Rock," the Yankee-made breed, largely changed this, and in the place of those described we see large heavy, meaty birds, that dress well for the table and are good layers. Later, the Wyandottes made their appearance and the improvement is still going on whereby the wealth of the individual owner and the State at large is being steadily increased.

Nor is this all. The incubator, for the artificial hatching of

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chickens, was made known by our efforts to hundreds. But, alas, many of these were destined to spend many weary days and months of labor and not a little money in the vain hope that through it they would achieve fame and fortune. Were they intelligent and persistent? I here ask, and I answer, Yes. The industry then was in its infancy, and all had not been learned about it that could be and was necessary. Nor has that happy time arrived. Great steps of advancement have been made and there is now developed in the southern part of the State a lucrative industry which promises to bring great wealth into our State. The character of the soil, no doubt, gives them great advantage over their brethren in the northern counties.

Another result of the work of our society is to be seen in the great strides that have been made by the fanciers in the improvement of thoroughbreds. In those early days of our history there were scarcely any fanciers in our State that had made a reputation beyond its borders. Now the contrary is the case. In the leading variety among fanciers, (Light Brahmas) a resident of East Orange, Essex county, leads all others in the country as a breeder of this variety, and his strain is sought after by breeders in every State of the Union. Then we have one or two breeders who are known everywhere for their Bantams, while in Hamburgs, Black Leghorns, Buff Cochins and Dorkings, we have breeders who are at the top of the ladder and compete successfully with the breeders of any part of the country.

There appears now to be a revival of interest in all of these matters, and it led to several discussions during the year upon the expediency of holding another public exhibition. The general sentiment brought out seems to be favorable to such an enterprise. To make it successful, however, a great deal must be done, and that at once. Those interested, in every part of the State, must unite their efforts, and then there need be no fear of the result. Our society must be strengthened in membership. Means must be taken to put the treasury in such a condition that there can be no doubt of its ability to carry out and fulfill every promise, when we will see an exhibition that for size and for the quality of the specimens shown will be second to none, not even the great New York exhibit.

J. H. BALDWIN.

The Chair: I understand the Committee on State Premiums is ready to report, and if there is no objection we will call on Mr. Baker, who will read it.

Mr. Baker: Your Committee on State Premiums report as follows:

[See Report.]

On motion the report was received and ordered to be printed in the annual report.

Mr. Borton: The Auditing Committee, to audit the accounts of the Treasurer of this Board, are ready to report.

Mr. Baker:

TRENTON, N. J., Jan. 29th, 1889.

*To the State Board of Agriculture:*

We, the undersigned Auditing Committee, hereby certify that we have examined the accounts of D. D. Denise, Treasurer, and find them correct in every particular.

(Sig.) JOSEPH B. ROE,  
M. BAKER,  
Committee.

Mr. Borton: I move that the report be received and adopted. So ordered.

The Chair: Have the Committee on Legislation anything to report? If so, we will hear them now.

Mr. Borton: Your Committee recommend the adoption of the following:

WHEREAS, The report of the State Treasurer, just out, gives a statement of the amount of money paid out during the last year, for the encampment of the First Brigade, National Guards, State Militia, in camp at Sea Girt;

AND WHEREAS, This large amount of money, \$31,343.00, is the expense of one week's encampment of a single brigade of the National Guards; therefore,

*Resolved*, That the State Board of Agriculture, now in session, take action and endeavor to secure the repeal of that part of the State Militia Law that has reference to the encampment.

(Sig.) T. R. MATTHEWS.

Mr. Matthews: I suppose few of you have experience of the

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inner workings of the State Militia Law as I have had, but I would like to be excused at this present time from making any remarks on it whatever. I move the adoption of the resolution.

The question being on the motion of Mr. Matthews, it was agreed to.

Mr. Borton : In regard to the following resolution, your committee have no recommendation to make, inasmuch as we are not familiar with the wants of the people of that section :

*Resolved*, That the Essex County Board of Agriculture request the State Board, through its Legislative Committee, to assist in securing such legislation as may be required to accomplish the drainage of the Passaic river, assessing a part of the necessary expense upon the counties at large ; and we urge the repeal of the act known as the " Five County Act."

Mr. Borton : In regard to the repeal of the " Five County Act," your committee report adversely.

Mr. Cook : I move the adoption of the resolution in regard to the repeal of the " Five County Act." This act was passed five years ago, and it relieves mortgages from taxation in five counties in this State, throwing the tax on the land owner. This is a sectional matter and affects those five counties only, and we would like to be placed on the same level you are, that is, to pay taxes only for the property we own.

The question being on the adoption of Mr. Cook's motion, it was agreed to.

In regard to Assembly Bill No. 60, introduced by Mr. Harris, modifying the Oleomargarine Law, your committee report it back adversely and will call on Mr. Appleget to read the present law on this subject.

Mr. Appleget : You will find this extract in Chapter 840, passed August 2d, 1886 ; it is as follows :

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled,

That for the purposes of this act, the word " butter " shall be understood to mean the food product usually known as butter, and which is made exclusively from milk or cream, or both, with or without common salt, and with or without additional coloring matter."

Mr. Borton : The resolution presented by the Salem County

Board, as follows, is returned with favorable recommendation for its adoption :

WHEREAS, Bribery in elections is not less common than heretofore, and is no less subversive of republican institutions ;

AND WHEREAS, The Australian Election System, in Australia, in Great Britain, and in Canada, has proved an efficient preventative of bribery in elections ;

AND WHEREAS, A bill embodying the essential features of the Australian System will be introduced before the New Jersey Legislature at the present session ;

*Resolved*, That the Salem County Board of Agriculture request our representatives in the State Legislature to heartily aid the passage of such bill, if it be efficient.

Mr. Borton : In regard to the resolution changing the dates of the open season for game, we recommend that the open season for rabbits, quail, partridges and pheasants, be changed to the period between November 15th and December 15th, instead of between October 31st and December 1st, and we also recommend that grey squirrels be included in the same open season, to prevent the destruction of the young squirrels.

The season for turtle dove we recommend be from July 1st to September 1st, so that the resolution is changed to read as follows :

“ On considerable inquiry of sportsmen in the lower part of Mercer county and upper Burlington county, we find the feeling is general that the present game laws should be so amended that the open season should be

“ For rabbits, quail, partridges, pheasants and grey squirrels, from November 15th to December 15th ;

“ For turtle doves, from July 1st to September 1st. Therefore,

“ *Resolved*, That this State Board recommend such ‘ an amendment.’ ”

Mr. Borton : We further recommend, in regard to the above resolution, that such a law be made general throughout the State.

Mr. Nicholson : I move that the report of the committee be adopted.

A Member : The present law was passed last winter, after a great deal of trouble, as a compromise measure between the up-

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per and lower sections of the State, and I fear there will be considerable difficulty experienced in having the amendment, as suggested, passed.

Mr. Case: I would like to see the prohibition against killing the rabbits removed. They do a great deal of damage to young trees and are a great nuisance.

Mr. Fritz: So far as Warren county is concerned, we do not want the rabbits protected. They frequently destroy a great many young trees, and I would like to see that resolution amended so as not to protect the rabbits.

Mr. Forsythe: Probably I am as well acquainted with the operation of the Game Laws as any man here. The destruction of game is constantly going on to an enormous extent. Of course it is against the law, but the destruction is going on just the same. During the period of the open season, game is being constantly killed off by parties gunning for the market only. Rabbits sold last fall for twenty cents, and quails for twenty cents, and the demand for them at those prices could not be supplied. These parties were killing them off day after day, and shipping them to the market. They could not shoot them fast enough, and then they began to snood them. Of course it is a violation of law, but they do it. In this way, they gather in all the game they can, coming home loaded, and send them to market. If it is possible to pass a law to reach this matter, I would like to see it done.

The question being on the adoption of the report of the committee, it was agreed to.

Mr. Borton: In regard to the following draft of a bill to establish a Meteorological Bureau, your committee recommend its adoption. While this may not meet the requirements just now something may come out of it.

An Act to establish a Meteorological Bureau for the State of New Jersey.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That there be, and hereby is, established, at the State Agricultural College, New Brunswick, N. J., a central office for meteorological observation, with the Director of the State Agricultural Experiment Station, the Secretary of the State

Board of Agriculture, and a third person, to be appointed by the Governor, as a Board of Directors ; the members of the Board of Directors shall be commissioned by the Governor, and be duly qualified as like officers of the State.

2. And be it enacted, That the director of the said Experiment Station is hereby appointed President of the Board, and, by and with the advice of the directors, shall establish, if practicable, one volunteer weather station in each county, and supervise the same ; he shall receive reports therefrom and reduce the same to tabular form, and report the same monthly for publication, as a New Jersey weather report, and shall annually make a report to the Governor, which shall contain a detailed statement of all expenditures made during the year, and a summary of the observations made at the various stations.

3. And be it enacted, That the President of the Board be directed to print, under contract, one thousand copies of each monthly report, which shall be distributed by said Board.

4. And be it enacted, That there is hereby appropriated for the ensuing year, for the establishment of said bureau and stations, the sum of one thousand dollars (\$1,000), or so much thereof as may be necessary for the purpose of meeting actual expenses of carrying out the provisions of this act ; no part of said sum shall be paid for salaries of any officer or for office rent.

5. And be it enacted, That no money shall be expended except under the order of the President Director, by and with the approval of the Board.

And be it enacted, That this act shall take effect from and after its passage.

Mr. Borton : This bill offered by Monmouth county in regard to the dog laws, together with the demand of the Warren County Board, (see reports of these counties) your committee report these back, without remarks, for the action of the board.

I would state in regard to this bill that there is now a similar bill before the Legislature, that all dogs worrying animals, or game out of season, may be killed without restriction, and we feel that such a bill will meet our wants. We have therefore referred the bill back without approval.

Mr. Jacobs : I move that it be approved ; I think it is a good



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thing. I would like to hear it discussed, for there are too many dogs running at large, worrying animals and fowls.

The Chair: If there is no objection, we will declare the subject open for discussion.

Mr. Jacobs: Where we are making a mistake in the dog laws is in permitting the dogs to run at large. Simply taxing a dog, and putting a collar on him, don't prevent him from killing sheep. In reading our county board reports, I notice that several county agricultural societies refer to this matter very strongly. The dog kills the sheep; we simply put a tax on him, and permit him to go at it again. Here is the trouble: A citizen may be permitted to kill a dog, but I would not like to kill my neighbor's dog, no matter how vicious he might be. There should be a pound-keeper, and he should have power to arrest and keep the dog until redeemed. Have him arrest every dog at large. I don't want to pay taxes because some one else loses his sheep. If this is to be done, I want some one to pay for the depredations of cats (laughter) that do damage to our poultry.

A Member: I am opposed to having my neighbor's dogs running over my property. I see by the reports of the discussion in Connecticut last year that this matter was brought up. Dogs should be restrained, the same as cows and horses.

Mr. Borton: I don't think there are many persons who will take the trouble to take a dog to the pound. The best way is to "pound" with a gun, and to shoot quick. (Applause.)

Mr. Pancoast: My amendment to that law last year I will introduce now. My amendment was, that township committees, or city or borough councils, be empowered to authorize some person to kill all dogs not properly registered, and such person to receive a compensation fixed by such township committee, city or borough council. Under the law, one neighbor will not kill another neighbor's dog. It is dangerous in many cases to do so. There are men in every community who can be hired to do this, and you can thus effect the object.

Mr. Jacobs: The great difficulty is that one neighbor will not kill another neighbor's dog. I won't do it, because I don't want to break friendship with him. Have an official appointed for the purpose, make it his duty, and pay him to do it, that is what we want.



Mr. Denise: Under the present law, we have no right to kill any dog. Everyone knows that to be a settled fact, and a dog has more right than a man in trespassing on your property.

I have suffered considerable damage from dogs. If parties are compelled to register their dogs, there will not be one left in ten, after a short time. Without the collar, we have the right to kill. One gentleman says that some one should be appointed to kill the dogs; the law says that the assessor shall kill the dogs, if taxes are not paid. The trouble is that the dogs will not be killed in that way. The damage done by dogs in our township was more than \$900 and there was not over \$300 collected as taxes on the dogs. The dogs doing the damage to sheep are owned by people who don't pay any dog taxes. I think that bill suits us. Last year many of the gentlemen objected to the one dollar charge for registration, as provided in the bill offered. They thought that too much money might accumulate, and we covered that by having the balance applied to the school fund. In cases where damage is done by dogs, the money can be applied for paying such damages. Under this bill all we ask is the privilege of shooting these dogs. If I don't want to kill my neighbor's dog, I will hire some one to kill him.

Mr. Blackwell: I am of the opinion that we already have an abundance of dog laws. If we enforce them they will be ample and sufficient.

Mr. Denise: The idea is just here exactly. We have a lot of officers who can do this if they feel so inclined. Put it into the hands of individuals who will do it. We can kill a dog if we can catch him in mischief.

Mr. Lippincott: I think the law before the House is just what we want. If dogs are to be allowed to run over neighbors' property, they should be killed. The principal part of the mischief done by dogs is done by the dogs of owners of from two to six curs running at large, who pay no taxes. They provide nothing for their families but must always have a lot of curs running about; some of them keep as high as half a dozen.

Mr. Denise: I move the adoption of the resolution offered by Monmouth County Board.

The question being on the motion of Mr. Denise it was agreed to.

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The Chair: We will call for the Committee on County Board Reports, if they are ready.

Mr. Dickenson: Your Committee on County Board Reports make the following report:

We find that Secretaries of County Boards are becoming well drilled in their work; the reports represent, in a well defined manner, the work performed by the county organizations, several of which reports it might have been well to read before this meeting, but our limited time would not permit; and we believe the Executive Committee were wise in giving the Board a synopsis of these reports and having it printed, so that each member could have a copy during the session. As most of the suggestions in these reports have been incorporated in resolutions, which have been presented to the State Board for action, we deem it unnecessary to make further reference to these recommendations.

(Sig.) JOHN W. DICKENSON,  
H. F. BODINE,  
V. P. HOFFMAN,  
Committee.

On motion, the report was received and referred to the Executive Committee.

The Chair: Our next topic upon the program is a discussion upon "The Present Status of the Ensilage Question," by Major Henry E. Alvord, director of the Maryland Experiment Station.

I take pleasure in introducing Major Alvord, who will now address you.

[See Address.]

On motion, a vote of thanks was extended Major Alvord for the valuable paper read.

Mr. E. B. Voorhees read a valuable paper on Ensilage at the close of Major Alvord's address.

[See Paper.]

Mr. Ward (Vice-President): The Executive Committee are gratified that they were fortunate enough to select a subject of so

much interest, and if we can take up this subject at some future hour we shall be glad to do so; but we have with us Mr. P. T. Quinn, whom I know we would all be glad to hear, and whom it is unnecessary for me to introduce to this Board.

[See Address.]

On motion, a vote of thanks was tendered Mr. Quinn for his instructive and entertaining address.

The Chair: I notice that we have a number of exhibits on the table, and I will appoint as a committee to examine and report on them,

J. M. White,	Middlesex.
J. W. Pancoast,	Salem.
J. H. Haines,	Burlington.

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#### AFTERNOON SESSION.

The Chair: We will call on the Committee on Taxation if they are ready to report.

The Committee on Taxation report as follows:

WHEREAS, It is believed that under the tax laws of the State of New Jersey, in their practical operation, real estate, especially farm property, pays more than its just share of taxation;

1. *Resolved*, That the Board appoint a committee to report at its next session whether such be the fact, and, if so, to submit to the Board such alterations in the present laws as will remedy that defect.

Your committee, to whom the above resolution was referred at the last annual meeting, report that they have carefully examined into the facts suggested by the resolution and we do find unanimously that the evidence to prove "that real estate pays more than its just share of taxation" is not only plenary, but goes overwhelmingly to further show that the grossest abuses exist, and that real estate bears not less than a triple, nay a sextuple burden.

Those having the greater experience and of most competent judgment unhesitatingly assert that the value of personal prop-

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erty in this State fully equals if it does not greatly exceed that of the realty, yet by reference to the last report of the Comptroller of the State it will be seen that the entire valuation of our real and personal property amounts to . . . . . \$586,917,360  
Of which the realty . . . . . 505,268,773  
And the personal . . . . . 120,928,939

The Comptroller's report for 1879 shows an assessable valuation of four hundred and twenty-seven millions of realty while the personal is one hundred and thirty millions.

So that you will be surprised to learn that while we supposed that we were rapidly accumulating personal property in the past ten years, and the Grangers would have you believe that farm property is decreasing in value, we are bound to accept the statement of our sworn officials, and admit that the contrary is true, and that our local Jay Goulds and Vanderbilts have actually lost nearly ten millions of dollars.

This last most monstrous fraud is ample in itself to show the system that seems to be gaining ground in all directions, which is to unload every and all burdens upon the shoulders of the submissive and uncomplaining farmer. The question of a remedy for this has been from time immemorial, in all States, a subject which like the poor "we have always with us," and has ever been one of the most difficult and complex that ever puzzled the legislator or vexed the taxpayer. It is and has long been of the greatest importance.

Recognizing this fact and yielding to an urgent demand for relief by a strong body of our taxpayers, the legislature of our State in 1879 passed an act providing for the appointment of a commission by the Governor, conferring upon them extraordinary facilities and directing them to investigate the irregularities and advise such changes and improvements as to them should seem most likely to promote the agricultural and other interests of our State.

The report of this commission, which consisted of some of the most able and learned citizens of our State, was submitted on February 16, 1880, and your committee feel that they would be remiss in their duty if they failed to call your attention to this able and exhaustive work.

A reference to a few of the more prominent features of their work will be of special interest.

They issued six thousand circulars of enquiry and held six public meetings in the most prominent and widely separated localities of the State, and in reply to their question, "In what ways, if at all, do individuals evade a proper assessment?"

The commission say: "It is not an agreeable duty to point out an evil which strikes so surely and so fatally at the very foundation of public morality."

But that there was abundant evidence to the purport and effect as given in answer to the question by an assessor who replied *by lying and then swearing to it*.

Fully recognizing the magnitude of the evil to be overcome the commission recommend: 1. That real estate and personal property of the tangible and visible kinds be taxed in all cases where found.

2. That bonds, stocks, shares, etc., issued by corporations organized under the laws of the State, be taxed in all cases at the place of issue.

3. Bonds, stocks, shares, etc., issued by corporations organized and doing business outside of the State, but owned by residents in this State, they recommend a system of listing to be verified by the oath of the person assessed, with power to examine by a Judge of the Court of Common Pleas in cases where fraud or evasion is suspected.

Having so undeniably shown the desperate character of the chronic and increasing disease from which we suffer, you will be prepared to agree with us in suggesting what otherwise might seem to be a desperate remedy. And we, therefore, recommend, in addition to the plans given in the last section 3, that we urge the enactment of a statute to the purport and effect that if any taxpayer shall refuse or neglect to list or furnish to the Assessor for taxation any bill, bond, note, obligation, or other evidences of indebtedness that are now or may hereafter be the subject of taxation, that such neglect shall forfeit the right to recover thereon, and every such evidence of indebtedness be thereafter null and void and upon due proof thereof be a bar to recovery thereon in any court of this State.

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The other recommendations are of lesser import but it is believed they are of value.

1. That Assessors and Collectors be elected for three years, being ineligible for re-election for the next ensuing term.

2. That household goods to the value of \$100 be exempt from taxation.

3. That Commissioners of Appeal hold their meeting before rather than after the Assessor is compelled to close his work.

4. That the mortgagor shall pay the tax, and that the mortgagee shall allow the amount so paid as a part of the interest due him, being the re-adoption of the law of 1854.

All of which is respectfully submitted,

A. S. APPELGET.

Judge Forsythe: This is a subject which is not new to me. Eight or ten years ago the Legislature appointed a commission to revise these things, and I was sufficiently interested to get up a tax law that I thought would reach all the property in the State of New Jersey—not only the land, but the money also. I did all I could, and made a report to that commission. It met in Mount Holly, at our county fair, and I tried my best to get them to adopt a statute by which all the property in the State of New Jersey could be equitably and honestly and fairly assessed. The commission decided that my plan was not feasible, from the fact that they thought it would be unconstitutional. I noticed, however, that the Legislature treated their report about as summarily as the commission had treated mine. They concluded that if my plan was worth nothing, neither was the plan of the commission, and their plan was never adopted. My plan was to make every description of property, let it consist of what it would, assessable, and pay taxes.

When we attempt to exclude any kind of property we must necessarily place the burden of taxation on all the remaining property. With the farmers of New Jersey, their property is all visible, and consequently taxable, but here are millions of dollars which every intelligent man knows are to-day going out of the State of New Jersey on Western mortgages, upon which seven or eight per cent. is guaranteed. This money escapes taxation entirely, not honestly but dishonestly. There is nothing

right or fair about it. Will the farmers of the State of New Jersey continue to submit to this? We have the indirect taxation, and now we have the direct escape of taxation of a large part of the property of New Jersey in this form. Are we satisfied to continue to submit to this imposition? I am willing to leave it to the farmers whether they will stand this or not. We must speak as men, and we must speak to be heard. The farm lands of the State are depreciating daily and hourly in value. They have depreciated so much they will not to-day bring as much as the lands in Nebraska and Kansas. I am speaking of a fact that came home to myself. Less than a year ago I bought a farm for \$9,000, and the buildings on that farm were valued for insurance at \$6,300, and the fencing on the property must still be deducted from the balance. Taking the cost of building and the cost of fencing from the cost of the property, and how much does it leave for the land? Not as much as land in Kansas or Nebraska, Iowa or Colorado.

Are you willing to submit to this constant depreciation of the value of your property? Many men have spoken to me during this season with regard to having a law passed by our legislators reducing the rate of interest to five per cent. Is there any man foolish enough to suppose that the Legislature would do such a thing in the State of New Jersey, when every man who has money can loan it in the West at seven or eight per cent., clear of tax? You can't get it here at five per cent. Every farmer knows that he cannot pay more than five per cent., and hardly that, if he has a mortgage on his farm. It is an exceptional thing to find a farm nowadays without a mortgage.

These are things requiring the serious consideration of this Board of Agriculture. There is no more important subject that can be brought before this State Board or before our State Legislature. The tax laws can be so framed—if the Legislature will—as to tax every article and every kind of property within this State. I advised a good method by which this can be done, and I know it can be done. The burdens of the State and County taxes should be born equally by all property wherever found. Exclude none, but tax all, is my motto.

Mr. Pancoast: I offer the following resolution :



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*Resolved*, That the State Board of Agriculture appoint a committee of five, to report at its next session, consisting of Joshua Forsythe, Adrian S. Appelget and three others selected by them, to co-operate with a committee of three from the Assembly, and two from the Senate, which we request the Legislature to appoint, to revise the tax laws and prepare a measure that, in their judgment, will equally tax personal property and the real estate of the farm, of the town, and of the city.

I move the adoption of this resolution.

The question being on the adoption of the resolution offered by Mr. Pancoast, it was agreed to.

On motion, the majority report of the committee was received and referred to the Executive Committee.

The Chair : The next thing on our programme is the "Past, Present and Future of Scientific Agriculture," by Prof. P. T. Austen, of New Brunswick.

I take pleasure in introducing the gentleman to the State Board.

[See Address.]

The Chair : The next topic on our program is "The Study of Plant Life in Our Schools," by Mr. Apgar, Professor of Natural Science, Trenton, N. J.

I take great pleasure in introducing Prof. Apgar to this State Board, although many of you are well acquainted with him.

Prof. Apgar :

[See Address.]

On motion, a vote of thanks was tendered Prof. Apgar for his interesting and instructive address.

The Chair : We have heard a great deal of the possibilities of the Experiment Stations in other States, and of the discoveries made by them, and yet to be made. We now propose to hear something about our own Experiment Station.

I take great pleasure in introducing to you Mr. E. B. Voorhees, of the New Jersey Experiment Station, New Brunswick.

Mr. Voorhees :

[See Paper.]



On motion, a vote of thanks was extended to Mr. Voorhees for his entertaining and instructive paper.

The Chair : We will now call on the committee appointed to visit the Agricultural College.

Mr. Ketcham presents report of the committee, as follows :

REPORT OF

COMMITTEE TO VISIT STATE AGRICULTURAL COLLEGE, FARM AND EXPERIMENT STATION.

*Mr. President and Gentlemen of the State Board of Agriculture :*

The committee appointed at the last annual meeting to visit the State College, for the benefit of agriculture and the mechanic arts, submit the following report :

The committee were duly notified to meet at Trenton, on Nov. 22nd, last. Three of the number were present, Messrs. Kaighn, Hollinshead and Ketcham, who, after conference, visited the college, experimental station, and farm the next day, accompanied by Secretary Dye, Mr. Pancoast and others.

Mr. Allaire visited the same subsequently in December.

At New Brunswick the committee were taken under the personal care and direction of Drs. Gates and Cook, President and Vice President of Rutgers College, and we feel it our duty to these gentlemen to say that every possible pains was taken by them to show the workings of the college, its facilities and the attainments of the students—the laboratory of the Experimental Station, with its important and intricate work, the farm connected with the same, and to furnish all information possible.

Your committee were aware, from the discussion which led to their appointment, also from other sources, that there existed considerable dissatisfaction, but after a careful and thorough investigation, we believe much of this has arisen from a want of knowledge or a misapprehension of the facts as they exist, arising undoubtedly from connecting the State appropriations to the Experimental Station with the State College.

The entire sum received by the College from the State, and which is derived from the sale of land scrips, granted by Act of Congress in 1862, is \$6,960.

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The Trustees of Rutgers College, in the acceptance of this amount, by Act of Legislature in 1864, were required to erect additional and adequate buildings, to furnish and provide a suitable tract of land, conveniently located, for an experimental farm, at their own expense, the \$6,960 being devoted exclusively to the payment of salaries in that branch of the College known as Rutgers Scientific School, and which, by Act of Legislature, is designated as "State Agricultural College." And further, the Board of Trustees shall cause to be delivered annually, in each county, one or more public lectures on agriculture, free of charge, and which was supplemented in 1873 by giving control of the public lectures to the Board of Visitors.

These obligations were additional to the forty free scholarships granted the State in the agreement.

That the Trustees of Rutgers College have faithfully done their part, is evident in the enlargement and erection of buildings costing \$150,000, in purchase and improvement of a farm at a cost of \$50,000, and adding voluntarily ten more free scholarships, making fifty. The present year the applications have exceeded this number by thirteen. To these the College authorities have opened their doors, so that sixty-three students are now receiving free tuition.

After visiting the College a number of questions were prepared and mailed to each member of the committee, answers to which were received from all except Mr. Stout, who declined on account of inability to act.

These questions were framed with a view to meet the objections advanced by resolution at the last annual meeting of the State Board, and in order that each member of the committee could give the subject a personal consideration, and are as follows :

1. Are you satisfied the Trustees and faculty of Rutgers are fulfilling the contract with State and Government ?

Answer. We answer, yes, to the best of their ability.

2. Why do not more farmers' sons apply for admission, and is the reason thereof with themselves or the College ?

Answer. Your Committee are of opinion that there is no blame to be attached to the administration of the College, from the fact that so few farmers apply for admission, but rather that the neg-

lect to do so lies with the farmers themselves, chiefly for the following causes: 1st. The matter of expense; 2d. The length of the time—even of the special course, which is two years; 3d. The standard of admission being higher than is within the reach of the masses; 4th. Because under the statute the collegiate instruction is not limited to the agricultural classes alone, but applies also to all branches of the mechanic arts.

3. Would it be advisable to lessen the requirements of entrance examinations and the curriculum for graduation?

Answer. Your committee realize this question is one of the most difficult to answer satisfactorily to the Board, in view of the different opinions upon this subject. It seems to us that the object of the U. S. Government was to encourage the establishment of colleges, not academies, according to the general understanding of the terms, and to lessen the amount of knowledge required would be a step backward, and wholly inconsistent with the advanced development of the nineteenth century. Almost all of the boys of New Jersey have facilities for obtaining sufficient education to meet the requirements of entrance to the agricultural course without leaving their homes, and even if compelled to do this for a short time, would be attended in most cases with far less expense than at New Brunswick. And if the course of our State College is somewhat higher than in other States we should rather be gratified than dissatisfied. The present course may not be perfect, but we must remember that the acme of perfection has not yet been reached in scarcely any one thing, and any radical changes in a matter of such great importance as this should be made with extreme caution and a clear foresight to future results, and it is possible that those who are most closely brought in contact with educational pursuits would be in time best calculated to solve this difficult question.

4. Would it be advisable to recommend a separation of the State College from Rutgers?

Answer. Our reply is: In view of the fact that the contract which has been made with the State is being faithfully carried out, and of the large expenditures that have been made by Rutgers College, it would not be advisable to make any change.

5. Could the agricultural class expect the State to support a separate college for that special purpose?

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Answer. They could not, any more than for any other industry or profession.

6. The Experimental Station being permanently located at New Brunswick, would it be advisable to separate the College from the station ?

Answer. It could not be separated, as the United States statute requires them to be connected.

7. Has the experimental station been beneficial to the farmers ?

Answer. It has, and your committee doubts if any appropriation made by the State yields larger and more satisfactory returns than this.

8. Is the farm conducted with a view to experiments, and the furnishing of information the farmer needs in crops, fertilizers and stock feeding ?

Answer. The committee think that the farm is conducted with the purpose specified, but it is also thought that fuller and more varied experimental agriculture, on this particular farm, would be welcomed by farmers in general as a great and valuable aid to all who are interested in the cultivation of the soil.

Our report refers mostly to the State College, as this was the principal object in question.

Concerning the work of the Experimental Station we would urge the agriculturists of our State to study carefully the bulletins and reports of the station, which are free to all, and can be had by every one on application. By so doing they will obtain a vast amount of valuable information that could not be derived from any other source. While it is true increased amounts have been sought for and obtained, it is also true the work has extended correspondingly.

The new laboratory, for which \$30,000 was appropriated by our Legislature last winter, is a building of which the farmers may be proud, as being almost expressly for their use. In this building will be finished a large hall for public lectures, including not only the theory of Agriculture but Veterinary Science and kindred subjects, and we hope the time is not far distant when this plan will become effective. We also, in this connection, believe an elementary course in Veterinary Science, if taught in the College, would be of great benefit, as a small amount of knowledge in this branch would often save both time and money.

We are glad to note the growing interest in the College and the increasing desire of the young men of our State to avail themselves of its advantages. The first students were received in 1865, but the tardiness of the citizens to avail themselves of its benefits was so great that in 1889 the Board of Visitors were authorized by Legislature for the purpose of bringing to public notice the free scholarships, by letters, posters or advertising, as they may judge to be for the interest of the State.

Why the young men do not return to the farm after graduation is a question each can answer most satisfactorily for himself, but if the education they receive prepares them to pursue a calling *more lucrative and less laborious*, should their decision in these matters be criticized.

In the drill room of the present freshmen class, Dr. Gates called for a showing of hands of students from the farm. Seven responded.

How many would return to the farm upon graduation? Two responded.

How many expect to own and manage a farm after becoming able to purchase one? Almost half of the class.

In conclusion, we would recommend any who are not satisfied with the State College to visit it and investigate for themselves. Seeing is believing, and while each may have his own views and opinions for his own benefit or profession, yet viewing the scope of the Act of Incorporation, comprising both "agriculture and mechanic arts," We believe they, with us, will be convinced the State College is doing all she can for the advancement of these interests with the means at her disposal.

Respectfully submitted,

SAMUEL B. KETCHAM,  
JOSHUA HOLLINSHEAD,  
HAL ALLAIRE,  
AMOS E. KAIGHN,

Committee.

On motion, the report was received and the thanks of the Board extended to the committee for their able report.

The Chair: If the Committee on Resolutions is now ready to report, we will hear them.

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In regard to the following resolution, offered by Ewing Grange, your committee recommend its adoption.

[See Mercer County Report.]

On motion, the report of the committee was received.

Mr. Ege: In regard to the resolution offered by Morris county, covering the working of the roads, your committee report favorably, and would recommend its adoption.

[See Morris County Report.]

Mr. Ege: In regard to the Salem County Board's request, asking for the establishment of a standard measure for milk, your committee recommend favorable action.

On motion, the report of the committee was received.

Mr. Ege: In regard to the resolution made by Sussex County Board, concerning taxation and freight rates, your committee would recommend such legislation as will create a railroad commission to regulate freight and passenger rates. We have no recommendation to make on the subject of taxation.

On motion, the report of the committee was received.

Mr. Ege: In reference to the resolution offered by Mr. Pancoast, your committee believe that the evils referred to in the preamble exist, but that this resolution does not afford a sufficient remedy, and should not be adopted by this Board.

WHEREAS, The bill for advertising the laws in the newspapers for 1887 was \$90,052.49, about double that of 1886 ;

AND WHEREAS, The object of such advertisement can be better secured, without expense to the State, but with greater satisfaction to the citizens ;

AND WHEREAS, the distribution of such a sum, almost if not quite exclusively to party papers, tends to make party papers more partisan and to destroy the independent press, to the injury of the community ; therefore,

*Resolved*, That the State Board of Agriculture request the Legislature to authorize the publication of the laws only in book and pamphlet form, to be furnished at actual cost to applicants."

On motion, the report of the committee was received and adopted.

Mr. Ege: In reference to the resolution in regard to the printing of all resolutions from the various county boards for distribution among the members in attendance, your committee have substituted another resolution which we think will better cover the case.

Your committee would recommend that all resolutions passed by the county boards, to be acted upon by the State Board, be forwarded to the Secretary, with the reports of said counties, to be printed at the discretion of the Executive Committee.

On motion the report was received.

Mr. Ege: In the matter of the resolution offered by Morris county, concerning Passaic river drainage, your committee refers this back to this Board for further action, without recommendation.

[See Report of Morris county.]

Mr. Cook: I move the adoption of this resolution as reported back by the committee.

Mr. Forsythe: I cannot see why the lands of other people, or of other citizens of the State of New Jersey, should not be drained at the expense of the State as well as these lands. Other farm lands in the State are not drained at public expense.

Mr. Cook: Our resolution does not propose to levy the tax on the State, but on the lands which will be benefitted, in the counties wherein the drainage is effected.

Prof. Cook: The plan proposed is that the lands just above those benefitted shall be subject to this tax. It is not intended that a general tax shall be levied all over the State.

There is one congregation that I know of, consisting of seventy-five families, on the uplands, adjoining these wet lands, and I have been informed by their minister of the church there, who has been there for twenty years, that every family has suffered with chills and fever, some of them, I think, dying from the effects. Every family in that congregation has chills and fever to the extent every year of two or three individuals.

The drainage of these lands will be a sanitary benefit as well as an agricultural benefit.

Mr. Roe: This seems to be a local matter; I do not think this



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Board would have any action in the matter, and think it sufficient to bring the matter before the Legislature.

Mr. Cook: The amendment to the general law would work the same all over the State. It is an amendment we propose. Under this amendment these commissions may apply to us, and in time may apply to any other part of the State.

This tax may be levied at the same time that the general tax is levied and thus save expense.

Mr. Crane: This resolution comes from the Morris County Board, but I wish to say that the Essex County Board coincides with it. Essex county sent a resolution coinciding with this, and asks for the same thing.

The question being on the motion of Mr. Cook, it was agreed to.

The Chair: The consideration of the resolutions recommended for adoption will now be in order. The Secretary will read the resolution offered by the committee as a substitute for that offered by Mr. Pancoast on printing resolutions of County Boards.

Mr. Nicholson: I move that the report be concurred in. So ordered.

Resolution of Morris county on working the roads.

Mr. Voorhees: I move that that portion of the resolution in regard to allowing tax payers to work out their road tax be stricken out.

Mr. Ward: I would amend this resolution by having it referred to the Standing Committee on Roads, who will report to-morrow.

The question being on the motion of Mr. Ward, it was agreed to.

The Secretary reads the resolution offered by Sussex county in regard to freight rates and taxation.

Mr. Loomis: In regard to this matter of freights, you may not all be acquainted with the difficulties we labor under in Sussex county. You may not labor under it in this part of the State, but we feel we have been very much abused by the freight rates in Sussex county and particularly in the article of milk. I am not going to advocate anything this time, but hope the matter can be taken up, and see if the State Board cannot suggest a remedy.

We are paying, for a can of milk to New York, forty



cents for a carriage of about forty miles. The Erie Railroad and the Ontario and Western charge the same, for about the same distance, to New York. They go back two hundred and fifty miles, and bring the same quantity of milk down clear across the State, and set it upon the platform in Jersey City, at about the same price, except a few cents, and take the milk in refrigerator cars at that. We put the milk in a common car and they transport it for forty cents a can. I want to say the receipts of that business are just as good to these railroad companies as if they had a twenty-five per cent. mortgage on every farm in Sussex county. They receive about one-third of the net receipts from our milk. I understand lately that the Delaware, Lackawanna and Western sends milk for about the same distance to New York for thirty-two cents a can. They also run refrigerator cars beyond this distance clear out to Binghampton and bring it at the same price from there to New York. What is New Jersey going to do for its farmers? Are we going to sit quietly by and have these Western States and the low priced lands in Sullivan county competing with us here in New Jersey—are we going to compete with these farmers, with their lands worth but twenty or twenty-five dollars an acre? They take the refrigerator cars and charge these farmers the same as they charge us for hauling the milk but a short distance. The Hudson River Railroad, and the Harlem River Railroad do the same thing for twenty cents a can. I don't know what the New Jersey Central does. We in Sussex county think we have been very badly treated by the railroad companies. Some years ago, in New Jersey, we got into what was called a milk war, and what a trouble we had at that time in regard to these things. That was in the making of prices, and not so much in the matter of freight. We were obliged to send the New York dealers the milk for whatever they pleased to give. They make the price once a month. The cars go along and get the milk, and they charge just what they please. The farming interests in Sussex county are in a very bad condition. I made a little note of some few things, and merely want to say here, without asking this Board to take any action on it, I want the people here to know what is being done

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in regard to the necessity of the farmer in the northern part of the State.

In this circular sent me by the State Board, there are two questions asked. I will read them.

“Are the farmers, as a class, satisfied with their condition?”

“If complaining, what are some of the complaints made?”

This State Board asks this question :

“What, in your judgment, do farmers and agriculturists most need to-day?”

I have written down some of these things here in a short way.

The first is, that the farmers in our section of the State are suffering from what might be called a recognition of the ten-hour system of labor. We are having a great deal of trouble in that respect. The mechanics only work ten hours a day, and many of the farm help are getting so they only work ten hours a day. I would like to know how the farmers are going to get the cows milked, and other work, beginning at seven o'clock in the morning and quitting at six.

Second. We complain about the extravagant rates of freight charged for our products for the short distance carried.

Our Legislature has turned a deaf ear to our repeated entreaties for protection in some of the most vital parts of our business.

We complain about the high rates of tax on real estate. We are paying most of the taxes, and the personal property, some way or other, gets skipped every time. I do not know whether the fault is with the assessor or whether it is the fault of the law, but I notice all the real estate of the county is paying taxes, and almost all the taxes, which I know is not correct or right.

Fourth. These wrongs exist because the farmers of New Jersey do not, or have not, acted in concert to get their rights.

I speak of these things generally, because I think the time must come before long that the State of New Jersey, with its access to New York City, and lying between two of the largest cities on the continent, has been, and is, in my judgment, very much oppressed by the corporations running through the State. Living adjacent to these two great cities, we have no benefit from them, or for the high prices paid for our lands. Since the enormous through systems of railroads have been established in

our country, you find real estate in New Jersey has been steadily decreasing in value for twenty years. So it is with us. I do not know how it is in this part of the State. Since these through systems own perhaps a dozen roads, they have their meetings and come together to make plans and rates. They do just as they please and the farmer must stand it.

When you come to taxing, raising money to support the State and counties, the farmer has to bear the burden. These corporations and these mechanics, and everything that has been done in our State, has been against the interest of those who own farms and who do the hard work. I don't know what can be done in the future. I am sure many of you are in the same predicament that we in Sussex county are ; we have been suffering for years, and there does not seem to be any redress.

If some gentleman will think of something to get us out of this trouble, we will be under everlasting obligations to him.

Mr. Bodine : I would like to allude to our experience in getting our fruit to market. It costs us fifteen cents a basket to land it on the commission stands in New York City. After the organization of the Fruit Exchange, they undertook to get a reduction in the rates. They made a complaint to the Inter-State Commission. The companies said at once that the Inter-State Commission had nothing to do in the matter ; that they only landed the produce in Jersey City, so they violated no law, and that we could not reach them in that way, but the Commission, in their wisdom, saw fit to make a recommendation to the companies that they reduce the rates of freights, at least, and the companies, after having this gentle hint from the Inter-State Commissioners, did reduce the rate two cents a basket, and though this was a small amount per basket, it amounted to a large sum of money saved. What you want is organization and co-operation, and you will get your rates too.

The Chair : We will call for the report of the Committee on Officers' Reports.

Mr. Voorhees : Your committee begs leave to report as follows :

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REPORT OF COMMITTEE ON OFFICERS' REPORTS.

Your Committee beg leave to report that they have examined the report of the Executive Committee, the President's address and Reports of County Boards of Agriculture.

We notice from report of Executive Committee an earnest desire of other States to co-operate with us in the formation of a National Bank of Agriculture, which we sincerely hope will be consummated, and as suggested by this Committee, "If, as seems to be the general impression throughout the country, the seed division had as well be curtailed or abolished, the money expended in this direction would go far towards, if it would not entirely cover, the expense of the National Board," and we trust the action of the State Board will be in this direction.

We trust the State authorities will yet take enough interest in the State Board of Agriculture to provide a room in the new Capitol Building, suitable for a place of meeting, records and office—a real Farmers' Home.

The thanks of the Board are due for the efficient services of the Executive Committee.

The reports from the County Boards of Agriculture make a continuous reference to the depressed condition of matters relating to agriculture. Yet we should not feel disheartened, for we believe that an earnest and determined effort to succeed on our part will be crowned with success, and while at present there may be a great reduction in our receipts, one way out of this dilemma is to reduce our expenses, and determine to live within our income—a course far more preferable than the one too often followed by many in financial circles, of living beyond the income limit, and then purchasing a ticket for Canada.

We notice with pleasure, in the able address of our President, he calls attention to the fact that the assessed value of farms often exceeds the selling price. There should certainly be a reduction in country property, or the value of town and city property should be raised. We heartily endorse what is said in regard to the adulteration of food products, and also what he says in

regard to the introduction of a complete system of elementary principles of agriculture in the public schools in the country.

(Signed) DAVID C. VOORHEES,  
WILLIAM F. ELY,  
THOS. E. HUNT.

On motion the report was received.

On motion, adjourned.

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EVENING SESSION.

JANUARY 31, ASSEMBLY CHAMBER, 8 P. M.

President Burrough: In calling the Board to order, I regret that I am obliged to make the following announcement. I have a telegram from His Excellency, the Governor: "I very much regret that I will be unable to attend the meeting of the Board to-day, as I had intended to. Signed, R. S. GREEN." In the absence of Governor Green, I would ask that Congressman Buchanan act as presiding officer for the evening. It is hardly worth while for me to introduce Mr. Buchanan to you, and I will ask him to take the chair.

Mr. Buchanan: This is a clear case of draft. (Laughter.)

Mr. Chairman and Gentlemen of the Board:—I came up here to-night for two purposes; one was to bring my friend Taylor with me, and the other was to take care of him after I got him here. For the time being, I deliver him to your tender mercies. Allow me to introduce to you Congressman Taylor, of Ohio, as the speaker of the evening. (Applause.)

[See Address.]

Senator Roe: I move that a vote of thanks be extended to the gentleman for his exceedingly interesting and entertaining address.

The question being on the motion of Mr. Roe, it was agreed to.

On motion, adjourned.

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### THIRD DAY.

#### MORNING SESSION.

Vice-President Ward in the Chair.

Mr. Ward: I have a letter here from President Burrough, saying that he was required to leave by an early train this morning, on account of sickness at home.

The first thing on the programme is the announcement of the Standing Committee on State Premiums. In the absence of Mr. Burrough, I take the liberty of appointing the same committee as last year.

T. F. Baker, Henry I. Budd, I. W. Nicholson.

The Standing Committee on Exhibits is ready to report, and we will hear them now, if there is no objection.

*Gentlemen of the State Board of Agriculture :*

Your Committee on Exhibits respectfully submit the following :

We find upon the table specimens of Meech's Prolific Quince preserved in strong brine. We understand this fruit has been kept in this way for two years. Mr. Meech also exhibits a specimen of canned quince.

J. H. W. Cook, of Caldwell, exhibits two boxes of very fine comb honey.

Horace Lippincott, of Jobstown, exhibits a sample of dried barley grains.

Chas. B. Horner, of Mt. Holly, exhibits a fine specimen of a well grown peach tree of a new variety called Wonderful.

Dr. A. D. Newell, of New Brunswick, exhibits specimens of corn said to be the original maize or Indian corn. This was raised from and procured by Dr. Newell from the Indian Territory. Each grain is enveloped in a separate brush and each ear is said to contain grains of yellow corn, of white corn, and of sweet corn.

Fine specimens of Leaming corn are exhibited by J. M. Dalrymple, of Hopewell.

We also call attention to the Eureka Sprayer, exhibited by Col. Pierson, with the description and testimonials :

THE EUREKA SPRAYER

Is a machine designed to distribute liquids in form of spray, or mist.

It consists of a copper tank—capacity six gallons—to be carried like a knapsack.

Within this tank is an air chamber, with a pump inside, made entirely of brass.

The elastic pressure of air in the pump maintains a continuous discharge of liquid from the spraying nozzle.

This machine is so made as to be not liable to corrosion from the acid mixtures which may be used from it as insecticides or fungicides.

With this machine one man may spray five acres of grape vines per day, or one acre of potato plants in two hours.

It is serviceable for spraying plants in hot houses, for spraying fruit trees, or any use for which an efficient spraying machine is required.

It may be readily carried by one of ordinary strength, as, when filled with water, it weighs sixty-four pounds.

Prof. F. L. Scribner, Chief of Section of Vegetable Pathology, Department of Agriculture, thus writes respecting this machine :

U. S. DEPARTMENT OF AGRICULTURE, }  
WASHINGTON, D. C. }

July 5, 1888.

"I approve the Eureka Sprayer. Every grape grower and small fruit culturist and gardener ought to have one. I know of no pump made in this country which combines so many good points. It is the only pump manufactured here which will withstand the action of the solutions of Copper Sulphate. In facility of operation and economy of material used in spraying, it is unequalled.

F. L. SCRIBNER.

J. M. WHITE,  
J. WALTER PANCOAST,  
Committee.

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On motion, the report of the committee was received and referred to the Executive Committee for publication.

The Chair: We will call for the report of the State Grange, if ready.

W. M. John Statesir reported as follows :

[See Report.]

On motion, the report was received and adopted.

The Chair: We will now call on Mr. Swayze, of Warren county, N. J., on "Drained Lands of the Pequest and their Products."

Mr. Swayze not being present, sends the following letter :

NEW YORK, January 1st, 1889.

*Prof. Geo. H. Cook :*

DEAR SIR :—Concerning the cultivation of the recently-drained lands in Warren county, known as the "Great Meadows," I regret to say I cannot give you a statement as fully as I would like to do, owing to the short time that I have had to gain information from others.

The crops raised by us last year have more than met our most sanguine expectations.

We planted one hundred and twenty acres in onions, and our crop yielded between sixty and seventy thousand bushels. Could not have expected more under any circumstances. The season was favorable till gathering time, when the rainy weather made it difficult to cure and harvest them.

We gathered three hundred tons of hay from one hundred and seventy acres—all first quality—that we are now marketing at twenty dollars per ton.

We did not grow any corn except for our own consumption, but Messrs. Arnold and Stevens had a large field three-quarters of a mile in length, that I think was the finest field of corn I ever saw.

The value of the lands has increased wonderfully in the minds of the people since the drainage.

They plainly see that twice the value of crops raised on the uplands are raised on these drained lands, at less expense.



Next year celery will be grown to a large extent, as the lands are equal, if not superior, to the famous Kalamazoo celery lands.

Respectfully yours,

A. J. SWAYZE.

The Chair: We will proceed to the next item, which is that of "Our Insect Enemies and How to Meet Them," by Dr. J. A. Lintner, Entomologist of the State of New York.

I take great pleasure in introducing Prof. Lintner to this State Board.

Prof. Lintner—

[See Paper.]

Mr. Bacon: I move that a vote of thanks be tendered Prof. Lintner for his entertaining and instructive address.

The question being on the motion of Mr. Bacon, it is agreed to.

The Chair: We also have with us this morning Prof. Hulst, who has been devoting much of his time to this same work in our State. He can give us an account of this work, its beginning and the plans that have been partially adopted for its development and continuance.

I take great pleasure in introducing to you Prof. Hulst, of New Brunswick, who will address you on "Entomology in New Jersey—Beginning and Prospective Work of the Experiment Station in this Department."

Prof. Hulst—

[See Address.]

The Chair: There is a subject on our programme for this afternoon, by Mr. Case, who asks the privilege of taking this time instead of this afternoon, as he is obliged to leave at noon.

If there is no objection we will hear from Mr. Case.

I have the pleasure of introducing to you Mr. W. W. Case, of Baptisttown, N. J., who will give us an address on "Money Making by Honey Making."

Mr. Case—

[See Address.]

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On motion, a vote of thanks was tendered to Mr. Case for his entertaining and comprehensive address.

The Chair : I understand the Committee on Nomination of Officers is ready to report, and if there is no objection, we will hear them now.

The Committee reports as follows :

For President, Edward Burrough, of Merchantville.

For Vice President, William R. Ward, of Newark.

For Treasurer, D. D. Denise, of Freehold.

For Secretary, Franklin Dye, of Trenton.

For Executive Committee, Prof. George H. Cook, of New Brunswick, J. B. Roe, of Woodbury, and William R. Lippincott, of Fellowship.

Mr. Baker : Mr. Roe begs to decline the nomination as a member of the Executive Committee, as he is a member of the Senate, and cannot fill the position with satisfaction to himself. He wishes me to nominate the present incumbent, Mr. Bacon, of Cumberland.

Mr. Bacon : I move to concur in the nominations made by the Nominating Committee, and to leave Dr. Roe as he is. He has served one year on the Board to this time, and should be continued, as he has been a very efficient member. I hope you will retain him on the committee. I have served your committee, I think, the limit of my time, and have endeavored to serve you faithfully.

I hope the nominations as made by the committee will prevail.

Mr. Pancoast : I do not suppose Mr. Roe would want his name withdrawn, unless he had reasons for doing so, and it would show the greater courtesy for us to grant his request.

On motion, Mr. Roe's declination was accepted, and Morris Bacon, of Greenwich, substituted in his stead ; then, on motion, the report of the Nominating Committee, as amended, was adopted.

On motion, adjourned until 2 o'clock P. M.

AFTERNOON SESSION.

The Chair: We will call for the report of the Committee on Roads. Is Dr. Ward present?

Dr. Ward: In behalf of the Committee on Roads I will first make an explanation.

This committee was appointed last winter, with the Hon. Secretary of State, Mr. Kelsey, as chairman. Sometime after the State Board adjourned, during the session of the Legislature, I wrote him and asked him to call that committee together. He said that at that time he was too busy. The duties pertaining to his business were such that we would have to wait until after the adjournment of the Legislature. After a sufficient length of time I wrote him again, asking him to call this committee together. I received no reply to this communication and I did not feel at liberty to take any further action, as Mr. Kelsey went to Europe. About the latter part of October, or the first of November, President Burrough called the committee together, and they responded and organized.

We have held several meetings, and went over the old road laws section by section, and formulated a draft of law covering mainly the working of the roads. We have placed the full power and control of the roads and road moneys in the hands of the town committee. Owing to the short time, and other hindrances, we have not been able to do more up to this date. The bill we report is as follows:

A further supplement to an act, entitled "An act concerning roads" [Revision], approved April sixteenth, one thousand eight hundred and forty-six.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That the township committee of each township shall have the full supervision, management and control of the making and repairing of all roads in said township, and may make and repair the same by hire or by contract, and for that purpose may annually appoint a competent person or persons to superintend the making and repairing of all roads, and who shall hold his position at the pleasure of the town committee.

2. And be it enacted, That the township committee of each township may procure machinery, implements, stone, gravel and other material, and hire laborers and teams necessary and proper for making and repairing all roads aforesaid, and to make and repair the same; and may have the power to purchase gravel pits and stone quarries and take title to the same in the name of the township.

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3. And be it enacted, That it shall and may be lawful for the said township committee, at any time after the road tax in any year shall be ordered to be assessed and before the same is collected, to pledge the credit of the township for a loan or loans of any sum of money not exceeding in all four-fifths of so much of such tax as shall be assessed, to be by them expended in paying the expense of such making and repairing of the roads of said township for the current year, and the road tax for that year, when collected, shall first be applied to repay such loan, and so much thereof as shall not be needed for such payment shall be used by said township committee in paying the expenses of making and repairing the roads as aforesaid.

4. And be it enacted, That hereafter all taxes assessed for making and repairing roads, shall be paid in money and collected by the collector of said township at the same time and in the same manner as other taxes are collected in said township for other township and county purposes, and the taxes so collected to be immediately paid over to the township treasurer, who shall disburse the same on warrants drawn by the township committee.

5. And be it enacted, That it shall be the duty of the township committee of each township to estimate the amount of money they deem advisable to expend for making and repairing the public roads for their respective townships for the ensuing year, and to publish the same at the same time and in like manner as the financial statement of the township is now required to be published.

6. And be it enacted, That it shall not be lawful for any township to raise by tax, for road purposes in any year, a greater amount than is estimated and published by the township committee in the annual statement of that year, except as hereinafter provided for.

7. And be it enacted, That whenever the inhabitants of any township owning lands along any section of road therein, or other persons, shall contribute a certain amount of money for the improvement of said road, they shall make such proposition to the town committee in writing, who shall publish the same in their next annual statement, and the said committee shall submit such proposition to the legal voters of such township, and the said voters shall vote upon the same, and if a majority of the voters shall vote an equal or less amount, then such amount so voted shall be levied and assessed in addition to the annual road tax, in the same manner as other township taxes are assessed and collected; but if the property-owners along any section in any township shall contribute the whole amount necessary in making or repairing said road, then they shall have the control of the expenditure of the same, with the approval of the township committee.

8. And be it enacted, That no person or persons, except the owner or the owners thereof shall cut down, wilfully injure or destroy any fruit, shade or ornamental trees, which may have been or shall be planted or set by the owner or possessor of any lands adjoining any public highway in this state, and which shall not be planted more than seven feet out from the line of the road towards the centre of the same, unless the township committee of the township in which the said trees are planted, or a majority of them, shall first order the trimming, cutting down or destroying the same; and any person or persons who shall offend against the provisions of this act shall forfeit and pay the sum of fifty dollars for each and every offense, to be recovered in an action of debt, with costs, by any person who may prosecute for the same within six months after such offense shall have been committed; provided, that this act shall not prevent

the clearing out of any highways to the full width where they pass through any woods or forest.

9. And be it enacted, That no law of this state for laying out or opening public or private roads shall be so construed as to permit any person or persons whatever to lay out any public or private roads through or upon any lands belonging to the state, unless the consent of the governor, treasurer and attorney-general of the state, or a majority of them, be first obtained in writing ; and if any person shall hereafter open any public highway or public road through or upon any of the aforesaid lands, he, she or they shall be deemed guilty of a high misdemeanor, and shall, each and every of them so offending, forfeit and pay the sum of one thousand dollars, to be recovered in an action of debt, to be prosecuted by the treasurer of the state for the use of the state.

10. And be it enacted, That it shall be lawful for the township committee to use a portion of the money raised for making and repairing roads, in constructing a sidewalk or sidewalks along the public roads in said township, providing that the width of any sidewalk shall not exceed one-fifth of the width of the road, where the road is not less than three rods wide ; where the road is less than three rods wide, the township committee shall have power to determine the width of the sidewalks.

11. And be it enacted, That it shall be lawful for any person or persons owning lands adjoining a public road or highway in any township, to construct sidewalks on said highway along the line of said land.

12. And be it enacted, That when a sidewalk shall have been constructed as aforesaid, every person who shall ride or drive a horse, team, bicycle or other vehicle thereon, except for the purpose of crossing the same when necessary so to do, shall forfeit and pay the sum of five dollars to the use of the township, to be sued for and recovered by any person who shall sue for the same.

13. And be it enacted, That all acts and parts of acts, both special and general, inconsistent with this act, are hereby repealed, and this act shall take effect immediately.

Dr Ward : I am sorry we cannot give you a better report, but will have to leave the matter in your hands.

Mr. Nicholson : I move the adoption of the report of this committee.

Mr. Ege : I would amend by having that committee continued until next year, to report again to this Board.

The amendment is accepted by Mr. Nicholson and the motion, as amended, was agreed to.

Mr. Baldwin : I want to ask the Road Committee with reference to the tax payer electing to work out his tax ?

Dr. Ward : This matter is left in the hands of the Township Committee. Unquestionably, you have your representatives from each section of the township, and they understand the wants of their constituents, and they will look after your interests.

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Mr. Cook: I hope all action on this road business will not be delayed for another year.

Mr. Ward: The committee hope to have this bill come before the present Legislature. We want to wipe out the road overseer business before the spring election of the overseers. I speak not only of my own district, but of other districts from which I have heard, and there is a general desire to do away with the road overseers.

The committee are very much in earnest about this matter, and will leave nothing undone to have the bill become a law at this session of the Legislature, if possible.

The committee will receive any suggestions at this time, and will receive them very acceptably and kindly.

Mr. Dye: I think it would be desirable for members to express their views at this time for the information of the committee.

Various suggestions were made, and a general expression of views, embracing the features of last year's discussion, was then had, and was participated in by Messrs. Collins, Green, Cook, Rogers, Merritt, Lewis, Anderson and others.

Mr. Baker: I have a resolution to offer, if in order. It is as follows:

*"Resolved, That inasmuch as other interests are being provided for in the State Capitol, that we, as the State Board of Agriculture, again renew our petition to the Building Commission for a room in the State buildings for the use of said State Board of Agriculture, and request the Executive Committee to present our request."*

On motion, the resolution was adopted.

Mr. Ege: I move that the thanks of the Board be presented to Vice Chancellor Bird for the grant of the use of his room.

So ordered, unanimously.

The Chair: I will announce the three members of the Committee on Legislation as follows: Hon. Theodore Budd, of Burlington; Dr. Wm. H. Coombs, of Monmouth; Ralph Ege, of Mercer.

Mr. Ege: I notice that we have overlooked one feature of our programme, and that is the institute work in the different counties. I would like to hear this matter generally discussed. I have been interested in the work of the county boards since their

organization, and as many of you know, I was President of the Mercer County Board for the first five years of its existence. During that time we tried to devise work for the board that would be for the well being of the farmers of the county, and for their advancement in agriculture. I think the boards are doing a good work, and anything that can be done to advance our farmers and teach them how to be more progressive in agriculture is certainly a great work we should all encourage. Of course, we may in our county boards discuss matters of general interest in the State. Our county boards and local organizations are the foundations of this State Board, and without the county boards the State Board would lack very much in interest.

With all the improvements that have been made, and the revelations of science and scientific agriculture, it is imperative that farmers should meet together and discuss their different methods and the different fertilizers to be used, and the relations of fertilizers to different soils, in order that we may know which is best adapted to our own peculiar soils and localities, and anything and everything that can further our interests will be of advantage to us.

Any suggestions we may be able to offer to farmers throughout the State we can make to our county boards, and this will make them far more effective, and we can the better reach the great mass of our farmers. Come together and talk over plans for future work, and talk over experiences of the past. This is what we need. We can learn more from the experiences and from the failures of our friends than we can perhaps from other sources. Through failure we learn. What we want is for the farmers to come together and discuss their failures.

With us we look forward with a great deal of pleasure and interest to these discussions in our county board. We secure good lecturers on scientific agriculture, on entomology, and on the different branches of science, in their relations to agriculture, in order that we may learn more about our business. We certainly need such knowledge. We need to be more progressive and more scientific in our profession, and in everything that will assist us we should take a deeper interest, for such interest will be of great benefit to the farmers of the State.



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Mr. Dye : The Gloucester County Board requests that there be one held in that county, under the auspices of the Executive Committee of the State Board. It occurred to me that the Executive Committee might arrange to hold at least one meeting in each of the organized counties during the year if desired. By doing so, we might infuse more interest, and secure greater good in our local boards.

Mr. Colwell : I agree entirely with Mr. Ege. I am rather unfortunately situated, being located some eighteen miles from our county board, or I would like to avail myself of the privileges of the board. I occasionally attend the Mercer County Board and derive a great deal of benefit and a great deal of pleasure from so doing.

I have not heard the question of the diseases of swine, which have occasioned so serious a loss to many of our farmers, brought up here, as it was before the Mercer County Board. I think these things could be discussed in such a way as to be of benefit to all. While I feel it is good to have all these papers read here, I think there are other lessons which practical farmers could give each other if the sessions of the Board were confined exclusively to the discussion of various questions by its members. We will not be any better prepared to make farming a financial success or to keep our children on the farm from listening to these many scientific papers. We want more practical talk amongst the farmers. We come here and sit around like clams, and take in everything but don't give out anything (laughter). There is not a farmer here but has some ideas that will do us good, if they are expressed. As a class farmers are not in the habit of talking, but we should encourage them to do so as much as possible in our meetings. If we would make our County or State Boards a success it rests with the farmers.

Mr. J. S. Ward : I notice, in reading agricultural papers, that during this present winter in New York State they have had some very successful institute meetings. In some of the larger and more successful gatherings of farmers the farmers' families have also attended and taken part in the proceedings.

In order to get this matter properly before this State Board, I move that there be held in each county of this State, during the coming year, an institute meeting, under the auspices of the Ex-



ecutive Committee of the State Board, and try and see if we cannot get up some additional interest in the different counties. I do not think it should be confined to the male members alone, but members of their families should also be entitled, and have some of the space on the programme, so that the ladies of the family—the wives, the mothers and the sisters—can take an interest in the subject and join in the discussion. If this is done you will interest the ladies as well as the men; under our present arrangements, the ladies are pushed outside, and can have but little interest in the meeting.

Mr. Forsythe: It seems to me all of us should be opposed to this resolution just offered by the gentleman, to have women mixed up with this thing. (Laughter.) It never has worked, and it never will work. (Laughter.) It has often been tried, without success. God Almighty tried that on the first farm, a great many years ago, and it turned out very unsatisfactorily. (Laughter.) You will find, if you attempt the same thing, the result will be the same in the State Board. (Laughter.)

Mr. Meech: On the line of Dr. Ward's resolution and remarks, I want to say that I have, for a number of years, had the pleasure of attending meetings of the Connecticut State Board, and they have settled upon it as a regular thing to have a paper or address from some lady at the last session of their annual meeting; and what he spoke about as being so desirable, this results in the families of the farmers coming there and staying through the meeting, and it adds very largely indeed to the interest of the meeting to have the families of these men come with them, thus showing the interest of the whole family in all matters that pertain to the farm.

I recollect the exceeding interest shown in their annual meeting when the sister of Harriet Beecher Stowe presented a paper on Sanitation and the Farm. They were so enthused with it that a vote of thanks was offered her, and by a rising vote. Her husband was asked to offer the remarks by which she was introduced.

A distinguished lady presented a paper there last month. I thought of it yesterday, and if you could see the ladies of the members at the meetings, as I have seen them in Connecticut, it

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would add very much, no doubt, to the interest of the sessions of our State Board.

They think it is worth their while to have some lady present a paper on some subject, as their share of interest in the great work they are seeking to accomplish for the State.

Mr. Ward: I endorse everything that Mr. Meech says about the ladies. (Laughter.) At the meeting he speaks of I was present. The three days' session of that society was profitable and instructive, and I only regret since that the meeting of the Connecticut State Society came at the same time as the State Horticultural Society, so I could not attend. I can heartily endorse everything Mr. Meech has said. The presence of the ladies with us at our meetings would awaken a great deal of interest.

Mr. A. Southwaite: We have heard a great deal of scientific agriculture at this session of the State Board, and I have never heard so much complaint before as at this session. These complaints come from the representatives of almost every county in the State, and are made in answer to the question (26) sent out by the Executive Committee, "Are farmers, as a class, satisfied, or do they complain of their condition? If complaining, what are some of the complaints made?"

Allusion was made, just before we adjourned, to the dilapidated condition of the farmer's pocketbook. Is scientific agriculture a remedy for this condition of the farmer? We have heard about scientific agriculture, and about increased fertility, to increase the products of our soil. This has been going on for years, but the farmer is still growing poorer. Is that the remedy? I say it is not. We hardly touch the subject that will give the farmers of the State of New Jersey, and of the United States, a much needed relief. One gentleman said this morning that nothing could be expected from politics to help the pocket book, and that is the only thing. By legislation we have been robbed of everything.

The wealth of every nation is measured by its agricultural products, and no nation is ahead of the United States in these, yet we continually grow poorer and poorer. This is the effect, but what is the cause? Why not undertake to get down to the bottom of the trouble and try to advise some plan by which some of the wealth can stick to the farmer instead of making

millionaires of one class and paupers and tramps on the other hand. It is necessary to grapple with these things with all our strength. Some of the members have been afraid of the politics presented at this and other meetings. I am as much opposed to partisan politics as any one, and my influence will always be opposed to its presentation before these meetings. What is meant by partisan politics? It means corruption, bribery and everything devilish and ornery. (Laughter.)

Politics—pure politics, is the science of government, and that is something we should all understand. The science of government is politics, and you should understand politics to know how to vote intelligently.

The State of New York has been in the way for years of electing forty or fifty farmers to the State Legislature. This last time, of fifteen elected, three of them were parlor farmers, who have a few flower pots in their windows (laughter), and yet at this very last election in the State of New York, the farmers of that State polled the majority of the votes cast. If this is true—I read this in the papers and I am only telling you what I read and heard—what I say is true, and what I say I heard I believe to be true—I say if this is true of the farmers of the State of New York, it is but little wonder that they may complain of the result. If they had voted together what would have been the result? They would have controlled the New York Legislature. They would have had a majority of Congressmen in Washington, looking after their interests there, and they would have had a majority in the State Legislature. Further, they would have elected a United States Senator to go down to Washington to look after their agricultural interests. If farmers would do this, they would help themselves, but if they will not, they should not make complaint about the times until they get to be intelligent enough to look after their own interests and let other people look after theirs. (Applause.) Until they can do this they will grow poorer and poorer and scientific agriculture and high culture will not help them. This is the cause in the past, and unless you do something in your own interest, it will be so in the future. Why will you look after the interests of manufacturers, and after the interests of everybody but yourselves? They look out for their own interest, and they are not so extensive a class as yours; then

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let the farmers stick together and look after their own interest, and they will be better off. (Applause.)

Mr. Wm. R. Ward, Chairman : This is a good time to ventilate this matter, and I would ask what suggestions the last speaker can offer.

The suggestion I offer is, for farmers to make a study of politics—the science of government. Instead of voting in the interests of politicians, and paying them to look after our interest, select representative men from among the farmers and send them instead of the professional politician. (Applause.) I have seen men here in this meeting since I have been here, whom I would be willing to trust in any position in the government, and they are men who can do the work more intelligently than any of the men now in the government. When we make such selections, we will secure what we want.

If this is not a good suggestion, I want some one to refute it. How did we get along when we had farmers in our Legislature? We had one from down in Crosswicks who brought his dinner with him to Trenton, and he sat on Peter Katzenbach's steps and ate it. (Laughter.) He did not sell himself soul and body. He did not sell himself to the corporations in order to live the high life that politicians are living now. I think I may safely say that if the farmers send such men as these to the Legislature they will have nothing to complain of, and they may expect a return for their work in accordance with the amount of brain and capital invested in it.

Mr. Black : There is one way to carry out the suggestions made in regard to legislation, and that is that each County Board should have a Legislative Committee, to watch the proceedings of the Legislature, and also to look after the public documents, and see that they are applied as well as passed. I think last season there was a complaint about the Boards of Freeholders. I refer to the report of the Comptroller of the Currency. In some of the lower counties, everything was itemized, and we could see how the money was expended. In other counties, everything was lumped, and you could not tell anything about it. Such committees could look after these matters, and their work would be a benefit to farmers.

Mr. Crane : In our county we are trying to hold institute

meetings, and propose to hold one next week. We will be glad to have any gentleman here present come and see us. We print a program for the day, because we find by doing so it is encouraging them to come; we send out these programs, and when they are received many of them come and join. At our meetings we endeavor to discuss practical questions, the question for discussion at the next meeting being, in the morning, "Dairy Farming," and in the afternoon, "The Atmosphere of the Farmers' Home." We divided it into sanitary, moral, social and the æsthetic, and it is suggested we appoint a lady competent to prepare a paper on the æsthetic. We invited at this meeting some gentlemen from a distance, those who were competent to speak, and at the next meeting we will have one editor of the *American Agriculturist*, Mr. Sears, of the State Farm, Mr. West, of Chester county, and the Secretary of this State Board.

Mr. Voorhees: It seems to me, from what we have heard, it would be a good idea to throw out this suggestion to the Executive Committee: That, at the next meeting, they invite a number of the farmers to read papers on their ideas of what can be done. Some good might come of that. A good many farmers have most excellent ideas, and perhaps they might suggest something that would work out satisfactorily. Science will not do for us what we most want. Science may somewhat improve your condition, but I doubt very much if it will do you as much good as something more practical. There is no science that will make your farms so productive that you will prosper under the present arrangement of things.

As a proof of this, many of you will remember that a few years ago a large capitalist bought a farm in New York State—I do not remember the name, but I think it was the Houghton or the Ogden farm, but Col. Waring had charge of it. Of course he had an endless amount of money, and he undertook to show that farming could be made to pay. He wanted to show what could be done, and told Col. Waring to spend all the money he chose for improved machinery and fertilizers, to produce crops to show how it could be made to pay. The understanding was at the end of ten years a careful account would be taken to show the scheme had prospered. At the end of ten years it was sold, and it was found that there was a heavy loss in the operation of

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the farm—between ten and twenty thousand dollars, I think. I do not say it proved altogether that scientific farming was not a success, but here is a problem science will never work out for us. I think this gentleman aimed in the right direction. If the farmers will do certain things they will increase their prosperity. If they work in their own interest, and want the Legislature to pass a bill in their favor, I say they can get it. Why not? Just as soon as the farmers take that step they improve their condition. If there is a small body of men in any one interest, and they want legislation, they get it. If the farmers will do the same thing they can also have legislation passed in their interest. That is my belief.

Mr. Forsythe: I agree very fully with the remarks of the gentleman who spoke in regard to scientific agriculture. I do not think we obtain all the benefits and the advantages from scientific agriculture that are sometimes claimed. There is much very interesting matter contained in the reports of county boards from which we do not derive the advantage that we should. This matter is brought here, and is of a very practical character, and should be thoroughly discussed by the State Board.

Mr. Pancoast: I unite with what Mr. Forsythe has said to this extent, that although we need some of these essays, when the sessions are so crowded as to shut out discussion of matters that come up here, of practical importance, we have too much of it. Discussions are too short all the time.

Pending the discussion of Dr. Ward's motion the following resolution was presented:

*Resolved*, That the county boards of the several counties may hold Farmers' Institutes under the auspices of the Executive Committee of the State Board.

On motion the resolution was adopted.

Mr. Crane: I have a resolution I would like to offer at this time:

*Resolved*, That a vote of thanks be extended to the Executive Committee of the New Jersey State Board of Agriculture for the interesting program by them prepared for this meeting.

On motion the resolution was adopted.

The Chair: Col. Pearson, of Vineland, has a paper on the prevention of grape disease, which he will read at this time.

[See Paper.]

On motion a vote of thanks was given Mr. Pearson for the valuable paper read by him.

Vice President Ward: I trust we will leave this afternoon with a desire to continue the prosecution of the work in which we are all engaged, the vocation which we have selected, and in which we have shown, during this and previous sessions, a great interest.

I trust there have been lessons received by us all that will encourage and aid us in the prosecution of this work, better in the future than in the past.

I thank you for the courtesy you have shown me during this day while presiding over your meeting. It is a new occupation for me, and wherein I have failed in omissions or commissions, I hope you will overlook and excuse me.

Trusting that some of us may begin the coming year with new and fresh ideas, and that they may be brought here to be presented to one another for the encouragement in our work, and trusting that that Providence who has smiled upon us in the past will continue with us and abide by us during this year on which we have entered, on behalf of the Executive Committee, I think I am safe in saying we will endeavor to present to you the coming year a programme that will be satisfactory, and we ask of you that you will aid us in this work.

It is very easy to attend an afternoon like this, if the work is all prepared for you, but there is hard work to be done previous to a meeting of this kind, and the Executive Committee look to the county boards, and look to you, gentlemen, to aid us in this matter.

I thank you again for your kindness, and trust that what I have said and done will be acceptable.

On motion, the State Board adjourned *sine die*.

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## EXECUTIVE COMMITTEE'S REPORT.

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## EXECUTIVE COMMITTEE'S REPORT.

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The condition of those engaged in agricultural pursuits is much the same this year as it was last. But little, if any, advance over prices of last year has been realized by the farmer for his produce, and little reduction in the cost of labor, fertilizers and other necessities to his calling. Although cast down, it is gratifying to note he is not totally discouraged, and there is a determination in many directions to look after his own interests more than formerly, with a purpose of securing better results to himself and family.

Noticeable in this direction is the increasing interest shown in farmers' organizations. The members of County Boards of Agriculture are beginning to realize more fully than heretofore the benefits to be secured through these when rightly managed. Meetings of more than usual interest have been held during the year in the organized counties. A number of these have been attended by some member of the Executive Committee. One new organization, that of Warren county, comes this year, knocking for admission to the State Board, and in your name we congratulate and welcome their delegates here, and bespeak for them a prosperous work for their County Board.

The State Grange and the State Horticultural Society have each held their annual meeting with marked encouragement and improvement. Both these and the County Boards are looking to the State Board to secure, through their representatives, needed legislation in the farmers' behalf as well as the consideration of the more general and scientific questions connected with our calling and our rights, as compared with those engaged in other pursuits. As an evidence of the increased usefulness of

and interest in the work of the Board, we name the hitherto unprecedented demand for the Annual Report, about six thousand copies of which have been distributed, and the demand still continues. The mailing of so many heavy books makes a serious inroad into our appropriation, and it is very desirable that our county boards secure for our Secretary the names of such persons in each county as desire and are entitled to receive the report, in order that both report and postage be not lost by sending to those who have no interest in our work.

The various committees appointed to look after certain matters entrusted to them, have, it is believed, as far as possible, attended to their duties. Their reports will be presented during the sessions.

As the further developments of some plan looking to the formation of a National Board of Agriculture and the securing of a room in the Capitol for the office, records and meetings of the Board were entrusted to the Executive Committee, and as the committee appointed to prepare a new road law for the State was to report to your Executive Committee also, we would, in this connection, state : We have, through our Secretary, corresponded with the officers of the several State and Territorial Boards of Agriculture.

STATE OF NEW JERSEY,  
STATE BOARD OF AGRICULTURE,  
SECRETARY'S OFFICE, TRENTON, N. J., Aug. 30th, 1888.

DEAR SIR :—The Executive Committee of the New Jersey State Board of Agriculture hereby request that your Board join us in requesting Hon. Norman J. Coleman, U. S. Commissioner of Agriculture, to issue a call for delegates from the different State Boards of Agriculture, such delegates to be appointed by the Executive Committees of said Boards, to meet at Washington at such time and place as the Commissioner may designate—providing the mileage of the delegates be paid by the Government—to take such action as may be necessary to organize a United States Board of Agriculture.

If this action meets with your approval, please sign this call,

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as indicated below, and return, and we will lay the matter before the Commissioner.

E. BURROUGH,  
President.

For the Executive Committee.

FRANKLIN DYE, Secretary.

The above call has the approval of the Executive Committee of the..... State Board of Agriculture.

Attest : Secretary. President.

STATE OF NEW JERSEY,  
STATE BOARD OF AGRICULTURE.  
SECRETARY'S OFFICE, TRENTON, N. J., August 30th, 1888.

GENTLEMEN :—Some correspondence on this subject was had with other State Boards of Agriculture by a Committee of this Board last year.

The following are some of the reasons advanced for this action :  
Such a National Board of Agriculture, if organized, would

1. Afford a cabinet, so to speak, of the official representatives of agriculture from the different States to the United States Commissioner of Agriculture.

2. It would constitute a United States Agricultural Congress, before which matters of national interest to agriculturists could be presented and discussed as occasion might require.

3. It would be a very effective agency in securing needed Congressional legislation in favor of agricultural interests, as also a hindrance to legislation adverse to those interests.

4. It would unify this national industry—by such a national organization—and generally it would be of advantage in various ways, we believe, as will appear from time to time if organized.

While this call is issued to the heads of State Boards of Agriculture only, it is left for the meeting, if called, to determine as to membership of heads of Agricultural Experiment Stations, State Granges, &c.

Respectfully yours,  
FRANKLIN DYE,  
Secretary.

To this appeal we have, up to date, received favorable responses from fourteen States, some of them endorsing the movement in strong terms, offering to co-operate with us in securing such a National organization. Hoping to have the Commissioner of Agriculture, the Hon. N. J. Coleman, present with us at this meeting, and here to lay the subject before him, we did not send a delegate to Washington on this errand. Failing in this, a delegate or delegates will have to go to Washington on this errand.

If, as seems to be the general sentiment throughout the country, the seed division had as well be curtailed or abolished, the money expended in this direction would go far towards, if it would not entirely cover, the expense of the National Board. It might be well for this Board, if it sees fit, to formulate a resolution in this direction.

As to the headquarters in the Capitol, the Committee has kept up a sort of running fire on the Building Commission, and if your interests as the producing class of the State are not honored in this direction, it will not be from any lack of endeavor on the part of your Executive Committee.

The Committee on Revision of Road Laws was not called together as early in the year as the importance of their work demanded. They have held a number of meetings, devoting their earnest attention to this intricate and difficult subject. They have reported to the Executive Committee as follows:

"The several matters of legislation asked for and referred to this committee last year were duly presented to the Legislature, and, in most instances, the bills asked for have become laws. Notably, the law to prevent forest fires in townships.

The resolution of the Board in relation to securing reduced postage rates on fourth-class matter, especially plants, seed, scions, &c., was promptly forwarded to our representatives at Washington, and met the approval of the seed trade organizations of the country, who co-operated with us, and through these combined efforts we are enabled to report that the reduction asked for has become a law.

The committees appointed on revision of tax laws, as to their bearing on real estate, especially on Agricultural College and Experiment Station and on weights and measures, will also report during the sessions of the Board."

## EXECUTIVE COMMITTEE'S REPORT.

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[6]The Executive Committee, in the prosecution of your work, have held seven meetings during the year. Important matters considered were, the material for the annual report, including the Entomological addition, and the distribution of the same ; the National Board ; our headquarters ; correspondence with and the encouragement to your committees and to the county boards ; annual question circular to county secretaries ; appropriations to the State Horticultural Society, and the several county boards ; subjects to be considered at the annual meeting, and the speakers to address you.

His Excellency, Governor Green, having requested the name of a suitable person to represent this State at the American Forestry Congress, held at Atlanta, Ga., the name of Editor William A. Stiles, of Sussex, was recommended as delegate. His report will be heard during your sessions.

In the preparation of the order of business, the committee have endeavored to make our sessions even more practical than last year.

As we have had, at previous sessions, protracted discussions on the milk question, we have given more prominence in this to chemistry, as it is related to crop growing, feeds and feeding, and in the discussion of these subjects it is believed much light will be gained as to the easiest and most economical methods of carrying our dairy cattle especially through from year to year, at a fair remuneration to milk producers.

Also the growing and important matter of Agricultural Entomology and Experiment Station work, and the study of plant life in our schools, so that your whole time will be occupied in the consideration of the various subjects presented, as opened by the speakers announced, as you may deem important.

The work of the Board is widening and assuming the importance the great industry represented by it demands, and an increase in the appropriation to the general uses of the board is absolutely essential. No county of the sixteen organized has yet received the full amount allowed by law, where good work is done, and if every county in the State were organized, the amount to each would be but very little.

Nor can the Executive Committee assume any expense in the way of travelling expenses of delegates to other State Boards and

organizations where we ought to be represented. His Excellency, Governor Green, in a recent letter to President Burrough on this subject, says : " I am very sorry to say that there has been no provision made for defraying the expenses of gentlemen who may be selected as delegates to the meetings of these various associations, and the expenses must necessarily be thrown upon them individually. Of course, this is a great drawback to a proper representation of the State at these various meetings, but there is, at present, no help for it."

A suitable office in the Capitol is also imperatively necessary. Our State is very far behind others in this direction.

Extracts from our county board reports have been made and printed, to obviate the necessity of reading the whole report here. Topics for discussion recommended in these can be considered as time permits during these sessions.

In the presentation of new business members are requested to introduce the same by a regular motion, as provided in the program, and to reduce resolutions to writing.

We congratulate the New Jersey State Board of Agriculture on the progress it has made in the work for which it was organized. It is for you to say what its character shall be in the next and succeeding years.

Your committee believe that no member of this organization will willingly allow it to stop in the important work now so well begun.

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ADDRESS  
OF  
**Hon. Edward Burrough,**  
PRESIDENT OF THE  
NEW JERSEY STATE BOARD OF AGRICULTURE  
DELIVERED AT THE  
Sixteenth Annual Session, at Trenton,  
JANUARY 30th, 1888.

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## PRESIDENT'S ADDRESS.

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*Gentlemen of the State Board of Agriculture :*

The year that has passed since our last meeting has been in many respects a remarkable one. Climatic influences, combined with a fertile soil and intelligent cultivation, have induced nature to respond liberally to the work of the husbandman, and the graineries of the nation are filled to overflowing with the products of the soil, and business generally remains in a prosperous condition.

Your presence at this meeting of the Board is an assurance that you appreciate the advantages to be gained, and the necessity that exists for a more intimate relationship and unity of action in advancing the agricultural interests of the State, in all its branches. The labors of the Board during the past year have been well set forth in the report of the executive committee, and it is not my purpose to repeat the same in my remarks. Last year I directed your attention to the need of suitable headquarters, wherein to transact the business and keep the records of the Board. The necessity still exists, and is more urgently needed, as the necessary work demands more care, and the labor required to advance the interests of the board is yearly increasing. It is to be regretted that we have but meagre statistical returns of the agricultural productions of our State ; the means at the command of the Board are not adequate to meet the expense of collecting the same, and the Bureau of Statistics and Labor does not recognize this branch of industry. If it is your wish that such statistics should be collected, we must either appeal to the Agricultural College and Experiment Station to collect them, or the Legislature should grant sufficient funds to enable the Board to employ the necessary force to do the work.

ENTOMOLOGY.

I am pleased to announce that my recommendation last year and the efforts put forth by the Board to impart information direct to the farmer in a brief, plain and concise manner, by electrotypes, and short descriptions of the most destructive of the insects that now attack the principal crops and fruits grown in the State, have resulted in the appointment of a State Entomologist at the Experiment Station, and with whom I trust you will become acquainted during the present session, and to whom you should apply for information concerning any troublesome insects that infest your locality. You should also forward to him specimens, and such information as is obtainable concerning the work of any new insect that may make its appearance.

DELEGATES TO AGRICULTURAL MEETINGS.

I desire to again direct your attention to the advantage of sending delegates to agricultural meetings in our neighboring States. The subject has been alluded to by the Executive Committee. My views upon the subject are unchanged, and fully set forth in a previous address as follows :

“The sending of delegates to such meetings of Agricultural Associations in the neighboring States as the Executive Committee should consider of sufficient importance to warrant the outlay necessary for the actual travelling and hotel expenses of such delegates. There should be no compensation allowed for time or services.

“The sending of such representatives might be confined to such gatherings as are recognized by State or National authority. The delegates to these meetings should be required to note carefully the topics discussed, and, also, any new items of interest, as well as matters introduced in regard to farm implements or machinery, and, in all cases, to submit a written report to the Executive Committee, who, in turn, can embody such portions of these reports and investigations, in their annual report to this Board, as they may consider of sufficient importance and act upon any subjects demanding their immediate attention.”

The subject of a National Board of Agriculture has made

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satisfactory progress, but has not been brought to any definite conclusion, principally because we were in hopes of conferring personally with the United States Commissioner on that subject at this meeting. And I regret that we are to be disappointed in this respect.

### DEVELOPMENTS OF AGRICULTURE.

Agriculture in New Jersey may truly be said to have experienced several marked developments within the memory of many now in attendance at this meeting. It is not my intention to contrast the primitive agriculture of the earlier settlers of the country with that of to-day, or draw upon your imagination as to the means and methods then employed. At the beginning of the present century a farm in New Jersey was hardly worth owning unless it contained a fair portion of meadow land, from which the forage and pasture could be obtained for the live stock of the farm. So great was the value of these lands, that there is scarcely a stream in the State that has not been banked to prevent the overflow of the meadows and marsh lands bordering thereon. To such an extent was this carried on, that the Legislature was frequently called upon to charter companies for the redemption and preservation of meadows bordering on certain streams, and the capital and labor expended amounted to many thousands of dollars. In order to show the exigencies in which our ancestors were placed, I have prepared a brief synopsis of the laws enacted by the Legislature to redeem and protect the lands bordering on the streams of the State, beginning with the act of May 12, 1697, and ending with the general act of December 23d, 1783, during which period seventy-three charters were granted by the Legislature to meadow and banking companies in almost every county of the State, a synopsis of which, including the date of the organization, will be found in our report and be of interest to those whose lands border the streams mentioned.

The greatest enemies the companies had to contend with were the muskrats, whose industry, frequently, in a few hours, destroyed the labor of months, and rendered valueless hundreds of acres of good meadow grass. So persistent was the work of these rodents, and so difficult to overcome, that many experiments were tried and much ingenuity expended, in order to circumvent their

work, but probably the most expensive and successful was that employed on the Newark meadows, where boiler iron plates were used in the embankments, and the success of this expenditure is still visible in the hundreds of tons of hay yearly gathered from the lands thus redeemed. During this period, when meadow hay held full sway as the farmers' main dependence, the artificial grasses, as they were then termed, were but little known or trusted. An acre of clover and a patch of timothy was about the usual amount found upon the farms. Gradually their value became appreciated, and when the horse hay rake made its advent in the harvest field, the rapidity with which these wonderful grasses supplemented the natural meadow grasses was astonishing, and before the mowing machine came they had become staple crops, and maintain their par excellence to the present time. The development of these grasses soon depreciated the value of the meadow lands; banking companies soon found it unnecessary to continue the labor of banking and damming the streams with their continued expensive labors, and what were once considered valuable meadow lands were abandoned to the tides, and are fast becoming a morass, and malaria breeding district. Many of the charters mentioned are still in existence and could be made available if desired. At the time the meadow grass held full sway farmers ate rye bread, and the growth of this cereal far exceeded the growth of wheat. As timothy and clover took the place of natural grasses, so wheat superseded rye, and the cradle supplanted the sickle, which in turn was supplanted by the reaping machine and self-binding harvesters, and New Jersey soon became a grain and grass producing State. These changes seem to have been the first marked development of the agriculture of the State. This condition appeared to continue profitable and satisfactory until about the year 1861, when the demand for vegetables to feed the great army then in the field to suppress the Rebellion, together with other exigencies incident to the war period, created an extraordinary demand for farm products, the like of which was before unknown. The farmer had a good home market for his produce, which stimulated increased production; lands before considered only suitable for grain and grass were found to be excellent vegetable

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gardens, the crops from which were abundant and soon rendered wholesale markets for such products a necessity in all our large cities, from which has sprung up an army of middle men, standing between the producer and the retailer and consumer, many of whom are necessary and useful agents; far too many, however, are nothing but leeches that suck the profits from the sturdy producer.

This era of good prices and healthy home markets developed the greatest advance in the agriculture of the country ever known, and farmers enjoyed a season of prosperity, the results of which were soon visible in the improvement of their farms and homes. A better class of farm buildings supplemented the uncomfortable, old and inconvenient buildings of a former period; low lands were underdrained, commercial and other fertilizers than those made upon the farm were applied with marked effect, and every method resorted to to increase the fertility of the land. The results fully justified the energy and labor employed. With the increased demand for vegetables came an equally strong demand for small fruits, which opened another branch of agriculture, heretofore but little known, and developed the adaptability of the soil for horticultural and pomological pursuits, the receipts from which were equally profitable, and in their development New Jersey suddenly changed from a grain and grass producing State to probably the greatest vegetable and small fruit producing State in the Union, and still retained a fair rank for grasses and cereal products. This I consider the second and greatest development of the agriculture of the State.

The close of the war re-opened the avenues of trade, and the constant increase in transportation has so extended the fields from which our markets are supplied that the growing of many of these products is no longer profitable and many farms are again devoted to grain and grass, which, in turn, is developing the dairy industry to such an extent that New Jersey will soon be found in the catalogue of the Dairy States of the country. Yet, notwithstanding our nearness to the great markets of the country, and the adaptability of our farms and soil to the cultivation of almost any crop, there has been a steady but marked decline in the agricultural industry and prosperity until it seems hardly possible for a further depression. There is a proverbial

saying that "The darkest hour is just before the dawn," and I cherish the hope that we are again on the eve of another of these marked developments that will return the prosperity of the agriculture of this country to its former remunerative position.

The agitation of the beet and sorghum sugar industry is indicative of good to the farmer of New Jersey. Our soil and climate are both suitable to the growth of these crops, and the extent of the area to which they are adapted is limited to that of Indian corn, for where a good growth of cornstalks can be obtained, sorghum cane will be equally flourishing. The great drawback will be the location of mills and the weight of the crop to be transported. These conditions, no doubt, will be overcome as soon as the machinery is simplified enough to allow of mills being built and maintained on small capital, which object it is gratifying, at least, to know will be accomplished at no distant day. The experiments mentioned in my last address, relative to this subject, have made encouraging progress during the past season, and their success seems almost certain to be realized, and is attracting the attention of our national legislators.

It is evident, from past experience, that what the farmer of New Jersey wants is a better price for his products, and how to accomplish this desirable object is what should engage your earnest consideration. When I last addressed you I gave you what I then considered a full explanation of my views, as to the course the government should pursue in fostering and protecting the agriculturist from foreign competition, and I feel that I can again allude to it without fear that my motives will be misunderstood. The importation of farm products flowing into our ports from Europe and British American provinces continued, and at the close of the fiscal year, in June, represented in round numbers over 8,000,000 bushels of potatoes, 1,900,000 bushels of peas and beans, 500,000 bushels of wheat, and 100,000 tons of hay, every bushel and pound of which took the place of just as many bushels and pounds of product that could and should have been produced here, and the money paid to the foreign producer and sent entirely out of the country should have been paid to the American husbandman.

It is not my intention to tire you with what may seem to have been a political issue, upon which the country has given an em-

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phatic expression of opinion, but what is most to be considered is that the rural voters decided the late political contest, and as the farmers of the country were largely if not entirely instrumental in bringing about the result it remains for them to at once give notice to the Legislative and Executive bodies that they expect the promises made to be kept, and demand their full share of the benefits to be derived from whatever legislation is enacted to promote the industries of the Nation. This cannot be accomplished by sitting quietly under your own fig tree and waiting for events to turn up in your favor ; on the contrary, we must be more thoroughly in earnest and more united in our demands. Our Congressmen must be made to understand that this influx of foreign products must be stopped by restrictive and prohibitory legislation, and at the same time the Government should be urged to offer every encouragement possible to open foreign markets for our products.

Our import trade with Mexico, the Central and South American Republics, Honduras and the West Indies, in the year 1887, amounted to about \$172,500,000, and we sold these same countries only about one-third the amount purchased, or \$60,000,000 worth of our products. With a balance of \$112,500,000 in this trade against us, it seems as though there should be a substantial opening for the development of a market with these countries.

I urge you to give this, and other matters of legislation, consideration in your County Boards, Granges, Clubs, and other Societies, and to inform your representatives in the Legislature and in Congress of your views and conclusions, by petitions, memorials and resolutions, and if necessary, to send delegates to confer with them upon any matter of interest to your locality or calling. It is in these matters that organization is most effective. I am gratified that there has been such an increased interest manifested in the meetings of the County Boards in the counties where they are organized. When the advantages to be realized from such organizations are more fully understood, they will be duly appreciated. The National Grange, Patrons of Husbandry, several State Granges, and other Farmers' organizations have passed resolutions on this subject, and I recommend that you give expression to your views.



VALUATIONS OF FARM PROPERTY.

The continued depression in prices for farm products has produced a corresponding depression in value of farm property, until, in most instances, the assessed value of farms is equal to, and occasionally exceeds, the selling value of the farm. This system of valuation would be satisfactory if all other taxable property were assessed at its true selling value. It remains an open question whether the valuation of other property should be raised, or whether the present assessed value of farms should be reduced to equitable proportions. As this question has been referred for investigation to a committee, whose report will soon be before us, I will not pursue the question further than to say that, in my judgment, it is a good time to purchase a farm in New Jersey, but a very poor time to sell one.

ADULTERATION OF FOOD.

The adulteration of food and drugs has reached such proportions that there is scarcely an article of diet upon the market that is free from adulterated substances. Spices, confections, medicines, milk, butter, cheese and lard have been adulterated to such an extent that, in some states and cities, inspectors are appointed to inspect such substances wherever found. I am of the opinion that their inspections should be extended to meats as well. It is not to be denied that there are many animals slaughtered, and the meat sold to consumers, when the flesh, if not diseased, is unwholesome. Animals too young, poor, half fattened, maimed and diseased, many of which are only fit for the bone-boiling and fat rendering establishments, are too frequently put upon the market and sold to members of the community, who of all others should have wholesome food. The placing of such meats upon the market and the large quantities of ready dressed beef from distant parts lessens the demand for better fed animals and is practically driving the stock feeding farmers out of the business in this State. The Legislature would not make a mistake in passing a law authorizing the appointment of Livestock and Meat Inspectors, whose duty it should be to examine the animals before they are slaughtered and consign all that are not fit for food to the bone yard.

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### AGRICULTURAL EDUCATION.

The enormous competition that the farmers of New Jersey are compelled to meet in their markets demands an accurate knowledge of the elementary principals of agriculture, and I am of the opinion that a system of text books should be introduced into the course of study of our public schools, embracing what may be termed the philosophy or theoretical explanation of the growth of plants, and of the usual amount of plant food generally found in different soils, what soils are best suited to the growth of cereals, vegetables, fruits, grasses, etc., the object being to impart a practical familiarity with the principles of agriculture in its several branches, avoiding the deep studies of theoretical nonsense, too frequently adopted as a prerequisite of an agricultural education.

I believe that such a plan as I have described, once fairly introduced and used in the schools, would do more to promote the welfare of the farmer by directly reaching the great mass of the tillers of the soil than all the agricultural colleges in the country, notwithstanding the liberal and thorough course of study adopted, and the advantages offered for a substantial education.

### CENTENNIAL CELEBRATION.

Before our next annual meeting, and as as early as the month of April, the closing exercises of the series of centennial celebrations of important events in the formation of the government will take place. The 30th of April next will be the one hundredth anniversary of the inauguration of the first President of the United States of America. That auspicious event took place in the city of New York, and Washington, the then President-elect, journeyed from Philadelphia to New York to take the oath of office and assume the duties incident thereto as the first President of the great Nation in the creation of which he bore such an illustrious part. On his journey he passed through the city of Trenton, and on his arrival at the State line he received an ovation from the citizens of New Jersey such as was never before witnessed and never excelled, and as it is understood that our President will journey to New York to participate in the celebration.

I am informed that it is contemplated to have the President met at the same point, on the State line, appropriately welcomed, and conducted over the same route through the State as that taken by his immortal predecessor. All classes participated in welcoming the first President, and all classes will join in a similar welcome of the present Executive at that time. The sturdy yeomanry of New Jersey bore an enviable part in the great struggle incident to the formation of the Government, their fertile fields having constituted the battle path of the Revolution, and it is fitting and proper that you should delegate a committee to represent the farmers of the State, and to take any action necessary for a proper representation, if called upon by those having the matter in charge.

In conclusion, I venture once more to remind you that the farmer of New Jersey, intellectually, socially, morally and financially, occupies a position that justly entitles him, as a citizen of a great nation, to a protection in his industry that equalizes him with his manufacturing and mercantile neighbors, in the comfort of his home, in the respectability of his circumstances, in the education of his children, and time for acquiring information.

These are rights, the denial of which would undermine the privileges of free citizenship, and threaten the safety of the nation. The American agriculturist must not descend to the level of the agriculturist of other countries; they must come up to us, or remain behind; we can not and will not go down to them.

It gives me great pleasure to acknowledge the kindness and attention which has been extended to the State Board of Agriculture by His Excellency, Governor Robert S. Green, by his presence at the sessions of the Board, and otherwise during his term of office. These courtesies are duly appreciated. May the precedent that he has established be followed by future executives.

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MEADOW LAWS.

May 12, 1697.—Empowering land owners to dam Alloway's creek, in Salem county, to keep out the tide and drain the meadows. Dam to be erected and maintained by assessments for benefits.

February 10, 1710.—Burlington Creek Act. (Only mentioned by title.)

January 26, 1717.—Supplement to Burlington Creek Act. (Only mentioned by title.)

March 15, 1713.—Owners of Salem meadows to keep out tides. (Only mentioned by title.)

March 15, 1713.—Owners of Newtown meadows, Gloucester county, to keep out tides. (Only mentioned by title.) (Lands of Sarah Mickle, John Dole, John Kaighn and Tobias Griscomb.)

May, 1753.—Supplement to Salem Act. (Owners to keep branches of creek open.)

May, 1753.—Supplement to make bank across Mannington creek. (Creek to be kept open—tenant's expenses for same to be deducted from rent.)

May, 1756.—To bank marshes on north side of Cohansey creek. (Property of Joseph Bishop, Amy Biddle, Thomas Sayer, Daniel Lubson, Jona. Holmes, Joseph Hodge and Noah Wheaton.)

May, 1756.—Elsinboro, Salem county, marshes. (Property of William Hancock, Jr., Joshua Thompson, Nathan Smart, Thomas Goodwin, William Goodwin, Aaron Bradway and heirs of David Morris.)

March 17, 1759.—To enable John Lawrence, of Burlington city, to bank meadows on Malaga creek, Burlington county.

August 12, 1758.—Owners of meadows on Mannington creek, Salem county, to keep out tides. (Only title.)

October, 1760.—To dam Little creek, Gloucester county. (William Harrison and Thomas Bispham, managers.)

October, 1760.—To keep tide from Will's creek meadows, Cape May. (Thomas Smith and William Goff appointed managers.)

October, 1760.—To dam Woodbury creek, Gloucester county ; to be continued. (James Whital, William Wood and John Sparks, erecting dam, responsible for damages.)

October, 1760.—To stop overflow on south side Cohansey creek, Cumberland county. (Managers to be appointed.)

December, 1761.—To stop overflow on north side of Cohansey creek, Cumberland county. (Samuel Miller, Nathan Harris and Benjamin Lupton, managers.)

December, 1761.—To enable owners to maintain dam on Little Timber creek, Gloucester county. (Managers, William Harrison and Thomas Bispham; empowered to assess owners and account annually.)

December, 1761.—To empowers owners of marsh on Will's creek, Cape May county, to bank out tides, create sluices, &c. (Managers, Thomas Smith and William Goff; assistants, Elihu Smith and Col. James Hildreth.)

December, 1761.—Owners of marsh in Fairchild, Cumberland county, on Cohansey creek, to bank out tides. (To select two managers and an assessor and collector annually.)

March, 1762.—To bank and dam Back creek, (branch of Newtown creek, Gloucester county,) to keep out tides. (To elect managers, &c., and assess meadow owners benefitted.)

September 25, 1762.—Meadow owners east side of Great Mantua creek, Gloucester county, to drain and bank,—to be kept in repair, (similar provisions) except apportionment.

September 25, 1762.—Meadow owners west side of Raccoon creek, Gloucester county, to keep tide from overflowing, (similar provisions) except apportionment.

September 25, 1762.—Marsh owners on Walker's creek, Chester township, Burlington county, to erect and maintain a dam and bank to keep out tide. (Similar provisions.) William Cox appointed manager.

December 7, 1763.—To empower meadow owners to keep a ditch eight feet wide and four feet deep between Stony Brook meadows, in Middlesex county, and the Great Meadows, in Hunterdon county, at expense of owners.

December 7, 1763.—To enable meadow owners to clear and widen two runs (Shippertaukin and Sandy runs) in Maidenhead, Hunterdon county, (Thomas Tindall and James Clark, Jr., appointed managers—usual provisions.)

December 7, 1763.—To enable owners of bog marshes along Black river, Roxbury township, Morris county,

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to drain same. (Managers, Samuel Hopkins, John Turner and Daniel Budd ; to straighten, widen and deepen said river, from the head of Younglove's mill pond to the head of the meadows, at the proportionate expense of the meadow owners.)

December 7, 1763.—To enable meadow owners to clean out Woodbury creek, Gloucester county, from Ward's dam upwards, to where tide used to flow, and keep same open. (Managers appointed, John Sparks and James Ward ; to do the work at the expense of the owners, if they refuse or neglect the same.)

February 23, 1764.—Owners of salt meadows, north side of Raritan river, from Walker's creek to Great creek, Woodbridge township, in Middlesex county, to make and maintain certain drains, bridges, etc. (Managers, J. Dunn and David Compton, who may rent land on refusal of owners to pay apportioned expenses.)

June 20, 1765.—Marsh owners on Newport creek, Cumberland county, to erect bank or dam to keep out tides. (Manager appointed, Leonard Gibbon, to assess or sue for same, in case of neglect for twenty days, or refusal, and to account yearly, retaining two shillings on each pound of expenses as his pay.)

June 20, 1765.—Owners of meadows on Little Mantua creek, Gloucester county, to maintain a dam and bank. Managers, Isaac Andrews and Moses Cox. Similar provisions.)

June 20, 1765.—Meadow owners near head of Newton creek, Gloucester county, to repair and maintain bank across said creek, to keep out tides, at equal expense, (Thomas Atmore and his successors excepted.) Managers, Joseph Garisbury and Jacob Stokes.

June 20, 1765.—Owners of Assinconk meadows, Burlington county, to deepen and widen said creek, from Job Lippincott's dam, up the south fork, to Barker's land, and up the the north fork to the head of Black's place. (Edward Tonkin and Joseph Ridgway appointed managers for one year, with power to assess, etc.)

June, 1765.—Supplement "to several former acts"—to enable the meadow owners on Burlington creek to support and maintain banks, sluices and floodgates, and to erect such new ones as may be necessary for draining said meadows. (Owners to meet at Burlington, May, 1766, and each year to choose two managers;

one assessor, one collector and one clerk—managers to have seven shillings and six pence per day, while employed about the work.)

June 20, 1766.—Owners of meadows on west side of Raccoon creek, Gloucester county, to maintain banks, dams and sluices, at equal expense, proportionately to amount of meadows owned. (Constantine Wilkins and William Key, managers, until others chosen one year after, with usual provisions.)

June 20, 1766.—Meadow owners on small branches of Allo-way's creek, south side, Salem county, to maintain dams, banks, &c., and to keep water course clear. Owners to meet first Monday in March each year to choose a manager. (William Hancock appointed manager, with usual powers.)

June 20, 1766.—Meadow owners, south branch of Stow creek, to maintain bank, dam, etc., to keep out tides; to meet in April yearly to choose managers. (Bradway Keasbey and David Long appointed meanwhile, with power, etc.)

June 20, 1766.—To enable owners of meadows on Delaware river, between Long Point, Kile's Hook, Salem county, to build a bank from the fast land at the Point to the Hook, to keep tides out; to meet yearly in July to choose two managers, one assessor and one collector, with usual powers. (No managers appointed.)

May 10, 1768. To enable Lower Meadow Company, of Woodbury creek, Gloucester county, to maintain banks and other works, and make new ones for draining and watering the said meadows. Annually to elect a clerk, assessor, two managers and two overseers. (Appointed James Whitall and Joseph Low, managers; James Cooper and John Wood, overseers; John E. Hopkins, assessor; James Whitall, clerk, temporarily. Neglected assessments to be recovered by action of debt; managers liable for neglect; penalty for interfering with or injuring property, £5 and amount of damage. Old act repealed, but not to interfere with the powers of meadow owners above Ward's dam.)

November 16, 1769.—To enable meadow owners on Newton creek, Gloucester county, below Graisbury's dam, to dam out the tide by water works between the fast land of Nathan Albertson, on the south side, and Benjamin Thackeray on the north side. The creek between the two dams to be kept clear of mud, etc., for four years, during which time Daniel Cooper and Benjamin Thackeray, "their executors, administrators or assigns," shall



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act as managers, with usual powers. At the end of four years meadow owners may choose two managers, etc., but on neglect the old managers continue until new ones are elected. The act relative to meadows near the head of Newton creek to be enforced for four years and no longer. Damages to be determined by "three discreet men," to be selected by Gloucester County Court of Quarter Sessions.

November 16, 1769.—To enable meadow owners on Delaware river, between lands of John Mecum and Allen Conglinton, in Lower Penn's Neck, Salem county, to stop tide from overflow, by erecting a bank with sluices, where a majority of owners may deem proper; expense to be paid by proportionate assessment. Two managers, one assessor and one collector to be elected annually the first Tuesday in March, with usual powers. (No officers appointed.)

December 6, 1769.—Act for maintaining banks, etc., for draining meadows on Mannington creek, Salem county; repeals the original act for insufficiency, and then provides that said bank shall be maintained proportionately, according to the amount of land owned within said bank. Owners to elect annually two managers, two assessors and one collector; the collector to sue all delinquents and give assessment in evidence. Fees, managers, nine pence per pound; collectors, six pence per pound, and assessors, four pence per pound of amount assessed, collected and expended. Owners empowered to elect three disinterested neighbors to stake and mark places for cutting ditches, and assess expense of cutting the same. Managers to pay five pounds for neglect of duty. Owners may erect new dams whenever rendered necessary by wash of the tide. (No officers appointed.)

December 6, 1769.—Supplement to act explaining the act relative to the meadows on both sides of the "creek surrounding the Island of Burlington." To repair damages caused by a freshet, authorizing owners "from time to time," to maintain the sluice and two rods of the dam on one side, and four rods on the other; but provided, whenever they shall erect a dam and sluice upon their own ground, they shall not be compelled to contribute to present sluice and dam, except as "Inhabitants of the city of Burlington."

March 27, 1770.—To enable meadow owners on Delaware river



and Salem creek, in Lower Penn's Neck, Salem county, to keep out the tidal overflow ; to make and keep in repair a dam, etc., from Ephraim Lloyd's land down Salem creek to the Delaware, then up said river to Finn's Point, to Thomas Newark's bank, and " so to the fast land." (With usual provisions.) (Ephraim Lloyd, Alexander Hill and Thomas Newark appointed managers and assessors, and William Adams, collector, for one year.) (Cranberry bogs, etc., not benefitted, to be exempt from expense.)

December 21, 1771.—To repair and maintain dam, etc., on the Forked creek, (south branch of Newton creek) Gloucester county, (usual provisions.) (Samuel Harrison and Isaac Albertson appointed managers until others chosen ) Managers empowered to flood their meadows for four weeks, between December 1st and March 1st, upon giving ten days notice—all expenses proportionate.

December 21, 1771.—To enable owners of meadows on Pinch ditch, Black brook and part of Whiponong river, in Morris county, to ditch and drain the same. Ditch to be ten feet wide and two and one-half feet deep from the end of Pinch ditch to said Black brook and Whiponong river. Owners to keep their part open. Not less than three nor more than five managers to be chosen, with power to determine necessary work, and assess to pay expenses. It is especially provided in sixth section that Moses Young shall be paid by the meadow owners for the benefit already derived from his digging the said Pinch ditch, and all future ditches shall be five feet wide and the depth of his ditch.

December 21, 1771.—Supplement to act to keep tide from overflowing meadows and marshes of the town of Salem ; authorizes the managers to clear out Cow-Neck creek, from the sluice to the forks, and drain the upper meadows by ditches. " Money to be raised at yearly town meeting of owners " to meet expenses. (A previous supplement is repealed.)

December 21, 1771.—To enable owners of tide marsh on English creek, Burlington county, to erect and maintain a dam, etc., across the creek at English's Landing, to keep out the tides. Usual provisions, except that the bank is declared a public landing. (Managers, Joseph English, Sr., Samuel English and John Sutton, appointed for first year, with the usual powers and " poundage.")

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September 26, 1772.—Meadow owners in counties of Essex, Morris and Somerset, on or near the Passaic and Dead river, between Woodruff's saw mill and Boyle's mill, and to Gauntt's bridge, to clear said rivers of obstructions. John Carl, Peter Layton and Nathaniel Ayers appointed "Managers or Commissioners," to clear channels until May, 1774. (With usual powers.) Owners may continue said managers, or elect new ones annually, with same powers. (Managers to forfeit five pounds for neglect, and to receive five shillings for each day's work. Forty shillings fine for obstructing said river.)

September 26, 1772.—Supplement to act passed June 20, 1766, relative to meadows on south branch of Alloway's creek, Salem county, (appointing Nathaniel Hancock additional manager with William Hancock, and empowering to erect a new bank from Tyler's Point, across Tyler's creek to Long Point, instead of the bank erected, called Back bank.) Owners may work out assessments, if done in reasonable time, or managers may rent out the land to pay assessments. Managers' pay, two shillings poundage, and to pay six pounds for neglect.

December 26, 1772.—To enable owners of meadows on Assinconk creek, city of Burlington, to erect a dam across the creek, from Henry Scott's fast land on the north side to his land on the south side. Expenses equally proportioned among owners, according to quantity of meadow benefitted. (Samuel Howe and Joseph Scott appointed managers for a year, with usual powers.) Managers' pay, one shilling in the pound, and to forfeit six pounds for neglect.

September 26, 1772.—Amends the English Creek Act of December 21, 1771, by adding in the first section that "The bank shall forever be maintained by the owners of the meadows benefitted, and is to be at or near the two channels of the creek, the breadth of twenty-four feet, eight rods in length," and repealing the original act.

September 26, 1772.—To authorize Samuel Nicholson, John Mason, William Hancock and Thomas Hancock, owners of marshes and meadows in Elsinboro township, Salem county, to erect and maintain a bank from John Mason's Point to a bank of William Abbott, and to make sluices and ditches; to proportion the shares each owner shall keep in repair. That Samuel Nicholson

and John Mason shall make sluices sufficient to carry off the water of the meadows, to the satisfaction of the majority of the owners.

March 11, 1774.—To enable owners of tide marshes, etc., on Mason's creek, Evesham township, Burlington county, to erect and maintain a dam from the fast land of Abraham Woolman to that of Joseph Engle, to keep out the tides. Owners to appoint one or two managers annually in March. Abraham Woolman and Robert Engle appointed managers for one year, with usual powers, "poundage," and penalty for neglect.

March 11, 1774.—Owners of meadows on both sides of Assinpink, from George Kirth's line to the lands of John Ely, to remove obstructions from said creek. John Chamberlain, John Hancock, and Dominicus Covenhoven appointed managers for one year. Owners may continue, or elect three new managers annually, with power to throw the "clearage" of the creek equally upon adjacent meadows. Managers to have five shillings a day, with forty shillings penalty.

March 11, 1774.—Meadow owners in Lower Penn's Neck, Salem county, to maintain a certain bank extending from Fishing Island to Stony Island, for carrying off the water. William Crips and Joseph Copner appointed managers for one year. Each owner to keep his part of the bank in repair and mow the same twice a year, and keep drains clear. Division drains to be eight feet wide and three feet deep, and held to be a lawful fence. No pay specified, but penalty for neglect five pounds. (Other usual provisions.)

March 11, 1774.—Owners of marshes in Upper Penn's Neck, Salem county, to erect and maintain a dam, etc., to keep out tides, bank to begin at the bank of William Beetle, and, crossing Deep creek, to be continued to the fast land of John Pitman. (Usual provisions relative to ditches and drains.) Jacob Savoy appointed manager until successor elected, with one shilling poundage, and six pounds penalty for neglect.

March 11, 1774.—Owners of meadows, etc., on English's creek, Burlington county, Mansfield township, to erect a bank twenty-four feet wide from the fast land of Thomas English, Jr., to that of the natural course of the creek, from the bank to the head of tide water, to be kept open. All rubbish to be disposed of equally

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upon each side of the creek. Joseph English, Sr., and Samuel English appointed managers until others are chosen. (The act, December 21st, 1771, relative to the same, repealed.)

March 11, 1774.—Owners of meadows adjoining Repaupo creek, Gloucester county, to erect dam to keep out tide. James Steelman, James Hinchman and Thomas Clark appointed managers, and Thomas Clark, clerk and assessor, until successors chosen. Bank from Thompson's Island to Lynford Lardner's bank, with a dam across the creek. Creek to be kept open as far up as William Rawson's house. Roads to be made across meadows.

March 11, 1774.—Owner of marshes on southwest side of Raccoon creek, Woolwich township, Gloucester county, to erect banks and other water works, from the bank of Constantine Eilkins to that of Conrad Shoemaker, to stop out the creek on each side of Thoroughfare Island. Constantine Wilkins, Jacob Archard and Samuel Hewlings appointed managers, with usual powers. Division ditches to be nine feet wide at top, five feet at bottom and three feet deep. The old creek to be a lawful fence. Managers' "poundage," one shilling and six pence, with five pounds penalty. Law relative to Wilkins' and Hewlings' bank repealed, and they are embraced in this act and subject to its provisions.

March 11, 1774.—Owners of meadows on both sides of the Walkill river, in Sussex county, known as the "Drowned Lands," to clear out and straighten said river, from the New York line to two miles above the junction of the "Peppercotton" river. Penalty for putting obstructions in the rivers, forty shillings. Expenses to be equally assessed upon meadow owners, in proportion to quantity of meadow benefitted. Managers appointed, William Southworth, Esq., Joseph Barton, Samuel Meeker, Ephraim Martin and Abia Brown, to receive five shillings per day; and Collector Joseph Crowell to receive six pence per pound for all money collected. Penalty, five pounds. Managers authorized to meet New York Trustees appointed for a similar purpose, and assess expense of widening and deepening the Walkill river, upon those benefitted. A clause prevents any individual "East New Jersey Proprietor" from locating any of the benefitted lands to his own use, after the "general proprietors"

have paid their proportion of the expense, without the consent of the proprietors at one of their stated meetings.

February 11, 1775.—Meadow owners on Ramboe's run, Deptford township, Gloucester county, to maintain bank, etc., (managers appointed, Samuel Wilson and John Wilkins, Jr.,) the care of the bank divided between John Wilkins, Jr., Thomas Wilson, Savil Wilson, Biddle Reeves, Arthur Reeves and Isaac Andrews, each to take care of his share, besides Isaac Andrews, Biddle Reeves, Savil Wilson and Thomas Wilson shall, "at their own expense," dig and keep open the main ditch from Isaac Andrews' lower line to the sluice, twelve feet wide to Thomas Wilson's bridge, and ten feet wide above said bridge, and of a depth sufficient to drain Isaac Andrews' meadow in proportion to their meadows benefitted. Managers to be elected annually, with usual powers. No provision for payment, but penalty for neglect, five pounds.

December 6, 1775.—To empower Isaac Haines, owning lands on the southernmost branch of the Ancocas creek, Evesham township, Burlington county, to erect a dam, grist mill, etc., upon his land, with the consent of adjacent land owners. Provides for flood gates in the dam to allow the passage of lumber or produce at proper seasons. (No provisions about flooding lands, etc.)

December 6, 1775.—Owners of meadows both sides of the south branch of the Pensaukin creek, in Chester, Burlington, Waterford and Gloucester, to erect banks to keep out tides. The dam to be erected across the creek from the fast land of Thomas Burrough to that of Samuel Rudderow. Managers appointed, Joseph Osler, Samuel Burrough, Jr., until others elected. Managers allowed one shilling "poundage," with six pounds forfeit for neglect. (Other provisions as usual, except it is provided that Joseph Stokes, John Wallace and Samuel Shute shall assess damages of complainants, to be paid by manager and allowed in settlement.)

September 24, 1777.—Owners of meadows between Fishing Island and Mud creek, bounding on Salem creek, Lower Penn's Neck, Salem county, to erect and repair dams, etc., and make line ditches to keep out tides. Andrew Sinnickson and Gamaliel Garrison appointed managers, with usual powers. Their pay eighteen pence poundage; forfeit, ten pounds.

June 11, 1779.—Owners of meadows lying between Wheeler's

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Point, Tompkins' Point and Maple Island, in the township of Newark, Essex county, to erect a dam and make ditches for improvement of said meadow. Three managers, Nathaniel Camp, Jr., Joseph Baldwin and Daniel Deach, appointed with authority to build a dam and sluice across Maple Island creek, upon the meadows of Dr. William Burnett and James Johnson, making reasonable compensation to the owners of said meadows for damages, to be assessed by three men mutually chosen by the parties. Pay, one shilling poundage; forfeit, six pounds.

December 22, 1779.—Owners of meadows between Mud Creek sluice and Wright's landing, on Salem creek, Lower Penn's Neck, Salem county, to erect dams and sluices, and make line ditches lawful fences. William Philpot appointed manager, with usual powers. Pay to be two shillings and six pence poundage, and forfeit of thirty pounds.

March 20, 1780.—Owners of Pigeon swamp, in the south ward of New Brunswick, in Middlesex county, to drain the same at owners' expense, to open a water course from said swamp through the lands of John Sutphin to Lawrence's brook. Managers, John Watterhill, Esq., David Williamson and James Gulick. Other provisions, as usual, except no pay or forfeiture of managers is specified.

October 4, 1780.—Owners of tide marsh, etc., on Absecon creek, Great Egg Harbor and Galloway townships, in Gloucester county, now Atlantic, to better, erect and keep in repair, water works across said creek, and improve said meadows, etc., and to make line ditches lawful fences. Managers appointed, Samuel Risley, William Read, Robert Doughty, Thomas Chamberlain and Isaac Ingersoll—five owners, with the usual powers. The bank to begin at the fast land of William Read, in Great Egg Harbor township, to extend to that of Joseph Ireland, in Galloway township. Division ditches to be eight feet wide at top, six feet wide at bottom, and three feet deep, and to be lawful fences. Fees, one shilling poundage and forfeit of five pounds; reasonable compensation for damages to be given to owners of meadows, upon which the bank or dam may be erected, to be assessed by three men, mutually chosen by the parties.

May 27, 1782.—Owners of tide marsh on Manamusing creek, Cumberland county, to build a dam across the creek from the fast

land of Henry Reeves to that of Elizabeth Bodily, and to erect necessary water works to keep the tide from overflowing the marsh. Elemuel Edwards, Abraham Hoffman, appointed managers, with the usual powers. Fees, one shilling poundage (no forfeit.)

June 22, 1782.—Owners of meadows on Assincunk creek, in the city of Burlington, to erect a dam, etc., over said creek, from the fast land of Aaron Schuyler, on the east side, to that on Broad street, on the west side, and to erect a fence across Pudding lane from the lot of Samuel How to the land of Thomas Wetherill. Managers, Abraham Scott, Joseph Scott and Aaron Schuyler, appointed for one year, with the usual powers. Fees, one shilling, poundage ; forfeit, ten pounds. To give a week's notice of opening sluices and letting in tides.

June 24, 1782.—Owners of swamp, etc., between Rachel Dalbo's fast land and that of Isaac Pedrick, on Delaware and Oldman's creek, in the township of Upper Penn's Neck, Salem county, enabled to compel holders of said swamp, etc., to keep up and maintain their parts of the banks, etc., and keep open the drains necessary to prevent the tide from overflowing the same ; to select three managers annually, with power to assess delinquents, and recover from them expenses necessary for the purpose. (No managers appointed, and the other sections of the bill are similar to those of other meadow bills.) Except owners refusing to assist are to be fined ten shillings for every day of refusal, to be recovered in Justice's court. Also, to assess one shilling per acre for an emergency fund, to be divided equally between the managers. If funds of either manager run short and the other managers, having money, refuse to deliver to him sufficient for the service needed, they shall forfeit twenty shillings, with cost of suit, to be applied to repairs. Banks to be mowed in June and August, under penalty of one shilling for every rod neglected. (Fee, six shillings a day ; penalty, three pounds.)

June 24, 1782—Owners of meadows on the Delaware, north-eastward from Pensauking creek, Burlington county, to maintain tide bank and sluices from Richard S. Smith's fast land, running up the Delaware, to James Toy's fast land, for the purpose of draining meadows of Jacob Browning, John



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Browning, Andrew Anderson, Jr., Richard S. Smith, Elizabeth LeConey, William LeConey, Isaiah Toy, Joseph Morgan, Jr., and James Toy. Three disinterested persons of the county to be chosen to measure each owner's share of the bank and sluice, to be maintained respectively. Two managers to be chosen, with power to compel owners to attend to banks, etc. (No fees mentioned, but penalty for neglect ten pounds.)

December 21, 1782.—Owners of meadows in Lower Penn's Neck, Salem county, adjoining the Delaware river, to keep in repair the banks, etc., between the fast land of John Callahan and that of Thomas Thackeray, to keep tide from overflowing the same. John Ashton appointed manager for one year, with the usual powers. Fees, eighteen pence, poundage; penalty for neglect, ten pounds. Disputes among owners relative to proportions to be settled by measurement, at expense of owners of meadows measured.

On the 23d of December, 1783, a general act was passed to "Enable owners of meadow ground to drain the same," the preamble of which states: "Whereas, many citizens of the State suffer great loss and inconvenience by reason of their meadows, meadow-ground and swamps being so situated as to render it impracticable to drain the same sufficiently without cutting through lands owned or possessed by other persons; and, whereas, many disputes have already arisen, and may hereafter arise, respecting the making and clearing of line ditches and drains, and no adequate provisions having been made for the same; therefore, it is provided, that any person having any meadow capable of improvement, so situated that it cannot be drained without cutting through the lands of others who will not permit proper ditching, to apply to two surveyors of highways and two chosen freeholders of the township, who are required to give five days' notice to parties interested, and if they determine the drainage necessary, to lay out a drain at the expense of the party applying. Officers fees, seven shillings six pence per day, and three pounds forfeit. Officers to assess damages and benefits and have works kept in repair."





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# ADDRESS.

BY MR. F. D. CURTIS, OF KIRBY HOMESTEAD, N. Y.

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## ADDRESS.

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BY MR. F. D. CURTIS, OF KIRBY HOMESTEAD, N. Y.

*Mr. Chairman and Gentlemen of the Board :*

The statement made by your President, that, at the close of my address, I would answer any questions you may propound, I would amend by saying that I will answer all questions I am able to, and not all you can ask.

I want to confess to you at the start that I feel slightly embarrassed in addressing this distinguished Board this afternoon, because I make no pretensions to being anything else but a farmer, and I shall not attempt to go outside of the line of my own observations, my own experiences, and some few deductions I have made from study, and from observation and experience.

I am further embarrassed from the fact that your line of farming is somewhat different from my own, especially with reference to the dairy, as this is a State where the production of milk is a leading feature in connection with the dairy. The things that are true in my own State, with certain exceptions, are true in your own ; our dairying is more in the line of a butter and cheese industry, but still we all belong to one family, and I find, on listening to your discussions, you have exactly the same embarrassments and the same problems in New Jersey that we in New York have, in connection with dairy farming.

I shall only attempt this afternoon to reach out for the truth. I do not pretend to be very wise, nor have I the remotest idea that I know more than a very little on this business. My talk will, like the clergyman's, be divided under three heads.

Under the first, he would tell them what he knew and they did not know ; under the second, what they knew and he did not know, and under the third, what neither of them knew. (Laugh-

ter.) My talk may bear a very good comparison with the clergyman's in this respect.

In the first place, I take it for granted that you need increased fertility of the soil. It seems to me this must be so, for a State cultivated so long as this has been, and where there has been for a great many years a certain line of farming, to produce crops from the soil, and to sell those crops from the soil, there must be an exhaustion of the fertility. This is so in our State and in all the older States. In my talk I shall endeavor to foreshadow the results of farming, in connection with breeding and feeding of animals, which shall tend to restore fertility. I want to pause here to say that no man has done so much in the United States in the way of educating farmers and giving them intelligent knowledge of the value of fertilizers, and in enabling farmers to purchase fertilizers wisely and profitably, as your own Prof. Cook, of your own Experiment Station. (Applause.) I say this because it is his due.

I shall talk to you in connection with the dairy, on feeding for fertility and feeding for quality. It is a fortunate fact that the foods calculated to make milk of the most value are the very identical foods which fertilize the farm most. In order that you may understand what I mean, I desire to be a little more explicit, and will illustrate in this way: If you take a kernel of wheat and cut it open, you will find the inner portion is composed of a white substance of a starchy character, and in addition a more yellowy substance, not exactly starch, which you can call gluten. On the outside there is a coating which, when the wheat is utilized in the usual way, goes into the bran or middlings. The starchy material is carbonaceous, and will produce heat and fat when fed. The gluten is more of a nitrogenous character. The outside or bran is very strongly nitrogenous, and contains a considerable proportion of the phosphates, which make the bone. So I divide foods in general into nitrogenous, or muscle and bone forming foods, presupposing that nitrogenous foods contain a considerable part of the phosphates which go to make up the bone, and then, on the other hand, I divide them into the carbonaceous, which are the foods to make heat and fat, required in sustaining the animal. The starchy foods, such as corn and barley and rye, have a considerable proportion of carbons, and rice also, and under this head

also come various other substances, under other names, which can be generally classified as carbonaceous. On the other hand, the outside of the wheat and the rye, and the outside coating of corn and the germ are nitrogenous. Cotton seed meal and linseed meal, and also the fodder plants, have a proportion of nitrogen. Of course, chemists make their subdivisions more than these two. Chemists get things down very fine, as they necessarily must, in their chemical analysis, and they subdivide these into other heads, with other names, but still, for our purposes, and for the purposes of the practical farmer, it is well to know that foods should be divided under these two general heads.

Now it happens that the nitrogenous foods give the greatest amount of fertility, and if fed, they afford the richest manure. The carbonaceous foods afford very little fertility, for the reason that when they decay they do not make the elements of fertility, except to a limited extent—these elements being known in the commercial fertilizer as nitrogen, phosphoric acid and potash.

Hence, it is fortunate in the production of milk that this is a fact—that the nitrogenous foods tend to increase fertility more than the others, because they are essential in the production of milk, and they are also essential in the growth of young animals. Farmers make a great mistake—that is to say, the average farmer, and I want you to understand this, that I am speaking in a general way and on general principles—of course I know that in so intelligent an audience these criticisms may not apply; but the average farmer, as a rule, feeds his animals while growing, and not producing milk, what he may happen to have on hand, or what is most handy, and he often confines this food to one kind, not reaching out for the truth, and not utilizing what he may have, to get better results.

It is a fact that when nitrogenous and carbonaceous foods are properly combined there is all the better yield in the amount of milk, and the milk will be of a better quality. This has been demonstrated so many times it is not necessary for me to remind you of it, but I mention this merely because I think it is necessary to emphasize the fact. It has been found that there are certain proportions of these foods which make the production much greater, and before I enter upon this, let me say that there are different ways of feeding, and different necessities in connec-

tion with feeding. The most essential is to feed for maintenance. Every animal, especially the cow, must have feed enough for maintenance. It is a fact—and this is where the mistake is so often made—that a cow will milk and thrive when almost entirely confined to carbonaceous foods, and the average farmer would say that is enough, but you will find, if you will experiment and observe carefully, that when you unite your two together, and so increase the food for maintenance, you will get a production that will surprise you, hence, another law—that of feeding for production. This requires more food than for maintenance, and requires a combination of foods, if you will get the best results.

It is a truth in our State—a great many farmers have another law of feeding, and that is, feeding for reduction, instead of production. The animal comes to the barn in good health and in fine condition, and the farmer feeds it his stores upon the basis of reduction, beginning in the fall of the year, and the result is, that in the spring his stock is not in as good condition as it was in the autumn; they have been reduced. It is too often true that young animals are thus fed, and it is a great mistake. We should never feed young animals on the line of reduction. They should always be fed for production, and to increase their weight and value. I do not conceive that there are any animals that should be fed on the line of maintenance only, except perhaps a horse or mule, or oxen, or perhaps breeding stock may be fed on the line of maintenance, simply, but all young animals, and all cows, should be fed on the line of production, and it is unprofitable business for any farmer to stop short of that high standard. In order to produce the best results, there must be a proper combination of foods.

It has been found that in order to get the best results there must be equilibrium in this production. Practical results show there should be a proportion of one part of nitrogenous for the growing animal, to four or five parts of the carbonaceous foods, and in the fattening of animals, of course, an increase of the carbonaceous elements, and so, according to the size of the animals, you should increase the proportion from four or five or six parts of the carbonaceous foods to perhaps eight or ten parts.

I have here on this chart what are called the German food

rations, which you have heard about, all worked out, with the proper combinations of food, upon the basis of one thousand pounds of weight.

You are aware that it is estimated by scientists, what it requires of food, two pounds for every one hundred pounds weight of the animal for a maintenance ration, and hence the estimates are based upon that foundation. To show the practical working of this combination of foods, I will refer you to some cases. Mary Ann, of St. Lambert, the cow which gave such an enormous yield of milk, was fed twenty-five pounds of oats in twenty-four hours, six pounds of oil meal, two pounds of bran and seventeen pounds of pea meal, together with all the clover pasture she would eat. She could not have consumed so much food and digested it, unless it had been of both the kinds I am speaking of, well balanced.

To feed for milk.—I shall make my argument in regard to feeding for milk upon a butter and cheese basis, because the consumer is interested, as well as the producer, in having good milk, and that is on the basis of one part nitrogenous to five parts carbonaceous food. If we unite our food in this way we shall always get rich milk; milk which will contain the proper proportion of solids. If we vary from this we are in danger of getting an excess of water. In our State the law is so strict that we do not like to vary very much in order to produce an excessive volume of milk, else it may be deficient in solids.

You are aware that the young animal's first food is milk. You are aware that there is no food so natural as milk. There is no food upon which they thrive so well as upon milk. It is a properly balanced food; the proper proportion of solids has been arranged for by the Creator and its proportions are especially adapted to the growth of animals. You are also aware that grass, as it springs from the earth, is also very nutritious, and animals when first turned out on it in the spring always thrive. This is also a well balanced food. This is because Providence has arranged another great law, that grass is naturally calculated to promote growth. It is a food for production, and we get grand results from our cows when we give them all the grass they can eat.

When we take the young animal away from its milk, and at-



tempt to feed it on solid foods, we violate a law of nature and injure the health of that animal, if we do not continue its food on the same line as the milk. You should unite the elements of food in the same proportion as those upon which milk is based, as nearly as possible. Just in proportion as the farmer studies the proper methods of feeding, and adapts them to young animals, just in that proportion is the young animal going to thrive, and be a healthy and vigorous animal. This is an important law, and it applies to all the animal kingdom.

The rearing of calves, of lambs, of young pigs, or of any animals is equally governed by this law, and it likewise applies to the rearing of children. We meet in agricultural conventions, and, perhaps, spend two or three days in discussing the proper feeding of young animals, and discuss domestic economy on the farm, and the best crops to grow, and the best method of producing those crops, and we forget the best crop of all—the children—the crop on which the future of this country depends (applause), the crop of men and woman who must come to the front and fill all the walks of life.

Hence, I want to say a word in connection with the adaptation of food for children, and say it from a fatherly standpoint, too—as I have had experience in that direction—that any father or mother allowing their children to eat the heat and fat producing foods exclusively, makes a mistake. I say this in justice to the children. If you feed your children on the starchy portion of the wheat, on the heat and fat producing portion, you make a mistake. Give them something to make muscle and bone. These things apply to all young animals, and you must feed muscle and bone producing foods if you would have a strong body in your young animals or in your children.

It is not necessary for me to say before this intelligent body that you can never expect to see a vigorous brain and intellect unless you have a good body. A puerile body means a weak brain. We should feed our children white wheat bread and no other; that is the only bread the children should eat. This is a properly balanced food because the proportions of wheat are, one part of nitrogen to five and eight-tenths of the carbonaceous. This you see is a little too strong in the carbonaceous portion; nevertheless, if you confine it to the starch alone, you are depriving

the child of the nitrogenous portion, the food and bone making material, and that is all wrong. We should feed our children fruit, and as this State is so well adapted to fruit growing, let me say that it has been demonstrated that fruit is a perfect food. The elements of nutrition are so well combined in fruit, that it is possible to live on fruit alone. This can be proven by this statement ; you can keep a lot of pigs through the entire winter and give them nothing else to eat but apples, and they will grow and come out in fine condition in the spring. This proves that it is a well balanced food. The pig is very much like the human animal. The pig is omniverous, and so are we. The only difference is in the structure, and we are supposed to know more than the pig, although I have seen many a pig about as smart as the average man. (Laughter.) I had a sow at home once so smart that she would go down to the orchard, and if she saw a limb she could reach she would reach up, catch hold and shake off the apples. One time she reached up for the limb of a Spitzenburg tree, but it was just beyond her reach, so she gave a spring for the apples, caught the limb, gave it a shake and got them. There is not much difference, after all, between the pig and man.

I speak of the elements of wheat being in the proper proportion. Let me also say that oats are the most complete food for horses you can get. Oats, next to wheat, are the best balanced grain of any. They contain one part of nitrogenous to six and one-tenth parts of the carbonaceous elements. You make no mistake if you feed oats to either animals or children. To show there is point in what I am saying, I have only to point you to whole nations who have been affected by this kind of food. Take the Scotch ; they are a stalwart race, and they are a race living pre-eminently upon oatmeal. The people of Kentucky also are a wonderful people in their strength and brain power. In the northern part of Kentucky, and in the Blue Grass region, are probably the finest types of man in the United States, and that is because the food growing on that soil is so well adapted to the needs of the people.

On the other hand, the Chinese and Japanese are pre-eminently a people living on rice. We all know that they are weakly in structure and diminutive in size, because they do not eat food to

furnish them with the requisite material for muscle and bone. They are pigmies in physical structure.

After we bring the animals to the barn in the autumn from their daily rations of grass, unless properly fed they usually decline in their physical condition. They will always do so unless they are in charge of an intelligent man, and unless the food they are given is properly balanced. It is important that we should unite these foods in a way to promote the whole physical structure of the animals, and this is best done by knowing the quality of, or the elements in, these foods, so harmonized that we feed the whole physical structure at one time, producing not only the lean and fat, but the bone and muscle necessary for physical development. I will furnish instances to show you how important this is. A few years ago, I had a flock of Merino lambs about the first of September, and had not fed them much after I took them away from the ewes. The butcher came along—the butcher from whom I had purchased my meat all summer—in our section we have butchers who peddle the meat from door to door through the country—and I had been paying this man from twelve to eighteen cents per pound for meat. I said to him, “Don’t you want to buy these lambs?” and I took him down and showed them to him. He said, “They are not worth very much, not over \$1.50 apiece, but being it is you, I will give you \$2.00 apiece.” I said, “No, sir; I will not sell them at that price.” I put them on fresh pasture—on second growth grass, the Lord’s own natural food, and fed them one part of linseed meal to two parts of bran, and at the end of two months they had more than doubled in size and weight, and I sold them for five dollars a head. I sold them to my wife, and boarded it out (laughter and applause), but you see I made by it (laughter).

Now, to illustrate this point further, I come to the dairy side of this question. It is a fact that you can not only change the quality of the milk, but you can impart more solids by a proper combination of these foods, and make it more valuable, and also change the quality of the butter made from that milk.

The four essential elements of butter or cream are stearine, butterine, oleine and palmatine. There are other properties in cream, but these are the four essentials. If we feed our cows only on corn meal, in connection with the fodder that you may

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give them, you will increase the amount of stearine, that is to say the hard property of the butter, and you will produce butter hard and dry. You can feed corn meal that will make good butter, but at the same time not so much butter, nor as popular a grade, according to the tastes of people nowadays. Unite some other properties with it—linseed or cotton-seed meal—and if you feed these you will get more butter than from feeding only corn meal, but the soft principal of the butter, the oleine, will be increased. It will be too soft if confined to the two, linseed and cotton seed meal. Unite them properly and you will get more butter and a better grade of it. This is an important thing for us to know, and it has been demonstrated in many instances, so that it is an established fact that we should unite those foods in order to get milk of a superior quality. This law has been taught in our State, and so much more care has been taken in the feeding of our cows, and in the proportion of their food, owing to the strict enforcement of the law, that less than one per cent. of that great river of milk that flows onward to the city of New York is found to be adulterated, or to be below the standard required by law.

There is another food, now, exceedingly popular, and of great value in connection with the feeding of stock, and that is the product of the silos. I know I ought not to say anything about that in the presence of Prof. Cook, who is a scientific man. It is important we should have silos. We can get more milk and make more butter than by feeding dry cornstalks. It is a food carbonaceous in its character, with a large amount of corn more so, and it should always be balanced by a nitrogenous food, such as wheat bran, linseed meal, or cotton-seed meal, and then you get the best results. I said that these nitrogenous foods are valuable because there are in them the elements of fertility, more than in the carbonaceous. In connection with the dairy it is my view—and I suppose we do as you do, we feed grass in the summer time out in the pastures, and generally the ground selected as a permanent pasture is the ground on the hillside and not tillable—these lands in our State are not as good as formerly. These lands are constantly being pastured year after year, and there is being taken from them the elements of fertility, nitrogen, phosphoric acid and potash—taken from the ground by the

animal in the form of pasture and brought to the barnyard and not returned. All milk contains large quantities of nitrogen, phosphoric acid and potash, so you see you are rapidly decreasing the fertility of your pastures. If you will improve your pastures feed your cows at the barn with well balanced foods in the proportions I have stated, of one to five ; you will give to your cows to take back to the pasture those elements which are necessary to maintain them, and the fertility of your pasture can be maintained. My idea is to make my cows factors or partners on the farm, to take from the barn, every morning, their stomachs full of these nitrogenous foods, in order that the fertility of the pasture may be restored and maintained. It is a popular idea that pasture land improves if left alone. This is an error, because if the cow feeds on the pasture she takes the contents of her udder up to the barn every night, so taking from the pasture the nitrogen, phosphoric acid and potash, never to be returned, unless fed these extra foods at the stable. If you confine the stock to the pasture and allow them to feed upon the grass, and remain there during the whole summer, you are doing nothing to aid the grass, because the stock are taking the strength out of the grass and there is nothing returning except what comes from what they have eaten in the field, and as this has already come out of the ground there is nothing added. I have demonstrated this, on a piece of ground which was pastured for twenty years, until it became almost barren, and I was obliged to resort to other means to keep up the fertility. Pasturing depletes fertility. It is frequently claimed that pasturing ground increases its fertility. This is a mistake ; the strength is washed down from the hillsides to the low places in the field, or the strength of the manure is concentrated around some of the shade trees in the field.

If the cattle pastured in the field be fed at the stable, the strength of such food is taken back to the pasture, and the fertility of the soil is restored very rapidly. I do not think that farmers appreciate the robbing of their farms. I will cite you an instance of a township I can see from my own doorstep. I can see almost the entire township spread out before me. Twenty years ago the land was very productive, and farmers got two and one-half tons of hay per acre from their lands. Under the stimulus of

high prices they commenced to sell hay. In the whole township there was but very little stock kept. The result has been that in twenty years the lands in that township have been reduced in fertility so that they yield less than one ton per acre of hay. It shows how rapidly this may be done, and the inevitable result is, that we depreciate the value of our farms. This is exactly the same thing in selling milk. For every ton of milk you take off your farm large quantities of these phosphates, and you can readily see it will only be one or two lifetimes before the fertility of your farms will be very much exhausted, unless that fertility can be restored.

In this connection I may add, by way of illustration, that butter making is the least exhaustive of any business of the farm. Very much less than the selling of milk or cheese. For every ton sold of cheese we take off \$20 worth of the elements of fertility, while in butter, the value of similar elements is only about fifty-two cents. I want to call your attention in this connection to the combination of foods and to their effects upon animals in their physical structure. I will call your attention to those which are of most importance, as shown by their chemical analysis. It gives an idea of what these foods are composed. Let me say, however, first, it is important to know the chemical analysis differs very materially from the analysis which the cow makes of foods which are called nutrition.

Chemistry determines whatever of value there is in the foods, but, in many cases, these elements have passed beyond the ability of the animal to digest them, and that is why silage is of such value. With the silo the entire cornstalk, for instance, can be made digestible and more valuable, and that is the reason that, with the silo, we can make more milk and more butter, and not only that, it promotes digestion in the animal.

I have here on this chart the analysis made at our Experimental Station, in New York, of several of the familiar kinds of foods of the farm. (See table on page 62).

In one hundred pounds of timothy there are of albuminoids 6.59 parts of the muscle forming material, 44.33 parts of the nitrogen free extract or carbonaceous, 2.69 of the fat, under the head carbonaceous, 26.88 of fibre, 4.16 of ash and 15.35 of water.



You have observed when you feed well cured clover hay your cattle always thrive. No matter whether your animals be lambs or colts, horses or cows, the animals will thrive. The same may be said of pigs, also. It is good food for pigs, and you can winter them on well cured clover hay, and on silage, also. Silage is not so perfect a food as clover hay. Your cattle always thrive because clover is the best balanced food of all the plants. It contains the proper proportions of these nitrogenous and carbonaceous elements, the proportions being as one to 6.8 parts of the carbonaceous.

On the chart here is an analysis of clover hay, and you can see why it is so valuable. 12.5 parts of the nitrogenous; 37.63 of the nitrogen free extracts, or cortohydrates and 3.48 of the fat. This is more nitrogenous than any of the others. Let me say that I was much surprised that orchard grass hay excelled the timothy in its nitrogenous elements. You see on the chart it contains nearly two pounds more of the albuminoids or nitrogenous. Here is an important thing: If I succeed in impressing you that the ordinary farmer in our State has the conception that fodder corn consists of fodder grown on land merely skinned over with the plow, the seed sown broadcast over the ground, harrowed in, and allowed to do the best it can—and that he calls this fodder corn, and that this is a mistake, I shall do you a valuable service. It is the kind of fodder corn which makes this vinous silage so injurious to the animal's teeth. That is why so many of us conservative farmers did not approve of the silo at first. It was because the silage was of no value, and I don't take back a single word of the strictures I used in regard to this kind of silage. That kind of silage contains only one pound of muscle in one hundred, 7.92 parts of the nitrogen free extract, and less than a pound of the fat, and less than ten pounds of nutriment in the hundred, and 84.14 pounds of water, as you see here by the chart. That was the kind that used to be put in the silo; that is the kind that was condemned, and which so many of the farmers are feeding now. Over eighty-four per cent. of water and less than ten per cent. of real, actual, bona fide nutrition, so that when the farmer hauled a ton of that kind of fodder, he was hauling less than one hundred pounds of food, and that did not pay. Then, when the fermen-

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tation commenced, and went on awhile, that amount was probably reduced to half, by the destruction of the sugar, by its being turned into acid.

The more modern system of raising this fodder corn is to have it sown in drills so that each stalk is perfect in its character, and produces a small ear. That is the perfect silage. You see by the chart that such silage has three pounds of albumenoids, 24.8 of nitrogen free extract, and 2.56 of fat.

This is the fodder corn which is valuable; this is the kind we speak of, and when you hear the intelligent farmer talk nowadays of fodder corn, this is what he refers to. This is what is needed in the production of milk and butter, and not the other we have just referred to. There is a vast difference between them, the one having 84.14 per cent. of water, while the modern fodder corn has but 59.29.

I have spoken of corn as a food for stock. It contains some proportion of nitrogen, but is not a perfect food. It had better be supplemented with other food, because I find I can produce better results in feeding, on this principle, than in feeding all corn. The same is true in the feeding of pigs, beef cattle, and calves. If we feed an excess of carbonaceous food, more than is required for maintenance, it causes a waste. If we examine the manure from pigs fed entirely with corn we find a considerable proportion is not digested, and goes to waste. This is equally true of cattle. I had an amusing letter from a farmer in the West, asking the length of time required for corn to be digested in the stomachs of cattle. He wanted to feed corn to his cattle by taking them out in the field and letting them fill up and bring them back in time so that their droppings will drop in the barnyard for his pigs to eat. This is the Westerner's idea of feeding pigs, and utilizing his corn. (Laughter.) So corn is not a perfect food.

Now we come to wheat bran, which we find is largely nitrogenous, containing 14.56 of nitrogen. Now, wheat bran is the proper food always to put with corn, not only in feeding young animals, who don't want corn anyhow, but to cows for milk, because you will get better milk from such feeding.

There is an important law which I have demonstrated by accident. My suspicions were first aroused and they have been con-



firmed since. It is this : When you feed an amount of carbonaceous food, if you will unite with it a proportion of the nitrogenous, there will be more carbonaceous food digested than if the carbonaceous food be fed alone. It is true that in feeding entirely on one or the other there is not so much digested as when both are properly balanced. To get the best results of feeding for the dairy the food should be so balanced, as you not only get more and better digestion by uniting, but at the same time you supply all the wants of the animal, and so keep the machinery of the animal in better condition.

Linseed meal is largely nitrogenous. It is a valuable food to mix with corn. It is a valuable food to go with those forage plants which are deficient in their nitrogenous elements.

You will find that if you give your pigs, your fattening pigs or your growing pigs, a small amount of linseed meal, you will always get better results, and always have healthier pigs. Lambs and colts should also be fed a portion of this food. Why? Because when you take a young animal from its mother you must prepare its food so that it shall be similar to the milk in its character, or the young animal is going to suffer. Hence, you make a combination which is nitrogenous, and contains enough of the oil meal to keep the bowels open, and in healthy condition, and you have got a food that supplies the place of milk.

If you make cheese, and you take out the nitrogenous material from the milk, then you must add linseed meal, and put that back into the cheese, and you supply the nitrogenous material you have taken out. The oil also helps to make the food better, and you can raise calves on whey, by putting in linseed meal, because you are supplying what is taken out.

It is the same way with pigs. If you feed sour milk or skimmed milk, you should feed linseed meal also. It and the milk contain the nitrogenous elements, and so you add more corn meal or barley meal, because the food will be more easily digested and balanced.

Now comes cotton seed meal, which is growing wonderfully in favor in our State. There is no food that will produce the amount of butter this will. In all our dairy rations, we put in about two

pounds of cotton seed meal. It is most excellent for milk and butter, but not so good for the young animal.

Here is the analysis; (referring to the chart) over half of it consists of food elements.

Here is the analysis of the mangolds; they have very few good elements, and a very large proportion of water—94.41. I have an idea in connection with the feeding of roots, which contains the germs, at least, of truth. It occurs from my own practical experience. I can feed turnips to sheep and produce the best of mutton. I have had considerable experience in the feeding of roots, and have come to the conclusion that there must be in them a nutritive value beyond what chemistry finds. I think there is a nutritive value in the water of the roots, on the same principle that a glass of Saratoga water will oftentimes cause a disturbance within you, because of the salts it contains. These are the elements. They have been put in that water while it has been coming in contact with the rock containing those elements through which it passes. This water has separated these elements from the rock, and they have been incorporated in the water. I believe that, on the same principle, the water in the roots contains, by absorption, elements not found in the solid contents of the root. I can account for the value of the roots in no other way. We know they help digestion, because, when eaten with solid foods, they moisten and put into more digestible condition these other foods than they would otherwise be. It is the moisture which helps to do this much more and sooner, but aside from all that, I think that the water in the roots contains elements of nutrition. I throw that out as the idea of a farmer, and as something that chemistry has yet to determine. Now, here is a chart which is of intense interest to me, because it demonstrates the truthfulness of my statements to you about feeding your cows for a purpose. This oil painting represents two sections of pork from different pigs, but exactly in the same place. Both sections are alike, so far as location in the pig is concerned. The pigs were both of one litter, fed one hundred days just alike and then separated and fed with entirely different food. The one was fed on nitrogeous food—on skimmed milk, wheat bran and dried blood, which is rich in nitrogen. The other was fed corn meal, strongly carbonaceous,

with only a small proportion of nitrogenous elements. They were fed in this way one hundred and thirty-six days. It was found that the pig fed on nitrogenous food had sixty-two per cent. more muscle than that fed on the carbonaceous food. A farmer who feeds his pigs entirely on corn is not preparing for his own use a good food—and farmers object to salt pork because it is indigestible. This is due to nothing more or less than the want of muscle. These red streaks are more red fibre than muscle. And in the one nature has eliminated this red fibre. It was necessary that this pig should have physical structure and frame, and hence nature has eliminated a sufficient amount of this fibre to give form and shape. The coarse fibre, as you know, is not digestible. Of course, you may perhaps soak or boil a little nutriment out of it, but it is not digestible.

This, the fatty part, is simply fibre put into this shape to contain the lard. The lard is the oil of the pig, which has been eliminated or transformed in the crucible of the body. If you cut it off and fry it out, as every lady knows, the result is a little scrap and a little grease. On the other hand, with the properly fed pig, you have a large amount of genuine muscle, and you have food which is different in its character from that of the other pig. We must also feed for bone as well as muscle. I spoke of the matter of feeding children on nitrogenous foods, in order that they may have the proper amount of muscle. In the two oil paintings I have here, you will observe there is a great difference between the muscle of the one and that of the other. It is the same thing with children. Children fed on sweet meats, sugar and starch, and that kind of stuff—the stuffs they are fond of, have this muscle here which is least desirable, simply fibre, in fact, no muscle at all—nothing but flabby fibre and no substance in it, and it makes puerile children.

The difference as shown in the two paintings here is the result of but one hundred and thirty-six days feeding, and compare that to a whole lifetime—for but twenty years, let us say. See the result of but one hundred and thirty-six days feeding in these two pigs; here is the bone in the one, and here the bone in the other; the one is sixty-four per cent. stronger than in the other. In the one we have brawn and muscle and a sturdy frame. Such a pig can jump over a four-

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foot wall without danger to its limbs, while the other would have a broken leg if it should but fall over a stone. The properly fed pig has fifty-nine per cent. more blood in it than the other, and the blood is the current of life. Many farmers attempt to fatten cattle upon corn, and while they had all the corn they could eat, they were really starving to death for want of the proper elements of food. You cannot expect to have success with young children, with young horses, or with young calves, unless you feed them properly. You must combine your foods properly and you can grow strong, vigorous animals—animals that will be useful and valuable, and who will be rid of most of the diseases and sicknesses which now afflict the animal kingdom.

The properly fed pig has sixty-two per cent. more muscle, and its kidneys are forty-nine per cent. larger. The other organs—the liver and spleen—are all of the same proportion larger; and this is the result of but one hundred and thirty-six days' feeding. Suppose you feed the animal during its whole life in that way, and you will be surprised to see what a difference it will make in the animal. On the other hand, feed them improperly and see how deficient the animal will be in the development of its internal organs. That is the key to so many mysterious diseases. Men are dying by thousands of mysterious diseases that you and I, Prof. Cook, never heard of when we were young, and it is all due to the character of the food. The physical organs are not sustained by proper food, and therein lies the difficulty.

Many of our Western cattle are slaughtered in unfit condition for food; a butcher once told me he never killed a pig coming from the West, except its kidneys were more or less diseased.

I am entirely satisfied of the importance of this lesson I am trying to teach you. Take it to heart, to your homes and to yourselves.

Of course, grown animals do not require so much nitrogenous food as the young animals, because they have their bone and muscle, but at the same time there is always a waste of muscle, and this must be supplied or the animal will become poor and weak and flabby, but if fed properly, to nourish the muscle and bone, they are all right.

Referring again to these two pigs which I have represented here, it was found, by Prof. Henry, that the pigs fed on nitroge-

nous food had made a gain of one hundred and fourteen pounds more in one hundred and thirty-six days than the pigs fed on corn. That proves my statement, that you can get a greater gain by combination of foods than by feeding entirely on carbonaceous foods.

In our State we have what is called a State Dairymen's Association. Last year they held a number of conferences, that is to say, they went to the farmers and organized dairy schools, and had experts to make butter. They required a certain amount of milk should be set apart by the person to whose place they went, and that cream should be reserved to make the butter of the experiment.

The first conference was held at Cornell University, and at that test it required fifteen and one-half pounds of milk to make a pound of butter. That was a very remarkable showing, because it takes thirty pounds of milk ordinarily to make a pound of butter in our State.

They came to my place, Kirby Homestead, and it was found that sixteen and one-half pounds of milk made a pound of butter, requiring one pound more of milk than at Cornell University. This was because we were not feeding so much of these special foods. We fed one quart of cotton seed meal and three quarts of bran, while at Cornell University they fed more.

Down in Delaware county, one of the most famous dairies in our State was tried. At that test nineteen and one-half pounds of milk were required for a pound of butter, and there the cows were fed with one quart of corn meal in connection with rich pasturage.

On another farm it took twenty-two and one-half pounds of milk for a pound of butter, and that was considered one of the best dairies in the county.

I might go on and give other illustrations if I had time, of one dairy where twenty-four and one-half pounds of milk were required, and of another where twenty-five pounds were required. Of twenty-eight dairies and creamery establishments tried, the general average was twenty-five pounds and a fraction, but the great general average is thirty pounds of milk to one pound of butter.

You can see that the lessons I have attempted to teach you

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are very important. You can see by feeding these foods you can return to your pastures the fertilizing materials the cows bring away, and you can restore the loss of the elements of fertility.

You see also you can improve the quality of your butter, and you can also increase the quantity by a proper mixture of these foods. You can build up the structure of the young animal, strengthen all the internal organs and fully develop the animal. In the feeding of your children these principles should also be applied, for you can give to them a physical structure you will be proud of, and that will fit them to go out in the world and cope with all its difficulties. You can improve their intellects also, because the intellect and the body are so closely allied. You can also sustain your vital nerve forces by a proper selection of your food. You can also restore your cows and horses and make them more profitable. With this brief summary of my experience as a dairyman, I will bring my remarks to a close (applause).

Mr. Collins: How about the importance of mixing these foods, whether corn meal or cotton seed meal, with clover hay, in order to get the best results?

Col. Curtis: They should always be mixed with coarse material in order to get the proper distention to the stomach of the animals. Pigs also require, very properly, some coarse material.

I had intended, if there had been a blackboard here, to have put on it a number of rations for producing butter and milk, and rations for feeding young animals, lambs and calves and colts, but I have here a number of rations worked out.

Mr. Vanderveer: How would you utilize the cornstalks in New Jersey? The practice is to feed the stalks night and morning, with a ration of bran.

Col. Curtis: I have the ration here worked out. I would utilize my cornstalks by feeding them to the cattle. The best plan of all is, however, to put your cornstalks in the silo, and then they are more digestible.

Mr. Vanderveer: You would advise every farmer to have a silo?

Col. Curtis: Yes, sir.

Mr. Meeks: You spoke of its being more digestible after passing through the silo. Is it not sour when it comes from the silo?

Col. Curtis : I don't believe in sour food. You cannot have anything sour without losing nutrition. The fact of its being sour shows that some of the sugar is turned to acid.

Mr. Meeks : Is there not a general impression that foods are worth more when fed sour ?

Col. Curtis : There may be such a general impression, but I think it is a mistake. I never feed anything sour. I was bred up with that idea, and we used to mix middlings in the swill barrel, and let it lay there until it fermented before feeding. I think it is a mistake.

Mr. Cook : Is not the silage, in some sense, soured or fermented ?

Col. Curtis : In the proportion it is sour it loses nutriment. If only a little sour, it is not injurious, and mixed with other foods, the silage is so much more digestible and will produce so much better results than the dry corn fodder, that we regard it of greater value than the fodder in its dry and natural state.

Mr. Cook : Is it best to leave it out before you feed ?

Col. Curtis : Only long enough to cool off, because it gets sour so very rapidly.

Mr. Pancoast : How far apart do you have the drills for the corn fodder, and at what stage of the plant do you put it in the silo ?

Col. Curtis. That depends upon the kind of corn grown. In New Jersey you have the advantage of us in being able to grow this sheep-tooth corn, and there is only a small portion of our State where it will mature. The favorite corn is the White Virginia and the Flint corn is also largely used. It is best to have one stalk about every foot apart. We have a system of putting it in drills a little thicker than we want it to grow, and then we harrow it before it comes up, and after it has come up, and after the leaf has expanded, we harrow it again, until it is too large to do so without injury. Of course, some of the plants are torn up, but we allow for this in seeding. When ready to grow, we do not want it any nearer than a foot apart. The rows of this large corn should be about three feet and one-half apart. Our own native corn will bear rows three feet apart. Cut it when the corn is glazed and the stalks green.

Mr. Loomis : What is your judgment with regard to feeding cattle on dry feed ?



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Col. Curtis : I believe in feeding them dry food. If the food is not perfectly masticated it comes back to the base of the tongue to be re-moistened and masticated again. This is what is called in cows chewing the cud. That is the reason it comes back again in order that the glands shall properly moisten the food and prepare it for digestion. We put our meal on the silage.

Dr. Hunt : Which kind of linseed meal do you prefer, the old or the new process ?

Col. Curtis : The new process is more digestible than the old, because it has been steamed. There is less oil in it and there is more nitrogenous food contained in it according to bulk. I want the old process for the health of the pigs and all my young animals.

Mr. Loomis : What would you recommend about brewer's grains ?

Col. Curtis : They are excellent for cows to make a quantity of milk, and good milk, unless they have begun to ferment and decay. Then they are not good for any purpose of food.

Mr. Loomis : The experience of some farmers is that they are not good until they have fermented. They put, perhaps, fifty to one hundred tons into a cistern and feed them from there to their cattle, sometimes putting them in in June. After they pack them in they are covered over as tightly as possible, and then they put on about six inches of earth to keep the air from them. After they are packed in the silo in this way they rise from a foot to twenty inches in height in the silo. In this shape they will keep until the next winter, perfectly fresh, and are relished by the cows more than when fresh from the brewer.

Col. Curtis : Are they sour ?

Mr. Loomis : No, sir.

Col. Curtis : Then they don't ferment ?

Mr. Loomis : But they rise in the cistern fully a foot or twenty inches.

Col. Curtis : I suppose there is some carbonic acid gas generated in the mass by partial fermentation. Does the whole mass rise in that way ?

Mr. Loomis : Yes, sir.

Col. Curtis : I have had no experience in that way.



Mr. Dalrymple : This has been a matter of considerable interest to us, and I would like to see it published fully in our report.

Mr. Collins : I move that we tender to Col. Curtis a vote of thanks for his interesting and able address.

The question being on Mr. Collins' motion, it was agreed to.

Mr. Pancoast : In reference to the feeding of this fodder corn, how large a crop is grown.

Col. Curtis : We have in our State yields of fodder corn all the way from ten tons to thirty tons. Of course, this last is an enormous yield. Common corn will yield about ten tons, and this Virginia corn, say fifteen tons, and excellent corn twenty tons, and so on up.

Let me say here that the future prosperity of the dairy depends on the silage. We cannot compete with the West in the growth of animals, nor in the making of butter, and unless we can get cheap foods and increased product from our dairies, we cannot stand. There is nothing better than the silo. My idea is to raise fodder corn and put it in the silo. I shall have twenty acres on my little farm, and get as much as I can to the acre. I shall try to get fifteen tons, or even twenty tons. This is the foundation of my farming, and all my stock industry, and in raising horses, pigs and lambs, or the feeding of whatever animals, the basis of my feeding will be fodder corn. I shall sell my rye straw, and in a year or two expect to sell a considerable quantity of timothy hay, and with the money thus received, I expect to buy wheat bran, cotton seed and linseed meal, feed it with silage, and get better results and larger production, and at the same time, bring the elements of fertility on the farm, rather than by the purchase of commercial fertilizers. You understand that of the amount of this food consumed the animal takes out but little. Wheat bran contains thirteen dollars' worth of nitrogen ; linseed meal, twenty dollars' worth, and cotton-seed meal, twenty-eight dollars' worth. This is based on the present market price. Of course, if the price is low they would not contain that much value. They contain a certain number of compounds. Now, when you buy these foods and feed them to your cows they take out about twenty per cent. of the value of these foods. The growing animal takes out not over ten per cent. Hence you see

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you have all the value, less this small amount, to go on the farm as fertilizing material, in a perfect and genuine condition, and you do not have to worry Prof. Cook to analyze your fertilizer to know whether you are being cheated. The elements of fertility are there and you need not worry. You are feeding your stock with the proper combination of food, and you are getting this amount of manure. You first get your pay from the animals, and then you get another profit on the manure, and that has got to be the future basis of our farming, or we go to the wall.

Mr. Martin: I would like to know your opinion as to a feed introduced largely by parties from the West, a kind of corn feed; is it a good feed for milk?

Col. Curtis: Yes, sir; it is a good food for milk, but don't make rich milk. It is a good feed with grain, with plenty of bran and linseed meal. [Laughter.]

Mr. Crane: I think this question of raising fodder is a very important one. We farmers want to save in our labor as well as in anything else. Why should there be a difference in the fodder corn raised by sowing the seed broadcast, and in that sown in the drill—say the seed is sown so there shall be about four stalks to the square foot; what is the difference between that which is cultivated and that sown?

Col. Curtis: I showed you that on the chart, and if there is any one else here who would like to see the difference, I wish you would come up here. The success of the fodder corn crop depends on the thickness. I have shown you on the chart here the difference between the two kinds of fodder—the one with less than ten per cent. of food elements. Corn is a sugar plant, and you can never get a development of sugar unless the sunlight can get all around the plant. You must have the perfect plant with the stalk covered with the epidermis or outer coating, and all these natural joints and sections, the complete stalk, with incipient ears; anything below that is inferior.

Mr. Crane: My practice has been to sow fodder corn broadcast. I undertook to put it in drills, and found it made a great deal of labor. I sow, perhaps, four stalks to a square foot, and my cows certainly do well on it, giving a full flow of milk. I would like to know how far I am wrong, because I am making a big mistake if I am raising so much water.

Col. Curtis: You are making a mistake. You have four stalks to the foot, and that is too close; if you had but two stalks to the square foot, you would get twice as much nutriment in proportion to the two, as in the four. On the beautiful land you have here you can grow this fodder corn with scarcely any labor at all. With us, we use the harrow, as I have previously stated; some use the old-fashioned square toothed harrow, and others use the Thomas smoothing harrow, which works better, because the teeth are turned backward.

Mr. Haines: Do you ever use clover in the silo? Some people think it much better.

Col. Curtis: Of course clover is better than corn, because clover is the most perfect food. I don't think it best, because we want our silo for corn, and we want the clover to feed with the silage. We want to feed cows forty pounds of silage a day, twenty pounds in the morning and twenty at night, and at noon-time five pounds of hay, and there is nothing better than clover hay.

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	Albuminoids.	N. Free Extracts.	Fat.	Fibre.	Ash.	Water.
Timothy.....	6.59	44.33	2.69	26.88	4.16	12.33
Meadow Hay.....	6.37	39.15	2.46	32.30	4.92	14.80
Orchard G. Hay.....	8.12	35.73	3.53	31.14	6.13	15.35
Red Clover.....	12.05	37.63	3.48	25.99	5.50	15.35
Silage (Old).....	1.00	7.92	0.84	5.14	0.96	84.14
Silage (New).....	3.62	24.80	2.56	8.11	1.72	59.29
Stover.....	6.47	35.87	1.25	28.43	5.35	22.63
Corn.....	8.90	67.16	3.82	1.74	1.30	17.08
Wheat Bran.....	14.56	52.56	3.11	10.83	5.53	13.71
Linseed Meal.....	31.52	34.95	7.03	11.54	5.13	9.83
Cotton-Seed Meal.....	40.56	23.86	13.57	3.56	7.39	11.06
Mangolds.....	Slight.	Slight.	Slight.	Slight.	Slight.	94.41

RATIONS FOR MILK, BUTTER AND CREAM.

PREPARED BY PROF. STEWART.

*For Milk :*

50 lbs. corn ensilage,  
6 lbs. cut oat straw,  
2 lbs. corn meal,  
6 lbs. prime shorts,  
4 lbs. cotton seed meal.

*For Butter :*

8 lbs. timothy hay,  
8 lbs. oat straw and corn stalks,  
5 lbs. oat and corn chop,  
8 lbs. wheat middlings,  
3 lbs. cotton seed meal.

50 lbs. ensilage,  
5 lbs. clover hay,  
4 lbs. oats, corn and rye ground,  
6 lbs. offal of roller bran,  
2 lbs. cotton seed meal.

40 lbs. ensilage,  
6 lbs. corn meal,  
3 lbs. cotton seed meal.  
25 lbs. corn ensilage,

40 lbs. ensilage,	10 lbs. best clover hay,
7 lbs. common hay,	8 lbs. corn and oats, ground.
7 lbs. shorts,	4 lbs. hominy feed,
3 lbs. cotton seed meal.	2 lbs. linseed meal,
	2 lbs. cotton seed meal.

50 lbs. ensilage,	40 lbs. corn ensilage,
6 lbs. corn and oats ground,	6 lbs. timothy hay,
6 lbs. wheat bran,	2 lbs. corn meal,
3 lbs. cotton seed meal.	3 lbs. wheat bran,
	4 lbs. red middlings,
	3 lbs. cotton seed meal.

60 lbs. corn ensilage,	30 lbs. ensilage,
10 lbs. wild grass hay,	6 lbs. cut rye and hay,
4 lbs. cotton seed meal.	6 lbs. corncob meal,
	6 lbs. wheat bran,
	3 lbs. cotton seed meal.

16 lbs. clover hay,  
6 lbs. corn meal,  
6 lbs. bran and sh' stuff,  
4 lbs. cotton seed meal.

6 lbs. clover hay,  
6 lbs. corn stalks cut and sh',  
10 lbs. oat and barley feed,  
6 lbs. cob meal,  
2½ lbs. cotton seed meal.

*For Fattening Cattle :*

50 lbs. ensilage,  
6 lbs. corn meal,  
4 lbs. cotton seed meal.

*For Fattening Hogs :*

1 lb. cut clover hay,  
3 lbs. corn meal,  
3 lbs. wheat bran,  
1 lb. cotton seed meal.

*For Cream to Sell :*

40 lbs. ensilage,  
4 lbs. mixed hay,  
4 lbs. oat straw,  
2 lbs. cotton seed meal,  
5 lbs. wheat bran,  
3 lbs. cotton seed meal.

*For Fattening Steers :*

12 lbs. corn fodder,  
5 lbs. corn meal,  
5 lbs. wheat bran,  
2 lbs. cotton seed meal.

*For Work Horses :*

10 lbs. timothy hay,  
4 lbs. ensilage,  
5 lbs. wheat bran,  
5 lbs. wheat middlings,  
2 lbs. cotton seed meal.

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# THE NEW JERSEY STATE WEATHER SERVICE.

ITS ORGANIZATION, WORK, VALUE AND REQUIREMENTS.

BY E. W. MCGANN, OBSERVER, SIGNAL CORPS, ASSISTANT IN CHARGE.

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*Mr. President and Gentlemen of the New Jersey State Agricultural Society :*

I have been requested to appear before you to-day and submit for your kind consideration a few facts regarding a service that is as yet in its infancy ; a service whose utility is but little understood ; whose value is even less appreciated, and whose requirements are absolutely unknown. An experience of seventeen years in the Signal Service necessarily brings with it a knowledge of the full value of the information thus obtained, and I crave the indulgence of this assembly while I lay before it a few points of vital importance which will show clearly the relation that exists between the National Government and the State, and the State government and the welfare of the agricultural community at large, most particularly that of the State of New Jersey. I shall touch briefly upon the service as operated in the other States of the Union—the organization of the service in New Jersey and its history. At the earnest solicitation of the late General W. B. Hazen, Chief Signal Officer of the Army, Dr. George H. Cook, State Geologist, and director of the State Agricultural Experiment Station, consented to accept the directorship of the New Jersey State Weather Service, (which was to co-operate with the National service) upon certain conditions, one of which was, that a member of the Signal Corps should be detailed to perform the clerical work and act as assistant. Owing to the many demands upon the time of Dr. Cook, it will be very readily understood this



task—I call it a task advisedly, for task it was, task it is, and task it will be until the State renders that aid which it owes to the tax-paying farming community—an assistant was sent by the government, Dr. Cook took charge and the first bulletin was issued in December, 1886. This bulletin contained reports from seventeen stations located in different parts of the State. Since that date a monthly bulletin has been issued regularly, containing a carefully prepared tabulated summary of the reports received, with what results? With this result, gentlemen: Where, heretofore, the bulletin displayed the names of seventeen stations, is now published results from no less than thirty-eight stations, more than double the original number. What better evidence of the usefulness of the service is required than this? From the beginning the advancement of the interests of the farmer and market gardener was the object sought. Was it gained? Yes. But was it appreciated? Only to a certain extent, yet the extent embraced was highly gratifying to the authorities at Washington, Dr. Cook and myself.

During the year, three thousand eight hundred copies of this bulletin were distributed throughout the State; copies were also mailed to all volunteer observers, to the directors of the various State services and to the press of the State. Agricultural papers, in particular, were furnished with the most complete data on the subject to be obtained, which data were duly published, thus giving enhanced value to the work of the service and additional publicity to its influence. In addition to the thirty-eight stations, which report monthly to the central office in New Brunswick, there are fourteen display stations that simply receive the daily indications and cold wave warnings; these offices display the signals. This gives the State Weather Service of New Jersey forty-nine stations in all. The demand for information of this character throughout the State is vastly greater than is consistent with the facilities afforded for supply. Such a condition of affairs is largely due to the failure to provide proper equipment for the registration and report of observations and the further maintenance of the service. This is not at all in keeping with the reputation of the State for advancement and research in other branches of economy politic; her appropriations for educational and agricultural pursuits compare favorably with any other State

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in the Union, but in the one vital field of interest to the majority of her citizens, that of the dissemination of information regarding the controlling elements, she is behind her collaborators.

There exists at present well organized and fully equipped stations in the following States: Alabama, Colorado, Dakota, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New York, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Wisconsin and the New England States. Shall New Jersey be added to this list? The Governor of Michigan, in his annual message to the State Legislature in 1887, recognizing the importance of State aid to the Weather Service, said:

“The General Government has sent to the Capital of the State an experienced member of the weather signal corps, and undertakes to give to us the full benefit of that useful service so far as it can do. This system has been of the greatest value to commerce for years past, and since it has been extended in its operations so as to reach the agriculture and other inland industries of some of the States, its usefulness has been much more marked. In order to make this service of more practical and widespread benefit, the Legislature will be asked to render some very slight, but imperatively needed, assistance, and I recommend that this be done as early as possible in the session.

Here are the principal items contained in the bill submitted: For the purchase of fifty complete sets of instruments, \$2,087.50; for weather signal flags, \$200.00; for the distribution of the indications, cold wave warnings by telegraph and telephone, \$4,000.00; incidental expenses, \$700.00; and for the salary of assistant to the directors, \$1,600.00; aggregating the sum of eight thousand five hundred and eighty-seven dollars and fifty cents. Now the bill for the organization of the New Jersey Weather Service, and which passed both houses of the State Legislature, but failed to become a law, only called for *one thousand dollars*, and among others contained this clause, “No part of said sum shall be paid for salaries of any officer or for office rent.”

Every county in the State should have at least one station fully equipped with a complete set of standard instruments, con-

sisting of a self-registering maximum and minimum thermometer. Dry and wet thermometers, instrument shelter, rain and snow gauge, and in selected portions of each county additional rainfall stations. The utility of knowing the rainfall of any locality is sufficiently obvious, and little need be said on the subject. A rain gauge should be accessible to every farmer and gardener. In the management of outdoor crops and plants, as well as in the construction of cisterns and tanks for the supply of water, a rain gauge is an invaluable assistant. By its use the gardener will be guided in judging how far the supply of moisture to the earth has been adequate and will appreciate how beneficial is even a hasty shower to growing plants, when he knows that a fall of rain measuring the tenth of an inch in depth, corresponds to the deposit of about forty hogsheads per acre, and that an inch of rainfall means a gallon of water spread over a surface of nearly two square feet, or a fall of about one hundred tons on an acre of ground. The study of the rainfall of a country is of great interest to agriculturists. The health and propagation of domestic animals, the development of the productions of the land, as well as the daily labors of the farmer, are dependent upon the excess or deficiency of rain. The establishment of these stations will put within reach of local agricultural clubs and individual farmers the means of accurate observations upon the relation of the weather and our crops. Without a weather record in figures, our conception of what the weather was during any particular season or year is sure to be very unreliable.

Prof. Smock, in his *Climatology of New Jersey*, says: "As factors of climate, the amount and distribution of the rain and snow are the most important factors, after that of temperature. They exercise a controlling influence in agriculture, and determine largely the kind of crops and the mode of cultivation of the soil."

Dr. E. M. Hunt, Secretary of the State Board of Health, in a letter acknowledging the receipt of certain climatic data, furnished by this service, said: "Your work has been of much aid to us, and will enable us still more to study the relations of climate to disease in different parts of our State. If uniform and continuous observations are kept up, we will have by your bureau a series of records upon which we can rely."

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As a further evidence of the benefits to be derived from a well organized weather service in this State, permit me to give just one more quotation. The Michigan Board of Health, in its annual report on the subject, says: "I may add that this branch of the work (the State weather service) has already yielded valuable data, for which the study of the causation of two of the most important diseases which caused deaths in Michigan, namely, typhoid fever and pneumonia, it having been shown by means of the data thus collected that the rise and fall of the typhoid fever in Michigan is apparently controlled by the rise and fall of the ground-water. The causation of pneumonia appears to be in an entirely different manner, not materially influenced by the rainfall, but it is controlled by the atmospheric temperature and humidity. Now, as soon as this is fully understood by the people it is hoped that many lives may be saved, even though such climatic conditions cannot be changed, except in buildings in which, after all, a large part of the time of most people is spent." I might go on and quote from other well recognized authorities the benefits which may be derived from a properly organized weather service.

Beginning in May, and continuing during the crop season, there was issued from the central office, with the co-operation of observers, a weekly crop weather bulletin, containing in brief a summary showing the actual condition and progress made during each week, of the staple crops in nearly all parts of our State. The observers selected for this important work were well known and responsible men, which greatly enhanced its value. These bulletins were published by the most influential papers of the State and were highly appreciated by the farmers, the press and general public. Permit me here to read the testimony of a farmer of Union county.

### HOW FARMERS APPRECIATE THE CROP REPORTS.

UNION, N. J., July 24, 1888.

*E. W. McGann, Observer, State Weather Service:*

SIR:—My brother farmers come to this station within an hour after the reception of the "Weekly Crop Bulletin," and hear it read. A score of them have charged me to convey to you their

hearty thanks for the valuable and timely information it contains. The farmers appreciate your good work.

This prompt intelligence can be obtained here in no other way. The condition of the crops of the whole State is known here within a circle of a mile from this station in a few minutes after the bulletin arrives, and before the close of the day in a large part of our township.

To obtain just this kind of intelligence far in advance of the farmer, the sharp speculator pays a high price, and too often, heretofore, the farmer has accepted a price for certain products far below their actual value. It is well known the farmer gets little enough for his produce, while the consumer is made to pay a high price. This bulletin should be widely disseminated throughout New Jersey for the benefit of its farmers.

I might enlarge on the usefulness of this bulletin. The point in the following is a pertinent illustration :

We do not raise grapes here extensively. One of my neighbors has an acre promising well. No rot at present is appearing here. A dealer saw the advantage of securing this crop rather than depend on shipments from York State or elsewhere. It being near at hand, he could market it at most favorable times. Yesterday he offered the farmer what might usually seem a fair price. The farmer brought him to my residence and I read to him the report from South Jersey : "Concords, seven-eighths gone ; Clintons, half." The result was, the speculator advanced his offer \$30 and the bargain closed.

The farmer told me afterwards that he considered the bulletin worth just \$30 to him in this instance alone.

Comment : The dealer was posted—so was the farmer.

Very respectfully,

F. L. DUNBAR.

The circulation of the bulletin during the crop season, by the press of the State, averaged over one hundred thousand copies weekly. Now a few words with reference to the weather and temperature signal feature of the service. Dr. Cook, in his remarks before this Association last year, said :

"We heard, yesterday morning, that the United States Government was willing to send every day to at least twenty-five sta-

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tions in New Jersey, at points distant from points where such information is generally secured, and in localities where the daily papers are not delivered so early, daily information in regard to the probable changes in the weather. This information they are willing to send by telegraph, giving the probable changes for the following twenty-four hours. They are willing to do this, if we will pick out the locations for these stations, and the information will be telegraphed free of expense."

The following display stations have been established during the year :

### SIGNAL SERVICE WEATHER AND TEMPERATURE SIGNALS.

DISPLAY STATIONS OF THE N. J. STATE WEATHER SERVICE.

PERCENTAGE OF VERIFICATIONS FOR THE MONTH OF DECEMBER, 1888.

STATION.	DISPLAYMAN.	WEATHER.	TEMPERATURE.
Belvidere.....	F. S. Widner.....	72.0	80.0
Bridgeton.....	H. A. Jordan.....	88.0	84.0
Clayton.....	W. T. Wilson.....	86.7	83.3
Egg Harbor City.....	H. V. Postma.....	92.0	92.0
Madison.....	Wm. T. Brown.....	—	—
Newark.....	Crane & Co.....	100.0	100.0
Newton.....	H. O. Ryerson.....	80.4	80.0
New Brunswick.....	Janeway & Co.....	83.9	83.9
Plainfield.....	R. J. Shaw.....	88.5	88.5
South Orange.....	Dr. W. J. Chandler.....	76.0	76.0
Trenton.....	Sol. Runeman.....	92.3	92.3
Westfield.....	E. R. Collins.....	92.3	100.0
Woodbury.....	C. W. Starr.....		

### PERCENTAGE OF PREDICTIONS FOR THE STATE.

Weather .....	86.6
Temperature. ....	87.3
Mean .....	86.9

We have room for as many more. In order to secure the benefits of this service, the only outlay or expense necessary is the purchase of a set of signal flags, which cost from four to six dollars per set, according to size.

As I said, the displays may be greatly extended, and become one of the most valuable aids to farmers and the public generally.

Many large firms are displaying these signals, and at the same time advertising their business by printing the signals and their meaning on the back of their business cards.

Now, Mr. Chairman and gentlemen of the Convention, I have endeavored to lay before you, in as concise a manner as possible, the history and work of the service. It should be remembered that it is entirely a voluntary organization, hence we find it very difficult to establish stations in the mountainous and southern portion of the State. We have no stations in Warren and Sussex counties in the north, and Salem, Gloucester and Camden counties in the south, so the climate of the extremes of the State is entirely neglected. We should have in the northern portion a station at Newton, Blairstown, Deckertown, and the northern central portion of Passaic county, and in the southern portion one at Cape May Court House, Harrisonville, Atco and Vineland. The other portions of the State are amply provided for, if they were uniformly equipped with the standard instruments. The observers have purchased their instruments, and by an accident any one of which is liable to be rendered unserviceable, necessitating the purchase of a new one ; this the observers do not like to do, so the valuable record of that instrument is lost, possibly for all time. Then owing to a change in business or of residence to some other portion of the county or State, a valuable record of a locality is suddenly rendered useless or greatly impaired, simply because the instruments are the property of the observer and not of the State. During the past year and a half we have lost several valuable stations on this account.

You may ask how, under the present organization, have we managed to issue during the crop season a weekly bulletin, and during the year a monthly bulletin, without an appropriation to defray the expense. I would say that in the first place the chief



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signal officer furnishes all the materials, stationery and franked postal notes for the crop bulletin, so that this expense is borne by the national government. The expense necessary in printing the monthly bulletin is in part made up from one or two advertisements, but the space is limited, so that the revenue derived from that source does not equal the expense of the service. So far during the year no funds have been received, excepting those mentioned above, so that we are a little behind in respect to finance, and we hope that this Society will appropriate a sufficient sum to clear our indebtedness.

Now, gentlemen, in conclusion, I would say that having been virtually in charge of the service during the past year and a half, I have felt a deep interest in its progress and success, and my ambition is to see the weather service of New Jersey placed upon a solid foundation by the State. I have again drawn up a bill for its proper organization, and sincerely hope that this Association will take speedy and favorable action and appoint energetic and influential men who will interest themselves in this measure and see that it becomes a law.





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COMING PROBLEMS  
IN  
AGRICULTURAL CHEMISTRY.  
BY H. W. WILEY.

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# COMING PROBLEMS IN AGRICULTURAL CHEMISTRY.

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BY H. W. WILEY.

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The science of chemistry applied to agriculture may be said to have had its beginning with Liebig. It is scarcely yet three-quarters of a century old. Although so young a science, and so greatly neglected in popular schemes of education, it has, nevertheless, accomplished a great work for agriculture. Before the time of Liebig experience had taught men the differences in soils, the value of manures and the good effects resulting from the application of certain mineral compounds to the growing crop. In the absence, however, of any definite knowledge concerning the action of these bodies, there was no general idea of their usefulness and no intelligent method of applying them. In the ancient writings on agriculture we look in vain for any correct idea of the constitution of plants or their nutrition. The necessity for rain or irrigation, the value of cultivation, the need of rotation of crops were all recognized and taught, but this was all. With Liebig came a new era. He collected the studies which had been made in a desultory way on plant composition and plant physiology and first formulated a definite science of agricultural chemistry. Before discussing the question "what has chemistry yet to do for agriculture?" it would be well, perhaps, to take a view of what has already been accomplished; but such a review, even of the briefest character, would occupy the whole of the time of this address. I must content myself, therefore, with only an outline of what has been done, in order

that the problem of what is yet to do may be placed in a proper light.

As is usual in the beginning of a new science, the most extravagant things were claimed for it. An analysis of a soil was supposed to reveal certain defects which could be cheaply and easily removed. With such an analysis a soil poor, hard and unproductive might be turned into a field as rich as the most valuable alluvium. The labor of the farmer would thus be made to produce four-fold, and even more, as much as before. Wealth would flow into the coffers of the agriculturist and the necessity for unceasing toil be removed. By a study of the composition of plants those suited to a given soil would be discovered, so that even without the aid of fertilization the most wonderful returns might be secured. These extravagant notions were very broadly disseminated and still exist in the minds of many people. The agricultural chemist is rather disappointed than otherwise if the morning mail does not bring him a sample of a few spoonfuls of earth scraped up somewhere within the broad domains of the United States, accompanied by a letter from its credulous possessor, asking that an examination be made and that he be informed of the kind of crop which would grow to the best advantage in his fields.

I, indeed, would be the last one to hold in small value the results of soil investigation and the composition of plants in regard to their effect upon production; but I need not call your attention to the fact that these extraordinary expectations cannot, in the very nature of the case, be realized. It will occur to you at once that a small sample of earth, taken at random from a field, could only represent the mean composition of that field by an accident which could occur only once in almost an infinite number of times. The analysis, therefore, although it might represent perfectly the sample sent, might apply with equal justice to a thousand fields remote from the one from which the sample came, both as to distance and character of soil. The value, therefore, of soil analysis depends first upon an accurate and scientific method of taking samples and a sufficient number thereof to give a general idea of the composition of the field in question. The erroneous notion that agricultural chemistry, by a simple soil and plant analysis, can remove the necessity for labor, smooth the

rough road which the farmer has to travel, diminish the hard toil which farm work requires and bring untold wealth into the coffers of our agriculturists, should be removed as soon as possible.

It is true a wealthy man may be a farmer, at a distance, and not be a laborer; but those of us who have been brought up on a farm know that there is no easy road to agricultural prosperity or wealth. Chemical analysis is not a talisman which will confer invisible powers to plow fields and gather harvests. There are accidents in all professions which sometimes bring success or failure without regard to merit; but in agriculture, as in any other profession, true success is reached only by industry, labor and good sense. "Blessed be agriculture if you do not have too much of it" is a good motto for the man who farms by proxy, but it is a poor one for him who uses his own hands.

I therefore dismiss the notion of the millennium of agriculture which shall come by reason of chemistry, or botany, or agricultural schools, or experiment stations, or—dare I say—by the State boards of agriculture? The coming farmer, like his ancestors, will rise with the lark, bear the burden and heat of the day, and literally, by the sweat of his brow, earn his bread. Nevertheless, do not understand me to take a wholly pessimistic view of this problem. I think I recognize as fully as anyone here the real value which all these sources may bring to agricultural science, and the way in which this value is to manifest itself, in my opinion, will appear further on.

At the present time there is a lively interest throughout the agricultural part of our country in the outcome of purely scientific investigation. The lines of agricultural progress seem to be in the following directions: First, purely scientific investigations, or what may be called abstract science. As an illustration of this kind of work, I may mention the study of the composition of the fatty acids as they occur, either in the fats of animals or the oils of plants. Second, practical experiments in the growth of various agricultural products in agricultural experiment stations, or in the production of other agricultural substances. As an illustration of this kind of work, I may mention the growth of plants under various forms of fertilization, the product of butter and milk from various kinds of foods and different varieties of

cattle ; or the production of fat in animals intended for slaughter by experiments of different kinds of diet. The third line of progress is in the application of all of these principals and practically working them out upon the farm. The latter, of course, is the chief object to be gained by all the other studies and necessarily comes last in the list. It must not be understood that all these lines of investigation or progress are distinctly separate ; they even merge into each other and may be pursued as co-ordinate branches of study. A favorable influence to all of them is the instruction which is given in our agricultural colleges, in the granges of the patrons of husbandry, in farmers' institutes, reports of State boards of agriculture and in other ways.

I am not one of those who would give to his own particular branch of study any degree of importance more than it justly demands, but I think that each one of you will agree with me in saying that in this progress which the future has in store for agriculture the science of chemistry will play not a mean part. Lying, as it does, at the very foundation of our knowledge of plant composition and plant growth, of the genesis and character of soils, the theory of the rotation of crops and the composition and value of fertilizing materials, there seems to be no branch of agricultural progress with which it is not intimately connected. I propose, therefore, briefly at this time to sketch some of the great problems connected with agriculture, with which the science of chemistry is now busy and by means of which the agricultural prosperity of our country may be promoted.

#### CONSERVATION OF MINERAL PLANT FOOD.

The most valuable mineral substances entering into the composition of plants are phosphorous and potassium.

In the cereal products alone of our country, the quantity of phosphoric acid annually removed from the soil is nearly three billion pounds. By the same crops a total weight of over four billion pounds of potash is consumed. This consumption of plant food per acre amounts to twenty-eight and eight-tenths pounds for potash and nineteen pounds for phosphoric acid. Taking into consideration all the agricultural products of the

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United States, the actual market value of phosphoric acid and potash consumed annually is fully one billion dollars. It is true that the stores of these materials in the soil and sub-soil accessible to plants are very great and it would require many years of cultivation and robbery to entirely exhaust the supply.

Did we not believe, therefore, in a hereafter for agriculture, there would be no need of study to supply the wants of the present generation. But that system of agriculture which leaves the soil impoverished is an insult to the present and a crime against the future. The soil has rights as well as its tillers and it should be protected in its exercise of them. The inalienable right of a soil is to maintain its fertility; its highest privilege is to have the fertility increased. Therefore, the first problem which chemistry must solve for the future of agriculture is to show how to preserve the present stores of mineral plant food in the soil and to increase them.

If a plant be burned, the whole of the mineral ingredients will be found in the ash. This fact shows the indestructibility of the mineral constituents of plants and thus narrows the problem of their conservation to one of simple economy. First of all, all plant residues should be carefully preserved and returned to the fields. In our Western States, and this is no fiction for I have seen it myself, the early stables and barns were not elaborate structures, more attention apparently being given to the ventilation of the stock than their protection from storms. Rail pens or rude enclosures made from saplings and covered with clapboards illustrated the prevailing style of barnyard architecture. When the manure would accumulate the farmer found it easier to move the stable than the manure. The faithful earth was treated with no respect, and on the theory that its fertility would last forever, many waste acres, abandoned to briers and broom sedge, attest the certain end of such a system of agriculture or *agripina* as it would be more properly called.

In addition to preserving all of these mineral treasures the soil already contains, the future chemistry will seek still further stores of them now inaccessible to plants. Already the caverns of the earth near Stassfort have been made to disgorge vast quantities of potash, imported into this country as kainite. The phosphoric deposits of this country, especially those in the



neighborhood of Charleston have already been explored and there is no reason to doubt that many more extensive mines of potash and phosphoric acid will be discovered. The chemist of the future will also study further into the best methods of making the substances more assimilable. Potash tied up in granite or in silicates is of no value whatever to the hungry plant. Phosphorus insoluble in apatite or South Carolina rock is of little help to the growing cereal. Much has already been done in chemical science to render these substances available; but he understands but poorly the limits of science who would assert that all has been accomplished. The various stages of change a mineral undergoes in passing from the fertilizer through the soil, or directly from the soil into the organism of the plant, are still but imperfectly understood. The laboratory of the plant, apparently a simple cell, challenges the most costly and perfectly equipped workshop of chemistry.

The analysis and synthesis which takes place in the plant tissues are the wonder of the highest scientific authorities. Here is indeed an inviting field for the future investigator. The way has been marked out by Maerker and Hellriegel, by Vines and Gilbert, by Berthelot and Andre, and many others. But while the way has been pointed out the work is scarcely begun. It would be out of place for me here to even outline the character of the work. I am addressing a company of intelligent farmers and not a society of trained chemists. In a general way I may say that the changes which go on in plant life, what is known as metabolism, are doubtless subject to definite chemical law. The conditions which attend them may be formulated and the exact course of the phenomena followed out and described.

Of much greater concern to the chemistry of the future, however, is the nitrogenous part of plant food. It may seem strange to give any consideration whatever to nitrogen as a source of food since it is remembered that the earth is clothed with an envelope of nitrogen, the weight of which is more than ten pounds for every square inch of the earth's surface; but in spite of this great wealth of material the nitrogenous food of plants, measured by its nutritive value and its market price, is the most costly of any article on the vegetable bill of fare. The total amount of nitrogenous materials entering into one agricultural harvest of the United

States is more than eighty billion pounds and its value, at the market rate of eighteen cents per pound for nitrogen, is over five billion dollars. If we were to estimate the nitrogen enveloping the earth, according to the market value of nitrogen in the proper form for plant food, the wealth of the possessor of an exceedingly small farm would be enormous. The value of nitrogen on one square inch of surface would be \$1.80 and the value on one square foot would be \$260.00, nearly. I will not make the computation for a single acre because the sum would be so large as to elude adequate comprehension. In view of the fact, therefore, that we have this great abundance of plant food in the atmosphere, why is it that its market price is so high and its importance for the future prosperity of agriculture so great? The answer is a most simple one. Free nitrogen, the form in which it exists in the atmosphere, is not assimilable by the growing plant, or if so, only by certain kinds of plants and to a very limited extent. The nitrogen which nourishes plants is what is known in chemistry as combined nitrogen and especially that form known as nitrates or albumenoids. The progress which has been made in the study of the relations of nitrogen and plant growth has already been great. We know a great deal more at the present time in regard to the chemical and physiological relations of nitrogen in regard to plant development than was known at the time of Liebig. In a recent address before the American Association for the Advancement of Science, I gave a full resume of our present knowledge in regard to nitrogenous plant food. In a still more recent address before the Society for the Promotion of Agricultural Science, Prof. Caldwell gave a similar summary. Even an abstract of these two studies would take all the space allotted to this paper; I can, therefore, only give a few points which will indicate what is to be done rather than what has already been accomplished. According to our present knowledge, all forms of nitrogenous food before assimilation by plants, is converted into nitric acid or nitrates; even ammonia, which was formerly supposed to be capable of direct assimilation, is now known to enter plants only after it is oxidized to nitric acid. Nitric acid and nitrates being soluble in water are thus presented in the most convenient form for assimilation or absorp-

tion to the rootlets of the plant. ¶ In the last few years we have also learned the general way in which the conversion of the nitrogen in nitrogenous matter takes place. A few years ago this was supposed to be the result of oxidation or slow combustion; it is now known to depend, however, upon an organism or nitric ferment, under the influence of which the nitrogen is rapidly oxidized. When proper precautions are taken for sterilizing soils so that the action of this organism can be prevented, it is found that no assimilation whatever of nitrogenous food can take place from the roots of the plant. The efficiency, therefore, of a nitrogenous food will depend upon the completeness with which this oxidation takes place under the influence of the organism mentioned. It must be remembered, however, that there is a de-nitrifying as well as a nitrifying ferment. The nitrogen existing in an albumenoid may be wholly converted into a nitrate, but this nitrate may afterwards be decomposed under the influence of another organism in such a way as to produce unassimilable oxides of nitrogen or even free nitrogen. It thus appears certain that much of the nitrogen existing in organic and other combinations suitable for plant food, may be lost during the progress of the changes noted. One great problem of chemistry in its future relations to agriculture will be to push forward the investigations which have been so well commenced by Gayon and Dupetit, Schlosing and Muntz, Warrington, Springer, Berthelot and Andre and many others. The practical advantage, which must accrue from study can scarcely be overestimated. Exact and thorough knowledge of every process connected with the physiology of plant growth and the chemistry of plant food cannot fail to result in economic applications of the most important character. Taken in connection with the investigations which Berthelot and Andre have inaugurated in regard to the occurrence and localization of chemical substances in the plants themselves, we may expect to see, not only our theories of plant fertilization, but our methods of the application of fertilizers changed, perhaps radically for the better, as a result of those investigations. I have mentioned already the constant loss of nitrogen which occurs during the decomposition of nitrogenous compounds.

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in the soil. Other losses are due to other sources ; for instance, there is a certain waste even in the economy of nature which, perhaps, scientific agriculture may diminish but never entirely avoid. Vast stores of nitrogen are carried into our rivers and oceans by rain and floods. Much of this, perhaps, may afterwards appear in forms suitable for food for man in fish taken from the ocean and other marine products cast upon the shores ; nevertheless, we must admit that much of this valuable material is lost forever to terrestrial plants and animals. Not only are these matters carried down in solution but even the soil itself is bodily transported, as the vast quantities of silt seen in our rivers during times of flood are a witness. Many of the fertile hills along our river banks have been almost denuded of their soil ; in fact, quite so of their first covering, by the process I have mentioned. What, we may ask, will be the final results of this constant waste ? There can be only one answer, viz : That the stores of nitrogen available for plant food will greatly diminish at the very time that the quantity of plant food required will be increased. In view of this fact we may ask is it not possible that some of the great stores of nitrogen existing in the atmosphere and other apparently unavailable sources may not be put into a form in which they will enter into the composition of plants ? The answer to this question will indicate at once that the chemistry of the future will have to consider very carefully the problem which has already been the theme of such fruitful discussion, viz : does nitrogen enter directly into the plant organism ? This is a question also, in which chemical opinion is at the present time widely divided. Seherain, Berthelot, Muntz, Hellriegel, Atwater and others, claim that it is demonstrated that plants actually do take nitrogen from the air. This may not be done directly through the leaves but it is more probably secured by the previous fixation of nitrogen in some way in the soil and its subsequent oxidation by means of the nitrifying ferment already noted. In the pursuit of this great problem it seems to me chemistry may, in the future, perform the greatest service to agriculture. Let us grant for the moment that the nitrogen of the atmosphere in some way may enter into plant life. This allowed, we already see that there are certain kinds of plants which seem to possess the power of fixing nitrogen in an excep-

tionally high degree. The cereals seem to be devoid of this property as far as we know at the present time, though subsequent investigations may alter our opinion of this subject. On the other hand, the bean family, clovers and some other plants seem to possess this property in a high degree. Our lines of future study will lead us to more accurate knowledge of the conditions upon which this assimilation of nitrogen depends and the kinds of plants which are best adapted to secure it. If chemical science may point out to the future farmer a certain method of fixing even an extremely small portion of the nitrogen with which he is surrounded, it will secure a vast increase in the products of the fields and do much to relieve the political economist from all anxiety in regard to the future food supply of the human race.

As an illustration of the character of the future studies in regard to the occurrence of compounds in different parts of plants and at different periods of growth, the following resume of our knowledge of nitrates may prove useful.\*

As has long been known, nitre is present in considerable quantities in sugar beets and allied plants, and the osmogenes in use in the sugar factories of Europe show how eager the operators are to be rid of this highly melassigenic material.

Even as long ago as 1747, Sachs† pointed out the existence of nitre in tobacco, wall pellitory, and fumitory (*Fumaria officinalis*).

Pursuing the study of the Agricultural Chemical Station, at Meudon, Berthelot has shown practically the universal presence of nitrates in plants. This general occurrence of nitrates gives a new economical value to the nitrifying ferment.

Berthelot and Andre‡ make a further study of the occurrence of nitrates in the different parts of plants, and also give the methods of estimating the nitrogen thus combined, a method which consists essentially in extracting the nitrates by sixty per cent. alcohol, and determining the nitrogen after evaporation of the spirit by Schlosing's method. They show further,§ that the percentage of nitrate increases in the growing plant (notably in borage), up to the commencement of florescence. During

\* The Economical Aspects of Agricultural Chemistry. Wiley, pp. 34, 35 and 36.

† *Fundamenta Chymicæ*, Para. 11, p. 105.

‡ *Comptes Rendus*, Vol. XCIX, pp. 355 et seq.

§ *Ibid.*, pp. 550 et seq.

the period of seed formation nitrates diminished in quantity, being presumably used in the formation of albumenoids. Afterwards the quantity of nitric nitrogen again increases. In respect of the distribution of the nitre, they show \* that the stalks of the plant contain most of it, next, the roots, and, last of all, the leaves and seed.

As to the actual weight of nitre produced per hectare, Berthelot and Andre † give some interesting facts. The plants which seem to be most nitrifiant, and the quantities of potassium nitrate furnished by them per hectare, are given in the following table :

<i>Borago officinalis</i> .....	120 kg.	Kno.
<i>Amarantus bicolor</i> .....	128 kg.	Kno. ‡
<i>Amarantus caudatus</i> .....	140 kg.	Kno.
<i>Amarantus pyramidalis</i> .....	163 kg.	Kno.
<i>Amarantus giganteus</i> .....	320 kg.	Kno.

It appeared from the analysis of the soil before and after the crop that the nitrogen in the above was derived chiefly from the soil. The authors say, however : "The atmosphere, perhaps, furnished some of it, in the form of ammonia or nitric acid ; possibly also, of free nitrogen, a question which we will reserve for the moment."

Of interest also in this connection is the ammoniacal ferment described by Ladureau, § which exists in the atmosphere and the soil, and which is especially active in transforming urea into ammonia, and thus fitting it for nutrification and absorption by the plant. Ladureau announces that he is seeking for a body that will temporarily destroy the activity of this ferment, so that the urea of barn-yard manures, etc., may be preserved from conversion into ammonia until such time as the plant may most need it. Chloroform retards the action of the ferment, but ordinary antiseptics, unless used in large quantities, do not. It must be confessed that a means of arresting this fermentation in the manner indicated would prove of immense value to the agriculture of the world.

\* Ibid., pp. 591, et seq.

† Ibid., pp. 683, et seq.

‡ Comptes Rendus, Vol. XCIX, pp. 355 et seq.

§ Ibid., p. 877.

In further discussing the origin of this large amount of nitric nitrogen in the plants, the authors come to the conclusion that it is not all furnished (as nitrate) either from the soil or from the rainwaters, but that its formation is a function of the plant itself, analogous to the nitrification which takes place in the soil by the action of the ferment described by Schlosing and Muntz. Those parts of the plant which are the seats of the most vigorous oxidations, viz: the cells of the stalk deprived of light, all the localities where nitrogen is most rapidly converted into the nitric forms, while the leaves and parts most exposed to the light, the chlorophyll-reducing organs, produce the opposite effect. In other words, the formation of nitric acid takes place in a manner entirely analogous to that of carbonic, oxalic, tartaric, malic, citric and other highly oxidized acids.

These views of chemists so distinguished, based as they are on a series of experiments, extended and laborious, even if not above criticism, must command our most serious attention. They expressly admit the possibility of the use of the free nitrogen of the atmosphere, but are careful not to literally affirm it.

The combined nitrogen which is the product of vegetable and organic life forms the chief source of nitrogen for the growing plant. Before it is assimilable by the plant it undergoes a process of oxidation, which is due solely to a living organism. The nitrates thus formed are absorbed by the plant, and the albuminoids of the new growth are formed from the nitric nitrogen by a process of reduction. The nitrates themselves are subject to the action of a ferment by which deoxidation takes place, and free nitrogen and nitrous oxide are evolved. The diminution in the quantity of available nitrogen thus supplied is restored by the fixation of free nitrogen by the action of organisms in the soil, or by the oxidation of free nitrogen by the interior cells of the plant acting in a manner analogous to the nitric ferment in the soil, or by the oxidation of free nitrogen by electrical discharges or by combustion. The quantity of combined nitrogen brought to the soil and growing plant by rain water and the atmosphere arising from the last two phenomena is an inconsiderable amount when compared with the whole weight required by the crop."

Another line of investigation which promises much for the



future is in the direction of physiological chemistry, I refer especially to composition of plants in reference to their relation to the digestive organs of animals. There is a growing belief among agricultural chemists that the old methods of estimating the value of food, food-stuffs and fodders is in need of revision. Preliminary to this revision is an exhaustive study of the components of food plants, their distribution in the plant and the point of growth at which a food crop should be harvested in order to secure its maximum value. I remember, when a boy, to have listened to discussions among practical farmers in regard to the best time of harvest for the hay crop. Some contended that the grass should be quite ripe, others that it should be mown while still a little green in order to secure the best results. In the same way, some farmers would begin to cut their wheat while still a little soft and others wait until the grain was quite hard. All of these questions have been somewhat complicated in the last few years by the introduction of the silo and its consequent problems of fermentation and decay

It is evident, however, to the careful observer that all these questions are about to be re-opened, both from a scientific and economic point of view. The crude and digestible fibre of fodders merits further investigations. It may be that fodders will be found more nutritive than they are now considered to be; and the proper methods of preparing them for consumption so that their maximum nutritive properties may become available will be pointed out.

So too much yet remains to be done with the carbo-hydrates in the same direction. The chemical changes which starch undergoes in the plant from its first formation, with the help of chlorophyll in the leaf, to its final deposition in its roots or grain, afford a most inviting field for investigation. It may be that the chemistry of the plant will elude all investigation, but I am fully of the opinion that another half a century will reveal much that is now mysterious. We will know then, perhaps, whether sugar, the kind known as cane sugar and also the other forms known as glucose, fruit sugar, grape sugar, invert sugar and inactive sugar are congeners of starch, whether they are transformed in the plant and whether this transformation may go on in both directions, either by hydration or de-hydration.



In like manner the chemico-physiological studies of the animal and vegetable glycerides, known as fats and oils, will deserve a full share of attention. In the oil of the cotton seed we have found a cheap and apparently wholesome substitute for olive oil, yet this oil contains some peculiar properties which demand for it special investigation. Among these I may mention the fact that cotton oil is capable of rapidly reducing nitrate of silver and separating the silver as metal. This property persists even through saponification and subsequent recovery of the fat acids. This only serves to illustrate the paucity of our knowledge concerning some of the most common food products. Who knows, for instance, the relative composition of the oils in the different cereals? Likewise the oils from almost every kind of food, both for man and beast, are well worthy of future study. Conjoined with these studies of constitution must be found further investigations of the action of the digestive juices on various food products. A short time ago I was asked to examine a number of supposed gall stones. The patient had taken a pint of sweet oil, and these stones were supposed to have come from the gall bladder and duct as a result of this remedy. These supposed stones proved to be concretions of soap and free fatty acid, the whole amount of oil having been completely decomposed during its short stay in the alimentary canal. Such a change worked by the digestive fluids on oil is unknown in the teachings of physiology. In fact the young student who mourns because there is little left for him to do, should rather stand appalled at the amount of work which is still before him. Hardly a commencement has been made. Those who at this time in the next century shall stand in our places, even after so much has been accomplished, will still have "all the world before them where to choose."

In addition to the points already mentioned there is another closely-related problem. For many years in scientific agriculture the special breeding of animals for definite purposes has been practiced. In one case speed has been the object sought, and the trotting horse has been developed; in another case, fat has been sought and the modern hog is the result.

So, too, in cattle, beef and butter as objective points have resulted in the Holstein and the Jersey. When our knowledge of

foods has been extended, as already indicated, it will be possible to secure in part the desired changes in animals by a judicious selection of food.

The physical differences in the fat and flesh of mast and corn fed hogs have long been known. It will be both interesting and instructive to study the composition of the tissues of animals fed on cotton or sorghum seed, swill, etc., and other substances. Oats have long been recognized as muscle forming food, and this is doubtless in part due to their contents of nitrogen. In fact, cereal eating nations have long been taking the lead over rice and fruit eaters. In eastern nations, where rice is the principal food, there is a permanent conservatism; changes are slow and painful. There is a definite relation of pure carbo-hydrates and nitrogenized carbo-hydrates to the progress of civilization.

As an illustration of the results which are to be obtained by the scientific adjustment of food to a definite end, the data recently collected by A. Mayer may be mentioned. When a cow food consists chiefly of mangelwurzel the content of volatile acids in the butter is uniformly high.

In a butter made in Denmark, from cows fed on sea grass, the percentage of volatile acids, as reported by Mr. A. H. Allen, was greatly below the average. Since the genuineness of a sample of butter is generally tested by its contents of volatile acid, this point is one of great significance.

Mayer further found that hay and ensilage will impart to the butter a high melting point, and green fodder a low one.

These observations open the doors to a systematic and thorough study of the specific effects produced by given articles of food on man and beast. The diet of the intending prize fighter and the poet of the future will differ not only in quantity but in kind, and our knowledge of the bodily and mental effects of foods be extended in a manner beneficial both to the producer and consumer of food.

I lay no claim to originality in this idea. It is as old as Homer and the Grecian mythology. Its original is found in the nectar and ambrosia of the gods; it is voiced by Shakespeare, who says: "Upon what meat doth this our Cæsar feed, that he has grown so great?" What we ask now is that it come down from its poetic pedestal and place itself in the hands of the analyst.

So far, I have studied the agricultural chemical properties of the future chiefly in lines of pure research, but it must not be supposed that the economic aspects of the subject are to be neglected.

The crucial test of "*cui bono*" will sooner or later be applied to all scientific processes. If they do not in the end add anything to length of human progress, the cup of human happiness and the general welfare and prosperity of the human family, their utility may well be called in question. The human race has had a relentless struggle for food and clothing. This fight commenced with the first appearance of life on the earth and has not abated with each successive period of evolution. This struggle will continue as long as life lasts; whether that life end suddenly at its highest evolution, by some awful cosmic cataclysm, or, whether checked and oppressed by its environment it return by a degrading involution to its primitive forms to finally disappear, chilled by a universal athermacy and destroyed by the stasis of matter. This struggle for existence is by no means the unmitigated evil which it might first seem; but by it, perhaps, the best accomplishments of the human race have been made possible. Still we must submit for final judgment all our plans to the grand jury which investigates the methods of amelioration of the environment of our race.

In this direction we see much which chemistry may accomplish for agriculture. There are yet many sources of food to be studied and developed. Confining our view again to our own country, let me call your attention to two sources of food which are just now demanding attention. The Cassava plant (*Jatropha Manihot*) has long been known in tropical countries where it has been used for food to some extent, despite the poisonous principle contained in its bark.

In the sub-tropical regions of the United States, especially in Florida, this plant has also been cultivated for some time. Last year a careful analysis of the Florida cassava was made by the department of agriculture and this investigation showed a plant rich in carbo-hydrates, especially starch, and free of any toxic principles whatever. The plant, under proper conditions, yields many tons of roots per acre, as high as thirty-five having been reported. We see here a plant not only rich in food for man and

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beast but also valuable as a source of starch for domestic and technical purposes, and capable of a yield which will render it a factor of wealth in our sub-tropical localities of no mean importance. It cannot be doubted that many other plants, suitable to different soils and climates, still await investigation. Especially may we hope to find in regions now arid and almost desert some form of vegetable life which will grow and prosper and bear under cloudless skies supplies of food large enough to invite immigration and support a large population. In a similar manner the case of cotton oil may serve to illustrate the economical value of chemical investigations. For years cotton seed was considered by cotton planters a nuisance, to be disposed of in as cheap a manner as possible. Fire and flood were appealed to to abate the nuisance. In inland localities the seeds were consigned to the furnace; on the rivers they were dumped into the flowing stream. Slowly chemical studies showed the waste of enormous quantities of available nitrogen; more slowly still the presence of vast stores of nutritious food. As a result of these studies cotton seed meal is now a standard fertilizer, cotton seed cakes a valuable food for cattle, and cotton oil a healthful article of diet, far more generally used than is suspected.

At the present time nearly one hundred mills are engaged in separating the oil from the seed, and nearly half of the lard of commerce contains cotton oil. So great has grown this adulteration that some of the States have already established regulations for the sale of imitation lard, and a bill is now before our National Legislature having the same object in view for the Territories and the District of Columbia.

Chemistry will yet introduce to man sources of food to which he is now practically a stranger, and thus confer on the race blessings, which it could not hope to receive from any other source.

Much is also to be done in the development of long established industries. I have been so long engaged in studying the problem of our sugar supply than I can best illustrate this phase of the future of agricultural chemistry from this industry. Capital, however, is still timid, fearing to venture where so much has been lost. It sometimes is a matter of wonder to hear men of affairs berate science for being unpractical and visionary. But we have lately seen these "men of affairs" put nearly a million dollars

into a scheme which claimed to produce refined sugar from the raw material by means of electricity. A few packages of raw sugar, in an inaccessible room poured into the sewer, and a few barrels of refined sugar concealed in the machinery poured through a spout secured the unqualified endorsement of men who presumably knew how to manage their own affairs. Even *diplomats*, much as they have lately fallen into disrepute, are more far-seeing. When the electric sugar swindle first attained notoriety the planters of the Sandwich Islands were interested in the wonderful discovery. They sent on an agent with one hundred thousand dollars to purchase the right to use the invention on the islands. The plan, however, was first to secure the endorsement of the Hawaiian Minister, at Washington. Some samples of the refined sugar were secured and Mr. Carter brought them to me. I reported the sugar excellent and the process absurd. The contract never secured the approval of the minister and the planters of the islands saved their money. The stockholders in New York and Liverpool, who now have a valuable experience as the result of their ventures, might have saved themselves not only their money but their pride by appealing to the science of chemistry.

So agricultural chemistry to-day has a double work to do for the sugar industry of the United States. It must save intending investors from the glowing enthusiasm and the false data of ignorance. It must guide it to the proper fields and show solid foundations for its investments. But this is only a part of the work which our science has to do. There are yet problems of the most weighty importance to be solved. In conjunction with physiological botany it must carry forward the work, already inaugurated by the Department of Agriculture, looking to the improvement of sugar-producing plants, especially sorghum, in harmony with the great principles of variation, adaptation to environment and selection which underlie the cosmic plan of evolution. It is certain that sorghum is capable of this improvement. Few plants are subject to greater natural variations. The favorable variations must be detected and propagated until the force of heredity establishes in a permanent type the variations which nature and design have produced. In your own State, much attention has been given to this subject.

Private enterprise, your State experiment station and the Department of Agriculture, at Washington, have worked together in this field.

Further, there are still problems relating to the recovery of the sugar after it is produced which will occupy the chemist for years to come. At the present time, with only spasmodic and unmethodical attempts to grow a richer cane, sorghum produces nearly two hundred pounds of sugar per ton. Of this, scarcely one-half is obtained in the crystalline form. We need some such process for sorghum as Manoury and Steffan have devised for the sugar beet. We want to find some way to enable the manufacturer to obtain all, or nearly all, of the sugar after it has been once formed. This is only a type of other problems, important, insistent, imperative, set for the coming chemist.

I know of no other way in which agricultural chemistry can confer so great a blessing on this country as to teach it to make its own sugar. That accomplished we will soon forget the rough road by which we have had to reach the result and the petty bickerings by the way. There will be such an exuberant glory accorded the workers in the field that all will be satisfied and none feel slighted.

The agricultural chemist has still another important task, the last one I shall speak of to-night, lest he be appalled at the demands the future will make on him. He must show to the farmer the danger of always taking and never giving. There are more kinds of thieving than piracy and highway robbery. There is a kind of farming, practiced chiefly in new countries, which may aptly be called agrarian sand bagging. The virgin soils are knocked down and robbed. We must teach the farmers that there are certain crops that can be exported with safety. These are cotton and other fibres, sugars and oils and fats. There are other products of the farm that should be sent off with great care. These are, hay, the cereals, and bone and flesh. Read the history of countries which sell to foreigners the cream of their soil. The value of the plant food annually exported from the United States is over \$30,000,000. Already the wheat fields of Minnesota, Dakota and California are beginning to feel the effects of this phlebotomy. The average yield per acre is but little over half produced by the virgin soil.



The farmer wants the debris of life to be as near to him as possible. His wheat and pork are, as far as he is concerned, best eaten in a neighboring town. We have no right to rob our children. Our fields should not with bare and haggard face mock our graves. Pay your debts to your fields, and a little bit more if they have been badly treated in the past. We transmit our national and municipal debts to posterity. Let us send with them the means of their discharge.

I have already intimated that we are not left without the means of preparing for the future work of agricultural chemistry nor for elaborating the plans of progress. Three pregnant factors of advancement are at our disposal, viz: private enterprise, not only of a single individual, but such as secure the advantages of collaboration, illustrated by the great work at Rothamstead due to the munificence of Sir John Lawes, and the splendid industry and achievements of Gilbert and later of Warrington. In Houghton farm, in this country, we see a similar enterprise inaugurated. Would that more men of wealth would endow such great institutions of research, free from the dangers of legislative parsimony and untouched by the tooth of partisan hunger.

To these we add the State and National schools of agriculture. It is true that many of these have never attained a state of agricultural grace or have fallen from it. These failures, however, are vices of environment and not of constitution. The fact remains that in these schools the young agrarian ideas are to be taught how to shoot. Their proper growth and culture will not be neglected. It must not be forgotten also that there were suddenly called into existence in this country large numbers of such schools where often trustees, presidents and professors needed instruction more than the students. Many most excellent and good men at the head of these schools considered prayer far more beneficial to potatoes than potash. The language of Greece was deemed far more important than its chemical composition. I am not disposed to judge harshly the failures, which, while serious, were scarcely to be avoided. I know of one instance where, when a professor was to be chosen for an agricultural college it was announced that no Presbyterian need apply because already two of the professors were of that persuasion. I have even heard it intimated that in some localities a

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candidate's political affiliations were of more importance than his knowledge of his profession. I myself was once cited to appear before the board of trustees of an agricultural college to show cause why I should not be dismissed from my chair ; not because any fault was found with my chemistry but because I rode a bicycle. But every impartial student must admit that these initial and inevitable faults are rapidly disappearing. Many of our agricultural colleges have already reached almost ideal excellence and all are on the road to improvement.

Joined with these schools the experiment stations are now adding their help. The work which they are doing and are to do I leave to my co-laborer, Prof. Alvord, to tell you. You will not easily overestimate the importance of this work.

I began this address with what might seem a gloomy outlook for him who is to labor in the fields in future days. I prophesied for him no surcease of toil, no lolling in pleasant shades while automatic harvests come suppliant at his feet.

I will end by saying I do not believe that labor is a curse. The man who wants to live peaceably, digest his food well and sleep o' nights must work. The tiller of the soil is not likely to go insane from insomnia. Thus, while agricultural chemistry will not soften the palms of the hands of the future farmer it will do much to improve his methods, increase his yields and add to the sum of farm wealth and comfort. But it will do more for the farmer than this. It will show him the nature of the phenomena which appear before him. His ideas will be enlarged, his knowledge increased and toil will be seasoned with that best of all condiments, intelligence.





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# THE PRESENT STATUS OF THE ENSILAGE QUESTION.

BY HENRY E. ALVORD.

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The wording of the topic to be now considered very properly and very comfortably limits the discussion. The ensilage question, as a whole, is a big one, and a general review would require much more time than can be here given. But to pass to the "present status" of that question, we may omit the historical features of the subject, the introduction of the system to America and its development and adaptation in this country. We may assume that the general facts regarding silos and ensilage, in their various forms, are known. Hence, perhaps, the best way of preparing for a discussion of "the present status of the ensilage question," is to formulate, as concisely as practicable, the leading points, which, in my opinion, appear to be sustained by sufficient evidence. This done, points which may be doubted can be presented in more detail, or those of the most interest may have additional facts brought out by question and answer.

Our present knowledge of silos and ensilage seems to render reasonably certain the truth of the following propositions:

1. Silos may be made with any of the various building materials, and some very crudely and cheaply constructed have been found to do good service.
2. Silos may be above ground or underground, or partly both; they should be water-tight and preferably air-tight and frost-proof, although these two points are not essential.

3. The situation and construction of the silo, and the arrangements for filling, covering and emptying, should be largely governed by local conditions.

4. Several small silos, independent or connecting, are usually better than one large one, and the depth should be considerably greater than the length, width or diameter. Yet circumstances may render one large silo, with length much greater than the other dimensions, more economical and otherwise more satisfactory than several smaller ones of the same total capacity.

5. A silo that will prove efficient may, therefore, be built at a cost varying from twenty-five cents to five dollars for every ton of ensilage it will hold. At a cost of about one dollar per ton capacity a very satisfactory silo can be completed. But, like an ice-house, a substantial, well-built structure, costing about two dollars per ton capacity, will probably prove in the end the most economical.

6. Silos may be filled slowly or quickly, in all weathers, the forage plants cut or pitted whole, and the cover may be heavily weighted or not weighted at all ; the ensilage produced will vary in condition and quality, but these variations of management do not materially affect the result. If the silo is not air-tight on the sides, however, it should be well covered and weighted.

7. Ensilage may be put up in stacks, in the open field, or under cover, with a regular gear for securing pressure, or rudely weighted. There will be some loss of material on the exposed surface, but generally little more in value than the interest and deterioration incident to a building.

8. Any plant or vegetable product, good for cattle food when green or fresh, may be preserved as ensilage, in an edible and succulent condition, throughout the year, or for several years.

9. As a rule, all horses, mules, neat cattle, sheep, swine and poultry, are fond of ensilage, if its material is ever such as eaten by them. Most farm animals prefer it to the dry forage. Coarse grasses and other vegetable matter, unfit for food when dry, and generally refused when growing, may be made palatable by passing through the silo, especially if mixed therein with better food ; this will supply bulk from material that might otherwise be wasted, although the food value of the plants so treated cannot be thus increased.

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10. The best time at which to cut any growing plant to make good ensilage is when the plant approaches maturity and has begun to decrease in the percentage of its water contents.

11. The cost of preserving a given crop as ensilage does not materially differ from curing the same crop by drying, in a suitable season ; but crops can be ensiled and preserved in seasons when they would be lost if drying was attempted. Hence it may be safely stated that the average cost of providing for storing most suitable crops in silo, and then of harvesting and so storing them, is decidedly less than like provisions in any other way.

12. All considered, Indian corn makes the most economical and satisfactory ensilage in most parts of the United States, and with a crop of twenty to twenty-five tons to the acre, when cut, which is a good average, the ensilage may be made, ready for use, at a total cost of two dollars per ton, and for less, under favorable circumstances.

13. An acre of corn as ensilage will weigh four times as much as the same crop dried as fodder. But notwithstanding the extra weight to be handled, if the silo is well placed and conveniently arranged, a given number of animals can be fed with ensilage at less labor and cost than when dry forage is used in any form.

14. An acre of corn, field cured, stored in the most compact manner possible, will occupy a space eight or ten times as great as if in the form of ensilage. For example, as to economy of storage, a bay, mow, or section of a barn, which has held ten tons of hay at the most, can be converted into a silo which will hold fully one hundred tons of good ensilage.

15. The chemistry of the silo is still somewhat in the dark. The contents of any one silo filled with crops from the same land, apparently managed in the same way year after year, will differ in condition and quality in different years. Knowledge of the subject is not yet accurate enough to prescribe with certainty the procedure which will ensure the best ensilage. Yet any forage crop can be preserved in a moist, fresh form, substantially unimpaired as food. There is generally a considerable loss in the carb-hydrate elements, and sometimes in the percentage of albumenoids, but there is evidently an increase in the digestibility of the material, which fully compensates for all usual losses.

16. Correct theory, reasoning on scientific principles, and the great preponderance of testimony resulting from the longest practical experinace, agree in recommending this process to get the best ensilage. Cultivate corn so every plant may have abundant air and sunshine to perfect itself and bear ears of grain; harvest when the kernels of the ear begin to glaze, or even a little later, when the plant leaves show some signs of drying; harvest preferably in good drying weather; run the corn through a machine that will cut it into lengths less than one inch; carry on the work as rapidly as possible; keep the cut fodder leveled in the silo, and when full, level the top, cover at once and weight with at least 150 pounds to the square foot of surface. (Yet, while these are pretty safe directions for the novice, judgment, based on slight experience, may dictate desirable exceptions at various points.)

17. As food for cattle, as well as other kinds of farm stock, ensilage forms a good and very cheap substitute for roots, and its condimental effects are especially apparent. But the usual ensilage crops fail to fill the place of the root crop in a judicious farm rotation.

18. In feeding, the best results follow a moderate ration of ensilage, rather than its entire substitution for dry, coarse fodder. Except in the case of animals fed merely to maintain their weight, ensilage cannot be recommended as a substitute for more than half the long forage consumed.

19. Ensilage, and especially corn ensilage, when compared with dry corn fodder, or with other feeding stuffs, produces results so satisfactory as to surprise the chemist and which chemistry cannot explain. As the result of practical feeding tests, it is very generally agreed that three tons of corn ensilage will equal in its effects as food a ton of average hay. This means that a farmer is as well off, if not better, with thirty tons of good corn ensilage and twenty tons of hay, as with thirty tons of hay. But it does not mean that a man can winter stock as well with ninety tons of ensilage and no dry forage, as with thirty tons of hay and no ensilage.

20. Ensilage, and good corn ensilage in particular, is a great acquisition to dairy farming. Fed with judgment, to a herd of dairy cows, it tends like other succulent food to well maintain,

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if not actually increase, the flow of milk. Fed judiciously, in combination with other foods, it reduces the usual cost of milk production and at the same time maintains the quality of that product. While it does not appear to increase the percentage or bulk of cream, the "churning quality" of the latter is improved and more butter is made from the same weight of milk than when dry forage alone is used. Carefully fed, no unpleasant flavor is imparted to the milk; the addition of ensilage to the ration of dry-fed cows, produces a marked improvement in the quality of the butter.

21. The adoption of this system of preserving forage, and the use of ensilage to the extent of one-half the corn fodder (or "roughness") on a dairy farm, makes it possible to more than double the number of cows kept upon the same farm.

22. The system is especially valuable in sections where farming suffers from droughts, as there is no better or cheaper method of providing succulent food for stock, to supplement or replace pasturage in soiling crops.

23. A silo or two well built, but not too large or too expensive, will be convenient and economical on most farms, to convert waste products into edible forage and to save crops which at other times might be lost, if not to preserve some crop specially grown for ensilage.

24. The silo system is best adapted to high-priced lands and so-called high farming, and to farms not suited to profitable grass growing. Also, in sections where waste products from a beet sugar factory or a sorghum sugar factory, a corn canning establishment, or a cider mill can be cheaply obtained.

25. The extensive use of ensilage upon any farm is chiefly a question of convenience and economy which local conditions must decide.

Mr. Evans: I would like to ask as to the proper way to frame a silo.

Major Alvord: A frame on the outside and a covering on the inside. A building strong enough to sustain considerable lateral pressure. I would use joists rather than ordinary studding, set on end, about as close together as you would place the joists to sustain a good floor. They may be placed anywhere from twelve to thirty inches apart, according to the degree of pressure to be



exerted against them. For a silo to hold, say one hundred tons, they should be placed fifteen inches from centre to centre, using joist two by six inches, or two by eight inches, and so secured at the bottom and top as to prevent any giving way at the corners. For the frame of the roof anything that will support the weight of the roof itself will answer. You have only to provide in the frame a sufficient strength to prevent it from springing laterally from the weight of the material. You should estimate the same as you would for a water tank, or about on the same basis. Provide for a strain of about forty or fifty pounds to the cubic foot of material, having a tendency to press outwards.

Mr. Denise : Would joists twenty-four to thirty feet high be strong enough to hold this height ?

Major Alvord : As you increase the length you must increase the strength, the same as timber used anywhere. For a building of that size it would depend on the thickness of the joists. If they are only twelve or sixteen feet long joists, two by six or two by eight would certainly be sufficient, and, perhaps, also for a length of twenty-five or thirty feet.

Mr. Pancoast : Is it necessary to line the silo with paper on the inside ?

Major Alvord : The silos should be built water and air tight, or as nearly so as possible. They should be built with close joints and have a double thickness of heavy paper, or felt paper, between the double thickness. The question of frost is still to be considered. You must so build the silo as to prevent the penetration of frost, though I do not think frost does much injury to ensilage. I have tried this action of freezing and thawing from September to April, from six to eight different times, and for one or two winters in succession, and found that in the spring it came out as nice and in as good shape as corresponding silage kept in the cellar away from the frost. If you want to feed it from the first of November on you don't want the frost in it at all.

A Member : How about the method of filling and the matter of fermentation ?

Major Alvord : As to the method of filling and the matter of fermentation, my idea is, and my experience is, that the best method is to do the work up as quickly as it can conveniently be

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done. I believe the ensilage in such cases is generally better. I think it is best to arrest the fermentation by filling quickly instead of allowing it to proceed as when filled slowly, and allow it to heat up to a high temperature. I regard all fermentation as destructive of material, and would arrest it as early as possible.

Mr. Pancoast: How long have you known a silo to be in filling, and yet the silage come out all right.

Major Alvord: From the time the first growth was big enough until Christmas. I have known such a silo to be kept open and anything put in that might be on hand. Used it just as a swill barrel would be used. I have known such a silo to be kept open and every two or three weeks some new material put into it, every article being in sufficient quantity to make a fair layer of from six inches to two or three feet. Each layer seals up by fermentation what is below it. At the end of the season, after it was filled, it was found to contain very good material.

Mr. Pancoast: Would you keep it weighted?

Major Alvord: No, sir; not even covered.

Of course, I said there was ensilage in this silo, but I said nothing about the quality. There is ensilage there which the cattle will eat, but a much better article is obtained by providing the articles promptly as possible, and sealing the silo as soon as convenient.

Mr. Cummings, (of Bucks county, Pa.): I have had a little experience with silos, and would like to ask a little about fermentation. Is it not better for the article that the corn shall not be overgrown, and should it not be subjected to rather more fermentation than if it is pretty dry? Should you not give it more time?

Major Alvord: To get the best ensilage, I would prefer not putting it in until it reaches a reasonable degree of maturity. If green, I should allow more time and greater fermentation before closing.

Mr. Evans: I would like to ask the gentleman if he can take corn and make a sweet ensilage—without having it sour? Fill it all in in one day, and would it come out sweet?

Major Alvord: I have heard of sweet pickles, and of sweet

ensilage but I never saw it. By filling the silo quickly we obtain what is likely to be least sharp to the taste.

Mr. Crane : Is it possible to have ensilage without fermentation ?

Major Alvord : No, sir ; not without fermentation. The only question is, as to the *degree* of fermentation.

Mr. Crane : How about the healthfulness of the cows' milk for children ?

Major Alvord : The cow's stomach is nothing more or less than a silo, in which fermentation is set up, and in which the acidity is generally found the same as in the silo. With the silo we are only anticipating the action of the cow's stomach. The gentleman is aware we have a certain class of population who raise strong, healthy and robust children, whose mothers, when in the full flush of milk, live largely on sourkrout.

Mr. Coffin : I would like to ask a question in regard to corn ensilage when cut from the field before being properly matured, whether it is better to fill the silo quickly, and weight it down or not, or whether it is better when the fodder is properly matured to fill the silo slowly.

Major Alvord : In the first place, I would wilt it and dry it. In the second place, let it remain a longer time exposed, and not fill as quickly. Allow me to say at this point a word in regard to stacking ensilage. I have seen two stacks in this county. It has been done by some farmers for many years, in the open air. The trouble is that in stacking ensilage in the open air, a large proportion is lost by the decay on the outside. A heavy pressure is exerted on the stack by mechanical means, and although the outside was lost by decay, the centre was as good as any ensilage I ever saw, but it was not a success otherwise, because of the small size of the stack.

I also saw a case in Massachusetts, where a Mr. Bodage, after the first frost—which struck his neighbor's field, but did not reach his own—he went into the field, cut it rapidly, and piled it in the centre of his field ; he gathered it all together and made a pile of it, and the pile was carelessly made. The pile was thrown up as nearly perpendicular as possible, with the butts of the fodder outside. He said it was not only done rapidly, but carelessly, because he did not have much faith in it. It was also raining

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hard the whole day while the work was being done. His men were soaked to the skin. The stack was run up to a height of about fourteen and one-half feet, and after it ceased raining, he sent his men and dug a trench around the stack, and threw the dirt on the top, and then sent his men up to pack it down, and pat it down with a shovel, giving it a little ridge towards the outside. He put the dirt on top about a foot thick. This stack was put up in the first week in September, and was opened in Thanksgiving week. I saw the ensilage on the last day of November, and the inside was as good a fodder as the sample which I have here, and there was but a very slight loss on the outside from decay. I have seen but two instances of this kind.

Mr. Pancoast: Was this material cut or whole?

Major Alvord: This was whole corn. The ears were just formed, and the fodder was cut and piled up in the open field, and when it was fed it was cut down on the face of the stack with a knife.

I would add that the butter made from these silos in New York probably brings higher prices than any other kind.

I may also state broadly that any plants can be made into tolerable ensilage.

Mr. Coffin: I should like to ask what, in your opinion, is the best quality of corn to plant?

Major Alvord: I answer that from a single standpoint. The object is generally to get the greatest quantity of ensilage from the smallest area of ground, hence we select the largest growing varieties of corn. If quality be also considered, as well as quantity, take the corn which, as a field of corn, is the best in your neighborhood. This large corn generally comes from the Southern Semi-Dent variety.

Mr. Coffin: What is the corn known as the B. & W. corn?

Major Alvord: This is named from the men who seem to have a monopoly of the seed. You can buy this in the seaboard counties of the State of Virginia. It can also be bought in the southern part of Maryland and in North Carolina. It is the tidewater corn. I have tried it, but have obtained extremely sour ensilage. I have ensiled it when the straw was beginning to take a white or yellowish color, and have obtained very valuable ensilage, but no better than any other.

One point in connection with these crops ought to be mentioned. Whenever a big crop is obtained from an acre of ground it means, as you well know, a big crop of manure put on that ground. We do not get twenty or thirty tons of green corn from an acre of land without the highest kind of manuring, and a big crop means big manuring every time.

Mr. Brown: I would like to ask the gentleman if it would not be better to plant a large kind of sweet corn.

Major Alvord: The more sugar the more active the fermentation in the silo. In fact, I think it is harder to get good ensilage from sweet corn than from common corn. If you succeed in getting ensilage from sweet corn it is good, but the more sugar the more vinegar afterwards. I have tried sweet corn and given it up entirely on account of the greater acidity which it invariably takes on.

I presume there is no question as to the edibility of ensilage. All animals are fond of it. It is certainly true that farm animals will eat very thoroughly fermented ensilage. I have never seen ensilage refused by the animals, except where it was decomposed, or so sour but what the cows would eat it.

I know of no class of domestic animals that will improve more by reasonable rations of ensilage daily, than poultry. Their consumption is as large in proportion to their food as any class of animals.

The cost of growing ensilage crops is also very reasonable. I would like to give as an example of the value of ensilage feeding—the case of Hiram Smith, of Wisconsin, who keeps one hundred and twenty-five cows on fifty acres of land. He figures that his ensilage costs him in the silo \$1.50 per ton, for a crop of several hundred tons.

Fermentation is a step towards destruction, and the further it proceeds, the greater the destruction. As to the question of economy in the use of ensilage, I prefer to leave this to other persons.

In my own practice, I endeavor to arrest fermentation in the silo as soon as possible.

The value of ensilage depends largely on the material used, and you must get the right material first.

I have made a comparison of ensilage and roots, and I claim that we can unquestionably produce ensilage cheaper than roots.

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Ensilage also compares in every way with roots, and it is a good substitute with all classes of domestic animals, for sheep as well as cattle. The question of moderate rations I would emphasize. You should never think of resorting to exclusive ensilage feeding. For wintering heifers, and breeding ewes and swine, ensilage will be found very satisfactory, but never think of using ensilage alone.

Mr. Denise: I should like to know what the shape of a silo should be.

Major Alvord: The silo I have alluded to is twelve feet square on the inside and about sixteen feet deep. It was weighted down. It was filled quickly in a day or two. It held about thirty-three tons, if I recollect right, put in load by load. It was filled with alternate layers of corn in the milk.

Mr. Denise: I don't see any grains in this sample you have brought with you.

Major Alvord: It was late corn, but it was in the milk when put in. The silo was built mostly above ground and was filled with alternate layers of corn and the Japanese bean, which is a richer food than clover.

Mr. Jacobs: How could it be used in small quantities without lifting the weights?

Major Alvord: You can put it up in barrels as well as in anything else. I preserved for several years different kinds of material in barrels. The only thing is that the greater the bulk the greater the degree of fermentation. I put it up in alcohol barrels coated with glue, and weighted the material until it was perfectly settled. I kept it weighted until it had reached its maximum of heat and cooled down again, when I have taken the weight off, and it need not be replaced. There is no necessity of keeping the weight on if you are going to use the material. If I was going to keep it over, I should prefer to keep the weight on. This will help the fermentation greatly near the top. Everything below the top layer is soft enough without the weight. The fermentation will generally be over within six weeks, if in bulk of fifteen to one hundred tons, and you can generally expect it will pass off and the material reach the stage of a good quality of ensilage within six weeks.

Mr. Palmer : Do you think it is not best to use it before six weeks ?

Major Alvord : No, sir.

Mr. Jacobs : Do I understand you to say we can take green food, in particular clover, without spoiling, if cut in a more advanced stage—can it be put up in barrels and be used for poultry ?

Major Alvord : I should keep my weight on the barrel for at least two months after the material is put in. After that I should not be particular. I have usually used the head of the barrel, trimmed off so it could pass down, as the material settled. It should be so arranged that the weight does not catch on the edge of the barrel.

There are two firms who put up ensilage in barrels packed by hydraulic pressure. I have experimented for two years, and I have had it put in my hands by the company in the month of October, and found it satisfactory.

I should pack it in the barrels as tightly as possible. I don't advise putting it up in such small quantities. It is not so desirable, I think, and a tank or hole in the ground six feet in diameter would suit me much better. This would not answer in the loose soil of some localities, but I presume that such an arrangement would ordinarily be more satisfactory than barrels.

Mr. Crane : I understood you to say that the chemistry of the silo is in the dark. Do you mean to say it has never been a success ?

Major Alvord : I mean there are certain questions as to the food value, and the chemical changes which take place in the material, which have not been satisfactorily answered by a chemical investigation. There is more work to be done in that direction. We can give no description of the exact changes which take place in this material from the time it goes into the silo until it is fed to the animal.

A Member : Can apple pomace be used in the same process ?

Major Alvord : Yes, sir ; it can be so used, and long before ensilage was known by that name, there were a number of barns in West Chester arranged for the storage of brewer's grains. They are nothing more or less than silos. That was ensilage of barley grain.



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A Member: A good deal of barley grain is used in my neighborhood, but I have never heard of any apple pomace being used in that way.

Major Alvord: I know it is used very largely, and it is an excellent article of food, when preserved from active fermentation.

The amount of feeding values is a question that is very wide.

Science and practice are more in conflict in this than anywhere else. Looking at it from the ordinary standpoint, we say an animal must have a certain quantity of solid or dry matter in his daily rations in order to sustain life. Take a given amount of this ensilage, say fifty or sixty pounds, and if it be examined by the chemist, chemistry says it is not sufficient. The German tables would say that this was insufficient to support the life of the animal, and yet, when you feed it to the cow she says something different, and she does live and thrive. There is a difference there not yet reconciled. It is the practical results of feeding ensilage, at variance with the theoretical.

It is true that practical men have fed cattle month after month and year after year, and have substituted from two and a half to three tons of corn ensilage for a ton of hay. Careful investigation in this and other States has not given the same result. I think we are reaching some explanation of it lately in the evidence that is being presented of the greater digestibility of the ensilage material. In the experiments made three or four, five or six years ago, it was found in many cases by some of the tests made, that the ensilage did not appear to have greater digestibility than the same plants dried, yet, in the later investigations, where the experiments as to digestibility have been made, we have found decidedly greater percentages of digestibility than when the material was fed in the green state.

I think the indications are that the economy of ensilage, the feeding value, is to be found in the matter of digestibility. It is a question which is still an open one. We can safely pursue it still further. The next point will be the relation of ensilage to the labor of the farm. I will say nothing about this, unless questions are asked upon it. It is nothing more than a canning process, and once well canned, it can be kept for an indefinite length of time, hence the advantage of having the silo full of edible material to carry on hand from one year to another, in case of drouth



or other failure of crops. There was ensilage shown at the Paris Exposition last year which was seven years old. They have a special premium, and the premium was taken last year by ensilage that had been put away seven years before. Once there, it can be kept until wanted.

Mr. Coffin: Would it be practicable to feed cows the entire year with ensilage, including the months during which you usually pasture?

Major Alvord: It has been done within one hundred miles of this place for something over two years. A large herd of valuable cows was kept in this way, but the result was not satisfactory by any means. They got the first year nothing but corn and dry ensilage and grain, and at the end of that time they showed that they had been under too much pressure. They had been living too high. Animals two or three years old gave the observer the impression that they were five or six. They began, then, to add to the dry forage about one-third of dry straw, or a cheap quality of hay, and there was at once an improvement in the general health of the stock. That is the only case I know of such long feeding of such large numbers, and that was not satisfactory. I see no objection to the substitution for pasture, during the pasturing season; if we give succulent food in winter, then in summer I would give a part dry food.

Mr. Coffin: The question asked was whether it was possible to keep one hundred cows on a given number of acres without the advantage of turning out for pasturage in the summer. One hundred cows would require a very large acreage of pasture, and the question was, whether you could overcome that by feeding ensilage in summer.

Major Alvord: It is done in many places in both the east and west.

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# ENSILAGE

VS FIELD CORN AND FODDER CORN.

BY E. B. VOORHEES.

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# ENSILAGE

## VS. FIELD CORN AND FODDER CORN.

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BY E. B. VOORHEES.

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Ensilage was made the subject of considerable study and experiment by the New Jersey Station during the years 1881-1884, inclusive. These studies had especial reference to ensilage as a source of actual food materials, and the experiments included :

- I. A test of the silo as a preserver of food.
- II. Feeding trials with corn ensilage to test its value as food, compared with dried fodder corn.
- III. Feeding trials with ensilage to determine its position among other food products, chiefly valuable for their carbo-hydrates.
- IV. To determine the economic value of food secured from equal areas, utilized as ensilage and as field corn.

(I.) The silo, as a preserver of food, was studied from two standpoints :

- i. The practical, which has reference to the percentage of total amounts saved and eaten by the stock.
- ii. The chemical, which regards all food products as materials furnishing definite amounts and proportions of the classes of food compounds known as fat, proteine and carbo-hydrates.

The experiments of the station from the practical standpoint included several forms of silos and methods of packing. The results secured demonstrated that, under favorable cond tions

materials could be preserved with a small percentage of loss, and that the product, whether corn, rye, clover, or sorghum, was readily eaten by stock and without injurious effects. In all comparative experiments, the materials were carefully sampled and a chemical analysis made, both of the green fodder and of the ensilage. From this data, the amounts and proportion of actual food constituents in each could be determined.

The results secured from all the experiments conducted showed that the loss of food in the silo ranged from two to eighteen per cent. of the dry matter, and that this total loss fell entirely upon the class carbo-hydrates, *i. e.* sugar, starch, etc., the least costly ingredient of fodder.

Comparative experiments were also carried out at the same time, to test the losses incurred by the ordinary methods of curing fodder corn, chemical analysis being made as before. The results of these trials were practically identical with those secured when corn was ensilaged, viz: a loss of dry matter was incurred, ranging from two to seventeen per cent., and falling entirely upon the class carbo-hydrates. The conditions under which these trials were conducted were such as to include the different stages of growth, whereby it was shown that the *greatest* loss followed when the corn was cut early and contained a high percentage of starch, and the *least* when the corn was more mature and the percentage of starchy matter relatively less.

Three conclusions were therefore reached by these trials :

1. That the losses of food in preserving corn fodder in the silo, and in curing it in the ordinary manner, are practically identical.
2. The percentage of loss is governed by the maturity of the corn.
3. The loss falls entirely upon the cheapest class of food compounds.

(II.) It has been shown that the preservation of actual food is secured equally well by the silo and by field curing. The next question is, how do the products, ensilage and dried fodder corn, compare in feeding value? That is to say :

- (i.) Will cows eat the dried fodder corn as readily and with as little waste as they will eat ensilage?

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- (ii.) How does the milk of cows which are fed dried fodder corn compare in quantity and quality with the milk of the same cows when ensilage is used.

Feeding trials, conducted to test these points, were carried through several weeks, care being taken to render the conditions uniform in all cases. The analysis of the fodder eaten and the milk secreted was made in every case. Without entering into the details, which may be found in the Animal Reports of the Station, the conclusions may be stated as follows :

1. That the dried fodder corn, when cut and crushed, is eaten quite as readily and with as little waste as ensilage.
2. That when the rations contain the same weights of digestible food, ensilage in the majority of cases has no more influence on the quality and quantity of the milk yield than dried fodder corn.

These conclusions indicate that the silo is simply a place in which green food may be preserved—not a place in which fodder may be stored with reasonable expectation of improving its quality.

Further feeding trials were made in order to test the comparative value of corn meal, corn stalks and corn ensilage. These products resemble each other in that from eighty-six per cent. to ninety-four per cent. of their digestible food belongs to the class carbo-hydrates. The high percentage of carbo-hydrates renders them unsuitable as complete rations for dairy herds. In these trials, therefore, fat and proteine sufficient to balance the rations were secured from other sources, and the experiment consisted essentially in the comparison of the relative value of the carbo-hydrates from corn meal, corn stalks and corn ensilage. The trial extended through four months, due care being taken to make conditions the same in all cases and to conform as closely as possible to those ordinarily existing among well-managed dairy herds. Eliminating details of experiments and conditions modifying results, the conclusion drawn was that, for milk production, the digestible carbo-hydrate from corn meal, corn stalks and corn ensilage can replace each other without affecting the quantity or quality of the product.

The conclusions reached in regard to the subject of ensilage were, therefore, that the silo preserves food quite as well as the

ordinary method of drying, and that the digestible food of corn ensilage, corn fodder, corn stalks, and corn meal, are of equal value for milk production. So far, then, as the actual feeding value of food present in these materials is concerned, the use of the silo presents no advantages over the ordinary method of drying corn, or the common practice of raising field corn and feeding its products, corn stalks and corn meal.

III. The question remaining has reference to the economic value of the food secured from corn ensilage and field corn, grown under the same conditions and on equal areas. An experiment was carried out to test this question, although strictly speaking only the actual amounts of food secured can be compared, since facilities peculiar to localities are liable to change the cost of handling and preparing the food for stock. The experiment was as follows: In 1883 a uniform field upon the college farm was heavily manured and prepared for corn in the usual manner; 5.3 acres were planted in fodder corn and averaged fourteen and one-tenth tons per acre; ten and one-fourth acres were planted in field corn and averaged, after harvesting and husking, sixty-eight and three-tenths bushels of shelled corn and two and two-tenths tons of dried corn stalks per acre. An exact expense account was kept during the entire experiment. The total amount of digestible food per acre in the field corn was one hundred and sixty pounds of fat, three hundred and eighty-five pounds proteine, and four thousand nine hundred and fifty-one pounds of carbo-hydrates, valued at \$68.21. The total digestible food per acre in the ensilage was seventy and five-tenths pounds fat, three hundred and thirteen pounds proteine, five thousand and seventy-eight pounds carbo-hydrates, worth \$62.33. The cost per acre for gathering the crop of field corn and preparing it for food (which includes cutting and crushing field stalks, and grinding corn and cobs) was \$22.71. The cost per acre for gathering the fodder corn, cutting, crushing and putting it in silo, was \$26.41.

Assuming that all the products of the field corn were utilized, the financial balance is in favor of that product by \$6.00 per acre. Considered in reference to cost of production, the balance is also in favor of the field corn by \$3.70 per acre—a difference in favor of field corn of nearly \$10.00 per acre.

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Representative samples of all were drawn and a chemical analysis, which included the phosphoric acid and potash of the ash, was made in each, whereby the value of the plant food withdrawn per acre by each crop was determined. The only noticeable difference in amounts of plant food is observed in the case of potash, the fodder corn utilizing eighty-five pounds and the field corn only fifty-four pounds; the total value of plant food, however, agreed very closely, that from the field corn being \$21.34, and from the fodder corn, \$21.94. The \$10.00, therefore, as before stated, represents the actual difference in value between an acre of field corn and of fodder corn ensilaged, when the whole product is utilized as food, the cost of raising the crop, the rent of land, etc., is the same, and no losses are incurred in the silo from imperfect preservation.

The conclusions reached by the New Jersey Station in regard to ensilage may, therefore, be summed up as follows:

1. That green fodders can be preserved in the silo without serious loss of food.
2. That the silo has no advantage over field drying in the preservation of corn.
3. That the digestible food from corn ensilage, corn fodder, corn stalks and corn meal can be substituted, pound for pound, in a ration without materially influencing the secretion and hence are equally valuable.
4. That, at the College farm, actual food can be secured from field corn cheaper than from corn ensilage.

Another point in this question of ensilage—which has reference only to the economics of feeding—should be touched upon.

In all the feeding trials that have been made by the experiment station, attention was also given indirectly to the question of the value of what are known as “German” feeding standards. Many persons, including both practical and scientific men, claim that a cow’s stomach is the proper guide as to food required, and that a standard which demands that a dairy cow, of approximately one thousand pounds live weight, requires four-tenths pound of fat, two and one-half pounds of proteine and twelve and one-half pounds of carbo-hydrates for a full flow of milk cannot be relied upon in the majority of cases.

The results secured by the Station, however, showed very



clearly that the most economical ration fed was one which contained approximately two and one-half pounds of proteine; that the increase of milk secured, when more was fed, was secured at a loss, and that the flow of milk was decreased below the point of the greatest profit when less than two and one-half pounds were fed, if proportional amounts of carbo-hydrates were included in the ration. In other words, the total amounts of proteine and the ratio of that product to carbo-hydrates, recommended by the standard, gave the most profitable returns.

Assuming, then, that two and one-half pounds of proteine are necessary in a day's ration for milk to secure the most economical returns, it would require the following amounts of the different farm products daily to secure it, viz: Clover hay, thirty pounds; corn meal, thirty-seven pounds; field corn stalks, eighty-three pounds; green fodder corn, two hundred and five pounds; millet, sixty-three pounds; ground oats, twenty-five pounds; oat straw, one hundred and sixty-four pounds; orchard grass, eighty-four pounds; rye straw, three hundred and twenty-one pounds; timothy hay, seventy-four pounds; wheat chaff, two hundred and twenty-nine pounds, and wheat straw, three hundred and eighty-five pounds. With the exception of clover hay and oats, which correspond very closely in composition to standard rations, all the farm products mentioned, which can be profitably utilized as food, show a marked deficiency in proteine. Taking the amount of carbo-hydrates recommended by the feeding standard as a basis, we reach the same conclusion,—though expressed as excess of carbo-hydrates.

A simple calculation shows that the rough material, field corn stalks, oat straw and wheat straw, secured from average crops from twelve acres each of corn, wheat and oats, would furnish carbo-hydrates for ten cows for three hundred days, and proteine for ten cows for but seventy-two days—an excess of carbo-hydrates sufficient for this herd for two hundred and twenty-eight days. If the corn meal is added to this food, it is obvious from the above that the excess of carbo-hydrates would be increased. From these facts, one of two conclusions can properly be drawn: 1st, that large quantities of carbo-hydrates are wasted in dairy farming, or 2nd, that sufficient proteine is bought to render a proper balance of food compounds.

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With few exceptions, therefore, carbo-hydrates are a surplus stock among farmers. Rational farm practice demands that these be utilized. In order to do so it is clear that the farm must either buy or raise proteine. The bearing of ensilage on this point is therefore obvious, since it has already been shown that the production of ensilage or fodder corn is essentially a production of carbo-hydrates. By producing it, the farmer increases his stock of material, of which he already has a surplus. This is true, except in those cases where large dairies are conducted on small farms, and consequently all forms of food are imported.

Major Alvord: I would like to ask one or two questions. The same year this work was going on in New Brunswick a similiar feed experiment to the one mentioned was made, which gave almost the same results with us. One point is not clear enough; that is, as to the production of the ensilage or fodder corn, and the silage corn and the corn stalks that were compared in this case. What was the tonnage per acre of the material?

Mr. Voorhees: The experiment did not include, in that case, any definite areas. It was only a sample of the same corn. The question of economy was only considered in the second case, where field corn was experimented with.

Major Alvord: The comparison was between equal areas?

Mr. Voorhees: Yes, sir; equal areas of fodder and field corn.

Major Alvord: What was the crop of silage corn?

Mr. Voorhees: It was fourteen and one-tenth tons.

Major Alvord: Less than half a crop.

Mr. Voorhees: The field in which it was grown was uniformly fertile. One acre in one part was as good as another, and in order to avoid any quality of soil the acreage was averaged, and the acre considered as the average of the field. It shows merely that the field corn gave sixty-eight bushels and the other gave fourteen and one-tenth tons. This was merely a test of that field, and the feeding trial was a test of the value of the two.

Mr. Blish: It has been stated that the chemistry of the chemist and the chemistry of the cow are entirely distinct in their results. Which shall we follow? (Applause and laughter).

Mr. Voorhees: So far as these experiments are concerned, the results shown by the cow and by chemistry are both about the same. The chemistry is verified by the cow.

Mr. Ward (Vice President): We will now call on Mr. Elwood Evans, who will take up and continue the discussion.

Mr. Evans, after some statements on this subject, was asked the following questions:

Mr. Borton: What is the size of your silo?

Mr. Evans: We have two of them, 10x20 each, on the ground surface. They hold about two hundred and seventy tons. They are entirely above ground, and they occupy what was formerly two hay-mows. This is the proper place for silos. I think a man had better use his hay-mow for a silo, instead of building an outside structure. It is much more convenient of access than any other way. The delay and inconvenience of getting it out of the silo during the winter, when the silo is built outside, is very great. If it is made near the manger, so it can be thrown right down to be used, it makes a far more convenient arrangement, and it is of greater value to the farmer.

Mr. Fritz: How do you feed from your silo, from the top, or how?

Mr. Evans: Mine being high, I take ten-inch boards and make a trough, ten by twenty, extending to the top, with windows opening into it, at various heights, all the way down. We begin at the top, because of there being less space there to allow the air to come in. I feed off the top, and throw it down through the spout as needed. We feed the ensilage at least once a day.

Major Alvord: On this matter of opening and emptying silos, I think there is a rule that can be applied there. Uncover the smallest surface. If your silo is deeper than wide or long, begin at the top; if it is long and not wide, and not high, then begin at the end and cut it down. The best way of emptying a silo that I ever saw was one where the silo was very long, and they sliced it off and rolled it down, instead of getting it from the top. As they fed it, they keep on slicing it off and raking it down. This makes less labor than in any other way.

Mr. Evans: In my case, the least surface would be directly across the top. That keeps a fresh surface exposed for feeding.

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H. HAYWARD ISHAM.....	Elizabeth.....	Union county.
JAMES SMITH, JR.....	Newark .....	Essex county.
P. SANFORD ROSS.....	Newark .....	Essex county.
GARRET A. HOBART.....	Paterson.....	Passaic county.

EXECUTIVE COMMITTEE.

JOS. COLYER.	H. H. ISHAM.	GEO. B. JENKINSON,	WM. L. TOMPKINS.
		HENRY P. JONES.	

## STATE AGRICULTURAL SOCIETY.

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*To the Stockholders of the State Agricultural Society :*

GENTLEMEN :—In the line of my duty as Corresponding Secretary of the State Agricultural Society, it affords me pleasure to give you an outline, at this, our annual meeting, of the work that has been accomplished during the year just closed by the Board of Directors and the officers you elected a year ago. It goes without saying, that the prosperity and usefulness of this Society has been in the past, and will be in the future, dependant upon the success and prosperity of the husbandmen of our State ; with a favorable year the farmers of our State produce maximum crops, which crops sell for paying prices ; they have some incentive, as well as time and means, to exhibit specimens of such at our annual fairs, giving the thousands of visitors an opportunity of seeing what can be reached under favorable circumstances. The same is true with those who invest in the raising of horses, neat cattle, sheep, swine and poultry. I need hardly dwell on this point, for it is well known to every intelligent man in our State, that when profit on the investment is the main object, the more widely the special products are displayed before this public the demand, for such are multiplied, with a consequent increase of revenue and profit.

The exhibition grounds not only give the producer the very best method of showing his products to interested visitors, but at the same time the visitors learn by object-teaching what can be accomplished by improved methods of culture of the soil or by the introduction of better breeds of neat cattle, sheep, swine and other products.



All of these points can be studied on the fair grounds, with comparative ease, and with great and lasting benefits to all who are seeking for profit from the soil or its kindred branches.

The profitable and beneficial results growing out of agricultural exhibitions are recognized by every enlightened and progressive nation and in no other country are they so numerous or more appreciated than they are in the United States. Not only have nearly all of our older States annual exhibitions, but county exhibitions are also numerous and when properly conducted seldom fail to draw crowds of interested visitors from their own and adjoining counties. When here and there county exhibitions fail to prosper, the cause is usually traceable to bad and inefficient management, or in allowing the trotting course to take precedence and prominence over all the other departments. Wherever this has been allowed or countenanced the fair association is sure sooner or later to come to grief and go into bankruptcy. For the twenty years that I have been closely associated with the State Agricultural Society, the policy of the directors and officers has always been conservative in action, liberal in premiums and broad in future designs to encourage on equal footing every branch of the husbandman's calling. This policy has proved to be eminently successful. The horse department receives the attention and prominence which it duly and justly merits, for the encouragement of breeding in our State heavy draft and fancy road horses, as well as trotting stock. A glance at premium lists for the past four or five years will show how carefully the awards have been divided among these different classes, with the sole desire on the part of the officers to give the greatest benefit to the greatest number interested in this important branch of industry. While it is true that the horse receives the acknowledgment that he fully merits on our grounds, it, however, is equally true that every other department is kept fully abreast of that of the horse. This is as it should be, and as long as this policy is followed, this society is sure to retain the full confidence of the farming community, and reap its meed of success. Any impartial and competent judge, who makes a close examination of the different departments at our annual exhibitions, must come to one conclusion, that is, that each one of the thirteen departments is well filled with choice

products and articles well worthy of the most careful examination by those directly or indirectly interested in the husbandman's calling. No one having such an interest can fail to appreciate the advantages growing out of an exhibition such as may be seen at Waverly Park in the third week in September each year. The same plan has been consistently followed since the reorganization of this Society in 1866. That plan is to divide the exhibits into appropriate departments, and then placing in charge of each department a competent superintendent, the Society holding such responsible for the management of his department. This method concentrates responsibility, and, in practice, has worked to the satisfaction of the directors and officers of the Society. When the superintendent is found to be lacking in the requisite qualities in performing the duties, his place is filled by a more competent person.

When exhibitors bring to the grounds the choicest products of their farms, gardens and orchards to compete for the premiums offered by the Society, these products should be judged impartially by judges who are honest, capable and impartial. The difficulty of getting the services of such judges in the different departments grows more serious from year to year and it is embarrassing and troublesome to the officers of the Society. It is asking too much from an intelligent man to come to the grounds from a distant part of the State, paying his own railroad and hotel expenses, work hard one whole day, for a free admission and a lunch ticket.

It is becoming more clear from year to year that this method will have to be abandoned, and that very soon. It is asking too much without any return. To have three persons judging in any one class of goods seems to me to be useless. One thoroughly competent expert will accomplish more and give better satisfaction than three. If the number was reduced to one instead of three, the Society could then afford, and should do so, that is, pay a stipulated amount for this class of expert services.

Exhibitors would be better satisfied and the Society would be better served. Other State Societies are learning in that direction, and our Society will have to adopt it before long. The outlay would not be very large; a few hundred dollars would meet

the expenses, and there is no doubt the society would be the gainer.

There is another, and to my mind a very important change, which should be put in practice. Every Director of this Society should have allotted to him some specific duty to perform during the days of the exhibition. This would bring all of the exhibitors and visitors in more direct contact with the members of the society, and be a means of harmonizing the thousand and one difficulties constantly occurring on the grounds during the fair. I know that this has been talked of before, but has never been fully carried out as it should be. There are some of the directors always on hand and perform a vast amount of hard work, but there are others who seldom put in an appearance or do any work.

I mention this matter here because I am fully aware that the success of any exhibition depends very largely on the individual effort of its officers and Board of Directors.

Soon after the annual meeting of stockholders a year ago, the executive committee met in their office in Newark, and with care discussed very fully the needed improvements on the grounds. This was continued after a personal inspection of all the buildings, cattle and horse sheds. To facilitate this work, the committee was divided into sub-committees, with instructions to have the needed work done without delay and at the lowest expense, for substantial work. That these different committees did their work goes without saying, for those who have eyes can see that the new stables and cattle sheds are models in their way, giving perfect satisfaction to the owners of horses and neat cattle. They are roomy, comfortable and well ventilated. They were all completed two weeks before the opening of the fair. It was unanimously agreed by the members of the executive committee to make an exhibition hall of the kennel building. This plan was carried out and it gave general satisfaction to exhibitors, affording plenty of room and light to show goods to the best advantage. There has been no improvement made on the grounds that has given such general satisfaction. The extension added to the poultry building was much needed in giving room and better accommodations to exhibitors in this growing department. Besides these, all of the sheep and swine pens

STATE AGRICULTURAL SOCIETY.

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were put in good repair before the opening of the exhibition. The premium list was carefully revised, new features and premiums added, making it, when published, one of the most complete schedules distributed by any State Society. Large and small bills were printed, and distributed from one end of the State to the other, as well as in wide sections of adjoining States. Every available point was billed, weeks before the opening day. The lunch to the State Press was held in the main exhibition building the last week in August, and proved to be a signal success. There were more representatives of the State Press in attendance than at any previous similar occasion. The President of this Society was persistent in his efforts that nothing should be left undone that would add to the success of the Thirtieth Annual Exhibition. He was earnestly and ably aided in his efforts by every member of the Executive Committee and the General Superintendent. During the year the Committee held thirty-one meetings, each meeting lasting from two to four hours. It would, indeed, be difficult to find a body of men who were more harmonious and dispatched the same amount of work, and they deserve the warm thanks of the stock-holders of this Society.

The entry books were opened one month before the date of the exhibition, and in practice this method works to the advantage of both the exhibitors and the Society.

We were not favored by good weather the week of the fair. Monday and Tuesday there was a down pour, Wednesday was clear and bracing, but, unfortunately, Thursday morning was cloudy and threatening, and kept thousands away from the grounds. With pleasant, clear weather there would not be standing room on the grounds on Thursday of the fair week. Receipts, as given by the Treasurer's Report, are larger than anybody thought they would be, considering the unfavorable weather.

The visitors were well satisfied with the exhibits in every department. As a whole it was superior in number of entries and quality of goods exhibited to any previous exhibition held by this Society.

The speed department was managed with skill and ability by its competent Superintendent.

The show class for horses has made considerable progress under the management of Mr. Henry P. Jones. For the last two years some of the best animals in the State have competed for the premiums. Over ninety head were shown in 1888.

In cattle the exhibit has been as good as any preceding exhibition and the number of animals competing in the various classes was in excess of last year.

Guernseys have taken the lead in regard to numbers, the breeding being equal to any in the country.

Among the herds represented were the famous "Evergreen Herd," owned by Mr. Geo. Lamonte, of Bound Brook; the "Tranquility Herd," owned by Rutherford Stuyvesant, of Warren county; "Fernwood Farm Herd," owned by Wm. H. DuBois, of Monmouth county, also the fine herd from the "Burnside Stock Farm," of Elizabeth.

Jerseys were well represented, both in numbers and breeding. Among the herds shown were the "Upholme farm herd," "Holly Grove herd," "Milburn farm herd," owned by Mr. F. C. Farley, also the "Elks farm herd," of Mr. Charles E. Teasdale, of Morganville.

The show of Ayrshire from the herds of William Lindsay, J. O. Magie and Sons and J. L. Benedict and D. T. Magie made a thorough representative exhibit. Among the animals shown were several famous prize winners, J. T. Field, of Red Bank, and R. Thatcher & Sons, of Flemington, exhibited a number of thoroughbred Short Horns that elicited much praise from the judges.

The "Holstein-Friesians" have, during the past few years, been receiving a large share of attention from stockmen in general, and while the exhibit of this class was not equal in numbers to that of previous years, the exhibit at our fair was excellent in all respects; the magnificent herd from Senator John R. McPherson's "Belle Mead" stock farm, which was exhibited by his manager, Mr. Jacob Klotz, along with some twenty head from the Lackawanna Breeders' Association, of Waverly, Pennsylvania, made an exhibition of Holstein-Friesians that would be well worth a journey to see.

Among other exhibitors of thoroughbred cattle were O. D. Munn, of Orange, with his herd of Dutch Belted, also William

# STATE AGRICULTURAL SOCIETY.

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H. Jones & Son, of So. Montrose, Pennsylvania, showing some twenty head of handsome Devons and Herefords, all tending to make up one of the best and most interesting exhibits of thoroughbred cattle ever brought together.

Grades or native cattle were shown in large numbers, five herds competing for the State premium for best herd of grades, to consist of thoroughbred bull and four cows. In the classes for single animals the competition was strong, the Judges after awarding premiums declaring they had never looked upon a better class of cattle or more deserving of recognition.

I have compiled the following table for the purpose of showing the number of herds and single animals entered in competition for the premiums offered, viz :

## STATE PREMIUMS FOR HERDS.

*Consisting of one bull and four cows.*

Guernsey.....	4	Jerseys.....	4
Ayrshire.....	3	Short Horns.....	2
Holsteins.....	2	Grades.....	5

A total of twenty herds of five animals each or one hundred head in all.

## SINGLE CLASSES.

Animals shown in competition for the State and also the premiums offered by the Society.

## BULLS.

	State Class.	Society Classes.	Total.
Guernseys.....	4	15	19
Jerseys.....	4	8	12
Holsteins.....	2	9	11
Ayrshires.....	3	15	18
Short Horns.....	2	6	8
Swiss.....	No State class.	4	4
Devons.....	No State class.	5	5
Herefords.....	No State class.	7	7
	15	69	84

# STATE BOARD OF AGRICULTURE.

COWS.			
	State Class.	Society Classes.	Total.
Guernseys.....	5	21	26
Jerseys.....	6	23	29
Holsteins.....	2	18	20
Ayrshires.....	6	22	28
Short Horns.....	2	10	12
Swiss.....	No class.	6	6
Devons.....	No class.	4	4
Herefords.....	No class.	9	9
Grades.....	9	27	36
	<hr/> 30	<hr/> 140	<hr/> 170

The single animals, according to the table, go to show that the number of thoroughbred bulls exhibited reached a total of eighty-four which added to the number of cows, would make a grand total of two hundred and fifty-four head of neat cattle shown at our thirtieth annual exhibition.

With the department for swine the exhibit exceeded in numbers that of any two previous exhibitions. So large was the exhibit that pens for the accommodation of the stock had to be constructed, a force of workmen being employed to put the old cattle stalls in condition to receive the exhibit.

Berkshires (registered animals only) were in the lead. The animals shown by the "Willswood Farm," of Budds' Lake, and those of R. Thatcher & Son, of Flemington, also the herd shown by James Glass, of Pennsylvania, went to make up a display of Berkshires equal to any seen east of Ohio. The high standard that prevails in most breeds can be traced largely to the efforts of this and kindred societies. The brisk competition for the purses offered compel breeders to give more time and study in their choice of breeding animals.

The exhibits of Poland Chinas, Jersey Reds, Chester Whites, Yorkshires and Cheshires were unusually large and fine. Essexes were not shown to any extent, but a few fine specimens were exhibited.

The exhibits of sheep reflect credit upon our breeders, and go to show that our State can produce as good as most.



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The breeds on exhibition included Southdowns, Hampshires, Shropshires, Merinos (long and short wooled), Leicesters, Cotswolds, Oxfords, and a pen of Dorsetshire horned sheep, the latter coming from the "Tranquility Farm," in Warren county. Merinos were in the lead, and the display was an exceedingly good one; Southdowns came second, with brisk competition, every premium having two or more entries.

The exhibits all around made up a department equal in every way to any preceding one, and one in which our State may feel a just pride.

I have also appended a table giving the number of animals and the various breeds exhibited for the premiums of both State and Society.

## FOR SHEEP AND SWINE HERDS.

*All breeds in competition for sweepstake.*

## SINGLE ANIMALS.

	Boars.	Sows.	Total.
Berkshires .....	20	19	39
Chester Whites.....	14	15	29
Poland China.....	17	19	36
Yorkshires .....	13	13	26
Jersey Reds.....	12	10	22
Cheshires.....	8	11	19
Essex.....	6	3	9
	<hr/> 90	<hr/> 90	<hr/> 180

This would make a total of one hundred and eighty single animals added to the numbers shown in the herds; five to each herd would make an exhibit of two hundred and fifteen head of swine.

## SHEEP.

	Rams.	Pens.
Merinoes.....	22	18
Southdowns.....	19	15
Shropshires .....	20	12



	Rams.	Pens.
Cotswolds.....	13	8
Hampshiredowns.....	13	8
Oxford Downs.....	8	6
Leicesters.....	6	3
Dorsetshires.....	..	1
	<hr/> 101	<hr/> 71

A total of one hundred and one rams and seventy-one pens, consisting of three ewes, or, in all, three hundred and fourteen head of sheep, making in round numbers the three divisions of Department B, cattle, sheep and swine, eight hundred and eighty-three head of stock exhibited.

Under the management of Mrs. Smith, the exhibit of ladies' fancy work has improved wonderfully, the goods exhibited in many instances displaying rare artistic ability, and making up a department of first importance in the success of our exhibitions.

Farm machinery and implements were in generous display; the latest and best labor saving machinery was to be seen in the field set apart for this department.

Another leading feature of the fair, and one that has year by year increased in numbers and excellence, is the poultry exhibit. Your officers added an extension equal to the old building, to accommodate the growing exhibit, feeling assured that this want had been provided for, but the entries have outstripped the improvements, and a tent had to be secured, in addition to the building, to make room for this popular and attractive exhibition. The poultry show was first-class in every respect and deserves encouragement.

To give a clear idea of the number of entries received, and the tremendous strides taken in all departments during the past five years, I append a list of entries in the various departments since 1874, to date.

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## TABLE OF ENTRIES FROM 1874 TO 1888.

DEPARTMENT.	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	EXHIBITS.
Special State....	59	70	106	106	148	124	170	146	149	106	155	140	129	126	132	Horses, cattle, sheep, swine.
Speed.....	52	98	105	99	98	149	.....	103	126	107	66	107	104	175	134	Speed.
Department A..	107	72	68	73	76	78	109	62	75	46	.....	74	78	88	89	Horses.
“ B.	392	431	633	715	818	737	950	963	837	845	984	972	1187	1160	1321	Cattle, sheep, swine, poultry.
“ C.	817	961	1005	1456	1140	1763	1697	1492	1467	1913	1998	2027	1832	1595	2061	Farm products.
“ D.	518	701	705	1416	946	702	1122	1091	1021	1182	1269	1113	1258	1296	1318	Ladies' needle-work, &c.
“ E.	164	182	233	256	291	415	540	793	521	477	639	720	818	715	1012	Canned goods, honey, &c.
“ F.	32	154	139	207	192	263	275	232	207	338	219	221	324	176	219	Farm machines, tools, &c.
“ G.	69	72	16	40	47	28	49	50	50	57	83	94	64	88	103	Carriages, wagons, &c.
“ H.	29	52	36	37	.....	211	204	86	64	52	57	34	39	35	46	Household furniture, woolen goods.
“ I.								121	83	85	112	102	110	127	165	Manufactured goods.
“ K.	97	114	115	136	214	142	177	183	255	300	219	355	380	412	416	Fine arts, &c.
“ L.	81	97	83	140	159	15	34	72	77	35	60	49	40	39	40	Sanitary appliances.
“ M.	.....	.....	.....	.....	.....	.....	.....	.....	35	16	.....	24	37	39	31	Dairy goods.
Total.....	2447	3004	3249	4681	4129	4087	5491	5394	4967	5559	5885	6184	6296	6063	7140	

As may be seen by a comparison, the total in 1874 was two thousand four hundred and forty-seven, while in 1884 the number was five thousand eight hundred and eighty-five, or more than double as much. To-day we have reached high water mark, the total being seven thousand one hundred and forty entries.

Under the provisions of the law passed by the Legislature March 30th, 1874, appropriating a sum not exceeding \$3,000 a year for State premiums, this Society has acted in strict accordance with the law. Not one dollar of this appropriation, directly or indirectly, has gone into the hands of this Society. The only advantage the Society derives is that the horses, neat cattle, sheep, swine and poultry competing for these premiums shall be exhibited on the State Fair Grounds at their Annual Exhibition.

Fourteen years experience has demonstrated that this law has been far more successful than its authors anticipated.

An attempt was made last winter to repeal this law and pass in its place a law dividing the State appropriation among the State and County Societies, on the basis of the cash premiums paid out by each of these Societies; such a plan would surely destroy the practical usefulness of a law that has been such a success for the past fourteen years.

At the quarterly meeting of the Board of Directors, held in Newark on the third Wednesday in October last, the question of renting the grounds for three days each week during the months of November, March and April for running races was submitted.

The Directors approved of the plan, and with proper security being given, the Executive Committee were authorized to carry out the contract. The contract was executed, a copy of which is now in the President's possession.

P. T. QUINN,  
*Cor. Sec.*

Delegates to the State Board of Agriculture, Hon. E. A. Wilkinson and P. T. Quinn.

The Annual Fair will be held at Waverly Park, on the grounds of the Society, September 16, 17, 18, 19 and 20, 1889.

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## TREASURER'S ANNUAL STATEMENT.

NEWARK, N. J., January 18th, 1889.

### RECEIPTS.

Balance in treasury, January, 18, 1888.....	\$4,128 36
General account.....	1,371 20
Fair account.....	24,823 75
Premium account.....	3,620 80
Interest account.....	46 63
Dividend account.....	42 00
	<hr/>
	\$34,032 74

### DISBURSEMENTS.

General account.....	\$3,694 75
Fair account.....	5,524 74
Ground account.....	762 75
Improvement account.....	5,017 74
Premium account.....	14,047 70
Interest account.....	60 00

## STATE AGRICULTURAL SOCIETY.

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Divided account.....	\$2,702 25
Balance.....	2,222 81
	<hr/>
	\$34,032 74

Correct attest :

CHARLES F. KILBURN, *Treasurer.*

HENRY H. ISHAM,

HENRY P. JONES,

JOSEPH COLYER,

*Auditing Committee.*

## GENERAL ACCOUNT.

### RECEIPTS.

Track rents, Driving Association.....	\$600 00
Track rents, other sources.....	705 00
Stall rents.....	52 00
Sale old lumber.....	14 20
Balance.....	2,323 55
	<hr/>
	\$3,694 75

### DISBURSEMENTS.

Insurance.....	\$228 00
Insurance, special.....	72 75
Directors' dinners.....	360 07
Press dinners.....	221 00
Sundry merchandise and expenses.....	491 43
Taxes.....	456 00
Dues to National Trotting Association.....	56 00
Entry clerk.....	250 00
Office rent.....	100 00
Salaries.....	1,400 00
Secretary's clerk and expenses.....	59 50
	<hr/>
	\$3,694 75

## FAIR ACCOUNT.

### RECEIPTS.

Gate admissions.....	\$8,835 00
Gate admissions, special.....	212 50
Grand stand admissions.....	934 75
Stand rents.....	4,117 75
Railroad admissions.....	5,374 05
Speed entries.....	2,513 90
Speed programmes.....	125 00
Society entries.....	605 00
Rebate, advertising.....	4 00
Special privilege.....	2,000 00

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Coat and parcel room.....	\$17 05
Hostlers' privilege.....	83 75
	<hr/>
	\$24,823 75

### DISBURSEMENTS.

Advertising, printing and posting.....	\$1,668 51
Judges, superintendents and assistants .....	859 50
Sundry help and expenses.....	1,947 00
Police .....	319 00
Refectory .....	550 73
Band.....	180 00
Balance.....	19,299 01
	<hr/>
	\$24,823 75

### GROUND ACCOUNT.

Balance.....	\$762 75
	<hr/>
	\$762 75

### DISBURSEMENTS

Salary to overseer.....	\$500 04
Help to overseer.....	138 53
Feed and horse shoeing. ....	124 18
	<hr/>
	\$762 75

### IMPROVEMENT ACCOUNT.

#### RECEIPTS.

Balance.....	\$5,017 74
	<hr/>
	\$5,017 74

#### DISBURSEMENTS.

Hardware and lumber.....	\$29 08
New sheds and repairs.....	4,071 35
General repairs.....	677 36
Architect's fees.....	119 70
Grading and extra help.....	60 25
Whitewashing.....	60 00
	<hr/>
	\$5,017 74

# STATE AGRICULTURAL SOCIETY.

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## PREMIUM ACCOUNT.

### RECEIPTS.

State premiums, 1887.....	\$3,295 00
Acct. Society Premiums, 1887, checks returned, not finding owners.....	40 80
Speed premiums, not trotted for or won.....	285 00
Balance.....	10,426 90
	<hr/>
	\$14,047 70

### DISBURSEMENTS

State premium, 1887.....	\$3,295 00
Society premiums, 1888.....	6,119 70
Speed premiums.....	4,400 00
Diplomas and Medals.....	233 00
	<hr/>
	\$14,047 70

## INTEREST ACCOUNT.

### RECEIPTS.

Discounts, sundry bills.....	\$46 63
Balance.....	13 37
	<hr/>
	\$60 00

### DISBURSEMENTS.

Interest upon bond and mortgage.....	\$60 00
	<hr/>
	\$60 00

## DIVIDEND ACCOUNT.

### RECEIPTS.

Account Dividends 1887, checks returned, not finding owners.....	\$42 00
Balance.....	2,660 25
	<hr/>
	\$2,702 25

### DISBURSEMENTS.

Account Dividend, 3 per cent.....	\$2,687 25
Dividend account, 1887.....	15 00
	<hr/>
	\$2,702 25

# SPECIAL STATE PREMIUM AWARDS FOR THE YEAR 1888.

Herewith is contained a list of the awards made at the Thirtieth Annual Exhibition of the New Jersey State Agricultural Society, held at Waverly Park, near Newark, on September 17, 18, 19, 20 and 21, 1888, under the provisions of an act of the Legislature approved March 30, 1874, and in accordance with the list made by the Special State Premium Committee for the year 1888.

Submitted by  
WM. M. FORCE,  
Rec. Secretary.

## HORSES.

	First Prize.	Second Prize.
W. Scott Smith, Flemington, Hunterdon county. Best brood mare "Nellie Webster," with family of three colts .....		\$100 00
R. Cadugan, Bayonne, Hudson county. Best standard trotting stallion "Bayonne Prince," with get...	100 00	
Fashion Stud Farm, Trenton, Mercer county. Second best standard trotting stallion "Rumor," with get....		\$50 00
Mt. Pleasant Stock Farm, Findeme, Somerset county. Best standard stallion "Lafayette," standing for park and coach horses.....	100 00	
Rutherford Stuyvesant, Allamuchy, Warren county. Best Percheron stallion "Duke of Normandy," with get.....	100 00	
Wm. Walter Phelps, Englewood, Bergen county. Second best Percheron stallion "Colonel," with get.....		50 00
R. Cadugan, Bayonne, Hudson county. Best standard stallion "Valdine," over four years old.....	50 00	

MILTON J. PALMER,  
WM. W. OGDEN,  
S. E. GARRETTSON,  
H. EDGAR MASON,  
Judges.

# STATE AGRICULTURAL SOCIETY.

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## CATTLE DEPARTMENT.

First  
Prize. Second  
Prize.

### AYRSHIRES.

J. O. Magie & Sons, Elizabeth, Union county.		
Best herd of Ayrshires, bull "Stanley," 4064, and four cows.	\$100 00	
Wm. Lindsay, Elizabeth, Union county.		
Second best herd of Ayrshires, bull "McDuff of Arwell," and four cows.....		\$50 00
J. O. Magie & Sons, Elizabeth, Union county.		
Best Ayrshire bull, "Stanley," 4064, over two years.....	50 00	
Wm. Lindsay, Elizabeth, Union county.		
Second best Ayrshire bull over two years.....		25 00
J. O. Magie & Sons, Elizabeth, Union county.		
Best Ayrshire cow, "Marigold," 7479, A. H. B.....	50 00	
Wm. Lindsay, Elizabeth, Union county.		
Second best Ayrshires cow, "Queen of Avon," H. B., No. 3746.....		25 00
B. C. SEARS, T. WEST, C. THORNTON, Judges on Ayrshires.		

### HOLSTEIN—FREISIANS.

Belle Meade Stock Farm, Belle Meade, Somerset county.		
Best herd of Holsteins, bull "Cornelius Artes," H. B., No. 3193, and four cows.....	\$100 00	
D. T. Magie, Elizabeth, Union county.		
Best Holstein bull, "Waldemar," H. B., No. 2879.....	50 00	
Belle Meade Farm, Belle Meade, Somerset county.		
Second best Holstein bull, "Cornelius Artes," No. 3193.....		25 00
Best Holstein cow, "Widgeon," No. 5269.....	50 00	
Second best Holstein cow, "Kanns Marie," No. 5315.....		25 00
LAFAYETTE CONOVER, COLLINS B. MEIERS, NICHOLAS WALN, Judges on Holsteins.		

### JERSEYS.

A. G. Atkins, Orange, Essex county.		
Best herd of Jerseys, bull "Brie," No. 6591 and four cows....	\$100 00	
Edward Bodee, Freehold, Monmouth county.		
Second best herd of Jerseys, bull "Queens Rufa," 20454, and four cows.....		50 00
A. G. Atkins, Orange, Essex county.		
Best Jersey bull, "Brie," No. 6591, over two years.....	50 00	
Edward Bodee, Freehold, Monmouth county.		
Second best Jersey bull, "Queens Rufa," 20454, over two years.....		25 00



STATE BOARD OF AGRICULTURE.

	First Prize.	Second Prize.
A. G. Atkins, Orange, Essex county.		
Best Jersey cow, "Anna Alpha," 19589.....	\$50 00	
Edward Bodee, Freehold, Monmouth county.		
Second best Jersey cow, "Vanda Mackness," No. 32212.....		\$25 00
NATHAN ROBBINS, S. B. WHEELER, CHAS. D. THOMPSON, Judges on Jerseys,		

GUERNSEY.

Geo. La Monte, Bound Brook, Somerset county.		
Best herd of Guernseys bull, "Accident," 879, and four cows	100 00	
Rutherford Stuyvesant, Allamuchy, Warren county.		
Second best Guernsey herd, bull (Isham 1485), and four cows		50 00
William H. DuBois, Marlboro, Monmouth county.		
Best Guernsey bull ("Sir Fernwood, Jr.," 1203), over two years.....	50 00	
R. Stuyvesant, Allamuchy, Warren county.		
Second best Guernsey bull ("Isham 1485.").....		25 00
Geo. La Monte, Bound Brook, Somerset county.		
Best Guernsey cow (Primrose, of Lehigh, 1410).....	50 00	
Second best Guernsey cow (Little Nell of Evergreens, 2149).		25 00
I. W. NICHOLSON, W. M. PANE, R. H. PAIGE, JR., Judges on Guernseys.		

SHORT HORNS.

J. T. Fields, Red Bank, Monmouth county.		
Best head of Short Horns (Bull Cayuga Prince).....	100 00	
Second best herd of Short Horns, Bull 2d Duke of Onondaga		50 00
Best Short Horn bull "Cayuga Prince".....	50 00	
Best Short Horn cow "Moll Pitcher".....	50 00	
Second best Short Horn cow "Loretta".....		25 00
G. H. VANDERBEEK, G. W. DEVOE, Judges on Short Horns.		

GRADES.

R. Thatcher & Son, Flemington, Hunterdon county.		
Best herd of Grades, Short Horn bull (Duke), and four cows	100 00	
D. T. Magie, Elizabeth, Union county.		
Second best herd of Grades, Holstein bull (Waldemar), and four cows.....		50 00

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	First Prize.	Second Prize.
R. Thatcher & Son, Flemington, Hunterdon county.		
Best grade cow, over two years.....	\$50 00	
T. L. Benedict, Elizabeth, Union county.		
Second best grade cow, over two years.....		\$25 00
<p style="text-align: right;">N. M. CULBERSON, LOUIS DAVENPORT, WM. MCINTOSH,</p>		
WAVRLEY, Sept. 20th, 1888.	Judges on Grades.	

## SHEEP.

Martin Dennis, Stillwater, Sussex county.		
Best Hampshire ram.....	\$20 00	
Benjamin Hulse, Allentown, Monmouth county.		
2d best Hampshire ram .....		10 00
Pen of Hampshiredowns, one ram, two ewes.....	20 00	
J. McCain, Mount Hermon, Warren county.		
Best Oxford ram.....	20 00	
Wm. C. Addis, Delaware, Warren county.		
Second best Oxford ram.....		10 00
Benj. Hulse.		
Best Southdown ram.....	20 00	
J. McCain.		
Second best Southdown ram.....		10 00
Benj. Hulse.		
Pen Southdowns, one ram, two ewes.....	20 00	
Chas. R. Hoff, Centreville, Hunterdon county.		
Second best pen Southdowns, one ram, two ewes.....		10 00
Benj. Hulse.		
Best Shropshire ram.....	20 00	
Jeremiah McCain.		
Second best Shopshire ram.....		10 00
Rutherford Stuyvesant, Allamuchy, Warren county.		
Best pen Shropshires, one ram, two ewes.....	20 00	
J. McCain.		
Best Merino ram.....	20 00	
Benj. Hulse.		
Second best Merino ram.....		10 00
J. McCain.		
Pen Merinoes, one ram, two ewes.....	20 00	
Benj. Hulse.		
Second best pen Merinoes, one ram and two ewes.....		10 00
J. McCain.		
Best Cotswold ram.....	20 00	
R. Stuyvesant, Allamuchy, Warren county.		
Pen Cotswolds, one ram and two ewes.....	20 00	

STATE BOARD OF AGRICULTURE.

	First Prize.	Second Prize.
Benjamin Hulse, Allentown, Monmouth county.		
Best Leicester ram.....	\$20 00	
	F. S. HOLCOMBE, JACOB LONG, PETER RICE, Judges on sheep.	

SWINE.

Wills A. Seward, Budds Lake, Morris county.		
Best Berkshire boar.....	20 00	
J. T. Fried, Red Bank, Monmouth county.		
Second best Berkshire boar.....		\$10 00
Belle Meade Farm, Belle Meade, Somerset county.		
Best large white boar.....	20 00	
Benjamin Hulse, Allentown, Monmouth county.		
Second best large white boar.....		10 00
Best small white boar.....	20 00	
Best small white boar.....		10 00
A. Silverthorne, Delaware, Warren county.		
Best Jersey red boar.....	20 00	
O. D. Munn, Orange, Essex county.		
Second best Jersey red boar.....		10 00
Martin Dennis, Stillwater, Sussex county.		
Best Poland China boar.....	20 00	
Wm. C. Addis, Delaware, Warren county.		
Second best Poland China boar.....		10 00
Benjamin Hulse, Allentown, Monmouth county.		
Best Essex boar.....	20 00	
Second best Essex boar.....		10 00

SWEEPSTAKES.

Albert Silverthorne, Delaware, Warren county.		
Best boar of any breed, all competing (Jersey Red).....	20 00	
Martin Dennis, Stillwater, Sussex county.		
Second best boar of any breed, Poland China.....		10 00
	JOHN E. KIPP, P. Q. HOLCOMBE, N. C. MEAD, Judges on swine.	

POULTRY.

Monmouth Poultry Yards, Englishtown, Monmouth county.		
Best display of poultry.....	20 00	
Dr. J. G. Maple, Trenton, Mercer county.		
Second best display of poultry.....		10 00
	NEWTON ADAMS, Judge on Poultry.	

STATE AGRICULTURAL SOCIETY.

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REPORT OF THE STATE PREMIUM COMMITTEE ON  
FARM CROPS.

TRENTON, January 16th, 1889.

We, the undersigned, members of the State Premium Committee, hereby certify the following to be a true return of the awards made to the several persons entitled thereto, as follows :

First premium on one acre of grapes..... \$25 00  
To Arthur B. Rue, New Brunswick.

Statement—The vines are set nine feet apart each way, trained upon three wires, and were trimmed back to one and two buds to the spar; the large thrifty canes were left quite long. Soil, clayey loam, nearly level. Spring of 1883, applied twenty barrels hickory wood ashes; 1884, 800 pounds ground bone; 1885, '86, and '87, (fall and winter) stable manure.

Amount of sales, 7,784 pounds for \$252.26, actual, besides 250 pounds used for wine. Total yield, 8,034 pounds grapes.

First premium on one acre of raspberries..... \$25 00  
To Chas. H. McKirgan, Newark.

Statement—Grown at Lyons' Farms, this being the fourth year from setting, at which time I used a light coat of yard manure; used nothing since; cultivated and hoed between the rows. Soil sandy loam, with clay subsoil. Crop harvested amounted to 1611 quarts and sold for \$188.

First Premium on three acres apples..... \$25 00  
To William B. Lippincott, Hartford, Burlington county.

Trees set 20 feet apart each way; age from 20 to 50 years growth; soil plowed and planted to sugar corn the past year; free loam, gravel subsoil; varieties most profitable: Bough, Red Astrachan, Maiden's Blush, Baldwin and Chester Spitzenburg.

Yield, 978 bushels; sold for \$242.98.

First Premium on two acres tomatoes..... \$20 00  
To William B. Lippincott, Hartford.

**Statement**—20 tons stable manure were applied per acre in the fall ; plowed twice in the spring, and a dressing of hog manure applied in the row ; plants set four by six feet and received two plowings—twice cultivated and once hand-hoed—soil, a free loam.

Yield, 775 baskets ; sold for \$175.82.

First Premium on Dairy Products..... \$100 00  
To William B. Lippincott, Hartford.

**Statement**—From a herd of 12 cows I received in the year 24,800 quarts of milk, which brought at wholesale, in Philadelphia, \$1,196.53 ; average per cow in milk \$99.71 ; amount received from the offspring of seven cows makes the average per cow \$105.54 ; cows were pastured on upland during summer, in winter are fed clover hay and uncut cornstalks.

Their mess morning and night consists of 2 quarts cob meal, 2 quarts bran and 1 pint cake meal, mixed with wheat chaff and clover heads, per cow. Estimated cost for grain is \$25 per cow.

Second Premium on five acres wheat..... \$15 00  
To John H. Denise, Freehold.

Partial failure ; too much stable manure ; straw too large ; too much wet ; prefer commercial fertilizers.

Yield, 24½ bushels per acre.

Second Premium on five acres corn..... \$15 00  
To John H. Denise, Freehold.

**Statement**—Timothy sod, on which 12 loads of stable manure per acre was plowed under 6 inches deep ; 600 pounds commercial fertilizers broadcast with a drill ; planted May 10th ; 4 feet by 4 feet ; variety, large White Dent.

Level cultivation ; soil, clay loam ; wind damaged crop 10 per cent. ; believes drill planting for small varieties will give largest yields ; vice versa for large varieties, allowing the sun to reach the soil, especially in wet seasons ; yield, 83 bushels per acre of 75 pounds for a bushel.

First Premium on five acres Timothy hay..... \$25 00  
To John H. Denise, Freehold.

**Statement**—Yield was baled without wood Aug. 25th to 30th ; weight per acre 3 tons and 1,785 pounds, which sold for \$15 per

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ton at barn—fourth year's mowing—yield not varying from this amount either year.

The third year 20 two-horse loads of manure were applied per acre in the fall. For the fourth year's mowing 600 pounds of fertilizers per acre was applied in March. The grass looks fine as it goes into winter quarters, with a dressing of 20 loads manure per acre. This field contain 20 acres and yield on the whole field about 3½ tons per acre.

First premium on five acres of clover hay..... \$25 00  
To John H. Denise, Freehold.

Statement—Yield 3 tons and 100 pounds per acre. A mixture of clover, alsike and timothy, cut from land heavily fertilized the previous year for wheat with squankum marl and 1,000 pounds commercial fertilizers per acre.

Aftermath left after mowing for winter protection.

Sixty-five acres cut 185 tons—the best paying crop of the farm, considering labor.

First premium on five acres of rye..... \$25 00  
To D. Augustus Vandervere, Manalapan.

Soil, clay loam ; rye drilled in Oct. 6th ; 1½ bushels per acre ; after potatoes ; a fair coat of manure broadcast before drilling in the seed ; yield of straw large ; yield of rye, 195 bushels, or 39 bushels per acre.

First Premium on one acre potatoes..... \$25 00  
To D. Augustus Vandervere, Manalapan.

Yield from one acre, 138 5-165 barrels, or 379 35-60 bushels ; soil, clay loam ; in grass 3 years previous, with no manure or fertilizers ; plowed 8 inches deep ; potatoes planted April 30th and May 1st, cut to two eyes ; rows 2½ feet apart and 16 inches apart in rows ; applied broadcast before planting 600 pounds John Taylor's potato fertilizer ; applied in the 400 pounds of fertilizer, and at second cultivation scattered around the hills 500 pounds more fertilizers ; total amount applied, 1500 pounds ; cultivated three times ; blight injured the crop ; potatoes were smooth and good.

First Premium on five acres of corn..... \$25 00  
To D. Augustus Vandervere, Manalapan.

**Statement**—Soil, clay loam; plowed seven to eight inches deep; rows four feet each way, four grains in hill; cultivated three times; yield, 440 bushels, or 88 bushels per acre, of 72 pounds each.

Second Premium on three acres potatoes..... \$15 00  
To John B. Warrick, Burlington.

**Statement**—Ground was broadcast with stable manure in fall of 1887 and spring of 1888; 1000 pounds of Grange fertilizer was applied; potatoes were planted three feet apart and 15 inches in the rows the first and second weeks of April; harrowed the ground both ways with smoothing harrow just before they came up; cultivated three times; hilled up with the Randall Cultivator the last operation; yield, 1,035 bushels, or 345 bushels per acre; gross proceeds, \$517.50, or \$172.50 per acre.

First premium on two acres cabbage..... \$25 00  
To Charles H. Dudley, Burlington county.

**Statement**—Soil, heavy loam; clay subsoil; plowed down stiff timothy sod; 15th of May spread ten loads of marl and fourteen hundred pounds Swift Sure Phosphate broadcast, also 1,200 pounds Swift Sure Phosphate applied in the row on the two acres cultivated flat. Number of heads marketed, 9,446; net receipts, \$305.24.

Second premium on two acres cabbage..... \$15 00  
To Wm. B. Lippincott, Hartford.

**Statement**—Soil, free loam; crop grown on four years old sod; previously spread with stable manure and fertilized in the row 700 pounds per acre. Plants four feet by two feet. Cultivated with cultivator and hoed by hand. Yield from  $7\frac{1}{2}$  acres, 30,243 heads; receipts, \$795.50.

First premium on one acre of onions..... \$20 00  
To John Henry Vanness, Pompton Plains.

**Statement**—Soil, dark sandy loam, peaty nature; ground plowed the fall previous; the following spring from 15 to 20 hundred pounds of fertilizers per acre was applied broadcast and harrowed

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in ; seed sowed in drills 14 inches apart ; yield per acre 610 bushels.

Signed,

ROBERT S. GREEN,

Governor.

HENRY I. BUDD,

THEO. F. D. BAKER,

P. T. QUINN,

THOMAS H. DUDLEY,

I. W. NICHOLSON,

Committee.

WM. M. FORCE,

Secretary.





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# ADDRESS.

VALUE AND IMPORTANCE OF AGRICULTURAL FAIRS.

BY P. T. QUINN, Esq.

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## ADDRESS.

VALUE AND IMPORTANCE OF AGRICULTURAL FAIRS.

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BY P. T. QUINN, Esq.

*Mr. President and Gentlemen of the State Board :*

I have not written a paper on the subject which the Executive Committee very kindly invited me to do. In fact, the subject is one with which I will occupy but a few moments, and I would largely prefer to answer any questions that may be asked by persons interested more or less in agricultural associations, as to the methods usually employed, than to give any historical account of the successive failures of agricultural societies.

I have been closely connected, not only with this Board since its infancy—I think Prof. Cook and myself were at its christening, and I have attended every meeting since its organization up to the present. I have also been closely associated with the State Society for the last twenty years, and feel that I have had some little experience in helping to make that Association successful.

Of course you are all aware, and it would not be necessary for me to say to so intelligent an audience, that agricultural fairs are the outgrowth of enlightened agriculture everywhere. In every country where agriculture forms the basis of prosperity it has been for a long time their purpose to form an association which would bring the farming community, who are scattered, of course, more than those commercially engaged—to

bring them together in some way, by which the experience of one might be shown to the other, and the products of the soil and of the farm yard, and anything or everything pertaining to it, should be brought to a central location, so that once a year, while making a pleasure trip at the same time, it would become an experience and a lesson to bring such things where all could see what other people were doing.

The Royal Agricultural Society of England, of course, brings together the best products of the soil and of the shop. I thought before I visited that fair that I knew something of agricultural associations in this country, but when I visited that fair, I was perfectly amazed—in the first place, at the general interest shown, and in the second place at the immensity of the exhibits. Professor Cook will bear me out when I say that here we have no conception of what an agricultural society is. Of a single article of exhibit at Bedford, there were one hundred and forty-six portable engines, and at another exhibition the exhibits were almost on a scale equal to that. The people who attend these fairs are of the better class of farmers, and all flock to the Royal Society show, and their experience is, as it is in France, that it is the most profitable way that a nation can lead its people to better systems and better methods, by bringing about rivalry. The fact is, it is a kindergarten on a large scale. Then, in the smaller places, as in the State of New Jersey, one would be surprised to find that people in the extreme southern parts would have certain methods of working successfully, while in the northern part, they would be entirely ignorant of them. An association of this kind helps to break down those differences, because it brings out just such experiences as you have had given you here this morning, and gives people ideas, and incites them to be better, and they go home wiser and better men. When you attend your county exhibition in the fall of the year, you there show what your methods are capable of doing, or when you visit the State fair, you there see the same thing.

The fact of the matter is, that agricultural exhibitions are acknowledged agents for educating our people to better systems, but the point that bothers us here, and, in fact, bothers us throughout the United States, is the bringing together of the largest

products to some central location, and at the same time to make such fairs a financial success.

The association that I have been so long closely associated with has sent out committees to the States of New York and Pennsylvania, and to a dozen other States where they hold exhibitions, to get a practical knowledge of the question of governing their associations, in the hope that by getting their experiences, instead of having to learn through years, and sometimes years of disaster, to gain experience that we might avoid a great many breakers, and many mistakes that these older associations have made. In order that we might endeavor to make our own State Society a success in the matter of exhibits, we have separated them under the head of different departments. We have thirteen distinct departments, which cover all the products of the farm, the garden and orchard, besides the domestic matters, and matters pertaining to the household. We discover that by confining it exclusively to agricultural products, there was a blank that kept away a large number of visitors. We discovered that to make an association a success, it was necessary to have household articles represented as largely and as fully as it was to have the farm and garden or the orchard represented. Then we met with another difficulty. A great many people objected very strongly to our paying attention to the horses. They say that the horse track was demoralizing and not an agricultural product. But our experience has been, and, of course, one can only deal out his own little experiences, that the horse is a very important factor in the agricultural interests of the State of New Jersey. We, therefore, have devoted a department to the horse, classifying him also, but in doing that we have always been careful and worked assiduously to carry out the rule that the horses should not overtop everything else. We are always careful to make other departments as full and as complete as possible, and where we do this the majority of the people will not find fault with the horse, or with the half-mile race track.

The mistake our Societies have made, and wherein they have failed largely, is, first, from want of practical knowledge of how to run them, and secondly by allowing horses to top everything, so that the association would be a horse trot only.

I say I believe that the horse should have the same standing as the bull or the cow or the sheep, the swine or the poultry. To make a successful fair is to satisfy your visitors, so that when they come in, they come to an agricultural show, or if they come to the horticultural department, and they know anything about fruit, they can spend two hours there examining the exhibits, and go away wiser and better than when they came there. If he wants to plant an orchard of apples, or quinces, pears or peaches, his coming here and seeing what are on those tables, marked from the counties from which they come—that man when he goes away has learned more, practically, than ten years would give him from nurserymen's catalogues—men who are only anxious to sell their fruit trees—by examining the fruit on the tables he sees the article itself, and does not need to run the risk of planting and waiting until his trees come into bearing. I believe it is true, also, that a method of showing fruit, to be of advantage to the community, should be the method we have adopted, and which I am glad to say is being adopted elsewhere, of keeping nurserymen from the exhibitor's tables as far as possible.

When a boy I knew of one case in this State where three-fourths of all the fruit exhibited, four-fifths I may say, was from nurserymen. Of course they have a right to show, if they choose, but when the nurseryman shows two hundred and fifty varieties of pears on the tables, though many of them are very fine specimens, people can go there and look at them, and go away again, not knowing much more than when they came. When they attend such an exhibition as we had at Waverly, or as Mr. Budd had at Mt. Holly, the entire farm is represented, the results achieved by men who grew the exhibits for pleasure or for profit, where the visitors can see what their neighbors have produced, and if the visitors are desirous of information as to the best varieties they should plant, they can see just the varieties that are most successful. We have gone on in that way until we have got our people warmly interested in competitive trials, and at the same time we feel that our method is an educative method. It is a method by which people can learn, when they visit our exhibition. Your departments should all be as full as possible, and should show all the different varieties. In the vegetable department all the new varieties should be

shown. Your visitors can then examine and make up their minds whether it would be a good investment for them to pay liberal prices for different seeds or let them alone.

In making a society a success, when you come into the poultry department, the same thing should be prominent; all the different breeds should be represented, and the different breeders should be encouraged to come there and make their exhibits. We can run through the entire departments of the fair in that way. When you go to ten or eleven or twelve departments, and every one can do this very readily, including the horse department—and every farmer ought to be fond of the horse, and I find no fault with him for being so. Still, if you give people sufficient in all the other departments to pay them for the time and money they spend to come to the fair, my impression is that horses will never interfere or be the cause of any county or State fair breaking down.

There should, of course, be one word said about premiums. When men bring their produce to county or State fairs, they look to the fact that they ought to be recompensed to some extent for the amount of trouble and the cost of transportation. I am firmly convinced—and if I have any influence in the future I shall endeavor to use it in that way—I am firmly convinced that, as a rule, our premium list is not large enough in amount for the most important articles. They cover variety enough, but as I say, it entails considerable expense and a great deal of time, sometimes a great deal of labor, for a man to make an exhibit in a county or State fair, and I believe that both county and State associations, if possible, should be more liberal with their premiums.

Another thing, I believe that there should be a closer intimacy between the different agricultural associations in our own State and in others. I believe that to-day, if every State that has an association, such as the Horticultural Association, the Cranberry Growers' Association—I believe that all these associations should come together, by representatives, and discuss the important questions that come before them year after year, and thus oftentimes learn more than by an experience of years, and I hope that the day is not far off when, besides the State Board meeting, there will be a meeting of the representatives of the dif-



ferent associations, the local associations as well as those of the State.

I don't intend to keep you on the matter of fairs. But if there is any question that any gentleman would like to ask me in relation to fairs, I will be glad to answer—if I happen to know how.

I thank you very warmly for listening to this short and desultory talk on agricultural fairs. (Applause.)

Mr. Pancoast: Do you think that if, in connection with the exhibits, the exhibitors were required to tell how these exhibits were produced, it would largely increase the interest in both State and county fairs?

Mr. Quinn: You can imagine it would entail a great deal of labor on the individual who makes the exhibit, and the fact is we have had very hard work to get men interested enough to send their products. If they were obliged to send an account of how produced, with their exhibits, it would add very largely to their work and to the difficulty of securing exhibits. I doubt if you can succeed in getting them to do it.

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# ADDRESS

ON THE

PAST, PRESENT AND FUTURE OF SCIENTIFIC AGRICULTURE.

BY PETER T. AUSTIN, Ph.D., F. C. S., PROFESSOR OF CHEMISTRY IN RUT-  
GER'S COLLEGE AND THE NEW JERSEY STATE SCIENTIFIC SCHOOL.

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# ADDRESS

ON THE

PAST, PRESENT AND FUTURE OF SCIENTIFIC AGRICULTURE.

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BY PETER T. AUSTIN, Ph.D., F. C. S., PROFESSOR OF CHEMISTRY IN RUTGER'S COLLEGE AND THE NEW JERSEY STATE SCIENTIFIC SCHOOL.

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As agriculture is the oldest industry on the face of the earth, it is not strange that many facts should have been discovered during the centuries of its practice. But before chemistry was developed there could be no science of agriculture. What was known was purely empirical, and no reason could be assigned for the result. Some of you may be surprised to know that scientific agriculture dates from 1862—twenty-seven years ago—the date of the publication of Liebig's great work on "The Chemical Process of Vegetable Nutrition and the Laws of Agriculture." Liebig's first work appeared in 1840, and was met with a storm of abuse and criticism. But, then, the world treats every new idea in that way. The more the world abuses you, the more reason you often have to suppose that you have evolved an idea which has some claim to be original. It seemed to particularly vex the public that a *chemist* should meddle with agriculture and dare to assail the views of practical farmers. The book went through many editions and then dropped out of notice, for, although founded on correct principles, Liebig had erred in his inferences, and his ideas, when put into practice, failed entirely. Liebig stated that the plant lived on or assimilated the simple or inorganic constituents of the soil and converted them into complicated organic substances, such as cellulose, sugar, albumen, &c.,

and that the animals lived on the plant ; that the plant built up complicated substances out of simple ones, and that the animal consumed these complex substances and then converted them back into simple substances. In other words, the plant was a synthetic organism, and the animal an analytic. To establish this, and to found on it a practical method of agriculture and physiology, was a work so colossal that it is no wonder that even the mighty intellect of Liebig should have failed at first to grasp all the details. Liebig examined an immense number of plants from all parts of the world, and found that while the plants all contained the same ash constituents, different kinds contained different proportions of these mineral ingredients ; even different parts of the same plant, as the leaves, the stalks or the seeds, contained varying relations of ash constituents. As a result, Liebig was able to state that every plant takes from the soil a certain amount of mineral substances as a definite mixture, and that these substances will be found again in the ash, and that the carbonic acid and ammonia which the plant requires to form its combustible parts are taken up through its leaves and roots from the atmosphere. If wheat or corn is grown on a field year after year, in time the mineral food of the soil will become exhausted and the plants will not thrive, but will be dwarfed and puny and incapable of enduring the weather, or will die of starvation. Now, if the proper amount of mineral nutriment be added to the soil the plants will grow, and the atmosphere and composition and nature of the soil will look after the rest.

A factory was established to manufacture artificial fertilizers according to Liebig's idea, but after several years of trial it was found that they were a complete failure. Liebig knew that his theory was right, but was unable to explain why it failed in practice. He worked and thought, and thought and worked. After several years, he noticed that certain fields which he had treated with his fertilizers, and which had not been bettered by them, began to show slight, but marked and increasing signs of fertility. In the meantime, the English farmer, Lawes, working with a chemist named Gilbert, showed that fertilizers would produce effects if added in soluble form, and, further, that ammonia and forms of nitrogen were not taken up by the plants from the air alone, but they must be added to the soil. If these conditions

## ADDRESS BY PETER T. AUSTIN.

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were followed the yield of a field was enormously increased. Liebig had supposed that if his fertilizers were easily soluble in water they would soak through the earth before the plant could assimilate them, and had hence made them as difficultly soluble in water as he could. But Thompson and Way long ago proved that surface-soil had the power to retain certain substances when in solution. The scales fell from Liebig's eyes. The mineral food of the plant must be placed on the soil in a soluble form; the soil would hold it and the roots absorb it. In 1862 appeared the new edition of his great work, and agriculture became a science. The manufacture of artificial fertilizers became an industry. It was easy to find out what was the proper food of any plant, and no farm need suffer from exhaustion. Since then the progress in this branch of science has been so rapid that it is hard to follow it. I have merely touched upon the striking facts of this discovery. There are many minor ones, and the conditions necessary for the successful application of the results are numerous, but every day shows advance in our ability to understand and apply them.

What are the effects of this discovery upon civilization? We find that agriculture as a livelihood—yes, as a profession—has enormously increased. The vast deposits of fossil bones and of guano have been opened and have developed a great industry, as well as have increased the resources of the world many fold. Stations have been established in many places for the examination of fertilizers and the determination of their value by chemical analysis, and employ a small army of trained chemists. The education and protection of the farmer have become a matter of national importance. Instead of farming land until it is used up, or relying on an empirical rotation of crops, the nutrients taken from the soil are systematically put back. How ridiculously simple it appears now that we begin to understand it! Careful study of the chemical composition of a plant, and the effect of chemical fertilizers, enables us to develop certain products formed by the plant. Thus, the beet-root, by careful treatment, has been compelled to produce a far greater amount of sugar than formerly, and Germany has been freed from her dependence on other countries for her supply of sugar. We know that certain substances will increase the specific functions of a plant, and so we can send

a plant into leaves, roots, stalk or seed. We can strengthen its stalk or weaken it. In fact, we are getting to be more and more masters of the vegetable kingdom, or, in other words, we can make two spears of grass grow where there was but one, and each will be bigger than the original one.

No man who has brains and muscle, and who is not afraid to work, need ever starve in this country of ours, where land is so plentiful. Let us note one fact here, which is often overlooked. The great wave of agricultural development has swept over the West and is rolling toward the Pacific. These pioneers skim the cream. When the soil gets exhausted they move on to new ground. This is not an entirely beneficial production. We are sending, it is true, vast amounts of grain and feed-stuffs to Europe, and money is coming back, but in what proportion? The mineral ingredients in these bread-stuffs are lost to us, and soon we shall have to replace them, which will cost us more, perhaps, than we have received. In 1883 we exported :

Of wheat.....	\$120,000,000
Of corn.....	28,700,000
In all.....	\$148,700,000

The cost of production of this was \$60,400,000, so that you might think there was a profit of \$88,300,000.

According to Mr. Voorhees, of the New Jersey Experiment Station, however, there were in this exported wheat and corn, 70,000 tons of nitrogen, 40,000 tons of phosphoric acid, and 21,000 tons of potash, which are worth, at market rates, \$33,000,000. Hence, our real profit is only \$55,300,000. You see, therefore, that there was a solid enrichment of Europe from America, in 1883, of a value of about \$33,000,000, and a corresponding decrease in the capital stock of the West. This amount, in time, must be replaced, or our soil will become exhausted. So long as we can draw on our native supplies, well and good, although they, of course, must be bought, but the time may come when we shall have to buy them back from Europe, and they will charge all they can get for them.

In a word, then, Liebig's great discovery has done much to develop the prosperity and independence of nations, for the independence of a nation will be based largely on how well it can feed

its inhabitants ; that is, its power of endurance. No better result of the wonders that scientific agriculture can accomplish may be seen than in the States of Connecticut and New Jersey. Look at the thousands of acres reclaimed from stone and sterility and now yielding bountiful crops under scientific treatment. Nor forget what honor is due to the men who, by dint of sheer persistence, grit and brains, introduced Liebig's work into this country, and who have educated the plain agricultural workers to such an extent that these States can compete with others better adapted by nature for agricultural production ; who established the first agricultural stations, after which all of our others have been modeled, and to whom not only these States, but our whole country, owes a debt of millions of dollars, if prosperity can be repaid in cash. I mean Professor Samuel Johnson, of New Haven, and Professor George H. Cook, of New Brunswick.

Let us now look into the subject of live stock, and see what chemistry has done there. Lavoisier had shown that animal warmth was due to processes of oxidation, a kind of burning of the carbonaceous and hydrogenous substances in the body, just as the heat of burning wood is caused by the oxidation of the carbon, its chemical union with oxygen. Dulong and Despretz proved that nine-tenths of the heat produced in the body was owing to this cause. Did it ever really occur to you that the heat of our bodies was a kind of flameless fire ? Of course you have been taught all about it, but one knows so much that one does not realize. Your bodily heat is very much like steam heat, and to produce it, fuel must be constantly kept burning under the boilers.

In the subject of animal nutrition, the mighty mind of Liebig again found a vast field to till. In many ways, this was no new and untrodden ground. Physiologists had accumulated hundreds of interesting facts, but the great question, how is it that although the nutrition of the various animals is so different, the composition of their bodies is so nearly the same ? had not been answered. The flesh of the ox, the bird and the man is about the same thing. The change of substance in a hungry herbivorous animal is about the same as in a carnivorous one. From the time of Hippocrates to 1840, this question had been becoming more clearly defined, but the answers to it were conflicting and



unsatisfactory. Suddenly, as by a flash of lightning, the gloom was dispelled. The essential facts had all been found, but a chemist was needed to translate and explain them. It was like the old story of the writing on the wall. It was there, but no one could read it. It would take me too far from my subject to attempt to explain the details of Liebig's views of physiological chemistry, to relate the fierce polemic wars waged on these questions, for the dictum of Ranke is as true in the history of science as in the history of nations: "All progress is through conflict." Suffice it to say that Liebig was the first to definitely assert that the animal must find the chief constituents of its blood, which form and nourish its whole body, ready formed in its food, and these substances originate and are found in plants. Following this up, we find that the animal is a kind of chemical factor, in which many chemical processes are being carried out. The machinery belongs to physiology; the processes, however, are largely chemical.

Chemical statistics in relation to animal life were collated and increased. Animals were analyzed wholesale, and their chemical compositions determined. For instance, Lawes and Gilbert found that the analysis of three hundred and forty-eight whole sheep gave an average of 2.34 per cent. of ash, 7.13 per cent. of proteine, 70.4 per cent. of fat and 20.1 per cent. of water. All kinds of animals were examined, and the composition of entire specimens and of the various organs and fluids determined. Foods were examined chemically, and, in fact, not only the body of the animal, but all that went into it and came out of it was analyzed by the chemists. The result of all this was that chemists found the animal to be as susceptible of experiment as the plant. Live stock can now be fed, for instance, to make flesh, to make fat, to yield milk, to produce work, or to simply maintain life. The nutritive elements of food can be determined, and their digestibility estimated. The economy of foods can be calculated, and in fact, the whole subject of animal-raising has passed from empirical management to scientific organization, and in this field, too, the progress has been rapid, and is still wonderfully rapid.

The animal is now studied very much like a steam-engine—in the one case we feed coal and get steam, power or heat; in the

other, we feed fodder and get milk, flesh or power, as the case may be. A "ration" can now be made in which the digestible proteine, the fat and carbo-hydrates can be obtained from the most various sources, and the fluctuations of the markets taken advantage of to produce the raw materials. The nutritive value and digestibility are carefully adjusted, and, as a result, for instance, we are able to produce milk at a total cost of three cents per quart. In this country, the science of live-stock feeding is yet in its infancy. We are, at least in the West, gathering the bloom of the land. Our cheap beef, and our cheap corn, remember, can only be produced for a time. Sooner or later, the riches taken from the soil must be put back again. It would be hard, indeed, to trace all the effects of these discoveries on the gradual progress of civilization. Cheaper food and more economical and profitable agriculture strengthen the great tap-root of all civilizations and human relations on earth.

In view of all this great advance in our knowledge of scientific agriculture, I say, without fear, that agriculture is a profitable profession, and I predict that more and more we shall see educated young men entering it. A well-managed farm, a comfortable house, a good appetite, a healthy digestion, a pretty wife, and some tow-headed, brown-faced, hardy children are far more satisfactory aspirations and possessions than the tapes and ribbons of a city shop, the uncertain stool of a broker's office or the somewhat dubious aspirations of a professional career.

Chemical analysis enables us to discover food in articles not formerly considered as such, or, by addition of the lacking ingredients, to convert useless substances into valuable ones. Are you aware that you can make jelly out of old boots? You will see the day when sawdust will make a part of the meal of the cow. A chemist has, indeed, recently fed his whole family on sawdust cakes, and with good results. [Laughter.]

The chemical study of foods has been carried up to the feeding of men. Professor Atwater, of Wesleyan College, has published the result of his investigations on the cost of supporting workmen, and finds that the amount of food necessary to support a man and enable him to do his daily work, can be obtained at a cost of twelve cents a day. For forty-five cents a man can live sumptuously. When meals are provided for a number at once

the cost is ridiculously small. It might be well for some of the Knights of Labor and Serfs of Capital to look into these matters. We see what a frightful waste there must be in our household economy of to-day. Hard times is another name for popular ignorance.

What a future looms up in this field of study! Think of the suffering and want that this accurate chemical work will alleviate. Already the German government is supplying the people in certain districts with plenty of written tracts explaining what are the most valuable nutriments in foods, and about what amount of each is needed to make a daily ration which shall neither want nor waste valuable substance. What an enormous increase in the purchasing power of money, and in the supporting power of a country, does chemical knowledge give! How greatly does it ameliorate the environment by making it more favorable to the people! Here is another field of work for our Experiment Station. How would you like to have a New Jersey State Experiment Station Cook-book?

I have heard many remarks made and many questions asked as to what the College for Agriculture and Mechanic Arts of a State should be, and what is its aim; and, as there often seems to be some doubt about that point, I will try to explain to you what I think it ought to be. In the first place, I may say that it is an institution of learning, intended to develop every part of the whole nature of the young men. If you talk to a man on the subject of education, and it is a subject in which he is interested, he will do it justice from his own standpoint. Each man talks best on the subject about which he knows the most. The remark was made to me on the train, "Why is it that the farmer's son, after he has been to college, so often does not come back to the farm?" This is a very pregnant question, and I have had the same question put to me by those who come to our college. I think I answer the question best when I ask the person who put the question what he really expects *his* boy to do. That is the real point. For instance, the farmer expects what? That his son is to come back well educated, competent and skillful, and is to remain with him on the farm. Then, what is the father's part in this arrangement? In many cases he expects, since the farm has not proved a success, that the boy, now hav-

ing been educated, is coming back to make it a success. I think you will find that not a few men have this idea. The father is, in this case, not so much interested in the future of his son as he is in the future of his own business. This is pure selfishness, and deserves a rebuke, which it usually gets in the end. This is just what it amounts to: Is the young man coming back, trained and educated, to make a success of what his father has made a failure of? To do this, the first thing he ought to have is capital. This, however, is usually lacking. If a man has a good, well-managed farm, showing a satisfactory balance-sheet, and the son comes back developed and educated, after four years of training, I think the young man will consider the matter of remaining at home very seriously. He sees a good, profitable investment for himself, a means to support himself and, in time, a family, not forgetting the day when the old people will require looking after. But if he comes back and finds the farm badly managed, and in poor condition—if he sees that his father does not understand his business, and the farm is not paying, that the balance-sheet is on the wrong side, and there is a top-dressing of mortgages—I hardly think you can expect him to take hold of it. No man likes to have anything of that kind unloaded upon him. You would not want your son to go into a business that is a failure. I think no man can ask his son to undertake the management of an institution, or a farm, or a business, that he really knows in his heart is not a success. I think that is the case in many instances, certainly in many I have met. I think the way to keep the boys on the farm is to make the farm worth keeping the boys on. [Applause.] I have yet to see a class of college boys among whom there is not a large number who would be very glad to get an opportunity to go on well-managed and profitable farms, such, for instance, as some of those now being worked by the graduates of our own agricultural college.

There is a little bit of human nature involved in these talks about education—that is, when you come right down to it. Is a man talking about his own son or someone else's son? That makes all the difference in the world. A certain prominent educator was asked if the money expended for an elaborate education was wasted. He said, "No, not if it were for *my* son." The neighbor's boy should stay on the farm. He should not adopt

any other profession. He should stay where he is. He should do what his parents think best. But with *your* boy—ah, that is different! Your own son—*your* boy—when you think that over, you will find almost nothing too good for that boy. [Laughter.] That is my experience with practical men. I usually find that the kind of education, or the management of education, is worked out and adopted for the other man's boy. "My boy" is different entirely. Nothing is too good, or too great, or too splendid, for "my boy." There is a good deal of human nature in all these arguments. But I respect the sentiment. The boy honors his parents, and the parents love their boy. This is as it should be.

God has placed in the mind of every child a little, fragile seed. If that seed is fertilized and nourished it may grow into a beautiful flower which may charm the fluttering butterfly and delight the sober bee, filling the air with sweet odor, and gratifying the eye with its delicate loveliness; or it may grow into a great tree, in the branches of which the singing birds may carol and nestle, and under whose broad, umbrageous arms weary men may rest and slumber in the soft, sweet sanctity of its verdant shade, while its huge shaft points upwards, like a mighty finger, to the pure, blue eye of God. But if that seed be not fertilized and nourished, it may grow to be a dwarf or a monstrosity, waving its distorted branches like palsied hands, dropping its blotched and blighted leaves before their time, sheltering the worm and the spider above and the grub beneath, its heart black and hollow, and its fruit sour and bitter, with a maggot in every seed. There is no man who can predict the future of a child—who can say which of a child's gifts shall not be developed. No one can tell. You cannot tell into what many a seed will grow, until it has been nurtured and has sent up its stalk, and even then it may grow a foot or two high, and still you do not know what it is to be like. In the mind of every child you will find certain attributes. So much you may see at any school. As the boy goes to college you will see them developed still further. No one can tell what the attributes are to be. We do know this, that whatever the boy is, he is no *man's* work. God has placed in that boy's mind certain faculties. They are to be developed. It is our duty as educators to see that they *are* developed. I hold it to be wrong that any man should interfere with the natural progress or the full development of a

human mind. I do not think one ought to put a bushel over a candle that God himself has lighted. It is our duty as educators to see that the talents of a child are developed and bear interest to their uttermost possibilities. Suppose a farmer's son or a mechanic's son, for the two classes have to be started alike, should come to an institution of learning, showing indications of certain intellectual gifts, the development of which will make him more valuable in other fields of work. What should be done? I have heard it said this boy should be kept back. What! Keep *your* boy from his heritage! That is not right. Should I send my son to an educational institution and find, after he had been graduated, that he possessed certain gifts, which his educators had not discovered, and were hence undeveloped and valueless to him; that he had not been allowed to come into his rightful heritage of intellectual wealth, I should demand an explanation from those teachers into whose charge I had entrusted my boy, and if they were unable to show good and satisfactory reasons for their lack of ability to discover my boy's gifts, I should consider them in the same light as I should a farm hand who should make a bouquet of potato blossoms, and leave the potatoes to rot in the ground. In a country like this, where men can split rails or drive mules, and yet rise to fill the Presidential chair with honor to their country and glory to themselves, [applause] no boy should be retarded in his progress; on the contrary, every one of his faculties should be developed and trained. He should be made a productive power in the land. When you think this matter over you will admit, I am sure, that if your boy has talents and abilities which will make him a success in any branch of life, anything and everything should be done to encourage him and fit him for the work to which he is best adapted. The true school is a school that takes boys as they are and makes them what they are intended to be; a school that develops every faculty, and turns the boy into the educated, upright and responsible American gentleman, to become a power in the land and an example to the world.

So much for the effect of education in the agricultural and mechanic arts, and that is as important as any subject. The fate of a nation does not lie in its farms or its manufactories, but it



lies in its schools. In Germany they recognize this fact more than we do, as yet.

Another great result of agricultural progress has been the development of the Agricultural Experiment Stations. You all know how the fertilizers are analyzed. Almost everything which the farmer uses can be tested, not empirically, but by exact processes. What they have thought to be valuable may be found to be worthless. It is known exactly which ingredients give the value. The work of the Agricultural Experiment Stations opens a great field. The farmer now knows more exactly what he wants. He finds out where he can get the best material at the lowest prices. He should watch the market and lay in his stock when he can. The farmer ought to make his own fertilizers. There is no reason why you should pay manufacturers for doing this. You ought to know exactly what you want, what your soil needs, and you ought to put on it what is needed. Anything not needed simply represents so much money thrown away. You will find that manufacturers will meet the demands of the market. Without the aid of the Agricultural Experiment Station you cannot tell what you are getting. The manufacturer can put anything on his bags that he wishes ; he can mark a fertilizer "carrots" or "potatoes" if he wishes. What is in the fertilizer cannot be ascertained without an analysis. Methods are continually being improved, and fertilizing substances can be made cheaper and better. Farmers should make many of their own fertilizers and use what their soil most needs. If the need be phosphoric acid, use phosphoric acid. There is no occasion to use tons of other material of no value to your particular soils. Of course, this implies great progress, but it need not surprise us to see great progress made in the line of supplying the needed materials for use. By purchasing the proper materials for his crops, the farmer may mix them as he wishes. You will see more and more, in time, the development of what we may call the independent farmer, and not the man dependent on any other set, or on other men.

In the matter of soils, enormous progress has been made by scientific agriculture. Once the farmer knew nothing about the soil, except that the plant grew in it. But no success could be had until the soil received proper attention. In the last years a

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great deal of study has been devoted to the soil, its chemical composition and the effect of rain upon it. One would think that the first thing a man would like to know would be what his soil was made of, and yet, as a rule, it is the last thing he thinks of. It is one of the hardest things to find out. More and more progress is being made in that direction, for the nature of the soil must determine very largely the character of the crops to be successfully grown upon it.

The same may be said of feeding. We are continually trying to find out how we can get the best results. We are experimenting on the effect of feeding upon the various animals. No better example of the progress in this direction can be given than the progress in the feeding of cattle to produce milk. A cow is now not much more than a machine, which we can run about as we wish.

We are studying the effect of fertilizers, not alone as to the quantity produced, but as to the quality product. This opens the field which we are just beginning to touch. Almost all the experiments so far have been made to find out whether the yield has been increased as to quantity, but now the quality of the product is being made an object of investigation. Particularly in the case of fruits, we should experiment on the effects of fertilizers on the color, taste, form and grain of the produce, and thus make a study of the quality as well as of the quantity. We want definite investigation as to the effect of each fertilizing ingredient upon these properties of the fruit. This must come last and is the more difficult. The effect of a fertilizer on the various properties of the plant is no easy problem to solve, but it is by no means unsolvable.

Great progress has been made in the study of insects, their relations to plants, and the combating of the species antagonistic to plant-life. It is a branch of study as interesting to the farmer as it is profitable to him.

There is another field which scientific agriculturists are studying, and that is water-culture. If we wish to study plant-life, we must eliminate every condition that is not necessary. Plants are grown in soil made of little glass marbles, and are fed with fertilizers in solution, so that they grow under the most favorable conditions. It is possible that in time, certain



vegetables may be grown in soils made of glass, with fertilizers fed to them in solution and regulated automatically. Such a thing is by no means improbable. When we think of the possibilities of manufacturing methods, and the rapidity of scientific progress, no limits can be assigned to what may yet be done in this direction. Already one man is advocating a garden in the attic as a necessary part of a house, and backs up his suggestion by successful results in his own house. What better place could there be for a hot-bed than the sunny attic of a well-heated and ventilated house?

Another result of the Scientific Colleges and Experiment Stations is the change from the private to the general experiment. Instead of small experiments made by those not used to the work, and not accurate observers, experiments are being made by those educated for it, or carried out under their direction. It requires years of practice to enable one to experiment successfully. There have been established, in Europe, farms entirely experimental, maintained at government expense. Such a farm relieves the farmer of a great many difficult problems. Few men like to undertake experiments when they are in the midst of the busy season, and hence are very glad to have the experiments carried out, as they can be, by those who are trained for it. Such a farm is not intended to prevent those who can undertake experiments from experimenting, or to interfere with the experimenting on private farms under proper direction. On the contrary, they stimulate such work. Experiments are made on every possible subject, and when one experiment is finished, another is undertaken. There is nothing done except for the progress and education of the farmers, and the discovery of new processes. Such experimental farms in Europe have made agricultural science there what it is. Let the State of New Jersey have such an experimental farm, and its expense will be covered many times over by the results that the farmers will gain from it. Such a farm supported at State expense, and manned by a corps of trained and skillful investigators, each on a fixed salary, and having no pecuniary interest in the farm, could be made a mine of wealth to the agriculturists. What splendid investigations could be carried out, what striking discoveries could be made! What an object-lesson could be made of it to show the

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boys how a farm could be made worth staying on, and what a field there is for them in the profession of agriculture!

There are many possibilities that we might consider in relation to the future of agriculture, but my time is nearly up. I would like to direct your attention to the fact that we are more and more able to preserve substances. This is an economical question of the greatest importance. Not many years ago it was impossible to keep beef, but now, by means of what is known as anti-septic treatment, it has been found possible to keep substances for months or years. There is no limit. If the small, low organisms which bring about putrefaction can be kept away, there is no limit to the time these substances can be kept. That opens a great field in the best management of crops, fruits, &c. Many a time a large quantity can be produced, but it does not pay. If the producer has such a method at hand he can utilize it and keep his products for months and years, and can hold them for better markets. We are now canning enormous quantities of meat and other articles of food, but there are many substances we cannot keep as yet. Great progress is being made in that direction. Why don't you can your own goods? The process is simple enough. Ask your Experiment Station to show you how. Make yourselves a reputation for your produce. Many a man will pay high for your canned tomatoes, corn or other produce, if it is extra good. Certainly you cannot grow poorer stuff than is canned at large. Put your individuality on your goods, and let the public pay you for your care and the excellence of your articles. I will pay more for that brand of corn grown and canned by John Smith, because I like it, even if it does cost more. I will economize elsewhere.

In the South we have sections where plants can be grown which will not grow successfully elsewhere. Let us experiment with some of the foreign plants—say the tea plant, the coffee plant, and the various species of quinia, &c. Why is there not a large field here?

Another great field to which recent attention has been directed is fish-farming. The profits from the systematic and scientific raising of fish are remarkable. A moderate-sized pond on a farm may be made to pay enough to make a good many fields take

a second place, and this does not include the water-cress patch, either.

On every side I see possibilities and opportunities in the profession and practice of scientific agriculture.

If I have given you any new idea, or anything of scientific interest, I shall be well satisfied.

On motion, a vote of thanks was extended to Professor Austin for his entertaining and instructive address.

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# STUDY OF PLANT LIFE IN OUR SCHOOLS.

BY AUSTIN C. APGAR,

PROFESSOR OF NATURAL SCIENCE, NEW JERSEY STATE NORMAL SCHOOL.

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I cannot open my remarks this afternoon with any better words than those of Prof. Asa Gray: "There is one department of industry, that of agriculture, for which no provision is made in our popular system [of education.] There is scarcely anything which has the most remote bearing upon the subject. The great business of life, for the majority of mankind, is left to be practiced merely as an art, based upon no scientific principles. 'The fathers have eaten sour grapes and the children's teeth are set on edge.' There is enough published on agriculture; there are sufficient inducements offered by societies and by the legislature; but there is wanting a *recipient power* in the general mind, the power of being instructed.... The title which Boyle has given to one of his essays applies with great force to this subject: 'Of man's great ignorance of the uses of natural things. This I regard as the most glaring defect in our system of popular instruction, and one which demands, from the magnitude of the interests involved, the immediate and earnest attention of all the friends of education.'

Any manufacturing industry in the Union will combine together and with the aid of a lobby at Washington, or at the State Capitols, will have special laws passed to increase their profits, and have schools organized to teach whatever may be necessary to increase the efficiency of their workmen, while the greatest indus-

try of all—that of agriculture—has hardly any laws on the statute books made for its benefit, or any subjects taught in the public schools which tend to make its work more efficient.

In Trenton we manufacture more pottery than in any other place in the United States. While comparatively there are so few potters, still there are many tariff laws made entirely to favor and protect them, and State laws enabling them to organize special technical schools for their work. Farmers have more money invested in their business than almost all manufacturing industries combined, and they, more than almost all other classes put together, control the organization of the public schools, still there are hardly any subjects taught in those schools which tend to make good farmers of their children. And many of these subjects merely tend to lead them from agriculture into stores and manufactories. You farmers, as trustees of the public schools, could, if you would, control the work of the schools and keep it in those lines most conducive to your work. My remarks this afternoon are intended to give you my ideas of the kind of work which should be introduced into the schools to make farmers, successful farmers, of your boys; work that will make the farmer's life to be considered a grand one, and the farmer's work a noble occupation.

We send our boys to school and they study nothing but words, the words of books all the time.

Ciphering and words fill up the whole of the school term. The great amount of time devoted to mathematical work in the schools has a strong tendency to send the students away from the farm into mercantile occupations; almost all the other instruction given has a tendency in the same direction. I do not see why it is that the farmers do not have their children taught, in the schools they control as trustees or electors of trustees, the things which will do them the most good.

One thing a farmer's boy should be taught is *to see things*. Not the power merely to read what others see, but to see things for himself. It is possible to read pages of words but not feel, see, or know the things which lie back of those words. If the boy can look over a landscape and see what that landscape shows, the trees and other plants that are growing there, the soil and its power and needs, he has within him the habits

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which will make him a successful farmer. If he can look at a tree, and tell by the curl or color of its leaves, by the tint or roughness of its bark, by the size and shape of its fruit, what is the matter with the soil or roots, or what insects are preying on its vitality, then he has within him the capability of becoming an honor to the corps of agriculturists. These habits of observation must be begun during the school years and had best be taught in the school room or under the charge of a good teacher.

How shall we have our children in our schools see things that will tend to the knowledge that every agriculturist, who is successful in his business, must have? It must be something besides book work. It must be something dealing with nature, some working with natural substances.

We are all creatures of habit. The successful man in any occupation is the one whose habits enables him to see, without even willing to do so, all that tends to help or hurt his business in every particular. A successful insurance manager or agent is one who cannot go through a town without noticing all the peculiarities of the fire risks, or through a house without noticing the flues, the rubbish and every thing which tends to make the risk greater or less. When are strong habits best formed? As a rule, they are formed early in life, or never.

In all our schools there ought to be some work with the real things of nature; and while some of this should be with animal forms, the first and the main work should be with plants.

A good subject for a start would be the trees of the neighborhood. They are conspicuous, very useful and not so numerous in kinds as to make the subject difficult for either teacher or pupils. Some definite time should be devoted to this as to all other subjects of the school, and quite a portion of this time should be spent out of doors inspecting and investigating the real trees, rather than in examining the small portions which could be used in the school room. Of course, a number of the lessons upon a particular tree could as well be given in as out of doors, and if after or before school all pupils could see and examine the particular tree there would be even less outdoor work needed by teachers and pupils. But some of the lessons should be given out of doors.



Let this study be continued till all are interested, till all can in winter or summer call by name the tree of the region.

When the arrangement of the branches, the color or surface of the bark, the peculiarities of the buds, in winter, tells as much to the mind of the pupil as the full foliage or fruiting of the summer, then the lesson has been well taught, the habit has been well gained. Instruction of this kind would tend to keep your boys in your business, and would make farm work among the most successful of the occupations of man.

What education besides this of the eye is needed by farmers? I have two charts here which will illustrate what I consider a great need here among agriculturists, namely, a knowledge of seed and bud.

In regard to the seed they should know its formation and its possible and probable power to produce plants; and of the bud, its certain power and the practical possibility of retaining its power through grafting, budding, slipping, etc., in nearly all cases.

The seed holds the first bud of plant growth, and in that bud rests a power to produce a certain fruit with uniformity; but until the seed has grown and the plant formed has brought forth fruit, no one can tell the variety it will produce.

The bud has the power to form the same fruit. Take a bud from the sweet harvest apple tree and that bud can make harvest apples grow on any apple tree, and while it is true that every apple that grows on that tree will be a harvest apple, the seed from those apples will not produce harvest apples. Fix that in the minds of the youth. You cannot tell what variety a seed will produce till it has been tried; but if its production proves valuable you can retain it as long as you retain buds from the plant formed. If this is thoroughly understood a great amount of unnecessary labor can be saved, and great loss of money, through the attempt to sell varieties not worth the buying, can be avoided.

The best way to understand and appreciate these facts is to understand what organs form seeds, and the manner of their formation.

Plate I shows a common wild plant, the Geranium. The whole plant is shown at 1, the flower at 2 and 3, and the essential

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organs for the production of the seed, found together in the centre of the flower in this and many other plants, are shown at 4 and 5. The stamens shown at 4 end in anthers, one of which is much enlarged at 6. These produce a fine dust called pollen, shown highly magnified at 7. Without the aid of these pollen grains, no seeds can be produced in the pistil (5) which forms the fruit. The pistil consists of the stigmas (C), where the pollen grains must adhere and act. The style (D) and the ovary (E), which forms the fruit and in which the seeds, after the action of the pollen, form, as shown in section at 8. The ripened fruit and the peculiar plan for spreading the seeds is shown at 9.

The ovule (12) is in the pistil at the start, and the seed (13), after the action of the pollen, has within it a small plantlet (14 and 15); this, on being placed in the soil, spreads out, takes root, and forms a young seedling (16), between the two leaves of which a bud (K) grows, having the power to continue the life of the plant. If the pistil should always receive its pollen from the same plant, the variety formed would generally prove much like the parent; but this is not only not generally true, but many plants have these parts so arranged that it cannot occur. This result is achieved in many wonderful ways. Sometimes the stamens and pistils are on separate plants, as in the willows. Sometimes on separate parts of the same plant, as in the corn. Often when in the same flower they mature at different times. Often only the wind or insects can bring to the pistil the pollen grains. By the wind and by insects pollen is often carried for miles.

As the power to produce seeds resides in nearly equal proportions in the pollen and the pistil, and as the source of the pollen can, in hardly a single case, be determined, the seed will have half of its quality an unknown quantity.

Many farmers allow the trees which spring up from the seed to continue growing till they produce fruit, and seem disappointed because the worst of specimens grow. The average fruit is very poor fruit. It is only one out of many thousands of varieties that is worthy of cultivation and sale.

The few good varieties which have been produced are named and retained by grafting, budding and other plans of keeping

the bud for a series of years much beyond the life of a single plant.

To illustrate a plant in which the stamens are separated from the pistils, I have Plate II, representing the Indian Corn. The whole plant (1) has the stamens in the tassel (B) at the top of the stalk, while the pistils (AA) are where the ear of corn is formed.

The ear (4) shows the numerous styles and stigmas (G) in the silken threads. One of these pistils is shown at 2, in which there is an ovary (C), a long slender style (D) and a stigma (E). The kind of flowers which are formed in the tassel is shown at 3, with their anther (F), in which the pollen is formed. Every thread of silk must receive its pollen grain from the tassel of some stalk somewhere, or the grain at the base will not form. The fineness of the pollen grains, and the position of the stigmas, make it almost impossible that they should come from the same stalk. This makes it always true that the result is a mixture; and as all the varieties of corn, sweet, yellow, red, white and pop corn, form but one species, these will always mix if planted near each other. This explains why our markets contain, every season, so much poor with so little good sweet corn. And it explains, as well, why farmers must receive such low prices for their products. If corn is planted in small patches, or worse still, in single rows in gardens, many of the ears will be found to have but few grains, as the chance for all the silken threads to receive pollen is very small.

Some plants mix much more readily than others. Plants in which there are different varieties will nearly always mix if they are planted near each other, and some, as the musk melons, cucumbers, etc., where the stamens and pistils are often in separate blossoms, must necessarily do so. This is why such a large proportion of the melons brought to our markets are very poor, and many unfit to eat. If the manner and ease of mixture were understood, how little chance for mixture would be allowed by the farmers, how few complaints would be made by the purchasers, and how much more money would cheerfully be paid and gladly received.

In many groups of plants we know of but one species, and all the forms, good, bad and indifferent, are but varieties of this one

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species. This is true of the peach. So if the different varieties are in the same orchard, the peach pits will all have an unknown quality, due to the mixture of pollen as well as to a general tendency, true of highly cultivated plants, to return to their original form. The original peach was a small, very hairy skinned cling-stone ; sour one ; and so the chance to get a good peach from the seed is almost no chance at all. There are so many good varieties known, which, through grafting, can with certainty be raised, that there is no excuse, except that of ignorance, for the many seedlings that are allowed to produce fruit which is not worth taking to market, and when taken, seldom brings the cost of freightage. Still, every year such fruit is offered for sale, and everywhere trees are producing such fruit and allowed to cumber the ground.

If an enumeration of the trees of the State could be taken, what a large percentage of the fruit would be found to consist of little, bitter or tasteless apples, cherries and plums, choke pears and caterpillar-like peaches? I know of a pear tree which cannot be less than fifty years old, which has never produced a single pear that has been fit to eat in any condition. Why is it allowed to stand in a place where a good tree could stand? Why allowed to use up the strength of soil which might nourish the best pears known in the land?

Should any seedling be allowed to grow without grafting, since all new varieties are produced from seeds, and new varieties might be good ones?

Except when special pains are taken that the pollen and the pistil are from the best of the plants of a species, and that a union of the qualities of the two will be an improvement upon either, the chance for anything worth preserving is so small that it need not be taken into the account at all.

Leave the formation of new varieties to the specialists of the Experiment Station. If by accident a plant has been allowed to grow until fruit has been produced, and that fruit is something luscious, why, then, name it, send specimens to your friends, and offer to send grafts, if desired.

Slips, instead of seeds, are often used to retain the exact variety; and whenever strong plants can be produced in this way, it is the better plan. Thus in grapes, though the plants are

readily raised from the seed, only layers or slips are taken advantage of; but with peaches, seeds are always used, and the seedlings grafted. The reason for this is, that the roots of all plants raised from the seed are stronger than those which grow from slips; and plants of such a weak nature and short life as the peach must be given, by the primary roots of the seedling, as much strength as possible.

Sometimes slips are planted as though they were seeds, and even in the language of the farm are called seeds. The potato is an underground stem with buds (eyes) for continued growth; so what is called a piece of potato with an eye, is just a piece of stem with a bud. In this case, the exact variety is retained, because only the buds are planted. If the real fruit of the potato, which grows at the top of the stem where the blossoms were, be taken and the real seeds be extracted and planted, a new variety of potato would be the result.

Let me reiterate, before closing, the points I would make.

Do not allow the teachers in the public schools to devote all the time to the subjects of grammar, arithmetic and geography. Insist that some of the time shall be devoted to the study of nature and natural things. Insist that the plants, their organs and the office of these organs are subjects as worthy of study as "cube root" and the "purchase and sale of stocks." Insist that the education of the eye to see things, and of the mind to comprehend these things, is as important as "parsing;" that a portion of the time devoted to the study of the rivers of Africa be given to the study of the trees of your neighborhood; that the three great kingdoms of nature, animal, vegetable and mineral, shall, at least, have a few periods of the school course devoted to their study.

You may think it a waste of time for the children to go out with their teacher for a half day. I wish you knew how false such an idea really is. If the teacher knows something of natural objects, and can awake an interest about natural things in the minds of the pupils, he can accomplish more toward fitting his students for life, and especially life on a farm, than any one who works only with books. I wish you knew how much better some kinds of knowledge are than book knowledge.

Farmers have ridiculed, and with good reason, book farming;

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yet they have allowed their children, who ought to be well fitted for their life work, to be instructed solely from books. Book farmers are usually failures, because they did not begin in the right way, and do not have the right habits.

They begin the farmer's work too late to get the habits of observation ; too late to get eyes to see, and mind to grasp the story of soil and plant life ; too late to learn the lessons which ought to have been taught while they were children in the public schools. How could it have been otherwise ? Their business needs a great deal of instruction, a great deal of tact, as well as accurate habits of observation. Books are all right ; books will add to anybody's knowledge ; there are many things which one can find only in books. Still there are many things which books cannot teach, and while I am advocating less book work and some other work in its place, it is because thus far in most schools it is only book work which is required.

Let us have a more equable division of the school time. It is now *all* for books, *none* for things ; suppose we try three-fourths for books, and one-fourth for things, and see how the real work of education, the developing of all the powers, will be enhanced by the change.

The longer I teach the more I find that pupils can repeat any number of words without at all feeling the truths which are back of and below and beyond the words. None but a teacher can comprehend how like parrots pupils can become.

But you say that the teachers do not know these things and so could not teach them. If your employers make this a requirement, you will find that the teachers will soon be forthcoming. Teachers will learn what they need to teach. Still I have something to propose which I think would secure the desired result in the best manner.

It is not every one who can make such subjects interesting. The teachers of the land have, many of them, grown old in the school room, teaching only the words of books. They could not well learn to teach new subjects in new ways. This proposed work is not intended to fill the whole time of the school, but only a certain portion of the time, so a single instructor might teach in quite a number of schools.

All the schools of a township could arrange for one or two in-

structors in natural sciences, and the work could be so mapped out that all the schools might receive the necessary amount of attention. By this arrangement, teachers with special talents for this kind of work could be secured, and thus the best results from the teaching be accomplished.

There is no State in the Union which is so completely a market garden as New Jersey, situated, as it is, between the two largest cities in America ; so there is no State in which such instruction as this I am to-day advocating is so much needed. In the western portion of the Union, where things are raised in the most extensive way, where single fields of hundreds of acres are planted with the same variety of grain, the danger of mixing is almost none at all. Since, here in New Jersey, a plot of ten acres will have growing upon it all of the fruits and vegetables, so the need of perfect knowledge of plant growth and reproduction is as great as possible.

I have said what I wished, and I can only hope that the facts as stated have impressed you with their importance, and that you will see to it that in your schools some study of plant life be placed on the programme and carried out in a practical manner. (Applause.)





PLATE I.

COMMON GERANIUM. (*Geranium Maculatum.*)

Fig. 1. The whole plant, showing roots, rootstocks, two radical leaves, two stem leaves, a cluster of flowers, and a cluster of fruit.

Figs. 2 and 3. Two drawings of the flower. 2 shows the five petals of the corolla and the essential organs within, and 3 shows a side view, with three of the hairy sepals of the calyx.

Fig. 4. The ten stamens, five short ones alternating with five long ones. A represents an anther and B a filament.

Fig. 5. The pistil with five slender stigmas at C, a single style at D, enlarged near the bottom, and a five lobed ovary at E.

Fig. 6. An enlarged anther covered with pollen grains.

Fig. 7. Three views of pollen grains, very much magnified.

Fig. 8. A cross section of the nearly ripened ovary, showing the seeds within the cells.

Fig. 9. The pistil in fruit; the hardened styles separating below from the prolonged receptacle throw the seeds from the carpels of the pistil.

Fig. 10. Diagram section of a flower showing the position of all the organs.

Fig. 12. An ovule before the action of the pollen.

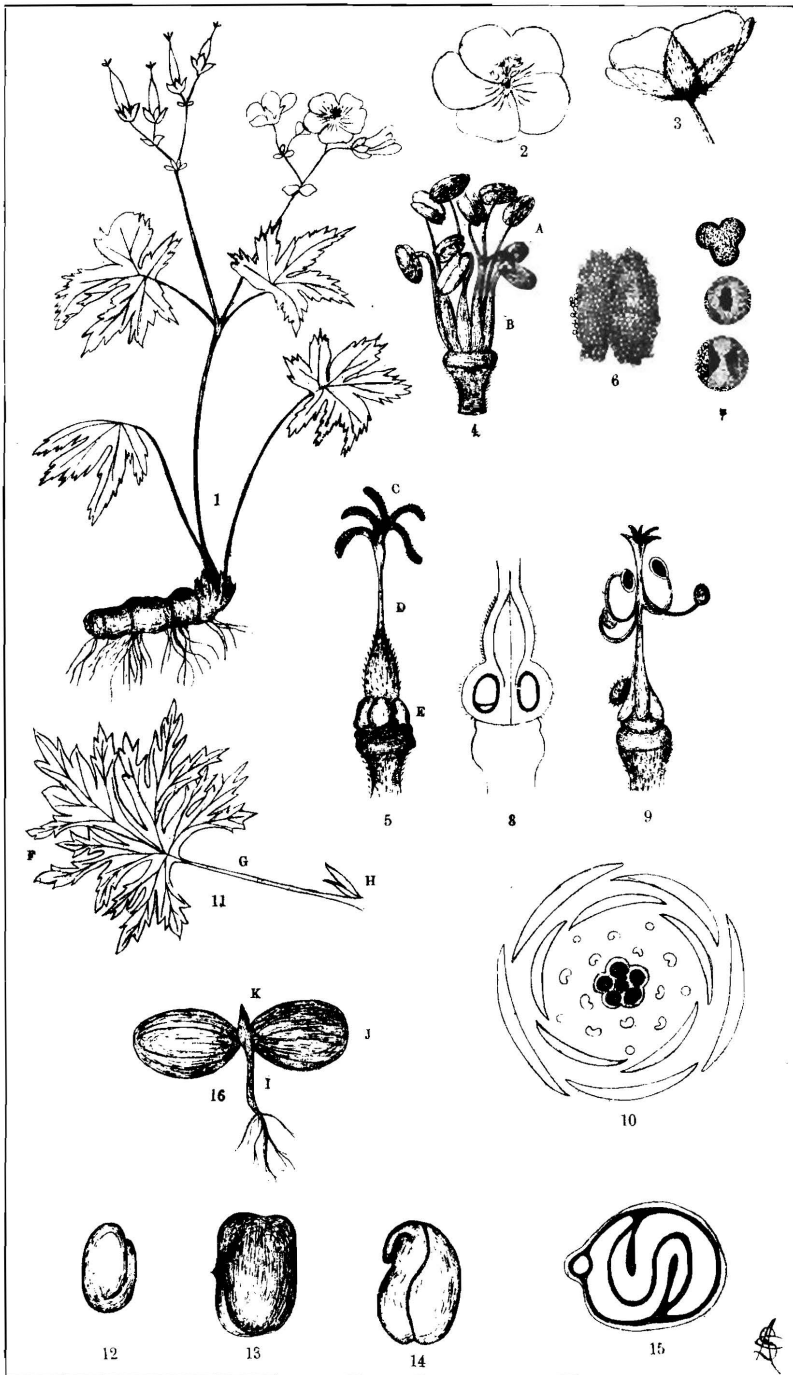
Fig. 13. A seed.

Fig. 14. An embryo taken from a seed by the removal of the covering.

Fig. 15. A cross section of a seed, showing the folded and convoluted cotyledons or seed leaves, with the radical at one end.

Fig. 16. A young plantlet. I, the radical; J, the cotyledons, and K, the plumule or bud.

Figs. 12-16 are all magnified.



4

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2

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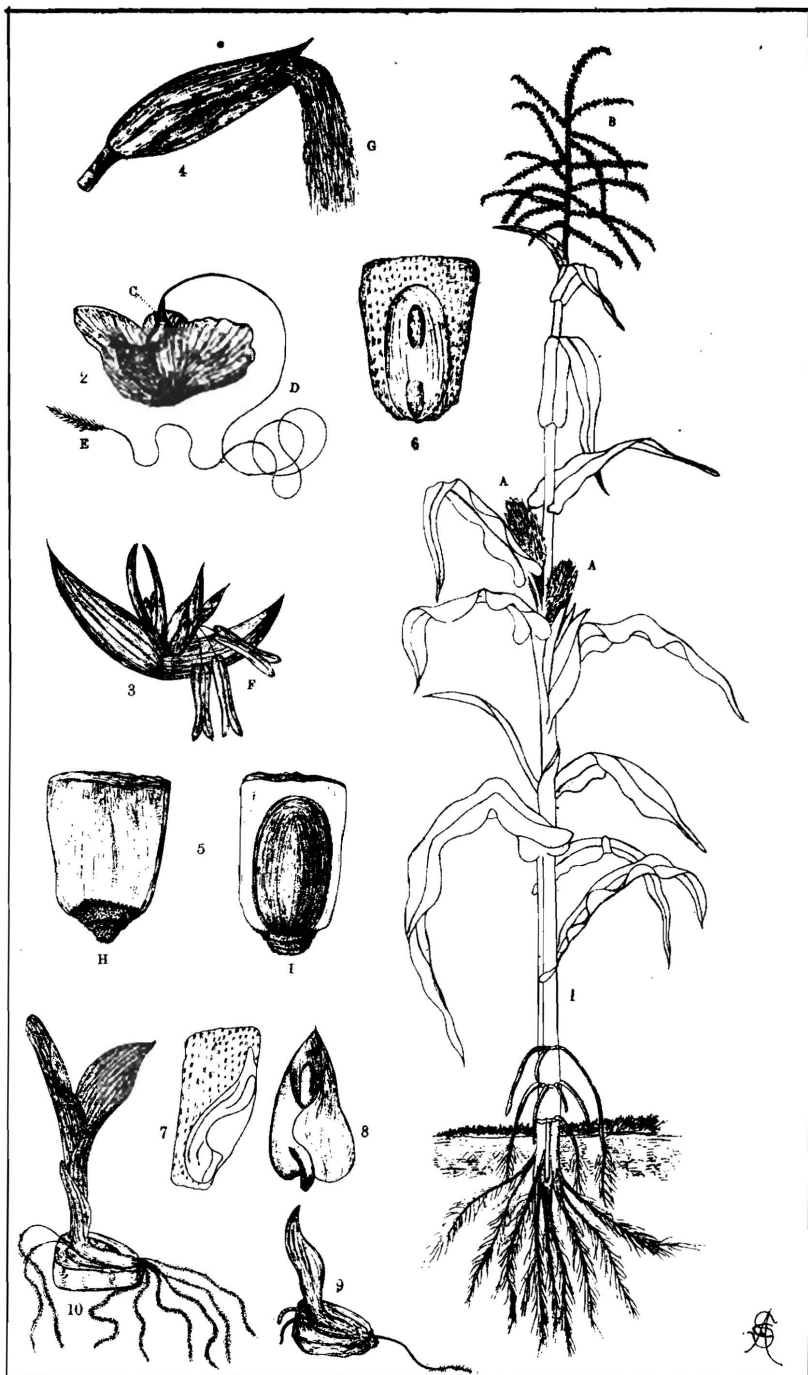


PLATE II

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PLATE II.

INDIAN CORN. (*Zea Mays*.)

Fig. 1. The whole plants, showing the primary and secondary roots, the parallel veined leaves sheathing the stalk, two clusters of pistillate flowers (AA), and the tassel (B) formed of staminate flowers in spikes.

Fig. 2. A, pistillate flower surrounded by glumes; C, the ovary; D, the long thread-like style, and E, the stigma.

Fig. 3. A staminate flower, with three two-celled anthers (F) hanging on slender filaments.

Fig. 4. A short axillary branch of the stalk with spike of pistillate flowers enclosed in husks; the many long slender styles and stigmas hang out at G.

Fig. 5. Two views of the ripened grain. H shows the back and I the side containing the embryo.

Figs. 6 and 7. The covering removed from the grain and showing the mealy albumen and the embryo.

Fig. 8. The embryo removed from the albumen showing the radical and single seed leaf.

Figs. 9 and 10. The growing plantlet.



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# THE NEW JERSEY EXPERIMENT STATION.

PAST YEAR'S WORK—SOME OUTLINES OF FUTURE WORK.

BY E. B. VOORHEES, A. M.,

CHEMIST, NEW JERSEY EXPERIMENT STATION.

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# THE NEW JERSEY EXPERIMENT STATION.

PAST YEAR'S WORK—SOME OUTLINES OF FUTURE WORK.

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CHEMIST, NEW JERSEY EXPERIMENT STATION.

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The work of the Experiment Station during the past year has been continued, with few exceptions, in the lines indicated by Dr. Neale in an address on Our Experiment Station, before this Society, in 1887, viz :

1. The analysis of commercial fertilizers.
2. The conducting of field experiments.
3. Investigation into the sorghum sugar industry.
4. The testing of fodder plants, and
5. The study of fodders and feeds in their relations to dairy industries and stock raising.

These various lines of work employ the station's forces throughout the year, each receiving the share that the facilities of the station allow.

1. The chief in respect to amount of work is the analysis of all brands of commercial fertilizers sold in the State, and is deemed of paramount importance, although not embracing as much scientific investigation as some of the other lines indicated. During the past season the analyses of over two hundred and fifty samples have been made, published and distributed to about nine thousand farmers in the State. It is the aim of the station to make and publish the analysis of every brand of fertilizer sold in the State, and it has been materially aided, in respect to secur-

ing its samples, by prominent farmers who take considerable pains and undergo great inconvenience in securing all the samples sold in their counties. During the past season, with the exception of Hudson, each county was represented by one of these farmers.

Besides the manufactured fertilizers, many samples of incomplete goods are analyzed, from which the complete are made; this is regarded as of considerable educational value, since it furnishes the farmers with information in regard to the sources of supply, and the prices of nitrogen, phosphoric acid and potash in their unmixed state in the markets, and also forms a basis from which comparative values may be secured. Many analyses are also reported of crude and waste products, which in many parts of the State can be secured at nominal prices and are of considerable agricultural value.

Besides these analyses much valuable data is collected, relative to the quantities of the different fertilizers sold, and their possible bearing upon the progress of agriculture is discussed. These statistics have been published from time to time in the annual reports of the Station and show the effect of the Station's work in helping the farmer to a better product at a price nearer its commercial value than years ago. By this study many interesting points are brought out, an illustration of which may serve to show how, indirectly, a control of the commercial fertilizer trade is benefitting those farmers who buy and use them. In 1885 the retail price at which certain fertilizing material could be bought was fifty-two per cent. higher than the wholesale; in 1888 the same material could be bought at retail for about thirty per cent. above wholesale prices. In other words, in 1885, material worth, in the wholesale market, \$1,000, could be bought from the manufacturer at retail for \$1,520; in 1888, the same material, worth in the wholesale market \$1,000, could be bought at retail for \$1,300, a difference in the farmer's favor of \$220, or twenty-two per cent. This only illustrates the meaning of the fertilizer control in reference to one of the costly elements entering into the manufacture of fertilizers—a sort of hidden effect only discovered by the method of comparing the work of 1888 with 1885.

Although it is admitted that the statistics gathered by the station in regard to the actual sales of fertilizers in the State

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are defective, in the sense that they are too low rather than too high, they serve as a guide in estimating the use made of these materials by the farmers of the State, and indicate either that they are found profitable or that the soil has been so reduced in plant food, by continual cropping, that it is necessary to import it in order to get a crop. The statistics for the past season show that at least \$1,045,000 were spent by the farmers of New Jersey for fertilizers. This seems an enormous sum, but looked at in another light the balance is found still on the wrong side of the ledger. Calculating from chemical analysis, the total product of corn, wheat, oats, rye and buckwheat that was sold from the farms of New Jersey in 1880, (reserving seed and feed for stock, and not including hay and straw of which the farm yard manure usually consists), contained nitrogen worth \$1,350,243, phosphoric acid worth \$307,365, and potash worth \$166,829—a total of \$1,825,000; there was, therefore, exported from the farm in that year, and not including animal product, milk, vegetables, fruit, etc., fertilizing material worth nearly two million dollars, against an importation of the same materials costing little more than one million dollars. Figures of this character have considerable importance, used as a guide in the matter of rational agriculture, viz: the farming which gives the largest returns for the expense incurred, without decreasing the capital stock in the soil.

It would of course be impossible to calculate the value in dollars and cents of work of this kind, or to predict what might follow if the control by chemical analysis was removed; suffice it to say that the trade in New Jersey—especially among the more prominent manufacturers—is highly creditable, and there seems a growing tendency on their part to put a good article on the market, at the lowest price consistent with good business principles. Among a few firms a lack of care is evidenced in mixing, and a disregard for good mechanical condition. The former is of considerable importance or the claims of the selling agents for the special virtue of their formulas lose their force. This, however, cannot be charged to intent to deceive the public.

2. It, however, remains for the farmer himself to determine, to a large degree, the proper and most profitable use of these manures. The fact that a fertilizer compounded of the necessary

elements of plant food, viz : nitrogen, phosphoric acid and potash, will bring and is actually worth \$30 per ton in the market, is no guarantee that it will cause the soil to produce such an increase as to secure a profit from the investment. That is entirely another matter. The agricultural value of a fertilizer must be secured from other data, and come from a knowledge of the wants of the soil and of the plant, coupled with a knowledge of the effects of the different kinds and forms of plant food contained in, and applied upon it. This may be illustrated as follows : The average analysis of the complete fertilizers sold in the State last season shows that nitrogen cost just one-third of the amount paid, or nearly \$300,000. Now, it has been clearly demonstrated that on leguminous crops, as peas, beans, clover, etc., the value of nitrogen in increasing the crop is relatively small, even under the best conditions, and that the probabilities are that the actual commercial value of nitrogen is not realized in any case when applied to these crops. It has also been shown that the amount of nitrogen secured by the cereal crops, even under the best conditions, is not more than two-thirds of the total applied. Conditions of this character have a tendency to modify actual values and render properly conducted experiments of the highest importance.

The field experiments conducted by the Experiment Station were begun in 1880, in order to test these points ; they have been continued to the present time and number nearly one hundred, carried out on all the staple farm crops commonly grown, and upon all the radically different soils of the State. In many cases these have been carried out by the farmers themselves, under the direct supervision of the station, and have been instrumental in securing much valuable information of an eminently practical character. I am personally acquainted with two or three cases where the influence of field experiments of this kind has been powerful in the communities in which they were conducted, and the farmers in those communities, besides having more money and better farms than six years ago, have that incalculable satisfaction and delight which comes from an awakening of the mind to the delight which accompanies rational work.

Definite conclusions, thus far reached, are as follows : 1st. That on certain farms no compound of, or single element of even

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the best kinds of plant food will increase the yield of any or all the farm crops in a rotation, sufficient to produce a profit ; 2d. That upon certain other soils the application of fertilizers is always followed by financial profit ; and I might add with safety a 3d : That in only two cases out of the forty so far tabulated did nitrogen, either alone or in its combinations, increase the crop sufficiently to admit of a profit, while phosphoric acid and potash were profitable in more than half of the experiments.

These results are of course only indicative, but they are right in the line with results secured by others from experiments of the same character, and they prove that the loss to farmers from an irrational use of fertilizers may be greater than the loss from irrational buying. The result of an experiment on peach trees, published in our report for this year, shows that the accumulated profit from the use of a single element is over six hundred per cent., and that phosphoric acid alone is the ruling and most profitable element on the farm, without regard to the crop, and that wherever nitrogen or potash is used it is used at a loss. These balances may change before the orchard ceases bearing. It has, however, remained true for two rotations. This nitrogen question is a wide and important one and its proper and complete solution may revolutionize the whole question of fertilizers. Certainly the grain farmer at least may find it a wise policy to be prudent in spending his money for nitrogen, and, while waiting for the solution of this problem, to experiment and study for himself.

3. As intimated above, the investigations of the sorghum industry have been continued and are embodied in a bulletin by Dr. Neale, recently published. The work shows that it only remains now for progressive capitalists, true to the material interests of of the State, to take the matter in hand and show that New Jersey is not only the leading State in successfully demonstrating the value of sorghum as a sugar producing plant and in developing the machinery for its profitable extraction, but also that it intends to lead in establishing sorghum sugar manufacture as one of the foremost of its industries.

4 and 5. The work of the Experiment Station, in aiding the dairy interests of the State during the past year, has been in the continued experiment and study with the lucern plant. It has

already been demonstrated that lucern can be successfully grown in this climate and utilized both as green fodder and as hay. Its chemical analysis shows it to be of exceptional value as a food plant; its amount and proportions of food ingredients, estimated on digestible dry matter, show its value to be forty-five per cent. greater than clover hay and sixty-six per cent. greater than timothy, calculated on the same basis. Feeding trials have not been made with it at the station, but testimony, secured from those who have used it, indicate a value in accordance with that secured from a chemical analysis. Its value as a source of proteine may be illustrated by the following comparisons: To secure a good milk ration by the use of timothy hay, proteine must be supplied from some other source in order to secure a ration that will give a sufficient amount of that material without entailing a loss of carbo-hydrates and fat; clover hay, however, is a fairly good ration in itself and can be economically used without the addition of any one of the classes of compounds mentioned; lucern hay, on the other hand, requires the addition of large amounts of both fat and carbo-hydrates in order to be profitably utilized as a milk ration. This fact renders lucern even more serviceable than its valuation would indicate, since, in the management of farms, either for dairy purposes or for grain farming, an excess of carbo-hydrates is secured, which, in the great majority of cases, is wasted, either through lack of proper material from other sources with which to balance the ration, or through ignorance of the real loss incurred.

Lucern, therefore, furnishes the farmer a feeding material, rich in proteine, which can be substituted for such waste products as wheat bran, cotton seed meal, etc., usually bought in order to profitably utilize the excess of carbo-hydrates.

It is also shown by chemical analysis that lucern makes extraordinary demands upon available plant food; this is especially noticeable in the case of nitrogen and potash. It is universally admitted that the mineral constituents of plants, as phosphoric acid, potash, lime, etc., are derived solely and entirely from the soil. In the case of nitrogen, however, it has long been asserted, and is now positively proven, that certain leguminous plants, as clover, peas, lucern, etc., have the power of assimilating large amounts from

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the atmosphere, when sufficient phosphoric acid, potash and lime are present in the soil. While it is quite possible that lucern, being a deep rooting plant, could secure all this nitrogen from the soil, the probability that it has secured a large quantity from the air enhanced its value as an agricultural plant, *firstly*, because nitrogen is the basis of the compound proteine, the most valuable part of the food product, and *secondly*, because nitrogen is the most costly element in fertilizing compounds.

Lucern serves, therefore, not only as a manufacturer of the chief element of food, but also as a collector, from sources otherwise inaccessible, of the most valuable fertilizing agent for a large class of agricultural plants whose only source of nitrogen is in the soil. It acts in the hands of the farmer as an agent for rendering locked-up capital available. When lucern is grown, and its products are properly utilized upon the farm, it cannot be considered an exhaustive crop, but rather as one fulfilling the proper aim of rational agriculture, which is to transform into produce the raw materials at our disposal in the atmosphere and soil.

During the past season, the Station has carefully compiled tables which show the feeding value of the fodder used and the feeds bought in New Jersey, and also a comparison made of their fertilizing value, besides showing the actual amounts of the fertilizing ingredients taken off per ton by the different crops grown. These tables have been arranged with especial reference to their usefulness for the practical farmer and feeder and show at a glance many of the points which are constantly coming up in the minds of thinking farmers. That the questions of rational methods of feeding and the utilization of farm wastes by the farmers of New Jersey are assuming greater proportions, is abundantly verified to the Station each year.

The values, applied to both feed and fertilizing elements, are however, relative, not actual. Use alone determines the actual values. The uses, however, of a chemical analysis of fodders and feeds, which include a determination of phosphoric acid and potash, are various and have an important bearing upon agricultural progress.

In regard to future work, it will be the object of the station, as in the past, to work entirely in the interest of the farmers. An



exact schedule could not be laid down, since many questions are coming up from day to day which demand immediate attention, and therefore to confine the lines of work to a few questions, which appear of the greatest importance, is deemed the wisest course to pursue. It can be safely said, however, that the fertilizer control will be continued and that a more extended study of soils and fertilizers by means of field experiments will be made. It is hoped also that studies may be begun concerning soiling crops and the sources of nitrogen to plants, though the latter question is alone sufficient to more than occupy the time and energy of a station with greater facilities than ours. The proper preserving and use of manures also invites study and experiment. The work of testing breeds, as to fitness for dairy purposes, is already begun, and it is also proposed to make an extended study of the products of the dairy. The raising of fruit and small crops is one of the greatest industries in the State, and furnishes a most promising field for study and experiment. These lines of work, to which may be added the study of the injuries which plants sustain from insects and disease, together with many others, only indicate the almost unlimited field which agriculture affords for scientific investigations, and also shows that work already done, although of the highest value, has hardly brought us to the threshold of what is beyond. The farmers of this State, however, may rely upon the wisdom of the managers of the Station in selecting such lines of work as shall conserve the best interests of the whole State.

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# OUR INSECT ENEMIES AND HOW TO MEET THEM.

BY J. A. LINTNER, Ph. D., NEW YORK STATE ENTOMOLOGIST.

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It is, I believe, conceded by every intelligent person that agriculture is the greatest of human industries, as, of necessity, it serves as the basis of all others. A sparse human population might exist upon this globe without tillage of the soil, but the man would not be very far in advance of some of those vegetable organisms which are endowed with powers that enable them to seize and devour, and, it is thought, to digest animal food. All literature, science and the arts are dependent upon—yes, civilization itself. It was, so far as we have knowledge, the primal privilege granted to man, when he was made in the image of his Maker, ere he was driven from Eden and doomed henceforth to toil, and in the sweat of his face to eat his bread.

Are figures needed to show the importance of agriculture? Here, in our own country, so remarkably adapted by soil, climate, topography and extent of territory to grow to perfection whatever crop may be grown in any of the temperate regions of the globe, as well as in some of the semi-tropical ones—of our present population of sixty millions there is an aggregate agricultural population of twenty-six millions. The total value of farm products in 1886 was \$3,727,000,000—nearly three and three-fourths billions—an amount quite beyond the need for home consumption, and its surplusage, one-tenth of the amount, was sent from our shores, mainly to supply the needs of Europe.

May you not feel an honest pride in an industry that can show such results? Is it not one that should be respected by every man, in whatever pursuit he may be engaged. Nay, more.

Is it not one that should be cherished and encouraged by every possible means, as the conviction is being more strongly impressed upon each careful student of political economy, that from the products of our broad territory are the less highly favored nations of the globe to be, hereafter, more and more largely fed? Whatever, then, may militate against this interest is deeply to be deplored. Not only must it, for our individual needs and for the welfare of the nations, be sustained, but it must be enlarged. Will this naturally follow, in continued progression, with the increase of our population and the occupancy and tillage of the extended tracts of uncultivated land in our Western States and Territories? No; for vast arid regions are being already reached, where productive crops can only follow costly systems of irrigation; and not many years will elapse before the virgin soil of the West will no longer respond with the prolificacy of its first receptiveness. Nature, at the outset, prodigal of her wealth, gives up her accumulated stores of centuries for the asking; but they are not inexhaustible, and sooner or later her golden returns will cease.

It is evident to all, that in the Eastern United States this condition even now prevails. The husbandman can no longer tickle the earth with his hoe or plow and have it smile into a bountiful crop or harvest. Where, fifty years ago, forty bushels of wheat could be grown from an acre, now, with even increased labor, but twelve bushels can be taken. Grain can no longer be cultivated with profit, and other crops are in the same category.

Other causes, in addition to an exhausted fertility of the soil, have concurred in the prostration of the agricultural interests in our eastern States, and to send up the cry so often heard, "farming does not pay." Prominent among these causes is the competition to which the eastern farmer is brought with the immense production of the fertile West—its comparative low cost of production and the low rates of transportation by which it reaches and commands the markets which he formerly controlled. The crops on which he hitherto relied, and the methods of agriculture which he and his fathers before him had remuneratively followed, must be abandoned. There must be a change of base—a new departure. Absolute necessity compels a movement all along the line, and the successful farmer of the

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future will be he who joins the advance, and strives to keep pace, as near as may be, with the foremost in the march.

The fact cannot be denied that a rapid advance is being made at the present time in the science of agriculture (we are no longer afraid to call science to its aid) through the investigations and teachings of our Agricultural Colleges and Experiment Stations. Well it is that the results of these investigations are being brought before our farmers very efficiently, through the Farmers' Institutes, which are being so successfully conducted in several of our States. It having been my privilege to attend a number of these institutes, it seems to me that their teaching may be summed up under these three heads: How to feed and care for farm stock; how to feed the soil, (this embraces its cultivation) and how to protect and preserve for use the products of farm labor. Under these will naturally group themselves all of the prominent topics of discussion as food and shelter and care of stock, production and preservation of manures, artificial fertilizers, rotation of crops, the products of the dairy, stock breeding, fruit growing, ensilage, and the like.

I need hardly state this truism, that all the labor, care and money that you expend in the effort to produce the conditions calculated to give you the best possible returns, will be lost, just so far as you fail, through neglect or lack of knowledge, to secure the resultant products to which you are entitled. In many directions are you chargeable with this neglect, but suffice it for the present if I refer only to that particular one, of which, in the invitation given me to address you at this time, you virtually confess yourselves at fault, and make promise of doing better in the future, if I will point the way.

Your Secretary has suggested as my topic: "Entomology in the Eastern United States; the importance of a more comprehensive knowledge of entomology to the farmer and fruit-grower, with some suggestions as to the simplest and quickest way of getting this knowledge before those interested." This, I think, is embraced under the brief title that I have selected for my paper.

ECONOMIC ENTOMOLOGY.

The losses resulting from insect depredations in the United States are very far in excess of those sustained in any other portion of the globe. The aggregate of annual losses to agricultural products is startling when an attempt is made to estimate it, while in exceptional years of some unusual insect abundance, the computations that have been made from time to time would seem to be almost beyond belief.

The magnitude of these losses has driven our people to seek protection from them in the study of insect pests and their habits. Hence it is that within the last fifty years a new science—that of Economic Entomology—has had its birth among us, a rapid growth, and a present development quite in advance of any of the older nations of the world. It may be defined as “the study of insects in their relations with man—of their character, habits, transformations, food-plants, enemies, diseases, etc., with a view of affording protection from the injuries of a large portion of their number, and of utilizing the benefits derived from a minor portion.”

Our Eastern States gave early recognition of the value and importance of this department of natural science to the Commonwealth. The first publication issued under State authority was the “Report on Insects Injurious to Vegetation,” by Dr. T. W. Harris, in 1841. The commencement of a series of “Reports on the Noxious, Beneficial and other Insects of the State of New York,” in the year 1855, by Dr. Asa Fitch, under the auspices of the New York State Agricultural Society, gave a new interest and impetus to the study, and was doubtless instrumental in initiating similar investigations and publications by Mr. B. D. Walsh, in 1867, in Illinois, and by Professor Riley, in 1868, in Missouri, in the first-named State, continued by Drs. LeBaron and Thomas and Professor Forbes up to the present time.

In 1878, at the termination of Mr. Glover’s labors as Entomologist to the United States Department of Agriculture (commenced in 1863), an Entomological Division was established by the Department and organized with Professor Riley as Chief. The work of the Division, generously sustained by Congress,

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has continued to be prosecuted with signal ability and success. Its publications, through annual reports, bulletins, and more lately, a monthly periodical, have been of a high order and of eminent service to the agricultural interests of the United States.

In 1877, a special Entomological Commission, to consist of three skilled economic entomologists, was authorized by Congress, for the purpose of investigating and reporting upon the depredations of the Rocky Mountain locust of the Western States and Territories, and the best practicable method of preventing their recurrence or guarding against their invasions. The investigations of the commission were subsequently extended to the cotton-worm of the Southern States, and to some other insects whose widespread ravages had given them a national importance. The labors of this commission were attended with valuable practical results, and have given us a large addition to our literature in four octavo volumes and seven bulletins.

In 1880 the State of New York resumed entomological investigations, after an interval of ten years—they having been interrupted in 1870 by the impaired health of Dr. Fitch.

There is not the time in which to refer to other entomological work done more or less directly under State authority in connection with agricultural and horticultural societies and agricultural colleges, a long recital of which might be made. It is fitting, however, that I should not omit mention of the impetus which has been given to entomological research in the recent establishment, under the "Hatch Bill," of Agricultural Experiment Stations in at least twenty-eight of our States. In twenty-two of these, so far as I know, an entomologist, charged with the study of insect depredations and methods for their control, has been appointed, and it is believed that the same indispensable work will be entered upon in each of the stations, as soon as competent persons can be found to meet the requirements of the position. Most heartily do I welcome this large addition to our hitherto small body of economic entomologists, and very bright are my anticipations of a greatly accelerated future progress, and of the benefit to result therefrom to the agricultural interests of our country.



IMPORTANCE OF ENTOMOLOGICAL STUDY.

Years ago, when insects were collected with no higher motive than the possession of a fine cabinet, or when their study went no further than giving them name and classification, it was customary to ridicule the pursuit as trivial, petty, unworthy of the dignity of a man. All insects, whether bees, butterflies or beetles, were "bugs," and those who collected them were "bug-hunters." To-day, the application of the knowledge which has been so long accumulating, to advancement in agriculture, horticulture, sylvaculture, etc., has given to the study of entomology an importance which is recognized as second to no other department of natural history. It is being everywhere prosecuted with vigor, by the General Government and by the States, as we have indicated, and by private individuals, in compliance with the wide-spread demand for efficient means of protection from insect ravages—for a release from a taxation upon the products of the farm which is most burdensome, and the compulsory payment of which brings with it none of the compensations that ameliorate the payment of other taxes, in the protection that they afford to property, and the privileges and comforts that they bring to our homes ; it is an entire loss.

The importance of the study of our insect enemies and their habits, may perhaps be better seen from a few considerations, which we will present.

THE SECRECY OF INSECT DEPREDACTIONS.

Probably that crop cannot be named that may not be impaired one-tenth of its full value, without the knowledge of insect presence and insect injury. Such secret injury is usually due to the operations of root-feeding insects, which are numerous in classes and in species, and from their subterranean life, do not fall under ordinary observation. Among these are plant-lice, the caterpillars of various moths and the larvæ of many beetles and of flies, known often only to entomologists who have made a study of their early stages.

It is not an unusual occurrence that serious and evident insect injury is inflicted through a term of years, while the author of it

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remains unknown. An illustration of this may be found in the failure of the red clover to produce its seed, which for a long time was ascribed to the want of fertilization by bees, but was discovered a few years ago to be the result of the feeding within the blossoms upon the forming seed, by the larvæ of the clover-seed midge. *Cecidomyia leguminicola*. Certain injuries to several of our fruits causing their gnarling and deformation, which have long been a mystery to me, have found their explanation during the past year, in the punctures made by a minute caterpillar—a *Coleophora*—which, always concealed within the peculiar case that it carries with it—if seen, as it doubtless often has been by the fruit-grower, would not be suspected of belonging to the insect world. Another new pest is baffling me and eluding my efforts for its discovery, through its secret girdling (believed to be at night) with a circle of incisions the tips of currant bushes in certain localities in New York, and causing them to break off and fall to the ground. There are cut-worms which leave their hidden retreats beneath the ground or shelter of rubbish, only after night-fall and climb into grapevines, where they cut off the clusters of the grapes, and into fruit trees, severing the stems of leaves and fruit. Numerous other insects intensify the loss that they occasion by the secrecy with which it is inflicted, and the consequent difficulty of meeting it. Of this class are the burrowers within the stems and stalks of plants or in trunks of trees, the numerous and destructive bark-borers which feed within the vital sap-wood, and leaf-miners, so minute as to find ample feeding ground in the range and concealment given them between the surfaces of a leaf.

## THE SMALL SIZE OF INSECTS.

Nature often teaches us the lesson, of which we need frequently to be reminded, that size is no criterion of importance. Thus, among our insect foes, many of the most injurious are among the smallest of their class, and, hence, we have the seeming paradox—"the smaller the insect the greater its capability for harm." In confirmation of this we may cite the grapevine Phylloxera (*Phylloxera vitifoliae*) which was first discovered by Dr. Fitch, in Washington county, N. Y., in the year 1854, was

introduced in France in 1863, and subsequently multiplied to such an extent as to threaten the entire destruction of that most important interest to France—grape culture. In 1879, nearly three millions of acres of infested vines had been taken up, destroyed and the land appropriated to other uses. For several years, annual appropriations amounting to nearly \$200,000 were made by the government for *Phylloxera* investigations, and a reward has been offered of 300,000 francs (\$60,000) for the discovery of and effectual remedy. And yet it is but a plant-louse, one of the smallest of its kind, and a mere dot, a microscopic object, in several of its stages.

The diminutive size of the insect does not permit his exclusion from your crops by the ordinary means that give protection from the incursions of domestic animals that at times break their inclosures and invade your fields, although the injuries wrought by the latter may hardly admit of comparison with those caused by the former. True, ditches are sometimes dug and barriers built by western farmers to stay the marches of the army worm and the chinch bug in seasons of their excessive abundance, and valuable crops have been, by these means, rescued from threatened destruction. But, as a rule, the armies of destructive insects which spring out of the ground or drop upon you as if from the skies, must be fought by methods which are only to be learned from careful and continued study of the secret operations and wily ways of the species with which you have to contend.

We err when we regard all insects as small, notwithstanding that one of the definitions given by Webster of an insect is "something small or contemptible." But our best lexicographers are sometimes open to just criticism, as, for example, when Dr. Johnson has given us a definition of *net work* lest its meaning might not be perfectly clear to the simple-minded—"anything reticulated or decussated at equal distances with interstices between the intersections." True, the insect is small in comparison with our domestic animals and most of the mammals, yet there are large insects as well as small, for we have gradations among them not less marked than in other classes of animated nature. It has been computed that the average size in the animal kingdom—with the smallest known protozoan at one end of the line and the flat-back whale of the Pacific coast with its

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ninety-five feet of length and two hundred and ninety-four thousand pounds of weight, at the other, is to be found in the common house fly, *Musca domestica*. All insects exceeding this in size may properly be called *large*, those only that are less in size *small*. Does this seem surprising? Remember that there lies a vast world of living beings, the limit of which is not yet defined, which the unaided eye does not see, and which the microscope must call up to our wonder and admiration, just as, in the other direction, each successive enlargement of the object glass of the telescope brings to our view from the depths of boundless space, suns and systems and galaxies of systems before unknown and unsuspected.

## NUMBER OF INSECTS.

Insects, in number of species, exceed by far all the rest of the animal kingdom combined. They are believed to be ten-fold more numerous than all of the mammals, birds, fishes, reptiles, myriapods, crustaceans, worms, molluscs, radiates and protozoans, united. At the latter part of the 17th century they were estimated at ten thousand species. During the last hundred years the discovery of new species has been very rapid, and in 1881 there had been described and catalogued throughout the world three hundred and twenty thousand species, while many thousands were in collections awaiting name and description—twelve thousand in a single collection—that of the British Museum. Judging from past discoveries we may venture to claim that if all the species inhabiting the world were known, the number would reach *one million*.

If from distinct species we descend to the consideration of individuals, figures are of no service, for the numbers that we should have to employ would be simply incomprehensible. I have seen at a glance, in a locality near Albany, within a small extent of roadway, of a single species of a snow-flea—a *Podura*, more individuals, as computed by me, than there are human beings on the entire face of the globe. A single small cherry tree of ten feet in height, infested with a plant-louse—one of a row similarly infested—was estimated by Dr. Fitch, by counting the number on a single leaf, the leaves on a branch, and the

branches on the tree, to contain the amazing number of twelve millions. Although this may strike one as a large number, yet few, if any, have any approximate idea of what a million means. Were I to count as rapidly as I could enunciate, simply naming the figures in their order and connection, omitting repetition of "hundred" and "thousand" where they occur—thus saying, "nine-seventy-three-four-eighty-one," instead of "nine hundred and seventy-three thousand four hundred and eighty-one," and continue thus counting for ten hours a day, it would require twenty-eight days to count a million, and consequently eleven months of such labor (an obvious impossibility, for utterly beyond human power of endurance) to have counted the aphides upon that little cherry tree.

#### RAPIDITY OF PROPAGATION.

The rapidity of propagation shown in some insects, is also without a parallel elsewhere. Perhaps in the aphides or plant-lice, it attains its maximum, where successive generations of living young, all of which are females, continue to be produced throughout the summer months, without the presence of the male by a process which has been compared to, and indeed styled, budding. Professor Riley in his recent studies of the hop vine aphid, *Phorodon humuli*, has observed thirteen generations of the species in the year. Now, if we assume as the average number of young produced by each female to be one hundred, and that every individual should attain maturity and produce its full complement of young, (which, however, never can occur in nature,) we would have, as the number of the twelfth brood alone, (not counting those of all of the preceding broods) 10,000,000,000,000,000,000 (ten sextillions) of individuals. Where, as in this instance, figures fail to convey any adequate proper conception, may I ask you to take space and the velocity of light as your measures? Were this brood as above given, marshalled in line with ten individuals to a linear inch touching one another, the procession would extend to the sun (a space which light traverses in eight minutes) and beyond it to the nearest fixed star (traversed by light only in six years) and still onward in space beyond the most distant star that the strongest telescope may bring to our view, to a point so

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inconceivably remote that light could only reach us from it in twenty-five hundred years. How fortunate it is for the human race, that in view of such amazing capabilities of increase in the insect world, so many counter-checks have been provided by Providence for the prevention of unrestricted development in a single direction, that all nature may still work together in harmony, when viewed in its broadest aspect.

### THE VORACITY OF INSECTS.

The larval stage of many insects is apparently one of incessant feeding. It may be doubted of some if they ever sleep, or even indulge in rest unless disturbed while feeding, or during their molting periods, when time is demanded for the changes required in the casting off of a skin distended to its utmost capacity, and the formation of a new one capable of further extension. Their voraciousness and rapid growth may be shown in the statement of two facts: A certain flesh-feeding larva will consume in twenty-four hours two hundred times its original weight; a parallel to which, in the human race, would be an infant consuming, in the first day of its existence, fifteen hundred pounds of nutriment. There are vegetable feeders, caterpillars, which, during their progress to maturity, within thirty days, increase in size ten thousand times. To equal this remarkable growth a man, at his maturity, would have to weigh forty tons. In view of such statements, need we wonder that the insect world is so destructive and so potent a power for harm.

### CAN INSECT RAVAGES BE PREVENTED?

I have attempted, from a few considerations, to show the importance of insects in their relation to agricultural pursuits; that losses appalling in their magnitude are inflicted by them; and that these losses are steadily on the increase. What can be done? Can they be prevented? We answer, No, not entirely, but they may be controlled. My studies of twenty-five years have taught me that the insect does not exist, the injuries of which may not be greatly diminished when we have learned its entire life-history and its habits. Each one, when we know it fully, discloses some vul-

nerable point, and a particular time in one of its four stages of existence when it may be attacked to the best advantage. I assuredly speak within bounds when I say, what could not with truth have been said twenty years ago, that with our present knowledge and with the means now at our command, in the insecticides and preventives known, and apparatus and methods for their use, we can, if we will, lessen insect depredations to the extent of at least one-half of their present magnitude. What an addition this would be to the national wealth and to individual well-being.

#### HOW TO MEET OUR INSECT ENEMIES.

Turning now to the practical part of my paper—how may we best meet our insect foes? I will name some of the methods by which this may be done.

*High Culture.*—First and foremost, I would recommend high culture. Just in proportion that the vigor and growth of a crop is promoted, to the same extent there is given to it the ability to resist and overcome the effects of insect attack. While the feeble plant succumbs, the vigorous one will flourish and mature despite the drain upon it. It will have a resistant force to sustain it, just as health and a well-developed body may exclude or triumph over disease. And then, again, the weak, sickly, or diseased plant, made so either through neglect of cultivation or lack of needed fertilizing material, directly invites insect attack. The peculiar odor that emanates from it when in this condition, is at once detected by the insect, and serves to draw it from distances that seem almost incredible. Insects, that they may readily find the food plants on which they are destined to feed and those upon which they are to deposit their eggs for the continuance of their species, as if in compensation for a feeble, short range, and quite imperfect vision, have been endued with a sense of smell which is marvellous in its acuteness, and is without parallel in any other class of the animal world. It is believed by some entomologists that many of our insect pests never make attack on healthy vegetation, but only on that which is diseased, as if in the economy of nature they were specially commissioned to hasten destruction and



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decay, and among these they would place many of the bark-borers that infest our fruit and shade trees, with which it seems almost hopeless for us to contend.

*Clean Culture.*—A large proportion of our insect pests survive the winter within such shelter as they may find in decaying wood, sticks, boards, or rails lying on the ground. Dead vines, stalks (particularly if they are hollow), twisted leaves, etc., afford excellent hibernating places for the adult forms of many of the Hemiptera (commonly known as "bugs"), from which they emerge and deposit their eggs in the spring, simultaneously with the commencement of vegetation, when attack is ever most harmful. It is obvious, therefore, that much benefit will result from the gathering, in the autumn, of all rubbish, dead vegetable matter, and other refuse material, and burning it with all the insects that it is harboring; or if this be regarded as wasteful, then so compost it, that the compost pile shall not be, as we believe it often is, a nursery for insect pests that in the injury that they inflict more than counter-balance the manurial value.

*A knowledge of insect pests.*—A favorite maxim of my school days was, "*Nosce te ipsum*,"—know thyself. One equally important in later years, of broad application, but of special importance to the agriculturist, is, *know your enemies*. How can you successfully meet them, check their operations, prevent their attack, or destroy them if need be, (for, fortunately, there are no laws against the killing of insects) unless you know who your foe is, when his attack is to be made, where it is to be made and what he purposes to do. To know this is to be forearmed and in readiness for the fight. Are your insect enemies so many that you fear that you cannot make their acquaintance? Do not be frightened at the seeming magnitude of the task, as if you were brought to contend single-handed, and with the perhaps twenty thousand distinct species which your State harbors. Some of these are your friends, others are at least harmless, while a large proportion are but comparatively injurious. In a list of one hundred species, there could, I think, be named all of those which it would be to your particular interest to know and to study. These, at least, you should know by name, so that you may confer with one another in relation to them, and communicate with your entomologist or other scientist of whom



you might desire information, such as the best approved remedy or preventive to be employed. The common name which every destructive species, known for any length of time, has received, would be sufficient for your use, but it would be advisable, so far as you conveniently could, to acquire also their scientific name, as a help to you, if you purpose to add to your own observation, the study of what has been learned and written of them by others. To illustrate what I mean: Your apple trees, perchance, are not doing well—something is the matter with them—probably an insect is the cause. What insect is it? Is the apple tree aphid infesting the buds or curling and distorting the leaves? Is the bud-worm tying up and consuming the young foliage just as it puts forth? Is the oyster shell bark-louse pumping out through hundreds of thousands of tubes the life-blood of the tree? Is the flat-headed borer tunneling the limbs, or the round-headed borer working at the base of the trunk? Are any of the tiny bark beetles burrowing into the sap-wood, and gradually girdling the tree? Is the root plant-louse clustering on the roots? Each of these, and many others that may be cited, are secret or inconspicuous operations, which must be sought for, with a knowledge of what they are, if you would discover them in time for their arrest.

In addition to names, the characteristics of hidden attack, habits and the different stages of life should be known. A shriveled head of grain or discolored stalk may indicate the presence of the wheat-midge larva in the head, the joint-worm knotting or twisting the stalk, the Hessian fly concealed within the sheath near a joint, or the wheat-stem maggot burrowing the stalk; or the wheat saw-fly may be busily at work cutting off the nearly matured heads and dropping to the ground one-tenth of the crop. If it were generally known that the eggs of the common apple tree tent-caterpillar could easily be detected upon the leafless trees in autumn or winter, as a broad belt of eggs from a half-inch to three-fourths inch in length, encircling the small twigs near their tips; and if, with such knowledge they were then clipped off and burned, apple orchards would never again have to suffer from such defoliation as they were last year subjected to in eastern New York and portions of the Eastern States and parts of New Jersey.

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*Enlist your Children in the Study.*—It can easily be done. Give them a cluster of eggs of which to watch the hatching, the emergence of the young caterpillars, the rapidity and eagerness which they devour the fresh food daily brought to them, the most interesting operation of shedding their skins four times (usually) during their growth, the construction of their cocoons when they have attained maturity, or their wonderful transformation to the chrysalis stage in the butterflies, and the final emergence from the pupa to the perfect-winged insect. Let them see all this, and they are made of strange material if they do not become entomologists for all future time. It will be a pleasure for them to collect insects and to study their varied and interesting habits, and to prepare collections which will adorn your homes. If consisting largely of the more injurious forms properly labelled and displayed, they would prove highly valuable for the use and instruction of your farmers clubs, illustrating far better than figures can, the descriptions that your libraries may contain. As a guide and an aid to the children's studies, put in their hands a little volume recently published by Dr. Packard, entitled, "Entomology for Beginners," in which they may find directions for collecting, preserving and rearing insects, besides much other matter which will be of value to them and to yourselves under the headings of "insects injurious and beneficial to agriculture;" "insect architecture;" "the structure, growth and metamorphoses, and classification of insects," etc., etc. Not only will the study be a delight to them, but it will serve, if properly pursued, as a means of mental discipline fully equal to many of the disciplinary studies of the schools. It will also place them in possession of knowledge which will better fit them to meet the demands that will be made upon the agriculturist of the future.

*Procure and study recent entomological publications.*—Economic entomology, has within the last few years made rapid and great advance. We, in the United States, have been compelled to study insect ravages greater here than in any other part of the world, and, as the consequence, the literature of applied entomology is far superior to that of any other country. The investigations having been made largely through appropriations from the general government or individual States, the publications

have been distributed gratuitously, at the request usually of those for whose benefit they were made. If every application cannot be met, it is probably owing to the fact that the demand hitherto, has not been sufficiently large to warrant larger editions. There is assuredly one publication which should be procurable by every farmer who will ask for it, viz: the valuable illustrated report of the Entomologist of the United States Department of Agriculture, Professor C. V. Riley. Of this report, contained in the annual report of the Commissioner of Agriculture, 425,000 copies are ordered by Congress, each year, but it is feared a large proportion of these never leave Washington, except as entering into the composition of other paper. The Department has also issued two reports of the United States Entomological Commission, seven bulletins of the same Commission, and eighteen bulletins of the Entomological Division. It is also issuing, at the present time through the Division of Entomology, an interesting and instructive monthly periodical, under the name of "Insect Life." Some of the above may be still procurable through application to the commission, or to Professor Riley, or to your Representatives in Congress.

The reports of Dr. Fitch, published in the Transactions of the New York State Agricultural Society, for the years 1854 to 1870, are of special value. Six of these reports, bound in two volumes, may still be obtained of the Secretary of the Agricultural Society at Albany.

The reports of the State Entomologists of Missouri and of Illinois are also very desirable. For these application might be made to Professor Riley, at Washington, and to Professor S. A. Forbes, at Champaign, Illinois.

A volume that would seem to be indispensable to the fruit-grower, is "Insects Injurious to Fruits," by W. Saunders, published in 1883\*, by J. B. Lippincott & Co., Philadelphia, Pa., 436 pages, 440 figures. A recent publication of particular value to the student as an aid to classification, and prepared specially for the agricultural student, is "An Introduction to Entomology," by J. H. Comstock, Professor of Entomology in Cornell University, Ithaca, N. Y. The first part only of this (price \$2.00) has

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\*A second edition has just been published.

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been published. Application for it should be made to the author.

*Learn of insecticides and how to use them.*—The publications above named, and notably those of the department at Washington, will give the needed information in this direction. The recent advance in economic entomology has been largely through discoveries of insecticides, and the invention of apparatus for their easy application. Of our best insecticides in use at the present are white hellebore, Paris green, London purple, pyrethrum, kerosene and tobacco. It is essential that one should know how, when and in what proportions these are to be applied, the proper dilution of those that require it, and the method of emulsifying kerosene. It is also important that the relative value of wet and dry mixtures and the most economical and effective method of application should also be known. The great practical value of a reliable insecticide was years ago taught us in the discovery of the method of destroying the Colorado potato beetle, which threatened at first to arrest potato culture in our country. More recently its value has again been clearly demonstrated in the use of the arsenites (Paris green and London purple), sprayed upon the forming fruit of our apple trees for protection from the apple-worm of the codling-moth. There is no longer question but that, by a proper use of either of the above named arsenites (but London purple by far preferable), at least three-fourths of the apple crop can be saved from the codling-moth. Worm-eaten apples should henceforth be a discredit and a disgrace to the fruit grower, and worm-hole a stamp attesting to ignorance or inexcusable neglect.

For the judicious use of insecticides, it is important that recognition should be made of two classes of insects—those that take their food by means of biting jaws, and those that feed only on the sap of plants through a proboscis inserted in the bark. The former, which includes the larger proportion of insects, can be readily poisoned by the application of the arsenites to the foliage which they consume. The latter, consisting of the Hemiptere, such as the plant-lice (Aphides), bark-lice, and all bugs properly so-called, which imbibe their liquid food from beyond reach of the poison, are vulnerable to applications which may reach them externally as tobacco solu-

tions, alkaline washes, and kerosene which closes their breathing-pores and produces suffocation.

*Beneficial insects should be protected.*—There are entire families of insects which consist almost wholly of species that are of direct benefit to the agriculturist, which should be known and spared from indiscriminate destruction. Of these are the *Coccinellidæ*, or lady-bugs, which have as their mission, the prevention of an overwhelming multiplication of plant-lice; the *Ichneumonidæ*, or ichneumon flies, which deposit their eggs within or upon the body of other insects, to hatch into larvæ which feed upon and destroy their host; the *Chalcididæ*, or chalcid flies which have the habits of the ichneumon flies; the *Tachinidæ*, resembling our common house-flies, also of similar habits with the last two named, and several other families which could be mentioned.

The importance of these parasitic insects will be conceded when we state that it is highly probable that to parasitic attack we owe the almost entire cessation of the ravages of the wheat-midge in the United States, when all human means seemed hopeless. At the present time, fruit culture in California, and more particularly the orange culture, is most seriously impaired, through the operation of a scale insect, known scientifically as *Icerya Purchasi* Maskell, which was introduced in the year 1868 on an Acacia from Australia. It has continued to increase and spread and feed on all the fruits and other vegetation, until its arrest, by any known application, seemed impossible. In this emergency, two agents of the U. S. Department of Agriculture have been dispatched to Australia, to collect the parasites that prey upon the *Icerya* there and send them to California, that an attempt may be made to colonize and multiply them. Consignments of parasites have already been received, are being propagated with care, and the present outlook is quite encouraging.

*Be careful observers of insects.*—You have opportunities for their observation which are not accorded to those in other pursuits of life. When you have become familiar with the appearance of those which are your annual visitants, you will readily detect the advent of an unfamiliar new form. Capture it, and send it with all the information that you can obtain of its habits, to some entomologist, whose pleasure and duty it will be to tell

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you what it is, and if it should prove to be a new pest, he may also be able to give the directions best calculated to arrest its further spread and multiplication.

### CONCLUSION.

Now that I have told you of your insect enemies—of their immense number, rapid propogation, voracity, the enormous losses that they cause, and increasing injuries annually; and have also told you how you may best meet them, it may be proper to ask what do you propose to do in the matter? Does the struggle that their control will require of you seem too formidable, almost a hopeless task? Do you propose to give up to the insect all that his insatiate greed and often excessive wastefulness demands, trusting that he may leave behind him enough for your wants? Will you rest on the promise that seed time and harvest shall not fail? Faith is well, but “without works it is dead.” Continue then to pray with fervor, as often as you join in the Church’s solemn Litany, “We beseech thee, good Lord, to give and preserve to our use the kindly fruits of the earth, that in due time we may enjoy them,” but do not fail to supplement your prayer with the force-pump and London purple. It was a wise saying, if construed aright, that “Providence is ever on the side of the heaviest artillery.” Fight the insect as you never have before, and do not sound an inglorious retreat or yield a pitiable surrender, just as the instruments of warfare and the insecticidal ammunition, with which you may wage effectual fight, have been placed within your reach. At least show the spirit of one who came to my office to learn of me how he might successfully fight the striped cucumber beetle which had troubled him greatly. “Not that I care so much about the cucumbers,” said he, “but it hurts me terribly to let that little yellow-striped cuss get the better of me.” Study and perseverance will bring recompense. It will yield you a rich return in more productive crops with less expenditure of labor. I venture to say that it will often give the desired factor for the solution of that great problem which is before you, “how to make the farm pay?” Let the myriad insect hosts feed unmolested upon your choicest products, for it is ever those that they prefer, and there is failure. Fight them energet-

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ically, scientifically and manfully, and there is success, and a brighter future for you and your children. Do not, I beg of you, tolerate longer, that inexcusable, shameful, costly neglect of the study of insect lives and insect habits.

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## ADDRESS

BY PROF. GEO. D. HULST, STATE ENTOMOLOGIST.





## ADDRESS

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It is not necessary that I should say a very great deal to you this morning. You have probably had enough on the subject for one day, at least, and if it is followed out, it is certainly sufficient to bring out very valuable results upon the farms of New Jersey.

This is the first time, however, that you have had any one who may be allowed, I suppose, to call himself an entomologist of the State of New Jersey, before you, and it is only right I should say something, as has been suggested, in regard to the work which has been done, and in regard to that which is in prospect before us, in order that you may understand what we propose, and what our desires may be, and as you may need us, you may make use of us.

The first question that comes before us, I believe, is this—does the thing pay? That is the question I would like, at least in brief, to say something upon, in connection with the fact that we have now an Entomological Department at New Brunswick in connection with the Experiment Station. Is it a matter that is called for? That depends. If there be enough work to make it pay then it is desirable. If the work be accomplished we can say it is a paying thing to have an entomologist.

I suppose, from what I heard when I came in, and I was not able to be here all the time, I suppose the doctor has told you all about insects. He is very abundantly able to tell it and tell it well. Are insects of any economical importance? Are they in the line of a benefit? We are all agreed that they are—some of them of great importance to us, for the honey

bee and the silk worm certainly do amount to something. The honey insects in New Jersey amount to many dollars in a year. The matter of the silk-worm is a very important one in a great many nations on the face of this earth. France and Japan and China would probably lose a vast deal of their wealth if it were not for the products of certain insects. Then, there comes in another very important thing, in the line of economical importance.

When I was a farmer's boy, as I was once, we always used to talk about certain seasons, during May, when the cherries and apples and pears were in bloom, and we had a good deal of rainy, cold weather, and consequently not much fruit. People said it was because of the cold weather, and that the blossoms were blasted. I think, if you will look into this matter, you will find the weather don't do nearly as much blasting as people imagine, but it keeps the bees from going about, and fertilizing the flowers, storing up the pollen and getting it where it will do the most good. This is very often the trouble with our fruit crops.

Then, insects come in in another very important way as scavengers. I do not know how long it would take the body of an animal to pass away through putridity, if there were no insects. These things that we look upon as so utterly nasty and detestible, are nature's scavengers, and what might take a long time to pass away, is thus destroyed by these nature's scavengers within a few days.

And so it is with beetles that do so much injury to us; they are only nature's providers, by which these old trees, and this decaying wood are carried into shape as quickly as possible for use of other trees, and for other departments of nature. Then, they are also of very great benefit in the way of destroying injurious insects. All these lady bugs, and a great many of the bees and insects of the bee family, lay their eggs entirely on caterpillars and other grubs, and thus destroy these injurious insects.

When I was a boy at home, I well remember we had ten or eleven acres of tomatoes, and my father paid my brother and myself to kill off the great worms that were on them, and we would very often talk among ourselves as boys, about those little

white eggs to be seen on so many of the worms. In those days we were very careful to destroy them, by my father's orders, lest they should develope into small worms, and so carry on the brood. These "eggs" are small cocoons, and there is a little wasp in there, as you probably know, which laid its eggs through the skin of the caterpillar, and there they had gone through their developments and worked their way through the skin of the worm and spun cocoons, and finally to come out as little wasps. A very nice experiment for you would be for you to take these little cocoons and put them in a glass and after waiting a while you would have a glass full of little insects, which would be your best friends in every respect. Of course these insects which do this work for us are of the least importance, comparatively. We look at insects from the standpoint of the few, and more directly, that means, we look at insects which are injurious. Insects do more injury, I think, than most people imagine. It is in the line of every one to talk up his own profession, and the importance of it, and may be you will give me a little lee room on that score.

After all, there is no cause in the United States that works more injury than this one cause of insects. This is a pretty broad assertion. All the taxation of the land each year, does not compare, I think, with the taxation which comes upon the farmer through this one agency.

I heard some calculations made by Dr. Lintner, and if I am not mistaken, I think he locates the amount of injury done by insects in the United States at an amount of at least four or five hundred million dollars, and while it is true it amounts to that, the vast amount of the difficulty we know nothing in the world about. We simply have poor crops, and we don't realize that perhaps half of what we might have had has been destroyed by insects. I have no doubt, that a thousand million of dollars would not cover the destruction throughout the United States which is done through this agency of insects.

New Jersey is, in many respects, better situated than other States in the Union, lying as she does, between the two great cities, New York and Philadelphia. She can have a great deal more rotation in crops and a great deal more variation in products, than any other States, perhaps, comparatively speaking. We do

not feel the evil so much. After all, the evil is a vast one. Take this matter of the cranberry, on which New Jersey prides itself. You all know about them, and I think you will all agree with me that the cranberry crop might be at least twice as heavy as it is. The crop now runs up to several hundred thousand dollars in value. Half the crop, you might say, is gone. A great many growers tell me that that would be a low average. If you take the fire-worm and the web-worm, and other worms that do so much damage to the cranberry, you will find the loss running well up towards half a million dollars.

Why don't you grow orchards of apples, or plums, and fruit of that sort? Simply because you have found you cannot raise enough fruit for your own use, on account of these troubles, and you find it don't pay for the value of your fields, for the sake of feeding the coddling moth and other worms. The professor has told you that through the knowledge obtained by the study of the coddling moth and others, the foe has practically been conquered, and so with the curculio. Fruit can now be raised, to a certainty, and if you are careful and watchful, you can have at least three-fourths, if not more, of all the fruit that may be grown on your trees.

The matter of the cabbage worm is also a serious one; I find a great many farmers who won't plant the early cauliflower any more. They are also a little doubtful in regard to cabbages. There is a little worm which bores down into the heart of the cauliflower, and there, after the eggs are hatched, a maggot bores down into the stem, and the first thing we know the cauliflower fades away and is no good. The whole crop is threatened by this little maggot, and it is the same way with regard to the onion crop, with regard to radishes, and with many other crops. If something is not done by all of you, there is one single crop in these United States, which formerly ran up to hundreds of millions of dollars, that will not produce as many hundreds of dollars. I refer to the potato. The beetle has spread itself over the whole northern part of the country, and if it were not for the means you make use of, no potatoes could be grown, whatsoever.

I do not mean to say that these are bad things. I am a little inclined to the opinion that they are excellent things, and so I

told the Horticultural Society. My father, who was a most excellent Long Island trucker, and who knew all about farming, counted the potato beetle as a blessing of the Lord, and he was a pious man. Why? Because he, like all pious men, knew that if he wanted to get a return from his crops, he must work. He said that the lazy people would not take care of their potatoes, and they would be destroyed, and if any part of the crop was destroyed, the men of energy would have a full crop, and would have a corresponding return for their labor and share. And so, these beetles were a blessing to those who were watchful and careful. These things are to be a premium to those who will take care of what the Lord has placed before them, and unless they will work, they cannot succeed.

As the birds are getting killed off, and the snakes, the number of vermin increase and multiply with enormous rapidity, utterly beyond the conception of most people ordinarily, and there must be a very great deal more work done, and more brains put into that work, if we would enjoy what the Lord has put before us, else there will be failures. With all these possibilities before us, I think you will grant that there is much room for experiment in Entomology.

What has the department in view in its work? I was told that I must not talk more than about twenty minutes, and forgot to look when I started, but the first object of the department is to make researches. This is the fundamental provision of the Hatch Bill, upon which the Station is founded. To make researches upon insects, carrying on experiments, looking constantly for the means for preventing and mastering the plagues, whatever they may be, in insect form. In the ascertaining of new and better agencies of destruction, so that you may plant in peace, with the assurance that if you make use of the instrumentality, as offered, you may reap a harvest. When you plant your peach trees, so far as the department is concerned in the matter of the peach borer, you may plant your trees in peace, with the assurance that no borer need ever disturb you, if you make use of the right means of prevention. It is not a matter of cure, it is a matter of prevention. There is no need in that case of having your trees from one-third to three-fourths girdled, and so lose the power and vitality of the tree in two or three years.

There is a desire on the part of the department to establish a central office of information at New Brunswick. This would seem to be of great importance to some of you, as you know a farmer cannot take every paper, and he cannot, or does not read all those he takes. When he takes the *Prairie Farmer*, or the *Cultivator*, or the *Agriculturist*, or whatever agricultural paper it may be, he looks at the pictures of the cows and horses displayed there, by those having a personal interest in the matter, and perhaps reads a little about them, but the Entomological Department is very often skipped. Besides, one brain cannot hold everything, and even if we endeavor to do the best we can, in the way of study, we cannot keep the facts collated, and we are apt to forget more than we ever learned—I had nearly said. (Laughter.) We forget more than we remember.

At New Brunswick we have as complete a library as possible, but to have all the insects of the State tabulated, and all the information in all these journals tabulated and systematized, so that the Entomologist, when a question is asked, can immediately refer to everything—to have all this literature in this form, so that the Entomologist may have it immediately before him—this is one of our objects. We hope to have a central office of information, so that farmers can make use of it, and can get good results for the use they make of it. Of course, in this connection, it is very important, and absolutely necessary, that the farmer shall make use of this department. There is no use of having a figure-head of a department if the farmers don't make use of it. Moreover it is important on the part of the farmers to make use of this, for when a man wants to help in this line he wants it all at once. He can't wait, and he can't hunt up books, and he can't wait until next week. Why? Suppose you have the army worm in your grain or grass fields—the first thing you know they are in the field and the roads are full of them. They have eaten everything around them, and are moving onward to new pastures. What will you do? If you must study up for yourselves, before you are able to get your information, and make use of your means, the evil is done. The only thing is to have a central office, in direct communication, if possible, with every farmer so that he can feel that while he don't own it he has a right in it, and it is his right to ask for all the informa-

tion he desires, and that it is the business of the entomologist, as well as the botanist, and others, to give all the information they can, as they certainly will, to the best of their ability.

Then, third, it is the intention of the Department to establish a complete museum of insects, as complete as possible. First, to illustrate what insects are found in the State, and have them so arranged as to give to any one who desires, the ability to learn just what an insect is, why it is put where it is, in classification, and all about its relations to other insects, as well as of its own life. And, most important of all, to have in that institution, so that it is illustrated by the eye constantly, to anyone who will look the whole history of every injurious as well as every beneficial insect.

Take for example the cranberry. We will have an illustration of the cranberry in its different developments of growth. Here we will have the insect, or the berry worm, with the berries, in alcohol or glycerine, showing how they appear, and how this particular worm appears at its various stages of development. The caterpillar, chrysalis, and the mature insect will be shown. So with regard to the web worm, and the fire worm, and so all the way through. And so with every other staple, and in time, with every product of importance in the State of New Jersey. We will endeavor to have these arranged so that anyone can go to New Brunswick, and there see for themselves the various insects and a complete history of them, from the time the egg is laid, until they, in turn, begin to lay eggs, and so on all the way through.

With regard to this matter I wish to say just this. I am extremely sorry, not so far as you are concerned, but so far as I am concerned, that during this past year I have had other lines of business. I happen to be what a Dutchman calls a *dominie*, and I had served a portion of my time in that line, and it was my hope I should be more or less established as your entomologist, but my people did not think I was as good an entomologist as I was a *dominie*, (laughter), and they outvoted me. I have, therefore, felt it my duty to resign my position. I am glad for your sake, and I say that honestly. I say that because there is another to take my place, who has for years been my friend, and who can do all this work very much better than I could do, or



would have done, I am sure, and I would have done the best I could. I refer to Mr. John B. Smith, of Washington, who has been studying for a number of years. He is a man much younger than Dr. Lintner,—but comparisons are odious—and so has more of a future before him. He will take the pleasure which I did not feel, and will do the work for you most thoroughly, carrying out those ideas, and introducing more of his own, to make that Station what it is intended to be—a place which shall show the history of the insects of the State of New Jersey, and which will be a pride and an honor to every farmer, as well as to every citizen in this State. (Applause.)

On motion a vote of thanks was extended to Prof. Hulst for his entertaining and interesting address.

Mr. Loomis: I would like to say that we have been listening with much pleasure to the remarks of those who have been representing the interests of the farmers of New Jersey, and I am only surprised that we do not carry it a little further, when there has been so much settled, and they don't ask us, "What are you going to do about it?" (Laughter). They tell us about these insects, and how detrimental they are, and we merely give them a vote of thanks. They have taken the pains to come here and give us the history of their research. I think it is due to these gentlemen, and something of a pleasure to us, if they will ask us to say to them by rising, whether we will not, all of us, during the coming year examine into those of these insects destructive to our vegetation, as much as we can. Whether we will take an interest and make an examination for the benefit, and the great results we may get by doing so the coming year. I move that, having heard these things, and the information we have received, we promise as a body of agriculturists to examine what comes in our way during the present year, and see and know for ourselves, and when we come here another year, if we should come,—and if we don't, others will—get this information and know more about it than we do. It will be a pleasure to them, and they would think that we appreciated what they have said.

Professor Hulst: It has been the intention of the Director of the Experiment Station to have one standard product studied up so far as possible each year. This year, so far as possible, it was

the cabbage. The insects injurious to the cabbage have been made a study, as well as the best means of preventing their ravages. The next year, under Mr. Smith, it will be the cranberry, and I simply wish to stand here and ask those interested in the cranberry to give him the very best possible show for experiment and investigation, so that at the end of the year if there is not everything known in the world about the cranberry, it will not be your fault.

Mr. Crane: In order to make this practical, I suggest that those who feel thankful for these remarks made here, and will promise to show their appreciation by doing as my friend remarked, rise to their feet. If they want to promise, let them stand up.

All rise.

Mr. Forsythe: I would like to ask the professor one question in regard to one insect which has been very destructive to agricultural production. I am one of those who are unfortunate enough to be engaged in growing cranberries. He has told us of the great destruction by worms, and of the various insects injurious to cranberries to-day; cranberries are worth, I suppose, in the market to-day, about \$1.50 a bushel. Suppose we had no insects to destroy any of them, and we had that home market mentioned in that eloquent address last night. Suppose there were no insects to injure the cabbage. Cabbage brought a cent and a half a head last year. What I want to know is, if we had had that home market and no insects, what they would have brought, and what the cranberries would have brought.

Prof. Hulst: I would simply say that in the little experience my father has had down in Florida, it has been found—and he is an old man nearly eighty—oranges with a good crop bring more than a poor crop at high prices. It is the same way with cabbage. You cannot help people planting cabbages or cranberries. If they are worth less than one dollar a bushel, and if there are a great many more of them, and if the market be widely extended, they will pay better. If they are but one dollar a bushel and you can have three times as many cranberries to sell, your general average will be much better than at \$1.50 a bushel.

Mr. Forsythe: I would like to say to the gentleman that if

the cranberries were to come to you ready grown, you cannot take and clean them and put them on the market for one dollar a bushel.

Prof. Hulst: That is not the fault of the insect, or the fault of the entomologist, but it is the fault of the farmers who will persist—if I may allude to it in that way—it is the fault of farmers in voting for other people's interests and against their own, and not doing what they should for themselves. (Great applause.)

Mr. Nicholson: With the permission of Dr. Lintner, I would like to ask a question of him. Can he give us any solution as to the introduction of that new pest, the *Hæmatobia Serrata*, which has increased so rapidly in the last year near our vicinity, which is called the Texas fly?

Prof. Lintner: I shall not be able to answer that for we don't know how it has been introduced. It is a species belonging to the south of France. It has there been a pest of the horned cattle for many years, and through the many avenues of commerce, it has recently been brought to this country. Perhaps it is not so very important as to how it came here, as to endeavor to ascertain the best means of contending with it. As you know, it is a small fly, about the size of a horse fly, and attacks cows, and, for that reason, has been called the cow fly. For some time it was known as the Texas fly. It was called this because anything bad was said to come from Texas, and this was a miserable thing, and so we called it the Texas fly. Recently the Department of Agriculture have had some specimens sent them from California, which I think may be the same species, and if it be so, it might have been introduced at two different points. Its characteristic is that it bites, and is closely allied with the insect known as *Stromoxys Calcitrans*. It is a fly which makes the animal kick, and also makes the human species kick. (Laughter.) It sometimes bites through the clothing and through the stockings. At first this fly was supposed to be the same species. Knowing that nearly all our insect pests which are most injurious have been introduced from Europe, before this was described in this country, I sent some over to their best authority, Baron Osten Sacken, and he was able to identify it beyond all doubt with the species described in 1830, known as *Hæmatobia Serrata*. We know we

have it and will endeavor to get some remedy against it. The best remedy will be applying something strongly odorous, to prevent the fly from lighting on the animals.

Mr. Lewis: During last year our potato crop when half matured, the leaves began to die, and you could take off the leaves and crumple them. We wondered what was the cause of this, and afterwards read in the *Rural New Yorker* that it was an insect which attacked the potato. I would like to know whether that matter is general in our State, and in other localities. What is the remedy for this trouble, if any?

Prof. Lintner: The insect to which the gentleman refers is the potato flea beetle; it is not new at all. It has been known from time immemorial. I remember seeing it when a boy. If you dust your potatoes with plaster of Paris, and sometimes mix a little Paris Green or London Purple with it, it will remedy the trouble. It is usually kept away by these things, or anything which is disagreeable for it to take in its mouth. It is a biting insect. It is the well known potato flea beetle.

Mr. Folwell: In regard to the fly we had last year in our section of the country, I would like to ask the farmers here what they have done with it. Whether it caused a shrinkage of the milk or of the flesh of the cattle. I would like to know from the farmers what they did. Did they notice any very bad effects from it?

The Chair: If the gentleman will postpone that question for a few minutes, we will be obliged, as the present discussion is in the nature of questions propounded to our friends, Professors Lintner and Hulst.

Mr. Vanderveer: Has the Doctor made an examination to know whether the potato black was caused by the beetle, or whether it was a fungus? There seems to be a great difference of opinion.

Professor Lintner: The operations of the flea beetle begin very early, eating little holes in the leaves, and leaving little brown spots, and then they die. Its attack is very easily recognized.

Mr. Anderson: Have you noticed in this blight there is a little worm going up the stem from the root, that seems to be the cause of the blight? In the southern part of the State and over

in Pennsylvania this is very serious. It has caused a great deal of loss to the farmers.

Professor Lintner: If that little borer be the cause of the blight, you can remedy it very materially by collecting the vines in the autumn and burning them. The insect is the stalk borer, which bores upward in the stalk of a very large number of plants. It is very frequently found, and its maximum size is about one inch in length. You can recognize it by its being parti-colored. It is one-half white and the other half black. It is very difficult when in the stalk to do anything with it. When the potatoes are dug, by all means, burn the vines. If you do this you will destroy the insects also.

Mr. Pearson: Has there been any discovery made about the prevention of the ravages of the rose bug?

Prof. Lintner: The *Rural New Yorker* announces that all we need to do is to spray with pyretherum in water. They say that this remedy is effectual, but I must say I have my doubts. I think it will not be effectual. That paper says it positively is.

Prof. Hulst: The way would be, I think, not to kill any more moles or field mice. This is one of the ways of getting at them. These animals live almost entirely on such vermin, and so they are wonderfully helpful. This is one of the things that it seems to me the farmers ought to insist on, that moles, field mice and snakes, when not copperheads or rattle snakes, and birds, especially of all sorts, kinds and sizes—crows included, should not be killed. I don't include sparrows, but I include them too unless they get to be a nuisance—but Professor Lintner don't altogether agree with me about the sparrow.

Mr. Rogers: We notice in the case of moles that they are injurious to a great many plants, and we find where they go we can raise nothing, on account of the damage to the roots.

Prof. Hulst: It all depends upon how many June bugs and rose bugs you have, and it is for you to decide which you prefer, these or the moles. (Laughter.)

Mr. Ege: I would like to ask whether you have had any experience with the wire worm in young stalks of corn? In the past year there has been a worm resembling the wire worm which has done much damage. It does the damage to young plants of

corn. Perhaps it was a benefit to my corn, as it might have been too thick. My corn grew very rapidly, and a great deal of it was cut off by these worms, but after it was six or eight inches high I saw no more of them. When it first came through the ground, a great many of the young plants were killed. You could look over the ground and see a great many of the stalks looking brown and dead.

Mr. Loomis : My soil is a pure sandy loam. My corn grew very well until it was attacked, and then it stopped and there was about an acre in the middle of the field that turned yellow. The other corn got ahead of it. I went into the field and pulled up a hill and found nearly a dozen of these little black wire worms on it. I examined around over about an acre of the corn, and found what was the trouble with it. I put some salt around the corn, about a teaspoonful to the hill, and it stopped them. The corn that was attacked never matured.

Prof. Lintner : Was it not a black beetle ? Wire worms are never black, I believe.

Mr. Loomis : They did the damage right around the root, and then it started up from the root and cut the stem right off, so the plants lay around the hill.

Prof. Lintner : I think the application made was very good. I would apply salt as a preventative. It is well understood that this is a simple and effective remedy.

Mr. Ege : It was not anything similar to the ordinary cut worm, not even resembling it. The salt would be sufficient for protection against the wire worm. When you plant your corn put a tablespoonful of salt on each hill. This is washed down by the rain into the young corn as it spouts, and you will be preserved from the ravages of the cut worm or any worm doing similar damage. This claim is made for the use of salt, and I think with truth. It should not be applied as the grain is spouting. The only proper time is at the time of planting, and then put it on the hill after covering.

Mr. Pancoast : Sometimes corn comes up very quick. I have had it come up within five days, and the rain might come on it so as to kill the whole field.

Prof. Lintner : I would apprehend no danger from it in that particular.

Mr. Loomis: My experience was that I put it on the hill and it did not hurt the corn. It was then perhaps eight inches high.

Mr. Ege: The worm I refer to eats into the centre of the stalk and eats upwards, and makes the corn first wilt and then die and dry up. It is certainly very dangerous and may become very destructive. The great dependence with us is upon the crop of corn, and if killed just at that stage, what will become of this crop? This little yellow wire worm eats the heart out of the corn. It is something new. They say they never saw anything like it before the last two or three years.

Prof. Lintner: I don't know the insect. I would suggest that you send specimens to some entomologist.

Mr. Ege: This sod was not plowed for perhaps ten years, where the wire worm attacked the corn.

Prof. Lintner: I don't know of any black wire worm.

Mr. Ege: This was not black, but rather brown, and about three-fourths of an inch in length, and very slender and very active. It got over the ground very rapidly.

Mr. Loomis: This worm I spoke of was a light yellow worm, and when about two-thirds grown, became a darkish brown and when full size, black.

Prof. Hulst: This is just one of the things I want to have emphasized here, and that is, the importance of sending samples or specimens to New Brunswick or to Albany—you can take your choice of doctors for particular examination and determination as to the character of the insect. Let me say in this connection, never attempt to send these specimens in letters. Put them in boxes. You can never tell anything about them when sent in letters, after they are mashed by the heel of Uncle Sam.

Mr. Folwell: I wish more farmers would give me their experience about the cow fly. What disadvantage do you find in the loss of milk and flesh?

Mr. Nicholson: It is suggested to put a little fish oil on the animals where these flies collect the thickest. They are very apt to collect the most where the skin is thin, behind the shoulder blade, or udder. They are small and not able to puncture the hide where thickest. The farmer will also find that if he has thoroughbred cows, they will be annoyed more than the ordinary



ADDRESS BY PROF. GEO. D. HULST. 321

cattle. Their skin is thinner. Some cattle make their sides sore with the ends of the horns, in endeavoring to drive away the pests. A little fish oil will prevent their adhering to the skins. Again, you will find they increase much more rapidly than any other fly. So much so, that the common fly the doctor spoke of seems almost to be lost sight of, the numbers of these others are so great. This last season, although a cold spring, they were in large numbers on the cattle by the 20th of May. They live only to about the middle of October.

Mr. Baker: In reference to the corn worm, I recognize, I think in that the same insect that has hurt our corn in my vicinity. A great many acres came up and looked well until about five inches high, and then died. We called it the web worm. We have known it for years. They weave a sort of web around the corn. The application of salt is a remedy in that section.

Prof. Lintner: The web worm does not burrow in the stalk, it lives in little cells in the ground. In relation to this common fly, I was told it clusters very largely about the horns of the cattle. I don't see why it is it seems to annoy the cattle there at all.

Mr. Folwell: It is pretty troublesome around the horn. Myself and neighbors put tar around the horns. If you examine around the horns pretty closely you will find they have eaten enough to make it raw. The horn would be black next to the head for about two inches. In the latter part of the day, they were more annoying, and early in the morning; more so than in the middle of the day.

Mr. Nicholson: The fly does not appaar to attack the animals about the root of the horn. The blackness on the horns is the excretia of the fly. You will hear the assertion that eggs are laid there, causing the death of the cattle, but there does not appear to be any foundation for this. The flies are so active that when the cattle throw their heads around to drive them away, by the time the head is back, the fly is back again. They never settle on the horses or mules. They take the bovine race altogether.





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# BEE CULTURE

AND ITS BENEFITS TO FARMING—HONEY SOURCES, SWARMING, CARE  
OF HONEY, WINTERING, ETC.

BY W. W. CASE.

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# BEE CULTURE

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BY W. W. CASE.

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It would seem that the rapid advances made in the science of bee culture in the last few years, and the favorable situation of the State of New Jersey, as regards climate and plant bloom, should give to it a very important place in the agricultural resources of our State.

## SOURCES OF HONEY.

The hills and valleys of this State produce an almost endless variety of the very best honey producing plants. In the early spring come the sugar maples, soon followed by the willow, cherry, peach, plum, apple and other fruit trees, which in turn are soon followed by the fragrant raspberry and the everywhere present beautiful white clover, *Trifolium repens*, producing large quantities of most excellent honey, and its half sister, the cultivated alsike clover. *Trifolium hybrida*, a most valuable forage plant and a fine honey producer, and the common red clover frequently yields fairly well to our beautiful Italians. The tulip, locust, magnolia and basswood abound in many parts of the State, and are good honey producers, the latter being the most wonderful honey producer we have in the East. In some sections of the State large areas are sown to buckwheat, which sometimes yields enormous crops of honey—enough to pay all

expenses, furnish winter stores and still leave a handsome margin of profits to the enterprising apiarist.

In some sections buckwheat is followed by a fine flow of honey from golden rods (*Lolidagoes*) and asters, and in many places chestnut and sumac, and a host of other plants too numerous to mention, contribute to the honey flow throughout the season, rendering, usually, the apiaries a very busy season and a quite profitable one too.

#### WHO TO KEEP BEES.

The bee business does not seem to harmonize with the busy farmer, but seems to be in this State, at least, a separate occupation, and one a farmer had better not invest too much money into unless he has a good deal of leisure time on his hands, or has some enterprising boys or girls to whom he is willing to give the time, to give the bees thorough attention. There is no reason, whatever, why a great many of our young ladies, (farmers' daughters) had not better add to their revenue by bee-keeping, than by learning a trade. Bee-keeping is a far more healthy occupation, giving pure air and plenty of exercise, and a dozen colonies of bees, well cared for, will produce more clear money than could be earned at a trade, besides leaving much leisure time for other occupation. It is, however, very suitable in connection with small fruit and poultry raising and to the professional the State offers fine opportunity. A great many make the bad mistake of starting with too large an apiary. To the novice, three or four colonies are a great plenty to begin with. Study these thoroughly, and in connection with one or more good works on bee culture, and they will increase as fast as the know-how to take care of them will. Among the best works on bee culture is the "A B C of Bee Culture," by A. J. Root, of Medina, Ohio.

#### NATURE OF AND HANDLING OF BEES.

The inexperienced naturally fear getting stung. Bees near their home are naturally suspicious, and are inclined to think all enemies until they find no harm is intended, but they do not sting near as frequently as some people suppose, and very rarely with-

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out just provocation, and the more experience a person has with bees, the less liable they are to get stung, as they soon learn what will and will not enrage them, and act accordingly; and to a person who becomes interested, interest dispels all fear, besides each successive sting has less and less effect, until soon they produce no effect whatever. Always dress in light clothes, move rather slowly and very quietly, and never strike at a bee. If necessary wear a veil. Gloves on the hands are a nuisance. Have a good smoker, and always have it in readiness for use. If the hands are covered with dark hair singe it off. In opening a hive never make a jar as that seems to be one of the things a bee particularly hates. Besides anyone handling nice mild Italians after having had experience with Blacks or Hybrids will hardly appreciate they are handling bees.

## EFFECT OF BEES ON FRUIT AND OTHER BLOOM.

The bee fills a very important part as marriage priest to many varieties of our most useful plants. Red clover, though failing to seed in many localities, does not fail to do so in the neighborhood of apiaries of Italian bees. Experiments by Professor Beal in such neighborhoods show the ratio of seeds in uncovered red clover heads was as 236 is to 5 in those that were covered so the bees could not reach to them. All varieties of cherries in cold wet springs frequently do not produce fruit, not as we are sometimes told, because the blossoms were blasted which rarely or never occurs, but because the pollen from the stamens is unable to reach the pistils which in nice weather is carried on the legs of the bee as he goes from blossom to blossom seeking his daily bread. The influence on nearly all fruit and other bloom is as marked as in the two instances quoted. The honey is not placed in the flower cup any more for the bee than the bee is created for the benefit of the flower cup and its drop of nectar is only to entice the bee to further the propagation of plant species, and in view of this end it is a law of bee nature that he never visits but one species of plant on a trip over the fields.

## SWARMING.

With due knowledge and preparation, swarming loses entirely

its formidability. Positively discard the tin pan and all other calithumpian paraphernalia. They have no effect unless it be to make both bees and beekeeper nervous. If swarms are allowed to issue in the old way, and should alight on a branch where no damage will be sustained, cut the branch off and lay it in front of the hive you wish it to occupy, smoke them gently and they will all soon run in. It is best to spread a cloth under the bees in front of the hive, as they can run in easier. Should they alight higher, or in a bad place, they can be got with a peach basket tied to a pole and dumped where you want them, or they can often be induced to enter a swarming box. By clipping the queen's wing, and often when not clipped, she will be unable to fly, and when the swarm issues catch and cage her, and soon as the swarm has all issued remove the hive to a new place and put an empty one in its place. The bees, finding the queen is not with them, will soon return and start in the empty hives. When about all are in, liberate the queen and cause her to run in with the rest of the swarm and they are hived. It is well to hive a swarm on sheets of wired comb foundation or part foundation and part empty combs, and if a comb of unsealed brood is placed in the center they will be much better contented. I would not advise a green hand to clip a queen, and in catching her much care is necessary not to squeeze her or she will be ruined. She should be caught by the wings.

#### AFTER SWARMS.

When a swarm issues there will nearly always be found one or more sealed queen cells which will hatch on the eighth day. Open the hive and find the best one. Mark the frame on which it is found so that you can readily find it. On the evening of seventh day remove all but this one and there will be no second swarms. Look after it in a day or two and see if it hatches all right, and should it fail to hatch in four or five days give them a cell from another hive. This is the simplest method. I usually introduce a laying queen in twenty-four hours after the swarm issues by smoking the bees thoroughly and turning her on the combs, and do not lose one queen in twenty by so doing. I always hive the first swarms into hives that have come out weak

## BEE CULTURE.

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in the spring. Saving the queen from the weak colony and next day giving her to the stock from which the swarm issued, thus increasing the chances for surplus honey.

## HIVES.

As regards hives, nearly all are good if properly handled, and all are poor if neglected. Which hive is best I do not know nor does any one else. The simplicity with nearly the original Langstroth frame is deservedly in great favor, conforming perfectly to the popular one pound section of comb honey, although a shorter and deeper comb is rather better for out of door wintering. And just here a word in regard to all hives,—if a person does not intend to use and manipulate a movable comb hive as they are intended to be used, he will find the result little or no better than if he had stuck to the old box hive. The main superiority of a movable comb hive over the box hive is that it may be controlled and handled more intelligently—not in the hive if left to itself.

## SURPLUS HONEY.

As regards storing of surplus honey, there are two methods employed, both of which are good. Top storing, where the sections are placed in supers on top of the brood nest, and one placed above another to give more space. Top and side storing I think gives enough more honey to pay for the extra amount of labor involved, and is the method I am using at present.

Honey should be taken from the hive as soon as it is sealed over as it will be soiled if the bees are allowed to run over it for any length of time after it is sealed up. It should be kept in a warm, dry place. A temperature of ninety degrees for six weeks will not hurt, but on the contrary improve it in quality and flavor and honey so kept will not become thin, sweat out and muss everything. The room in which it is kept should be fumigated occasionally with sulphur to destroy all larvae of the wax moth. Honey that is fumigated in about one week after it is taken from the hive, and again about ten days later, will, if kept out of reach of the wax miller, be safe from further ravages.



MARKETING HONEY.

If the simplicity hive is used the honey will be stored in the popular one pound section, and if properly graded in packing and put up in proper crates will bring a better price than in any other shape. Every case should be carefully packed and quality of contents marked. Never send your honey to a foreign market until you have thoroughly developed your home market. Frequently honey will have a good sale in small towns at a fair price much more than would be realized by sending to a wholesale market, although extra fine honey will sometimes sell at fancy prices at a brisk business centre. In this State, at least, there seems to be but small demand for extracted honey, hence would only advise the use of the extractor in this State, merely for the purpose of controlling the size of the brood nest.

WINTERING.

Out-door wintering seems to be preferable in this State—the climate not usually being severe enough to require cellars or clamps. My apiary is sheltered on the north by a tight board fence, five feet high, and hives are chaff-packed. My losses are light. Winters of '86 and '87, loss one colony; '87 and '88, loss four colonies, three of which perished in the March blizzard, the other from lack of honey. No loss so far this winter.

Mr. Cook: Have you not had colonies snowed under, and yet come out all right in the spring?

Mr. Case: Yes, sir; I have had them covered over with snow, and left to their own resources, and yet have them come out healthy in the spring. In some cases, I think, that dampness was absorbed through the walls of the hive.

Mr. Cook: Have you any faith in the pollen theory; of their eating too much pollen and thus becoming diseased in the winter?

Mr. Case: I think too much pollen will produce dysentery among the bees.

Mr. Cook: Do you take any means to prevent it?

Mr. Case: No, sir; there is usually not a great deal of pollen stored in our section.

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Mr. Cook : What is your experience as to the profits of honey making ?

Mr. Case : My experience is that honey yields better returns than any other business I know of.

Mr. Cook : Can you give me any reports of your success ?

Mr. Case : Yes, sir ; I have increased my colonies until they number eighty. I made over 3,500 weight of honey from these hives, netting me over \$490. I have had time enough also to give to other occupations. I have served as clerk of my township and taught school for five months.

Mr. Cook : What causes spring dwindling ?

Mr. Case : Various causes. In one case with me, I think it resulted from coldness. I think the swarms were damaged by the blizzard last year. A few were not snowed under, although they showed the same result of dwindling.



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STATE GRANGE OF NEW JERSEY  
PATRONS OF HUSBANDRY.

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## OFFICERS OF THE NEW JERSEY STATE GRANGE.

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<b>Master,</b>	
JOHN STATESIR.....	COLT'S NECK, Monmouth county.
<b>Overseer,</b>	
HENRY F. BODINE .....	LOCKTOWN, Hunterdon county.
<b>Lecturer,</b>	
EMPSON ATKINSON.....	WOODSTOWN, Salem county.
<b>Steward,</b>	
DAVID S. ADAMS.....	MICKLETON, Gloucester county.
<b>Assistant Steward,</b>	
EDMUND BRADDOCK.....	MEDFORD, Burlington county.
<b>Chaplain,</b>	
FRANKLIN DYE.....	TRENTON, Mercer county.
<b>Treasurer,</b>	
C. A. RULON.....	SWEDESBORO, Gloucester county.
<b>Secretary,</b>	
M. D. DICKINSON.....	WOODSTOWN, Salem county.
<b>Gate Keeper,</b>	
E. E. HOLCOMBE.....	MT. AIRY, Hunterdon county.
<b>Ceres,</b>	
ZILLAH H. ADAMS.....	MICKLETON, Gloucester county.
<b>Pomona,</b>	
LAURA E. CUBBERLY.....	HAMILTON SQUARE, Mercer county.
<b>Flora,</b>	
KATE B. LIPPINCOTT.....	HARTFORD, Burlington county.
<b>Lady Assistant Steward,</b>	
HANNAH C. HOLCOMBE.....	MT. AIRY, Hunterdon county.

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### EXECUTIVE COMMITTEE.

JOHN STATESIR.....	COLT'S NECK, Monmouth county.
JOHN T. COX.....	FLEMINGTON, Hunterdon county.
THOMAS BORTON .....	MULLICA HILL, Gloucester county.
JAMES H. BAIRD.....	MARLBORO, Monmouth county.
WILLIAM B. LIPPINCOTT.....	HARTFORD, Burlington county.



## STATE GRANGE OF NEW JERSEY.

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*Mr. President, and Members of the State Board of Agriculture :*

The State Grange of New Jersey, P. of H., held its Sixteenth Annual Session in the Assembly Chamber, in this city, on December 4th to 5th last, with a good attendance, and a pleasant, and, we trust, a profitable session.

The Secretary and Treasurer's reports show a good condition of the order financially, and some progress made.

The reports of the several deputies and others show the order to be in a flourishing condition in some sections, with considerable increase of membership, and the work prospering, co-operation being very generally practiced to mutual satisfaction and advantage, meetings well attended, and a general interest in the objects of the organization manifested ; while in other portions of our State the cause has made little if any progress, and in some counties has not, as yet, gained a foothold.

Many thousands of dollars have already been saved the members in this State, in the matter of insurance alone, during the few years that Patrons Insurance Companies have been in existence among us, two of which have been organized for insuring the property of members of the order alone ; which are in a prosperous condition, and rapidly gaining the confidence and support of the members generally, as the continued increase of applications bear witness.

We learn from the published proceedings of the last meeting of the National Grange, held at Topeka, Kansas, in November last, (at which meeting nearly every State and Territory in the Union was represented) that the Order is prospering throughout the country generally, one hundred and ninety-three (193) new



granges having been organized during the year, notwithstanding the complaint generally made that the exciting presidential canvass had so distracted the minds and absorbed the attention of farmers "and the rest of mankind" that other interests were nearly lost sight of.

The Order, though still young, has already accomplished much for our benefit, in the laws which have been passed by Congress and legislatures, chiefly urged and supported by its members; and its committees are now in attendance to urge upon Congress still further action in our interests, which efforts will, in due time be successful, if properly supported by us, and much more could be done did all farmers understand the objects of the Order fully, and properly consider their own interests.

In the language of another, "If we have done what we have with our scant numbers, oh, what had been, if all had gone with us."

Boards of Agriculture, Agricultural Societies, Farmers' Clubs, Fruit Growers' Associations, Horticultural Societies, and other organizations of farmers are beneficial, and have accomplished much to the advantage of the tiller of the soil, where properly patronized by those whose interests they are intended to serve; but their influence for good is necessarily local, mainly, and therefore, cannot, under any circumstances, accomplish so much to further the interests of the agriculturist, as can the Grange, properly understood and supported, with its complete national organization.

Let it be distinctly understood, however, that the Grange does not, and will not in any way interfere with any of the organizations named; on the contrary will prove a great help in advancing their interests, owing to the aforesaid more complete and extended organization.

The financial considerations, though so apt to claim and obtain precedence, are not the only nor, indeed, the greatest objects directly sought to be obtained by the founders of our order. As its Declaration of Purposes declare, we aim "to develop a better and higher manhood and womanhood among ourselves;" to "enhance the comforts and attractions of our homes;" to "foster mutual understanding and co-operation;" to "secure entire harmony, good will and vital brotherhood among our-

NEW JERSEY STATE GRANGE.

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selves," and "thus insure mental, moral and material advancement;" to "bring producer and consumer into the most direct and friendly relations possible;" to do all in our power "to advance the cause of education;" and "wages no warfare against others lawful interests, asking only for ourselves what we are willing to grant to others," believing that "individual happiness depends upon general prosperity."

"Our work is for the present and the future," and no person joining our order surrenders any of the inalienable rights of an American citizen, but on the contrary by uniting with us heart and hand will assist to perpetuate the glorious inheritance bequeathed by our forefathers, untarnished.

Why this organization, intended directly to benefit the farming interest, and having been proved by the trial to which it has been subjected during the more than a score of years of its existence, to be deserving of all that is claimed for it, should fail to receive, as it deserves, the fullest confidence and support of all farmers is one of the problems yet to be solved.

JOHN STATESIR,

Master N. J. State Grange, P. of H.

Colt's Neck, January 30th, 1889.



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NEW JERSEY  
STATE HORTICULTURAL SOCIETY.

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## OFFICERS FOR 1889.

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DAVID BAIRD.....MANLAPAN.

### Vice-President,

C. W. IDELL.....HOBOKEN.

### Secretary,

E. WILLIAMS.....MONTCLAIR.

### Treasurer.

C. L. JONES .....NEWARK.

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WM. R. WARD.....NEWARK.

C. W. IDELL.....HOBOKEN.

D. A. VANDERVEER .....MANALAPAN.

J. M. WHITE .....NEW BRUNSWICK.

E. P. BEEBE.....ELIZABETH.

### Fruit Committee.

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IRA J. BLACKWELL.....TITUSVILLE.

ELI MINCH.....SHILOH.

D. A. VANDERVEER.....MANALAPAN.

J. B. WARD .....NEWARK.

### Vegetable Committee,

FRANKLIN DYE.....TRENTON.

D. C. VOORHEES .....BLAVENBURGH.

D. V. CARHART.....HIGHTSTOWN.

### Flower Committee,

GEO. C. WOOLSON.....PASSAIC.

J. T. LOVETT.....LITTLE SILVER.

HENRY I. BUDD.....MT. HOLLY.

### Director to the State Board of Agriculture,

E. WILLIAMS.....MONTCLAIR.



## WEEDS AND THEIR EXTERMINATION.

The following resolution was passed by the State Horticultural Society, at its annual meeting :

"WHEREAS, The production of noxious weeds and their eradication being so very important to the general farmer, as well as the fruit-gowers :

*"Resolved,* That the subject be referred to the State Board of Agriculture for definite action, and that our delegates to that Board be charged with that duty." Adopted.

As the secretary (and delegate) Mr. Williams, was not able to be present at the meeting of the State Board the subject was not formally brought before that body. Since the meeting of the Board correspondence has been carried on between the Botanist of the Experiment Station, Prof. Byron D. Halstead, and the Secretary of the Board, with the object in view of publishing a paper on this subject in this report. At Prof. Halstead's suggestion, it was finally decided that he would prepare and publish such an article in the form of a bulletin by the Experiment Station, to which the readers of this report and the members of the Horticultural Society are respectfully referred.

FRANKLIN DYE,  
Secretary.





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# LECTURE

ON TREATMENT OF FUNGUS DISEASES OF PLANTS.

BY A. W. PIERSON, SPECIAL AGENT U. S. DEPARTMENT OF AGRICULTURE.

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# LECTURE

ON TREATMENT OF FUNGUS DISEASES OF PLANTS.

BY A. W. PIERSON, SPECIAL AGENT U. S. DEPARTMENT OF AGRICULTURE.

As some of my fellow-citizens seem to be ignorant of how and why these experiments, instituted by the Department of Agriculture, originated, I will enlighten them by a brief explanation. A more intelligent understanding, in fact, may be had of the result reached, by learning the steps which led to it.

The Downy Mildew, and the Black Rot of the grape have been known in this country for the past forty years. Ever since grape culture became extended in the United States these maladies of the vine have been more or less epidemic.

They have hitherto been but little understood, as it is but recently that they have been made especially the subjects of scientific investigation.

These vine diseases are believed to be peculiarly American, and are observed to affect nearly all of our native species of *Vitis* in all of the territory east of the Rocky Mountains.

They are caused by two distinct species of parasitic fungi, which prey upon nearly every species of the grape. They are even found upon the leaves of the *Ampelopsis Quinquefolia*, our well-known Virginia Creeper.

*Vitis Rupestris* is our only grape which seems to be exempt from the depredations of these destructive fungi. I have this species growing in my vineyard, and it appears to be entirely free from mildew and rot.

Several years ago the American grape-leaf mildew, known botanically as *Peronospora Viticola*, appeared in European vineyards, probably introduced there by the importation of American vines. During the summer of 1885, black rot was for the first time discovered in France. It aroused great public concern, and was at once carefully studied by those eminent scientific viticulturists, Professor P. Viala, Professor of Viticulture at the National School of Agriculture, and his able assistant, M. L. Ravaz, by whom the first elaborate and well illustrated description of our American black rot was published in a bulletin from the National School of Agriculture at Montpellier.

This bulletin reached our Department of Agriculture early in 1886, and in the month of May of that year I called the notice of our National Viticultural Convention at Washington to this proof of French enterprise in viticulture.

It is scarcely creditable to the science of American grape growers that in less than one year the French arrived at a correct knowledge of this malady of the grape, which for more than forty years had remained a mystery to the generality of Americans.

Even yet it is not difficult to find members of our viticultural community who believe that our grape rot is caused by the sting of an insect.

Our French competitors in viticulture not only published an accurate description of our grape rot, but they also suggested a preventive or remedy for the disease. It had been observed in France that solutions of copper sulphate applied to the vine were preventives of mildew, and there was reason to suspect that this chemical might be found equally valuable in the treatment of black rot. Meanwhile, our distinguished Commissioner of Agriculture, Governor Norman J. Colman, of Missouri, had organized at the Department the Section of Vegetable Pathology, under the direction of that eminent botanist and mycologist, Professor F. L. Scribner.

The work of this section was first directed to the study of our peculiar grape maladies, and to an investigation of the efficacy of the preventives or remedies for them which were suggested in France. Experiment stations were located at Charlottesville, Virginia, Denison, Texas, Neosho, Missouri, and at Vineland, New Jersey. Circulars were issued by the Department to viti-

culturalists all over the union, inviting volunteer experiments with various preparations of copper sulphate.

In June, 1887, Professor Viala, deputed by the French Minister of Agriculture to inspect viticulture in the United States, arrived at New York and came directly to Vineland.

Experiments were begun here on June 13th under the personal supervision of Professors Viala and Scribner, Professor Ellis, of New Jersey and Dr. E. C. Bidwell.

The vineyard subjected to treatment is of the Concord grape. It has eleven rows of vines, one hundred and ten in each row. This vineyard was divided into five nearly equal sections, transverse of its rows, and to each one of these five sections was applied one of the five formulae of copper sulphate to be tested. The sixth row, being the middle row of the vineyard, traversing all of its section, was left untreated for comparison.

It is needless to describe the chemical formulae employed, as they have been widely published by the Department of Agriculture, copied by Vineland journals and hundreds of newspapers throughout the United States.

In the autumn of 1887, the reports of results of the experiments, made all over our country, were received at the Department of Agriculture, and published in bulletin No. 5, Section of Vegetable Pathology. They generally coincide in stating that the solutions of copper sulphate are quite efficient to prevent mildew but of no avail against black rot. This result of the experiments of 1887 was a viticultural disappointment.

However, Professors Scribner and Viala, from their knowledge of the habit of the Black Rot fungus, suspected that the failure as the fungicides, as employed against this foe to the grape, was due to the failure to use them early enough in the season. Any antidote to Black Rot must be employed as a preventive. After the infecting germ enters the tissue of the grape it cannot be destroyed without destruction of the fruit.

These professors of viticultural science advised a repetition of experiments with the copper sulphate in 1888, to be commenced sooner in the spring. My instructions from the Department were to make a first application of the preventives by May 15th. Owing to delay in getting from Philadelphia the requisite chemi-

cals, I was unable to apply them until May 29th. This, however, proved to be early enough for the season.

For the experiments I used the same vineyard treated in 1887, dividing it into six sections to which I applied six different mixtures, carbonate of copper, sulphur and lime, Bordeaux mixture, Eau Celeste, and sulphatine, using in each treatment the same mixture upon the same section, and making the applications on May 29th, June 4th, June 21st, July 2d, July 11th and August 8th.

The weather during the summer was generally wet, and favorable to the activity of the fungi.

On July 15th, I invited our fellow citizen, Dr. E. C. Bidwell, (already distinguished as the discoverer of the winter form of the Grape Rot fungus, which, in honor of its discoverer has been named "*Laestadia Bidwellii*") to inspect results of my experiments. Dr. Bidwell considered that the efficacy of the copper sulphate treatment in prevention of black rot was demonstrated, and he thus wrote to Professor Viala, by whom the fact was published in France.

On July 31st, Professor Scribner, of the United States Department of Agriculture, came to inspect my experiments. Professor Scribner, together with Professor J. B. Ellis, of Newfield, New Jersey, and Dr. E. C. Bidwell, of Vineland, found the evidence of the efficacy of treatment in prevention of grape rot to be quite conclusive.

Professor Scribner caused photographs to be made of grape clusters from the untreated row and the treated rows in my vineyard. These photographs have been copied and published in France, and are now being prepared for show at the Paris Exposition.

A description in detail of the various treatments used in these experiments will be of but little practical interest. It is sufficient to say here that the preparation of Copper Sulphate known as the Bordeaux Mixture gave the best results, and so decidedly that it may be recommended for exclusive use as a preventive of the Black Rot of the Grape, and as a preventive and curative of our grape leaf mildew.

The formula which I use in making the Bordeaux Mixture is as follows: Dissolve six pounds of powdered sulphate of copper

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in a sufficient quantity, say six gallons, of boiling water. In another vessel slake four pounds of new lime in sufficient water, say four gallons. Mix the two solutions and dilute with water to make twenty-two gallons of liquid. Apply this mixture to the vines and grapes in a spray of the liquid to wet the surface. It is unnecessary to drench it. This spraying is best done with a machine adapted to the purpose.

In 1887 I used the Vermorel Spraying Machine, imported by the Commissioner of Agriculture for use in these experiments. In 1888 I used the Eureka Sprayer, a pump invented and patented by Mr. Adam Weaber, of Vineland, N. J. It is an improvement on the Vermorel machine.

If the vine, and its fruit, be well sprayed with Bordeaux Mixture, early enough, and often enough, I believe that full protection will be secured against rot and mildew.

I recently visited the United States Department of Agriculture, which is now in possession of the reports of experiments made in 1888, in this country and in Europe, for prevention of grape mildew and rot. The results of these experiments corroborate my own conclusions, and of the chemical mixtures tested, the Bordeaux Mixture is generally preferred.

For the prevention of these fungus maladies it is well to use every available means of disinfection.

Clean the vineyard. Remove or bury all of the mildewed leaves and rotted grapes found upon its surface. Then, early in spring, before the start of vegetation, spray the vines with a strong solution of Sulphate of Iron, say two pounds of the copperas to a gallon of water. Hot water will make the solution best. After the vineyard is ploughed, in May, top dress its surface with say forty bushels of dry hydrate of lime per acre. Lime is in itself destructive of fungus germs. It will also increase the saccharine of the grape. When the vine is setting its clusters, and before they open their blossoms, spray with Bordeaux Mixture, and repeat this spraying every three or four weeks thereafter, taking pains, after the foliage is dense, to visit all the fruit with the spray. This may be readily done with the cyclone nozzle of the machine. Continue treatment until the grapes begin to color, when of course all applications to the clusters should cease. They must take their chance for the rest of the season.



The philosophy of the prevention of grape rot by means of these solutions of the sulphate appears to be in the coating of the surface of the berry with an infinitely thin pellicle of the mixture, which, after it dries, is not readily dissolved by rains, and which interposes its metallic shield between the skin of the grape and the fungus germ, just like the protection furnished by the paper bag. Besides this, the copper solution destroys the vitality of the fungus. So long as any of the chemical (no matter how little of it) remains upon the epidermis of the grape, the infecting germs which may alight there cannot sprout and take root; in fact, they are killed by the contact with the Bordeaux Mixture. Hence it seems only needful to renew application of the copper solution whenever it may be washed off of the fruit by drenching rains.

On general principles it is advised to spray the vine once every three weeks, but the need of such frequent applications will depend much upon the weather. If drought be protracted the protection of a spraying will probably continue while the drought lasts. If heavy rains be frequent, spray more frequently. With the copper solution ready prepared this is very easily done, as with the spraying machine, which I use, I can spray five acres of vines per day.

Where grape rot is epidemic, and the weather favorable to development of the fungus germs, it is doubtful if the grape may be efficiently protected later than the last of August by anything excepting a paper bag. I have seen grapes preserved by bags until October 1st, which were then infected by rot after removal of bags.

To trace the activity of infection of the black rot germ I last year made an experiment which was instructive. Beginning so soon as the grape clusters were formed, and before blooming, I every day put on them two hundred paper bags and continued this until grape rot appeared in July. Upon unbagging these clusters in October I found a few berries destroyed by black rot in bags which had been applied before the grapes were formed. This proves that under favorable conditions the infection of black rot may enter the grape very early in the season, and it explains why we were so unsuccessful with preventives used in 1887, which

were not applied until June 13th, when the fruit was already infected.

The disinfection of the vine in early spring by a bath of a strong solution of sulphate of iron or copper sulphate, cannot be too thorough. The spores of mildew and rot hibernate in the dry leaves and petioles of the vine, and in the rotted grapes on the ground beneath it. They are also lodged in the bark of the young wood of the vine, whence they emerge in their season to infect the leaves and fruit.

Now it is proved that these spores do not germinate after being treated with these sulphate solutions, and the director of one of our experiment stations writes me that he is most completely successful in preventing rot where he washed the vines in March with a saturated solution of copperas. He made this application with a sponge. I have already tried this, this year, and can do the work ten times more rapidly and efficiently with the spraying machine. I have received sundry inquiries as to the possibility of being poisoned by the use of grapes which are sprayed with copper sulphate solutions. I believe that there is no danger of this. Chemists fail to find a trace of the salt in analysis of the grape juice, or its lees, and I ate freely of the fruit which last year was preserved by the Bordeaux Mixture.

Under direction of our Department of Agriculture, I shall this year make more extended experiments in the treatment of the fungus maladies of grapes and of other plants.

The report in detail of experiments made in 1888 will soon be published. It may be obtained on application to the Department of Agriculture.

I have neglected to mention that sulphate of copper does not dissolve readily, even in hot water, unless its crystals be pulverized, and this is not easily done without the proper tools. Many who may wish to use these chemical mixtures may not have at hand the conveniences with which to prepare them. To provide for this contingency the Department of Agriculture has arranged with manufacturing chemists that the preparations recommended as fungicides may be made ready for solution and supplied in quantities to suit individual needs.

Messrs. H. K. Mulford & Company, chemists, No. 1800 Market street, Philadelphia, have agreed to furnish Bordeaux Mix-

ture and other formulæ which may be found useful as preventives or cures of fungus diseases of plants.

Mulford & Company state that they will supply the Bordeaux Mixture in powder, ready to be dissolved as directed, in packages of ten pounds, price \$1.00 ; twenty-five pounds, price \$2.25 ; and in casks of one hundred pounds, price \$8.50. This is cheaper than the average farmer can prepare these chemicals for himself.

I shall rely upon Messrs. Mulford & Company to furnish me with the chemicals to be used in the experiments planned by the Department of Agriculture for next summer.

Ten pounds of the powder for the Bordeaux Mixture will be sufficient for from twenty to twenty-five gallons of liquid. It is not essential that the quantity of liquid should be strictly limited to twenty-two gallons as prescribed.

It is chiefly essential that there be enough of lime present to decompose the copper sulphate and neutralize its acid.

I would also counsel those who purpose trying preventives of fungus diseases of plants to stick to the Bordeaux Mixture for the present. I have found it pre-eminently the best. It accomplishes its purpose, and does not damage the plant.

I find that some of the solutions of copper sulphate suggested for experiment are destructive to the tender vegetation of the grape. I have also found that certain species are more liable to damage by this chemical than are others. What is endured with impunity by the *Labrusca* is ruinous to the *Estivalis*. What will not harm the pea vine is destructive to the bean. And so of various other plants.

Hence, the average farmer or gardener will be wise to run no risks with his crops, and use only those preparations of chemicals which have been already tested. Leave experiments to the official testers who are employed by the government to find out facts which may subsequently be utilized by the public.

Efficiency and satisfaction in the use of any of these anti-fungus mixtures, and especially of the Bordeaux Mixture, will depend greatly upon the efficiency of the spraying apparatus with which the liquid is applied.

The Eureka Sprayer, which I am now using, is a machine invented and patented by Mr. Adam Weaber, of Vineland, New Jersey. It consists of a portable tank, holding about six gallons of liquid.

Inside of this tank is a pump, entirely of brass, which works within an air chamber, causing an elastic pressure which gives a continuous jet from the nozzle. This nozzle is known as the "cyclone nozzle," and is the only one I have tried which will deliver, without clogging, liquids in which particles of lime are held suspended, such as in the Bordeaux Mixture.

For his invention of the Eureka Sprayer, Mr. Weaber merits the special thanks of American Horticulturists.

I have stated that the "cyclone nozzle" of this spraying machine is not liable to clog with the Bordeaux Mixture. I have thus used it for two years, and it has not clogged. My experience, however, is contradicted by that of a prominent horticulturist of our State. At the meeting of our State Society, he said that he had tried the Eureka Sprayer, and "it would not work," because it clogged. After a few days' trial of it he had to send it back to the maker for repairs. Apparently he had poured into the machine a lime mixture nearly as thick as mortar, and in attempting to spray this he found very naturally that the sprayer would not work because it could not. It will spray thin milk of lime, but it will not spray mud. I will explain to those intending to use the Bordeaux Mixture that when the powders are put in a solution they deposit much sediment, much of which must be separated from the liquid as used in the pump. I make the mixture in 50-gallon casks; stir the liquid well, when it resembles the milk of lime; then let it stand for two or three minutes to allow the coarser particles of the lime to precipitate; then draw off the liquid from the cask into a tub; then fill the solution into the machine, permitting nothing to go into the tank which will not pass through the strainer at its top. When this strainer becomes clogged rinse out the sediment in a bucket of water.

With these precautions the Eureka Sprayer will do any spraying required of it more efficiently than any other apparatus I have tried.

The quantity of the Bordeaux Mixture expended in spraying five hundred vines will average twenty-five gallons at each treatment. It will need less of the liquid early in the season, and more later as growth develops. The cost of twenty-five gallons of the mixture will be one dollar. Estimating six treatments as

sufficient, the cost per five hundred vines will be six dollars plus the labor of spraying.

Only a beginning is as yet made in the study of germ diseases of plants, and of animals, and in discovery of means of prevention or of cure. In the department of vegetable pathology the field of work has been scarcely entered. There is hardly a plant which is not the prey of some destructive parasite, and it is the function of science to learn the nature of these, and to devise methods of mitigation, of prevention, or of cure. For this our stations for experiments are instituted, to seek the knowledge which the average farmer is unable to obtain through his own efforts, and to make such knowledge public.

The experiments of the past two years have merely thrown a little light upon the paths of investigation to be followed in the future. The work of the coming season will be to test the comparative efficiency as fungicides of sundry chemicals, with the aim of finding something which may be preferable to what is already prescribed, and to verify observations which have been made regarding the treatment of fungus diseases of other plants besides the grape.

Casual experiments made last year in the treatment of potato blight, tomato blight, melon blight etc., give me reason to hope that I shall soon be able to state decisively that we may control these plant pests as completely as we now can control grape leaf mildew and grape rot.

Since writing this letter I have had reason to refer more emphatically to recommendation which I have made for thorough disinfection of the vineyard. We know that the spores, or seed, of mildew and rot pass the winter in the rotted grapes, in the dry leaves and stems, and in the bark of the vine. We know also that these fungus germs are very numerous. I do not exaggerate in stating my belief that in my vineyard alone there are enough germs of mildew and grape rot to infect every grape which will grow next year in all the vineyards of the earth. Possibly there might be even a few more left to go round on some of our neighboring planets.

Realizing this it occurred to me that if one might destroy in their winter resting places a great number of these fungus germs

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it would aid the preventives to be employed the following summer. There would be just so many less of the enemy to fight.

Last November I made an experiment which, in the results so far developed, is encouraging. I cleaned a lot of grape vines, sprayed them with Bordeaux Mixture, and broadcasted them and the soil liberally with dry hydrate of lime. Microscopic examination made a few weeks ago of the fungus spores thus chemically treated, discovers that a large proportion of them are dead, while where not thus treated the spores retain their normal vitality. Careful inspection of the results of this experiment will be made every two weeks until in May. Its practical results will be only fully seen at the vintage.

A. W. PEARSON.

In answer to questions, Col. Pearson said that the winter spore is different from the summer spore. The winter spore produces the growth from which come the summer spores. During the month of September the atmosphere is filled with them. It is estimated that as high as 5,120,000,000 spores come from a single rotten grape. For agricultural purposes oyster shell lime is the best.

The tomato blight is expected to increase.

The mixture is good for tomatoes, potatoes, watermelon vines, etc., as well as grapes.

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U. S. DEPARTMENT OF AGRICULTURE.

BOTANICAL DIVISION.

SECTION OF VEGETABLE PATHOLOGY—CIRCULAR NO. 6.

TREATMENT OF BLACK ROT OF THE GRAPE.

With the view of answering the queries of many correspondents, the following circular on the treatment of black-rot of the grape has been prepared.

NORMAN J. COLMAN,  
Commissioner of Agriculture.

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SIR:—I have the honor to submit herewith a circular on the treatment of black-rot of the grape, prepared in accordance with your instructions.

B. T. GALLOWAY,  
Chief of the Section of Vegetable Pathology.  
HON. N. J. COLMAN,  
Commissioner of Agriculture.

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REMEDIES.

The experiments made in 1888 have demonstrated beyond question that the copper compounds, especially the Bordeaux Mixture, can be relied on to prevent black-rot. Where the remedies were properly applied from 60 to 70 per cent. of the crop was saved.

In view of these facts the preparations which furnished the best results in 1888 are here given, with the urgent request that one or more of them be thoroughly tested during the coming season.

(1) SIMPLE SOLUTION OF SULPHATE OF COPPER.

Dissolve 1 pound of pure sulphate of copper in 25 gallons of water. While this preparation has, in a number of cases, been used with beneficial results, its employment, especially when the foliage is young and tender, can not be advised. For spraying the vines in spring, however, before the leaves appear, it will doubtless prove as efficacious as any of the following mixtures, and is more easily prepared and applied.

(2) BORDEAUX MIXTURE.

(a) Dissolve 16 pounds of sulphate of copper in 22 gallons of water; in another vessel slake 30 pounds of lime in 6 gallons of water. When the latter mixture has cooled, pour it slowly into the copper solution, taking care to mix the fluids thoroughly by constant stirring.

(b) Dissolve 6 pounds of sulphate of copper in 16 gallons of



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water, and slake 4 pounds of fresh lime in 6 gallons of water. When cool, mix the solutions as described above.

This formula requires *fresh* lime. Air-slaked lime, or a paste made by allowing freshly slaked lime to settle, contains a large percentage of water; consequently, if they should be combined in the proportions indicated, there would not be sufficient lime to decompose the copper. Experience has shown that while 4 or even 3 pounds of fresh lime is sufficient to decompose 6 pounds of copper sulphate, it requires double that quantity of air-slaked lime, and three times the amount of paste,

The manner of preparing the Bordeaux Mixture may be modified in various ways. Colonel Pearson pulverizes the sulphate of copper, and then dissolves it in from 2 to 4 gallons of hot water. The lime is then slaked in the same way that masons slake it for mortar. This is strained into a box, left to settle and thicken, and then combined with the copper, adding water to the required amount.

### (3) SOLUTION OF AMMONIACAL CARBONATE OF COPPER.

Into a vessel having a capacity of about 1 gallon, pour 1 quart of ammonia (strength 22 degrees Baume), add 3 ounces of carbonate of copper, stir rapidly for a moment, and the carbonate of copper will dissolve in the ammonia, forming a very clear liquid. For use, dilute the 22 gallons. So far as we know, this preparation has not been used in this country as a remedy against black-rot. As a preventive of mildew, however, it has given satisfaction. It is easily prepared and applied, and adheres firmly to the foliage.

### (4) EAU CELESTE.

(a) Dissolve 1 pound of sulphate of copper in 2 gallons of hot water; when completely dissolved, and the water has cooled, add  $1\frac{1}{2}$  pints of commercial ammonia (strength 22 degrees Baume); when ready to use dilute to 22 gallons.

(b) Dissolve 2 pounds of sulphate of copper in 2 gallons of hot water; in another vessel dissolve  $2\frac{1}{2}$  pounds of carbonate of soda; mix the two solutions, and when all chemical reaction has ceased add  $1\frac{1}{2}$  pints of ammonia, then dilute to 22 gallons.



## TREATMENT.

To indicate a definite line of treatment that will be applicable to all regions is somewhat difficult. As a first step, however, every precaution should be taken to remove as much of the infectious material as possible. With this object in view the old leaves and rotten berries should be carefully collected in the fall or winter and burned or buried. The trimmings should also be burned as they often harbor thousands of the minute spores or reproductive bodies of the fungus.

In spring, after the vineyard has been pruned and put in order by the plow, but before vegetation starts, spray the vines thoroughly with the Bordeaux Mixture, formula *a*, or with the simple solution of sulphate of copper. The object of this spraying is to destroy any spores of the fungus that may be hidden away in the crevices of the bark. About ten days before the flowers open, spray all the green parts of the vine with the Bordeaux Mixture, formula *b*, taking care to wet the foliage thoroughly. Spray again with the same preparation when the flowers are opening, repeating the operation every three weeks until the fruit begins to color. The necessity for beginning the treatment early can not be too strongly urged ; *it is absolutely necessary to insure success.*

For applying the remedies, spraying pumps with specially constructed nozzles are necessary. The Eureka sprayer, fitted with the improved Vermorel nozzle, answers the purpose admirably. With this machine, which is carried on the back, knapsack fashion, a man can spray from five to six acres of vines per day, and the cost of treating an acre in an average season, using the Bordeaux Mixture as indicated above, need not exceed \$12. The price of this machine, including all the fittings, is \$20.60. Good pumps, suitable for vineyard use, are also manufactured by the Nixon Nozzle and Machine Company, of Dayton, Ohio. In all cases where the Bordeaux Mixture is employed it will be best to use the improved Vermorel nozzles, for the reason that they are specially constructed to prevent clogging. These nozzles may be attached to any force-pump having the proper apparatus to make the connection. They are manufactured and sold by Thomas Somerville & Son, of Washington, D. C., the retail price being \$1.50 each, or \$15 per dozen.

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PROCEEDINGS OF THE NINETEENTH ANNUAL MEETING

OF THE

**American Cranberry Growers' Association,**

HELD IN THE BOARD OF TRADE ROOMS,

TRENTON, N. J., JANUARY, 15th, 1889.

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## CRANBERRY GROWERS' ASSOCIATION.

The Nineteenth Annual Meeting of the American Cranberry Growers' Association was held in the Board of Trade Rooms, Trenton, N. J., January 15th, 1889. The President, Dr. J. H. Brakeley, on taking the chair, said :

GENTLEMEN :—I have written no address to-day. I have no doubt there are a great many facts in connection with the crop of last year, its gathering, marketing and other matters, that would be of the highest interest if they were properly presented to us, but I regret to say that I have not been able to get such a grasp on them as to prepare an address. There is one item, however, I will mention, that of the circulation of the recipes for the cooking of cranberries, with the statement concerning the class of berries which make the better sauce. This has been done to a very considerable extent, and I am satisfied that it is telling largely in favor of lighter colored berries. Having used up the quantity of recipes printed by the Association, and not being satisfied to send my berries without some of these with them, I had twenty-five thousand printed for myself. I think it would be wise to circulate these with all the berries we send out, and I know we will derive benefit from it, as we are already doing.

The minutes of the last meeting were approved as printed.

The statistician then read the following :

### STATISTICAL REPORT.

MR. PRESIDENT :—I regret that this, my last statistical report, must be, in one important particular, less authentic than heretofore. The Old Colony system of railroads moves the crop of Plymouth and Barnstable counties, (Carver and Cape Cod) Mass.,

and of some less important sections. A number of years ago we secured permission of the Boston office to compensate one of their clerks for sending daily reports of the entire cranberry movement by that system.

During the last two years these reports have been prompt and apparently very full and accurate, and the stipend paid seemed quite satisfactory.

At the commencement of the present season I wrote as usual to the same clerk for the reports, but got no reply to my first or second letter.

I then wrote twice to the General Freight Agent, with like result. Then I tried the Superintendent, and finally got the statement that Mr. Poor, who had done that work, had been put in a different position; that they were making up their annual amounts, and required the entire service of all their clerks.

To my inquiries as to getting the reports when the extra work referred to was over, I got only evasive replies. I then respectfully inquired if other reasons than those assigned, stood in the way of a continuance of the reports, but got *no* reply. I report to you this matter so fully because I think some adverse influence must have induced the company to shut off these reports. The largest movement by this system is to New York, and this I have been able to get through the Mercantile Exchange, and find it is 15 per cent. smaller than that for the corresponding time last year. I fill up the tables by assuming the same ratio of shortage to other points of destination.

This season, as last, I have no official report of shipments West by Pennsylvania Railroad via Trenton, but from information sent to me by the President and Vice President, supplemented by my own knowledge and some verifications by station agents, I think this important item is substantially correct.

(Tables showing movement by months of cranberries from commencement of crop season to January 1, 1889, from New Jersey to Philadelphia; from New Jersey to New York; from New Jersey to the most direct; from New England to different points, also from Wisconsin to different points, are given full in the Association's published report.)

These summarized show the following results as contrasted with crop of 1887:

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## TOTAL SHIPMENT FROM NEW JERSEY.

DESTINATION.	1888.			1887.		
	Reported.	Additional (estimated).	Total.	Reported.	Additional (estimated).	Total.
Philadelphia.....	64,121	5,000	69,121	52,953	5,000	57,953
New York.....	35,235	3,000	38,235	30,303	3,000	33,303
West, direct.....	69,542	.....	69,542	28,029	.....	28,029
Home market.....	.....	6,000	6,000	.....	6,000	6,000
Totals.....	168,898	14,000	182,898	111,285	14,000	119,285

## TOTAL SHIPMENT FROM NEW ENGLAND.

DESTINATION.	1888.			1887.		
	Reported	Additional (estimated).	Total.	Reported.	Additional (estimated.)	Total.
New York.....	123,769	5,000	128,769	152,515	5,000	157,515
Boston.....	44,093	10,000	54,093	48,865	10,000	58,865
Philadelphia.....	30,627	5,000	35,627	37,187	5,000	42,187
Home markets.....	.....	5,000	5,000	.....	5,000	5,000
West, direct.....	32,540	.....	32,540	38,277	.....	38,277
Totals.....	231,029	25,000	256,029	276,844	25,000	301,844

The reported movement from Wisconsin to Chicago amounts to 75,344 bushels. Assuming as heretofore that one-fourth goes elsewhere, the entire crop of that State, assuming that all has

been moved, would be 100,459 bushels, against 140,672 the previous year.

The New England crop was in the interior sections almost destroyed by frosts and greatly reduced in Carver and Cape Cod. The publication of the August report was so much delayed that I was able to note therein the first serious frosts, but further and perhaps greater damage occurred afterwards.

Frost and fire also considerably reduced the Wisconsin crop.

#### THE COURSE OF TRADE.

The New York market for Cape Cod cranberries opened in the first week of September at \$8.00 @ \$8.50 per barrel. A week later prices were more than \$1 per barrel less, and so continued until the first week in October, when, with increased demand and reports of great damage from frosts, an advance of fully \$1 per barrel occurred. The following week a further advance of fifty cents per barrel occurred on the best Cape Cod, bringing the quotations up to the opening prices of \$8.00 @ \$8.50 per barrel. Sound New Jersey berries were at this date (October 13), quoted at \$1.75 @ \$2.00. This was the highest point on Cape Cods, and at the end of the month the highest quotation was \$8, while Jersey crates were \$2.00 @ \$2.25.

On the 3d of November the market was reported very dull, with quotations of best fancy Cape Cods at \$7.75 @ \$8.00, and running down the scale to \$3.50 @ \$4.00, with best Jersey crates at \$2. The next week Cape Cods were quoted \$7.25 @ \$7.50 down to \$2 00 @ \$2.50 for inferior and frosted, Jersey remaining at \$2 per crate. From this time until December 1st there was some improvement in the very finest Cape berries, and the outside quotation reached \$8.50 again, while all other sorts, including Jersey crates, were unchanged. No material changes occurred in December. The quotations of Jersey crates were advanced to \$2.00 @ \$2.25, with accumulated stock, and in the latter half of the month an exceedingly dull market. When a customer appeared and the quality suited, the price did not seem to stand in the way.

But so few could be sold that quotations seemed quite nominal, and without significance as to obtainable prices on any considerable quantities. There seems to be at least two palpable

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reasons for this unpleasant state of trade, viz. : the poor quality of the New England crop, which, scattered through the country, has hindered consumption and entailed loss upon dealers, and the great abundance and cheapness of apples and canned goods. The unmoved stock of sound fruit is, as usual at this time of year, mostly in New Jersey ; and if no more than the amount moved is short of the August estimate, we might reasonably expect a revival and some improvement in prices ere long.

The report was accepted with thanks of the association.

FOREIGN TRADE.

Under this topic the Secretary said :

There is another field of usefulness to which, I think, the Association may direct its attention with advantage and profit to all concerned. For many years we have been giving such careful attention to the cultivation of cranberries and the overcoming of obstacles that presented themselves, that we may soon—perhaps too soon—find ourselves confronted with the fact that we have more fruit than market. Some three years since we had a foretaste of such a condition, and the same is liable to be repeated whenever a full crop is had in the East and West. It is true that our markets are continually expanding, and new fields being opened up at home ; but this expansion is not equal to our increased acreage.

I believe it is practicable and possible to educate the people of Europe to so appreciate this delicious and healthful fruit as to create a demand which shall tax our utmost capacity for production. But it cannot be done without cost, or by a few persons ; it can only be accomplished by a united effort and a liberal expenditure. But it will pay big returns to cranberry growers.

The efforts of the Fruit Growers' Trade Company and others have been productive of some good ; but on the whole, I think we have aimed too high, and our shots have passed over the heads of the masses, or middle class of people, who are the consumers of such luxuries.

My plan would be to secure liberal contributions of fruit from growers, and send a live man into the field ; have him secure a



place in each of the large markets of London and Liverpool, and cook the fruit before the people's eyes as they are passing, and feed it to them hot, as Hecker does his buckwheat. They cannot help but see it, they cannot help but like it. Give them a small package to take home with them, with instructions for cooking, which they have already seen done.

Mr. Collings said : In speaking of trying to make an outlet for cranberries, might it not be well to get some agents, say in Paris, Liverpool and London, to try and sell the berries, and the growers agree each one to give each year a certain amount to be sold on commission, and open up an outlet in that way? I think something of that character would help very much. If each grower would send half a dozen, a dozen, or more, boxes, have an agent in Paris, one or two in Liverpool, and one or two in London, we might after a while create a demand.

Mr. Rider : I agree with Mr. Collings in part, but it seems to me we ought to have some arrangement in progress to meet an emergency which is likely to arrive any year. It would be impracticable and not fair that a few growers, and small growers at that, should open up a market which would be of as much or more benefit to others than themselves. It would be very well to communicate with some of the large growers. Interview such men as Joseph Hinchman, J. J. White, Hon. E. P. Empson, and others, of New Jersey ; A. D. Makepeace, Emulous Small and others, of Cape Cod, and the large growers of the West, and ascertain from them what they will contribute, or what they will do for furthering the introduction of cranberries abroad by furnishing fruit for distribution there. The quantity that can be sold on commission in London and Liverpool is very limited, and that is already being supplied. If my plans were effective, an increased quantity could be sold, and I believe sufficient to pay the expenses of the agent. We want some one there to teach them how to cook cranberries—give them an object lesson "in cooking and eating," and they will not only like them, but will not get along without them after. If a personal letter was addressed to every pie baker in London, calling his attention to the fruit, inviting him to call and see it cooked and taste it, and telling him if he will use it he will be furnished with a barrel of berries free of cost, it would help to start the ball rolling.

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These methods and others that might be inaugurated on the spot, it seems to me, would set the people literally "wild for cranberries."

Mr. Wills asked Mr. French to explain what was done in this direction by the Fruit Growers' Trade Company.

Mr. French: It must be thirteen years since a great effort was made to open foreign markets, and with a definite, business-like organization. Prior to this organization we had sent a man, an enthusiastic Irishman, one of the best talkers I ever heard, P. T. Quinn, Esq., of Newark, on a set mission to England, to open a market for cranberries. He went there and made the acquaintance of conspicuous editors and dealers and made a splendid blow, and was satisfied from the impression he created there and the high encomiums that were passed upon him in the press, that the road was open then to a large trade; and when he came back and made his report we made haste and organized a Fruit Growers' Trade Company, and obtained a charter for it. We went to work (I may speak feelingly, for I had an everlasting amount of work to do) putting up fruit of the best kind, and sent it over; and with it we sent two men who could properly attend to it. It was several years before we got it all closed out. But in addition to this, we commenced immediately to export cranberries, and have persisted in it ever since. I have made it a rule to commence with the first cranberries picked and follow it up from week to week until we can make nothing on them. Some years we have made respectable profits; some years a respectable loss. I think we have done a little more this year than usual. I am sorry I have not the figures to present, but my impression is we have sent something like fifteen hundred crates this year, and other parties have swelled it to nearly two thousand. I believe the only export now is from New York. They have had such ill-luck in Boston, sending berries over there, they have subsided altogether. We get dribblets of orders from Germany, but they do not amount to anything. A few years ago I happened to get hold of a Hamburg fruit dealer; people told me he was in an excellent position to sell cranberries. We made up a little consignment (my impression is that it was forty-five or fifty crates,) and I wrote him a letter explaining the whole thing to him, telling him there was

nothing grown like American cranberries. After due time he wrote back to say that he had given attention to it, not only in his own market but he had examined English markets, and considering them better, transferred the consignment from his house to a Liverpool merchant. He said, we have an abundance of fresh cranberries here. They are grown in Sweden, some in Germany, and some in Italy. We tried Paris without success. We got an order once, I think, for ten cases of sauce from Saxony.

Now that I am on this subject, I think the right thing has been struck, and the only one for a rapid increase in foreign consumption. I think that at present the fruit we send over there is almost wholly consumed by Americans; that Englishmen have never yet learned to appreciate cranberry sauce. They have a fruit there that we do not appreciate very much, but they eat it in enormous quantities. Black currants are a great dish with the English people. If it is possible to educate the Englishmen to like cranberries as we do, it will be no trouble at all to sell them.

Mr. Collings: Some years ago I sent, early in the season thirty crates to Manchester; it took all winter to sell them. Some three years ago, in March, I was in Liverpool, and went around among the merchants and saw some of Mr. French's conserves there. A gentleman said they were selling a few of them—getting about two and a half for them—and they were doing pretty well, considering the price we were getting at home.

Mr. Wills: We send our berries to two or three of the larger Western cities; do they reach out over the great West and Southwest, or are they sold particularly in the immediate neighborhood of those cities? For instance, we send a quantity of berries to Philadelphia; they reach the towns adjacent to Philadelphia, but do they extend to Baltimore, Richmond, Charleston and other Southern towns? Is there not a large field here to be supplied, as well as in England? Perhaps this has been done, but I am not informed upon the matter.

Mr. Rider: I can speak for Trenton, and what is our experience here is true of many other places. We have our wholesale grocers, who go out into every part of New Jersey and eastern Pennsylvania. They have men on the road all the time, and one of the commodities they take samples of and orders for is cranberries, so that every country store is reached.

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Mr. Abbott: Did our secretary ever know of a direct shipment from New Jersey to St. Louis, or farther South?

Dr. Brakeley: The South does not seem to have the same taste for cranberries that we do here. So far as Baltimore is concerned, they have a pretty good trade. I tried Richmond, Norfolk and Charleston; I opened a correspondence in these three places, and sent some berries to Norfolk. I got acquainted with dealers there, and they sold them, but at very moderate prices. They go to grocers who send orders to Baltimore or New York. I happened in a market in Florida some ten or twelve years since and heard a woman ask, "When are you going to have those cranberries?" The answer was, "They are so high that we cannot get them." I remember pricing them that year, and they were forty cents per quart. They do not seem to take to cranberries there as we do here in the North and West.

Mr. Rider: I have been told that for the last year or two there has been a very large market in the Northwest, especially during the latter part of the season, way up to June, and that the market was increasing. I know that dealers have consignees in Denver, St. Louis, &c., and from there they are distributed to smaller towns.

Mr. Holman: When I was in California, several years ago, they had lots of berries there; they were almost the first thing I saw. A short time ago I saw a man from Charleston, and he said: "Why, we are growing finer berries down in Charleston than you do here."

Mr. Collings: Of late years they are shipping carloads to Denver and St. Louis, where they used to take but small lots. I sent one car to San Francisco this year. The West is using more berries than we do East. I asked a Western gentleman why they ate more cranberries than we, and he said there was a lime or an alkali in the water that the acid of the cranberries counteracted.

Mr. Rider: I believe we have an increasing demand in this country for cranberries, but it does not increase fast enough for the production. I observe here that when persons have something that people do not know how to cook they send cooks into the market places where people are constantly passing. They reach here the heads of households, or the butlers, who

look after the culinary matters. They see the fruit prepared, its appearance is highly favorable, they taste, and are pleased with it. They carry this impression home, with a sample of the fruit, and if they do not strike it right the first time will try it again, for they have tasted and know what it should be, and the result will be a victory for the American cranberry.

Mr. Abbott: I agree with the remarks of the Secretary. I think it would create a demand for the berries, and I think it could be done successfully—if not in one year, then take a longer time.

A motion was made that a committee be appointed who should interview all the large growers, either by letter or personally, and learn from them what they would be willing to do in an effort to open up a foreign market for cranberries; committee to report at the next meeting of the Association.

This motion was carried.

(The Secretary will be glad to hear from growers on this subject, and will turn any correspondence over into the hands of the committee.)

The President appointed as members of this committee, Mr. E. Z. Collings, Mr. M. M. Chew and Mr. E. O. Evans. Mr. C. W. Wilkinson and the Secretary were afterwards added to the committee.

The Treasurer then read his annual report:

Balance of cash on hand from last report.....	\$10 84
Receipts for membership fees.....	274 00
Receipts for advertising in report.....	10 00

Total.....	\$294 84
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And to amount of disbursements, for printing reports,

and postage, gathering statistics, &c.....	\$301 05
Leaving a balance due the Treasurer of.....	\$6 21

There was an unpaid bill of French & Co. of \$48.20, and assets to meet it in the shape of uncollected advertising accounts and dues paid for 1889.

The report was accepted, and Messrs. Abbott and Wills were appointed a committee to audit the accounts. The committee subsequently reported that they had examined the accounts and vouchers and found them correct.

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On motion, the President appointed the following committee to nominate officers for the ensuing year: Messrs. Holman, Chew and Collings.

They reported the following:

*President*—Dr. J. H. Brakeley, Bordentown, N. J.

*First Vice President*—Hon. Theo. Budd, Pemberton, N. J.

*Second Vice President*—C. L. Holman, Lakewood, N. J.

*Secretary and Treasurer*—A. J. Rider, Trenton, N. J.

*Statistician*—

*Representatives in N. J. State Board of Agriculture*—Dr. J. H. Brakeley, Bordentown, N. J.; A. J. Rider, Trenton, N. J.

*Executive Committee*—J. H. Brakeley, A. J. Rider, Theo. Budd.

*Corresponding Secretaries for New Jersey*—M. M. Chew, Williamstown, N. J.; Chas. L. Holman, Lakewood, N. J.; D. C. Leech, Vineland, N. J.; Alfred Satterthwaite, Crosswicks, N. J.; William Quicksall, Hornerstown, N. J.

*Corresponding Secretaries for Massachusetts*—Isaac Alger, Attleboro, Mass.; O. M. Holmes, Box 5223, Boston, Mass.

*Corresponding Secretary for Connecticut*—D. C. Spencer, Old Saybrook, Conn.

*Corresponding Secretary for Rhode Island*—A. C. Sampson, 15 Weybosset street, Providence, R. I.

*Corresponding Secretary for Long Island*—Wm. Jagger, Jericho, L. I.

*Corresponding Secretary for Michigan*—S. H. Comings, St. Joe, Michigan.

*Corresponding Secretary for Wisconsin*—L. G. Kniffin, Milwaukee, Wisconsin.

Mr. French positively declined to serve as Statistician.

The report was accepted, leaving the office of Statistician vacant until the Association choose to fill it.

On motion, the Secretary was instructed to cast the ballot, and those named were declared elected.

On motion, the Secretary was instructed to notify the several Corresponding Secretaries that reports would be expected from them concerning crop prospects, etc., before the next meeting.

The Secretary called attention to a communication from the U. S. Department of Agriculture, concerning an exhibit for the Paris Exposition. Any person having photographs or litho-

graphic pictures of cranberry plantations, at the period of harvesting, or any other time, are requested to forward them to the Secretary, who will duly acknowledge and forward them.

A. J. RIDER, Secretary,  
Trenton, N. J.

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EXTRACTS FROM THE REPORT  
OF THE  
DAIRY COMMISSIONER  
OF THE STATE OF NEW JERSEY, 1888.

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# EXTRACTS FROM THE REPORT OF THE DAIRY COMMISSIONER.

Adhering to the custom followed heretofore, and for purposes of completeness, I have separated the account of work done under the several laws, and have grouped together, under distinct heads, all details relating to special inspection and the results therefrom obtained.

## OLEOMARGARINE.

The law regulating the sale of this substance has been strictly enforced during the year, and, as will be seen by the detailed report given later on, the transactions in imitation butter are now usually carried on honestly and according to the legal provisions. The number of licenses granted by the United States authorities would indicate that the demand for oleomargarine was very limited in this State. This condition would seem to indorse the statement made in a former report, to the effect that as soon as the law was rigidly enforced, and when dealers were compelled to sell the article for what it was, the amount sold in this State would be very small. In 1886 there were 149 licenses granted; during the past year only 28 were issued, and many persons holding these have abandoned the business.

Several important cases, which have been pending for nearly two years, have been decided by the Supreme Court, and all essential particulars of the law are now adjudicated upon. The

recent decisions are printed at the close of the report. It is held that oleomargarine colored by its substantial ingredients does not come under the ban of the law, but it may be sold in this State if the other provisions of the law are observed.

Penalties to the amount of \$1,100 have been paid to the State Treasurer.

#### MILK.

As will be seen by the detailed report given elsewhere, nearly all sections of the State have been visited by the Inspectors, and the milk-supply has been shown to be in excellent condition. The number of cases of adulteration of this article of food noticed this year is less than ever before. The importance of the law to farmers is being appreciated by that class, and many samples have been sent by them for analysis, in order to test the milk yielded by their herds.

The table printed on another page will show the number and results of the analyses made during the year.

Penalties to the amount of \$550 have been imposed under this law and paid to the State Treasurer.

#### FOOD.

The examinations made of various foods prove conclusively the necessity of the present law and its rigid enforcement. Six hundred and twenty-three articles of food were analyzed during the year, and it was ascertained that over 48 per cent. were adulterated. All of these articles were purchased at retail, at the usual places of business in the State, hence the results represent the average food as furnished to our people.

While the adulterants used are rarely harmful to health, they are always fraudulent, and deprive the purchaser of an amount of money equal the amount of adulteration; hence, if the law can but restore to the people an amount equal to that of which they are defrauded by the adulterator, many times the sum appropriated for this work shall be returned to the pockets of our citizens.

Several suits were instituted under the provisions of the Food law, but no penalties were imposed. In some cases proceedings were discontinued when the defendant promised to cease selling

## DAIRY COMMISSIONERS' REPORT.

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debased articles, or to return them to the manufacturer. In many instances the responsible person resided out of the State, and could not be reached by our legal process, but the return of his goods had as salutary an effect as if a fine had been imposed. One violation, on account of which a case was instituted in Burlington county, consisted in the sale of cream of tartar that was adulterated with eighty per cent. of sulphate of lime. The dealer had previously been warned concerning the character of the article, and had been notified to stop its sale ; when this notice was not obeyed the suit was begun. Cases were tried in Hudson county against persons manufacturing adulterated honey, and selling lard mixed with tallow. But I have thought it best to acquaint the trade with the provisions of the law before taking more vigorous proceedings. To that end some two hundred and forty-eight warning notices have been served ; these inform the dealer what the article is and with what it is adulterated. At the same time he is notified that a continuance of its sale will be followed by prosecution.

The trade has also been informed that I will examine any article of food sent to me, so that all shall know whether it is equal to the requirements of the law or not.

## DRUGS.

Four hundred and fifteen articles, under this head, were analyzed ; of these nearly fifty-six per cent. were adulterated. The tables printed on the following pages give in detail the names and composition of all drugs analyzed.

Several special investigations were made during the year, the results of which are reported in detail, and I would call your especial attention to the remarks on canned goods, baking powders and carbonated beverages.

## ANALYSES.

The analyses required by law have been made by the following chemists : Prof. Henry B. Cornwall, of Princeton College ; Mr. Shippen Wallace, Mr. August Drescher and myself. Mr. Joseph F. Geisler, Chemist to the Mercantile Exchange, made the special analyses of spices.

## FOOD.

During the year 623 articles of food were analyzed ; of these, 303 were found to be adulterated, or below the legal standards, and 320 were pure, or equal to the requirements. This shows that 48.64 per cent. were adulterated and 51.36 per cent. pure.

The following table exhibits in detail the names of the articles examined and the results obtained. Besides these articles, fifty-five analyses of baking powders were made, a separate report on which will be given at the close of this statement :

## ARTICLES OF FOOD EXAMINED.

Article.	Total.	Pure, or Standard.	Adulterated, or not Standard.
Butter and Oleomargarine.....	68	24	44
Milk.....	121	78	43
Lard.....	141	80	61
American Canned Goods.....	55	54	1
Imported Canned Goods.....	16	5	11
Ground Coffee.....	24	8	16
Coffee Essence.....	1	0	1
Tea.....	19	19	0
Black Pepper.....	28	6	22
White Pepper.....	4	2	2
Cayenne Pepper.....	3	3	0
Mustard.....	41	1	40
Cinnamon.....	20	7	13
Cloves.....	13	3	10
Allspice.....	8	2	6
Ginger.....	11	8	3
Nutmeg.....	2	2	0
Extracted Honey.....	10	5	5
Maple Syrup.....	9	5	4
Molasses.....	2	2	0
Drips.....	1	0	1
Vinegar.....	12	1	11
Pickles.....	7	5	2
Carbonated Beverages.....	7	0	7
Total.....	623	320	303
Per cent.....		51.36	48.64

All of these articles, with a few exceptions, were bought at retail and at the usual places of business throughout the State,

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hence the results obtained represent faithfully the condition of the food supplied to the consumer in this State. As I shall comment, more or less exhaustively, on each class of articles examined, it seems unnecessary to say anything further in the way of introduction.

## OLEOMARGARINE.

Frequent and systematic inspections have been made as required by the provisions of the act to prevent deception in the sale of oleomargarine. Licenses for the sale of oleomargarine have been granted under the United States statute by the Internal Revenue Collectors, for the year ending with November 1st, 1888, as follows :

Newark.....	2
Jersey City.....	5
Hoboken.....	2
Paterson.....	5
Elizabeth.....	1
Orange.....	1
Bloomfield.....	1
Perth Amboy.....	5
South Amboy.....	1
Woodbridge.....	1
Sayreville.....	1
Camden.....	2
Vineland.....	} 1
Salem.....	
Millville.....	
Total.....	28
Issued in 1887.....	30
Issued in 1886.....	149

The above figures show that there are fewer dealers now in the State than during the past three years. It is also to be noted that those now dealing in imitations of dairy products endeavor to obey the law in every particular, and that attempts at fraud are rarely observed. In Jersey City, one or two stores

have been opened for the exclusive sale of oleomargarine, and the public is thoroughly informed, by the display of signs, that nothing but that article is there sold. This venture, new in this State, but common elsewhere, is watched with considerable interest, with the view of determining how extensive the popular demand for the article really is.

Many samples of substances supposed to be oleomargarine have been sent to me by purchasers for analysis. In every case the article has proved to be bad butter, and it may be stated as an invariable rule that if the suspected material is rancid and has a disagreeable odor, that it is inferior butter, not oleomargarine. The latter article may become granular and have a disagreeable, greasy taste, but it never turns rancid.

The law has proved, during the time it has been in force, of value to the consumer of and dealer in pure butter. The former has been protected from fraudulent compounds, while the latter has been enabled to obtain a reasonable profit on pure dairy products.

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## MILK.

The usual inspection of milk has been carried on in nearly all portions of the State, with the exception of Newark, where the Board of Health has undertaken the duty of protecting the consumer from the evils of adulteration.

Complaints in cases of violation have been made in the following counties: Essex, 3; Hudson, 16; Warren, 3; Morris, 4; Sussex, 4; Camden, 2; Hunterdon, 1. Many of these cases are now pending, while the remainder are closed, either by conviction or otherwise. Penalties to the amount of \$550 have been paid into the State treasury.

Never, since the law regulating the sale of milk was first enacted, has the quality of the supply been so excellent. The rigid enforcement of the act for seven years has had a salutary effect, and cases of adulteration are now rare. It is only in the large cities that adulteration is carried on to any extent.

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## LARD.

In my last report I devoted considerable space to the subject of lard adulteration, pointing out the character of the adulterants used and the methods employed for their detection. This year a large portion of my time has been given to an investigation of lard now supplied by dealers in this State. As was before stated, "leaf lard" is now almost a myth, as that article is only to be found on farms, or when prepared in limited quantities by local butchers. The amount thus prepared in the whole State probably would not weigh one thousand pounds. The article sold to the consumers represents the fat of all portions of the hog, and no attempt is made to select one portion for the preparation of the product. Local packers in Trenton, Newark and other places in our State, prepare a very excellent article free from any adulteration, and they are able to supply the trade in those sections. The larger quantity used in our State comes from the West, and is rarely pure. One may judge of the quality of this article by the testimony of Mr. Fairbanks, a large Western refiner, who stated as follows before the Committee on Agriculture of the House of Representatives. He said: "Now, the great packing-houses of the West do not stop to clean the guts or make sausage-casings of them; they just wash around, not thoroughly, and then throw all into the tank—guts, heads, feet and everything. The lard-tank to-day in a packing-house is a sewer for cleaning out everything in the shape of grease, but there is no such thing as white grease, from packers, on the market. All goes into the lard—all the product that we used to buy as white grease. There is no such thing as No. 1 lard any more. It all goes in, and is all prime steam lard. The quality of it had deteriorated to such an extent that we had to get something to mitigate it—to take away the taste and the smell. The lard we get from the packers we put into a large tank, and open steam is put in and it is all boiled up with steam and washed. It is boiled for an hour or two and then allowed to precipitate, then it is skimmed off. Precipitation takes place, and it is allowed to stand for ten hours. All the ordure is taken out. Out of one hundred tierces of lard we take out a tierce or two of mud. It



was as black as your coat. All the packers' lard is made in that way. It contains all of this filth, necessarily, from throwing into the tank guts and everything, and steaming it altogether."

This statement, couched in very plain English, defines that unsavory and mysterious compound—Western lard.

A mixture now on the market known as "refined lard" is a compound of beef fat, cotton-seed oil and hog fat, the latter in small quantities.

## AMERICAN CANNED GOODS.

Considerable attention was given to the examination of vegetables and meats packed in tin vessels. The frequent statements to the effect that articles thus preserved often contained dangerous quantities of the poisonous metals, and the importance of the canning industry in our State have prompted me to investigate the subject closely.

Previous examinations had been made by the chemists of the State Board of Health, but the records were not available or were imperfect, hence I decided to re-open the question and initiate a new line of analyses.

During the year just closed, 3,319,437 cans of tomatoes alone were packed in the United States, our State of New Jersey contributing its quota of 789,363 cans. When we know that the amount of corn, beans, asparagus, peas and fruits packed during the year is not included in the above figures, we cannot but be impressed with the importance of this industry to the farmers, the packers and the consumers. If there is any danger to health due to the use of these articles it should be disclosed and steps taken to prevent it. But if this class of food is healthful, we should strive to encourage its use and to stimulate this important industry.

It has been my custom for the past few years, to investigate all reports of poisoning supposed to be due to the eating of canned articles. As soon as a newspaper report reached me an investigation was begun, and in no instance did I find a well-authenticated case of poisoning from the use of these articles.

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It is claimed that lead and tin have been found in large quantities in canned vegetables. My investigations have never revealed a single case where lead was in quantities large enough to detect. If that metal is present in these preserved foods, immediate steps should be taken to prevent the sale of articles so contaminated, for it is well known that the constant ingestion of very minute quantities of lead, and some of its salts, is almost invariably followed by symptoms of poisoning. And these symptoms are well marked and known to every physician, hence, if there are cases of lead-poisoning due to this cause, a short time only would elapse before they would be placed on record. Lead is a cumulative poison and is very slowly cast out by the system, but the ingestion of quantities as small as the  $\frac{1}{24}$  or  $\frac{1}{100}$  of a grain for a time, is almost certain to be followed by symptoms of poisoning. I mention these well-known facts for the following reasons: First, if there have been cases of lead-poisoning caused by the use of canned foods contaminated with this metal, the medical profession would have, ere this, published accounts of the cases; second, the contrast between this metal and tin is so marked that the mere mention of the facts will be convincing.

There is no doubt but that tin is frequently found in the articles preserved in vessels made of that metal. Especially so is this the case with acid vegetables like tomatoes, and in the following tables it will be noticed how often it has been revealed by the analyses just concluded. This being the case, the question is naturally asked, Is this metal poisonous, or are the quantities detected of any importance? Tin is commonly considered, next to iron, one of the most innocuous of the baser metals; nearly all of our culinary vessels are made of it, and their use is never followed by any ill results. All the evidence regarding the effect of tin on the system is negative; there are no recorded cases of poisoning, and, in fact, no mention is made in the authoritative works on toxicology of tin as a dangerous metal. The only instances where poisonous properties have been claimed for tin are in the records of cases of adulteration of molasses by a certain salt of that metal. Such cases were tried in the Massachusetts courts, but the evidence was not conclusive. We may then accept the facts in this relation, and state that, so far as scientific records now go, and so far as evidence is recorded, the quantity and quality of tin as found in canned foods are not injurious.

The following statement of Mr. Shippen Wallace, the Chemist of the State Board of Health, who has made all the analyses recorded below, will be of interest. He says :

"The accompanying tables show the names of the various packers whose canned goods were bought in the open market, and examined with especial reference to the detection of the presence of lead or tin, the assertion having been made that the former was quite often present.

"In all the goods examined no lead was found, while tin was detected in traces merely, in all the tomatoes, unless the contents were in a bad condition, and then, of course, in larger quantity. There was but one can in all which was not in prime condition. This, however, may, and undoubtedly does, occur in the goods of all packers to small extent ; but because one can should be of poor quality, is no reason why the remaining ninety-and-nine should be condemned. The fact cannot be too thoroughly impressed on the community, that the present system of canning vegetables is of inestimable value ; but the same rules should be followed which are made use of with fresh vegetables in their use, that is to say : if on opening a can the contents are spoiled, act as one would with fresh vegetables under similar circumstances—throw them away. This done, there is no possible danger in their use ; but if not, the same risk is run as would be in the use of spoiled fresh vegetables, only to a greater extent.

"In the case of canned asparagus, a large amount of tin was found, and the interior of the can was invariably blackened. This comes from the acid of the asparagus, or what, in my opinion, is more likely, from the use of certain ingredients in the process. I am of the opinion that there may be a slight danger from this cause, and that it would be better, and should be so recommended, to use glass in the place of tin, as is done by a few. With the exception of asparagus, there cannot be the slightest danger in the use of any canned goods that I know of, if they are in good condition, and are not allowed to remain in the can after being opened. This last rule should be strictly followed."

Of all cases of sickness caused by eating canned goods, the cause has always been found to have been that the contents were spoiled when opened, or the can had been allowed to remain open for a day or more before the contents were used.

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## IMPORTED CANNED GOODS.

Sixteen cans of imported vegetables were examined, and copper was found in eleven. It is the custom of many foreign packers to add small quantities of sulphate of copper (blue vitriol) to peas and beans, the object being to give a green color to these articles. As the addition of any coloring material is prohibited by law, proceedings should be taken against dealers in these articles. The following table is published with the object of informing the public, so that they may select the brands not containing copper.

## IMPORTED CANNED VEGETABLES.

Number.	Article	Name of Packer.	Quantity of Copper Present.
1945	Peas.....	F. Roudenet, Nantes.....	0.970 gr. in lb.
2002	Peas.....	G. Talbot, Bordeaux.....	None.
1662	Peas.....	Alex. Bernard, Bordeaux.....	0.55 gr. in lb.
B 109	Peas.....	G. Talbot, Bordeaux.....	None.
B 191	Peas.....	F. Roudenet, Nantes.....	Copper.
B 70	Peas.....	Duprat, Clement & Maurel, Bordeaux.....	Copper.
A 58	Peas.....	E. M. Dadelzen, Bordeaux.....	Copper.
A 66	Peas.....	L. A. Price, Bordeaux.....	None.
A 202	Peas.....	Eugene du Raix, Bordeaux.....	Copper.
A 230	Peas.....	J. Fiton Aine, Bordeaux.....	Copper.
A 207	Peas.....	D. M. Ausone, Bordeaux.....	None.
A 251	Beans.....	G. Talbot, Bordeaux.....	Copper.
A 247	Mushrooms.....	J. Fiton Aine, Bordeaux.....	None.
B 232	Peas.....	Eugene du Raix, Bordeaux.....	Copper.
B 244	Peas.....	Guillaumez, Nancy.....	Copper.
A 69	Peas.....	Gabriel Triat & Co., Bordeaux.....	Copper.

## GROUND COFFEE.

Twenty-four samples of ground coffee were examined, eight of which were pure and sixteen were adulterated. The adulterants found were roasted and ground peas, beans, rye, wheat and

chicory. The agent purchasing the samples asked for coffee and paid the usual retail price, hence expected to receive the genuine article.

## GROUND COFFEE

Number.	Where Bought.	Label on Package	Results of Analysis.
1881	Beverly .....	Sold in bulk.....	Adulterated
1845	Hancock's Bridge ..	Sold in bulk.....	Adulterated
1826	Woodstown.....	"Blue Seal," Wm. Scull & Co.....	Adulterated
1815	Millville.....	"Sunrise," Weikel Spice Co.....	Adulterated
1832	Beverly .....	"Partola," Henry Meyer & Co.....	Not adulterated.
B254	Beverly.....	"None Such".....	Adulterated.
1823	Bridgeton .....	"None Such".....	Adulterated.
B158	Vineland .....	Brooks, Brower & Ware.....	Adulterated.
A 37	Elizabeth.....	"National," Davis, Silvers & Co.....	Adulterated
A 8	Newark.....	Sold in bulk.....	Adulterated.
A 12	Newark.....	Sold in bulk.....	Adulterated.
1702	Jersey City.....	Sold in bulk.....	Pure.
1700	Jersey City.....	Sold in bulk.....	Pure.
1742	Somerville .....	Sold in bulk.....	Pure.
1763	Plainfield.....	U. P. T. Co.....	Adulterated.
A 3	Newark.....	G. A. & P. T. Co.....	Adulterated.
1810	Trenton .....	Sold in bulk.....	Pure.
1703	Jersey City .....	"8 o'clock Coffee".....	Adulterated.
A 34	Elizabeth.....	Sold in bulk.....	Adulterated.
A 28	New Brunswick....	Sold in bulk.....	Pure
A 14	Newark.....	Sold in bulk.....	Adulterated.
A 23	New Brunswick....	Sold in bulk.....	Pure.
A 42	Elizabeth.....	Sold in bulk.....	Pure.
A 48	Trenton.....	Union Pacific Tea Co.....	Pulverized.

Besides the above, one sample of "George Hummell's Premium Essence of Coffee" was analyzed. It was composed of burnt molasses, roasted ground corn and no coffee.

## TEA.

Nineteen samples of tea were purchased in different places in the State; these were analyzed, and duplicate portions sent to Messrs. James and John R. Montgomery, of No. 127 Water street, New York, the oldest and most expert tea brokers in the

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trade, for their opinion as to quality and purity. The results obtained show that, while there is no adulteration, there is a large amount of inferior and debased tea sold in the State. The United States law prevents the importation of the adulterated article, but much that comes to this country is of very poor quality, having little of the flavor of the true leaf.

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## GROUND SPICES

The adulteration of ground spices and condiments may now be regarded as one of the fine arts, and much skill is shown in the methods of sophistication, and considerable time is given to the invention of new combinations. If a spice-grinder can take buckwheat hulls, cocoanut shells, properly charred, and a little cayenne for flavoring, mix them thoroughly, affix a gaudy label "pure pepper," and then persuade the consumer that the article is pure and unadulterated pepper, he is certainly entitled to the name of artist, or, at least, necromancer. This is done constantly ; and he is also able to combine corn meal, turmeric and a modicum of cayenne, and by a kind of legerdemain transmute the mixture into "pure ginger." These facts are by no means new, for there is no class of articles used for, or in the preparation of, food that is so commonly and systematically debased ; and this has been the case for centuries. As early as 1316, an ordinance was passed for the government of dealers in pepper and spices in London. Since that time the adulteration of this class of food has very frequently called forth the edicts of law givers.

More work has been done by those studying the subject of food adulteration, and more has been written in this particular line of investigation, than in any other within the domain of chemical and microscopic analysis. Every book, pamphlet and treatise on the subject of food sophistication contains extensive notes regarding spice adulteration and its detection. The last and most valuable contribution, "Bulletin 13, Part 2d, United States Department of Agriculture, Foods and Food Adulteration,"

contains no less than 120 pages on this subject alone. New adulterants are being constantly discovered, and as soon as the analyst has become acquainted with them, he is called on to identify a recent invention and to investigate the uses of an entirely new article. And so the war between the spice-mixer and the analyst goes on, and they follow each other with alternate detection and mystery.

In the next few weeks our microscopists will have to grapple with a new adulterant that they shall find in white pepper, and they will not identify it unless prepared to recognize "grains of Paradise."

Dr. E. H. Bartley, of the Brooklyn Board of Health, who has recently been the rounds of the spice-mills, and who has been initiated into the mysteries of spice-grinding, very kindly sent me a few notes on the subject, which I here transcribe. He says:

"Both of the mills I visited have sale-rooms in New York, while the grinding only is done here. According to their own statement, a very considerable proportion of the chief mixtures made by them are sold to the trade, and are not sold under the firm name, that is, these mixtures are prepared in the mills and sold in bulk to other firms, who put them up in packages and sell to retailers, or ship in bulk to Western cities. It is, therefore, not easy to trace a large part of these adulterated goods after they leave the mills. That they reach the market is certain, because they would not be manufactured for any other purpose. The information here given is based upon what I saw in the mills. Mustard was in process of preparation at only one of the mills. So far as my observations, on two separate occasions, went, the oil was expressed from all the mustard used in the factory. The cake from the press, after removing the oil, is used for the manufacture of table mustard. The hull or chaff from the black seeds was removed and used as an adulterant of black pepper. Besides the pure mustard prepared from the expressed seeds, mixtures are made containing corn meal, ginger, turmeric and red pepper. In some cheap mustard compounds there is but little mustard, and, according to the statement of the workmen, a mixture is sometimes made that contains no mustard at all, the necessary pungency being obtained by the addition of cayenne pepper. Ginger was being prepared of several grades, varying



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from the pure article to those containing none at all. The adulterants used were corn flour, corn meal, pilot biscuit and cayenne pepper. In one of the mills I was shown a very good imitation of ground ginger, but which contained no ginger whatever. I was unable to learn for whom this was made, but was informed that there was a demand for it, and that it was used by the compounders. Cloves were seen in the process of grinding; they were mixed with burnt or charred walnut shells, to the extent of 50 per cent. Cinnamon is cheapened by the addition of ground almond and cocoanut shells. In order to brighten the color of this mixture, a small amount of sienna is added. In some cases the cinnamon bark is ground alone, but in all the above mixtures, which I saw in process of preparation, the cinnamon buds were mixed with the bark before grinding. There were very large quantities of ground cocoanut shells used at this factory. A very small amount of cayenne pepper is used to increase the pungency of these reduced cinnamon mixtures. I was shown several barrels of pepper compound, which was a very good imitation of ground pepper; it, however, contained no trace of pepper. This article was for shipment to New York, to be used for the purpose of 'reducing' ground pepper. Following is a list of articles used at this mill for adulteration: Cocoanut shells, natural and charred; walnut shells, corn meal, buckwheat hulls and middlings, mustard chaff, ground charcoal and cayenne pepper."

Besides the articles above mentioned, grains of Paradise, turmeric, charred bread and biscuit, and ground and charred grains are used.

Knowing all these facts, I was prepared to find a large amount of adulterated spices in our market, and the results of the analyses warranted the investigation.

I at first thought that the publication of all the names on packages, both of pure and impure spices, might be followed by good results, but after consideration of the probable results I have omitted names, for the present, and if inspection during the present year shows no improvement, all the names and labels will be printed in the next report.

The following facts are deduced from the results of the investigations: 1. A few dealers put up nothing but absolutely pure spices, and every package examined bearing these dealers' names



proved to be of excellent quality. 2. Several spice-mills and wholesale dealers put two grades on the market—one pure, the other adulterated. 3. Many houses selling spices sell nothing but adulterated articles. 4. Spices sold in bulk are almost invariably adulterated. 5. The price paid the retailer is no guarantee of the quality. 6. The retail dealer and the consumer are jointly responsible for the adulteration—the former by encouraging the sale of cheap and impure articles, the latter in trying to get spices at a less price than will warrant the sale of pure articles.

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### EXTRACTED HONEY.

Ten samples of extracted honey were examined; five were adulterated with glucose. The plea is made by the mixers that the addition of glucose is necessary to prevent the "candying" of the honey; that this is only a subterfuge, and is no excuse for adulteration, is proved by the fact that the pure extracted honey examined had no deposit or "candy" in the vessels containing it.

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### MAPLE SYRUP.

This is commonly adulterated with water and molasses; glucose is also added as an adulterant.

Besides the samples of honey and maple syrup, there was examined an article marked "White Clover Drips," which the maker did not claim to be either of the above. Analysis showed it to be glucose syrup, flavored with some essence.

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### MOLASSES.

Two samples of molasses from Beverly and Camden were analyzed. No. 1946 was a pure cane syrup, containing 39 per cent. of sugar; the other, No. 1478, was a pure syrup, containing 45 per cent. of sugar. It had been bleached with sulphurous acid.

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## VINEGAR.

A special law regulating the sale of vinegar was adopted by the Legislature, but only Inspectors appointed by the Boards of Freeholders have authority to act under it. It requires at least 4.50 per cent. of acidity. The below-mentioned samples were examined with special reference as to whether they were cider vinegar or not.

Number.	Acidity, per cent.	Cider or other vinegar.
1884.....	3.10.....	Cider.
1419.....	9.75.....	Not cider.
1420.....	7.50.....	Not cider.
1426.....	5.50.....	Not cider.
1430.....	5.00.....	Not cider.
1421.....	6.00.....	Not cider.
A 239.....	3.32.....	Not cider.
N 1.....	4.00.....	Not cider.
N 2.....	4.33.....	Not cider.
N 3.....	2.18.....	Not cider.
N 4.....	5.23.....	Not cider.
N 5.....	3.40.....	Not cider.

## PICKLES.

Seven samples of pickles were examined to determine the presence of copper. Two samples contained that metal.

## PICKLES.

No.	Name on Label.	Acidity of Vin- egar.	Metals Present.	Cider Vinegar.
1998	"The Brownies" ..	3.1 per cent.....	No.....	No.
1999	Westchester Pickle Co.....	2.85 per cent.....	No.....	No.
2009	F. & J. Hemz.....	2.65 per cent.....	No.....	No.
1668	None.....	3.00 per cent.....	No.....	No.
A 205	H. Irwin.....	.....	No.....	No.
A 209	None.....	.....	Copper.....	Yes.
A 245	None.....	.....	Copper.....	Yes.

## LEAD IN CARBONATED BEVERAGES.

My attention was called to a case of lead-poisoning in Paterson, with the request that I endeavor to ascertain the cause. The man thus affected was the keeper of a beer saloon, but was a total abstainer from beer. That enabled us to exclude a common cause of lead-poisoning; that is, beer allowed to stand in lead pipe. It was ascertained that he drank a large quantity of lemon soda water, as usually furnished in bottles with an adjustable stopper. I found that the contents of these bottles were acid, and that they were largely contaminated with lead. This metal came from the stopper, which is made of an india rubber ring held in place by a metal button. Through the latter is inserted a piece of wire, coated with zinc. The metal button is made of an alloy of tin and lead. As these bottles are kept in an inverted position, the metal is constantly bathed in the acid fluid, hence not only is solution of the metal rendered possible, but this is hastened by the galvanic action between the button and the wire. At the time the above investigation was being made, Mr. August Drescher, one of the chemists of this Commission, was conducting a separate and independent series of experiments for the bottling trade in Newark. The results he obtained were identical with mine, and he kindly placed at my disposal the following notes. He states: "'Soft' drinks, such as lemon and vanilla soda water, sarsaparilla, ginger beer, etc., are usually put up in bottles with metal stopples. Lead has been found in these drinks as well as in the stopples, and a number of cases of lead-poisoning are said to be due to the use of these beverages. Since last spring I have examined, qualitatively, twenty-eight samples of soda water put up in these bottles. All but four were found to contain lead. Recently quantitative determinations of the lead in five bottles of soda water have been made at my laboratory, with the following results:

No.	Lead found. Troy grains.
1 .....	1 64
2 .....	1 5
3 .....	1 39
4 .....	1 20
5 .....	1 1

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“ Each bottle contained about half a pint. The stopples of all of these bottles consisted of a loop of coated brass wire, and a tin button containing lead, with a rubber belt. The analysis of some of them showed the presence of lead, copper, zinc and tin.”

In view of these facts, some action should be taken to prevent the use of bottles provided with this style of stopper.

## NOTES ON THE BAKING POWDERS SOLD IN THIS STATE.

Samples of nearly all of the different brands of baking powders for sale in this State were purchased and sent to Henry B. Cornwall, Ph.D., Professor of Analytical Chemistry at the John C. Green School of Science, Princeton College. He was requested to make the necessary analyses to determine the ingredients of the powders, to ascertain the leavening power or strength of each, and to report on the character of the substances used in their composition, with especial reference to the healthfulness or otherwise of the residues left in the bread after baking. It was at first intended to make a special inquiry regarding these residues, and to make tests of the powders by preparing a portion of bread with each. But the expense and time necessary to carry on this elaborate and costly series of experiments have been spared us, as Professor Mallett, of the University of Virginia, has recently completed an investigation in this very line of work, hence it is only necessary to refer to his report for information concerning this branch of the subject. His paper is quoted liberally in Professor Cornwall's report ; it may be read in full in the London *Chemical News* for December 7th and 14th, 1888.

The opinions given in the report of Professor Cornwall are based on some fifty-five analyses of thirty-nine brands of baking powder, as follows :

	Analyses.	Brands.
Cream of tartar and bi-carbonate of soda powders.....	13	8
Phosphate of lime and bi-carbonate of soda powders.....	7	4
Alum, phosphate of lime and bi-carbonate of soda powder.....	26	20
Alum and bi-carbonate of soda powders.....	6	4
Unclassified.....	3	3

His report and the analyses accompanying it, constitute an extremely valuable and impartial contribution to the literature of the subject, besides being of great importance to all who use baking powders. A careful study of his paper is recommended, as one can thereby be the better qualified to form an opinion on the relative healthfulness of the different brands of powders, and be prepared to accept or disprove the biased statements put forth in circulars and advertisements issued by manufacturers. Comparing the deductions given in that report, which are founded on experiment and scientific investigation, with the mere bald statements of advertisers, will show the consumer which is correct.

As was stated, each sample submitted to analysis was purchased at retail in this State, by myself or one of my agents; each package was in its original form, and the seals and wrappers were undisturbed when delivered to Professor Cornwall. The greater number of the inferior grades of baking powders were only to be had at stores patronized by poor people, or those of moderate means, hence we are forced to believe that any fraud in these articles is perpetrated at the expense of those least able to bear it. Many of the brands had no name of manufacturer or maker on the package; these were almost invariably of very poor quality, and containing ingredients of doubtful salubrity.

Another point worthy of note is, that large quantities of inferior baking powder are sold in bulk by manufacturers. This is put up in boxes by the retailer and a fancy label affixed, he knowing nothing about the composition of the substance—its cheapness only concerning him.

As will be seen later on, the formula of a reliable and efficient powder can only be elaborated after experiment, with the assistance of a competent chemist, and the ingredients themselves must be pure, healthful and frequently tested. Rather than trust to baking powders made by unreliable persons sold without the indorsement of responsible manufacturers or composed of un-

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healthful materials, our housewives are recommended to rely on that well-known and accepted leavening agent, yeast, which can never do harm.

During the time the samples were being collected it was ascertained that some of the makers of and dealers in the inferior grades of baking powders joined with their business another undertaking, that of a lottery or gift enterprise, and plates, cups, lamps, pewter casters and other household goods were given away with a certain number of cans, or a can of baking powder was given with a certain quantity of tea or coffee. It was stated in one section of the State, that one enterprising manufacturer offered a wagon with each purchase of a certain number of cans.

The above facts are given for the information of the people, for, as I stated before, the functions of this office are not only to arrest fraud, but to educate the people so that they shall be enabled to select their food, regarding both health and economy; and if by this process of education our citizens are told where and how to avoid fraud in the food-supply, the work of the department shall not be for naught.

From inquiries made in various parts of this State, and from knowledge gained in conversation with those conversant with the habits of all classes of our people, I may say that the use of baking powders is confined to the preparation of biscuits, cake and articles other than bread. The biscuit thus prepared is usually eaten hot, and constitutes a very large portion of the dietary of our working people. In the homes of many of our wage-workers, this biscuit made with baking powder is the usual form of bread used for at least two-thirds of the time, fresh, yeast-leavened bread being the exception. This, of course, does not obtain in the large cities, where bread is easily bought. It may be said, without fear of contradiction, that bread made by means of yeast is by far the most satisfactory and the most healthful of all the preparations of flour. It contains no residue about which there can be any controversy, it contains no added chemical; it retains, with but little change, the nutritive elements of the flour. Hence, while baking powders may answer for occasional use, they cannot be recommended as a complete substitute for yeast,

as their action is different and the product dissimilar from that obtained from fermentation.

The success of many in this business of manufacturing baking powders has led others to try their skill in compounding all kinds of mixtures, and to-day the different brands of powders on sale in the shops are so numerous as hardly to be counted. It is our purpose to inform the public what the ingredients of these powders are, and what the value of the preparation really is. This has been done by Professor Cornwall, and the reader can see at a glance which powder has a high leavening power and which contains hurtful ingredients, and the thorough vesiculation accomplished by the true leaven is not equaled by any rapidly-acting chemical agent.

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NOTE.—For full tables of analyses, under each of the foregoing heads, and for Prof. Cornwall's Report on baking powders sold in this State, see full report of the Dairy Commissioners for 1888.

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REPORT ON  
CONTAGIOUS DISEASES OF ANIMALS  
FOR 1888.

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REPORT  
ON  
CONTAGIOUS DISEASES OF ANIMALS.  
FOR 1888.

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BY E. M. HUNT, M. D.

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At the time of the closing of the report as to the Contagious Diseases of Animals for 1887, the Board, after full consultation with the United States authorities, and with His Excellency, the Governor of the State, and also the Attorney General, had consented to an agreement, by which the more active oversight of contagious pleuro-pneumonia was exercised by the United States authorities and they also made responsible for payment to owners. While this system was based on the intent of slaughtering not only all such animals, but all those exposed to the disease, no authority was given to do the latter without the consent of the owners and agreement as to the price to be paid or consent to the action of appraisers as to it. Our own additional object in the arrangement was the prevention of the importation of the disease from adjacent States. While we believe that the method adopted by this Board under the State law, could, as it had done for eight years, keep the disease in check, it could not eradicate it so long as our authority, or some other authority, did not reach adjacent States. In the conference had with the U. S. authorities several important matters were settled.

The following is the plan of co-operation with the Bureau of Animal Industry :

First. The State Board of Health discontinues the employment of veterinary inspectors so far as pleuro-pneumonia is concerned.

Second. It continues to avail itself of local Boards of Health, to report to it this or any other form of communicable disease among animals, and in the case of pleuro-pneumonia will report these to the Bureau of Animal Industry or its inspectors.

Third. All quarantines are to be made by the State Board of Health.

Fourth. At the end of each month report is to be made of the number of cattle having pleuro-pneumonia that have been slaughtered, and the number, besides, that have been slaughtered in exposed herds. Payment is made by the United States Bureau of Animal Industry.

Fifth. Where information of real or suspected pleuro-pneumonia comes to this Board, any inspector of the Bureau of Animal Industry in this State shall, when notified by letter or telegram, promptly see said herd and report its condition both to this Board and to the Bureau of Animal Industry.

Sixth. The names and post-office address of all persons on duty in this State, and the time of their appointment or transfer or relief shall be reported to this Board.

The United States authorities early made an examination of suspected or known localities of the disease in the State. It was made apparent that the disease was not prevalent to a serious extent, except in Hudson county, which, because of its proximity to New York, had long been known to have the disease. After advisement between the State Board of Health and the United States authorities it was deemed necessary to quarantine the entire county. The consent thereto of the local Boards of Health was sought and all secured, so that quarantine notices could be issued under date of February 1st, 1888.

The member of the Board in special charge of the contagious diseases of animals had frequent consultation and correspondence with various authorities concerned until the plan was fully perfected.

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During February notice reached us of an outbreak of pleuro-pneumonia, near Stewartville, Warren county. This was promptly dealt with and extension prevented. Cases which occurred in Middlesex county were also reached.

But the chief activity of the bureau was in Hudson county. As soon as arranged, the United States authorities proceeded to tag all cattle in the district and to deal with such herds as had pleuro-pneumonia in them.

The Board availed itself of the opportunity this afforded to distribute the combined circular as to the Contagious Diseases of Animals, as also to inform itself of other diseases, such as tuberculosis, which might be found to exist.

In the meantime, some cases of glanders came to our notice, as well as reports of some, that upon examination, proved to be erroneous. It was shown that glandered horses were being brought over from Philadelphia and sold in South Jersey and an effort in both States was made to break up the serious traffic.

During March, April and May the Bureau of Animal Industry was active in the work of tagging cattle in Hudson county and slaughtering such herds as were found diseased.

The monthly reports received by us show the actual work done. There was little of the disease outside of Hudson county, but of this also record is made. The entire list will be published by the Bureau of Animal Industry.

Outbreaks of pleuro-pneumonia were occasionally reported all through the year.

In December some threatening cases occurred in a distillery at Millstone and some of the cattle were transferred to Camden, but were soon reached by the United States authorities. At present, outside of Hudson county, there are but few herds in quarantine.

Several cases of glanders were reported to the Board and promptly and satisfactorily disposed of.

The subject of tuberculosis among milch cows and its relation to human beings, as well as to cattle, has become so important that we abstract from the report of the Board of Health, as follows :

TUBERCULOSIS OR CONSUMPTION IN CATTLE; ITS RELATION TO  
FARMING INTERESTS AND TO HUMAN HEALTH.

There has long been a recognition of the fact that there is a close resemblance between some diseases of mankind and those of the lower animals. For instance, the view was long ago entertained as to smallpox, that it is a disease which, communicated from man to the horse and then to the cow, becomes modified into kine-pock, or that a disease originating in the horse and communicated to the cow becomes cow-pox, or vaccinia. Even more definitely than this it was claimed that some animals could catch some of the diseases of man. It was, however, reserved for a comparatively recent period for us to be able to collect and analyze a sufficient number of facts to prove the communicability, or interchangeability, or identity of certain human and animal diseases, and to see the most important bearing of the facts secured upon the prevention and limitation of disease. Thus says Fleming: "Mankind has the aptitude to receive anthrax, rabies, foot-and-mouth disease, glanders, cow and horse-pox, diphtheria, and in all probability tuberculosis—not to mention the reception of entozoa and epizoa, entophytes and epiphytes, which give rise to morbid conditions, often of a most serious nature, in our own species."

As an illustration, we may best take the tuberculosis of man and animals. Before the able brochure of Dr. Creighton, of Cambridge (1876), there had been accumulating many observations that pointed to a relationship between human and bovine tuberculosis. His careful microscopical, histological and pathological investigations, with facts presented in evidence, seemed to make out a strong case as to the marked similarity and possible identity of the disease as found in man and in the lower animals.

These have been followed by accumulated evidence derived from various sources. (See summary of same in the first annual report of Bureau of Animal Industry, Washington, 1884, pages 350-370.) A great interest was added to these investigations when tuberculosis in man, as also tuberculosis in animals, came to be claimed as, under some circumstances, infectious or trans-

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missible diseases. So high an authority as M. Chauveau, of the Lyons Veterinary School, in recalling the recent researches which have led to considering tuberculosis as an infectious malady, says: "Foreseen by the illustrious Mosgagni, and afterwards suspected by Andral and Laennec, the infectious nature of tuberculosis is now no longer disputable since the work of Villemin, of Koch and others." He then recalled the experiments of the school of Lyons, "the researches of which have placed the identity of human and bovine tuberculosis beyond a doubt. The transmissibility of a similar malady from one species to another is futile in practical consequences." (See minutes of Congress on Tuberculosis, Paris, 1888.)

George Fleming, F. R. C. V. S., Principal Veterinary Surgeon of the British army, in a letter to the *London Lancet*, April 7th, 1888, speaks thus: "The letter of Dr. Creighton, in *The Lancet*, once more draws attention to the most important subject of bovine tuberculosis and its relationship to tuberculosis in mankind and other creatures. \* \* \* Dr. Creighton is right, so far as I know, in ascribing to Klencke the first published notice of the communicability of the malady to mankind by means of the milk of 'scrofulous' cows."

"But the evidence rested only on clinical observation, and though the cases he adduces appear to warrant the conclusion he arrives at, and though, also, in recent years, similar observations have been made public, yet they are not absolutely convincing that the human species can be, or has been, so infected. But clinical observation and most careful experiments on animals have gone far to demonstrate that infection of mankind by the flesh and milk of tuberculous animals is possible—nay, very probable. And in this demonstration members of the veterinary profession have played a very important part, though Villemin, of the Val de Grace Hospital, Paris, in 1865, and again in 1866, led the way in experimental investigation. Soon afterwards Gerlach, then principal of the Hanover Veterinary School, undertook a series of experiments, which were conclusive as to the communicability of the disease to various species of animals. At the same time (1868), Chauveau, then at the Lyons Veterinary School, instituted experiments which had the same results as

those of Gerlach, and proved beyond doubt that the disorder could be conveyed not only by inoculation, but also through the digestive apparatus. Chauveau was, I believe, the first to indicate the danger of allowing the flesh of tuberculous cattle to be utilized as human food. The veterinarians, Harms, Gunther, Bollinger, Bagge, Zurn, Semmer, St. Cyr, Jolin, Leisering, and others, experimenting in the same direction, all reached the same conclusions, and, with Toussaint, of the Toulouse Veterinary School, undoubtedly showed that flesh and milk were infective.

"So strong and so startling was the evidence thus accumulated, and so alarming did the matter appear with regard to the public health, that in the *British and Foreign Medico-Chirurgical Review* for October, 1874, I called attention to its urgency, gave the chief facts—clinical and experimental—recorded up to that time, and concluded the paper as follows: 'From what has been already ascertained, there is every reason to view with grave suspicion the use of the flesh of phthisical cattle as food, especially if the disease is much advanced and the tissues are generally involved. But with more reason the milk from cows affected with tuberculosis should be prohibited, more particularly for the use of infants, who mainly rely upon milk for their sustenance, and whose powers of absorption are very active. Even if this milk did not possess such dangerous infective properties its deficiency in nitrogenous matters and in fat and sugar, and the increased proportion of earthly salts, would alone render it objectionable as an article of diet. It has long been known that it was liable to produce diarrhoea and debility in infants; but, though many children fed on such milk may have died from general or localized tuberculosis, the part probably played by this fluid in its production has not been suspected.' Since that time I have seized every opportunity of insisting upon the danger of tuberculosis in cows, in *The Veterinary Journal*, in public addresses, and especially in my work on 'Veterinary Sanitary Science and Police,' Vol. II.), published so long ago as 1875, I have earnestly endeavored to point out the destructiveness of the disease among cattle, and the peril to which its extensive prevalence exposes our own species."

At the recent meeting of the British Medical Association, at Glasgow, August, 1888, Professor Edgar Crookshank, of London,

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the distinguished microscopist and biologist, read a paper on "Tuberculous Cows' Milk." Dr. Crookshank regards the "tubercular bacillus of the cow as identical with that found in man. In view of the fact that milk from tubercular udders must frequently come into the market, he considers that immediate legislation is demanded. In reply to Dr. Coals, Dr. Crookshank said that the disease of the udder was not a mere local condition, but part of a general tuberculosis. Its importance, however, consisted in the fact that if the udder was unaffected, the bacilli were not found in the milk. Professor McCall, of Glasgow, thinks that he has seen the disease transmitted from tuberculous cattle where no disease in the udder could be found. Professor Crookshank stated that the opinion that there was any difference in size between the tubercular bacillus, as found in bovine and human tuberculosis, as held by Klein, was probably due to the fact that Klein had examined bovine tuberculosis only in sections. The bacillus as found in tubercular milk has quite the same size and appearance as that found in tubercular sputum. Inoculation experiments with sputum and milk gave the same lesions and the same bacilli in rabbits." The significance of all these views is greatly emphasized by the proceedings of the "Congress on Tuberculosis of Man and Animals," held in Paris from July 25th to July 31st, 1888. It commanded the attendance of three hundred members, almost every country being represented.

While the veterinary profession was the more largely represented, eminent medical authorities united in their testimonies. The papers and discussions took a wide range as to the evidences of tuberculosis and its modes of propagation in man and animals. Experimental and chemical evidences were adduced. The character of the proceedings and the eminence of many of the authorities have given to this Congress a large consideration from the medical profession, and by all sanitarians. The tone of professional opinion is well represented in the two following extracts from editorials—the one from the *London Lancet* of September 1st, 1888, and the other from *The (Philadelphia) Medical News* of September 8th, 1888 :

"The recent Congress on tuberculosis, held at Paris, under the



presidency of M. Chauveau, affords a striking illustration of the widespread interest that is taken in, as well as of the importance of, an accurate study of this disease. The keynote of the proceedings was contained in the affirmation by M. Chauveau that now, thanks to the observations of the past twenty years—from Villemin to Koch—we have been awakened out of the false security of believing in the innocuity of tubercle, and recognize the grave possibilities of its transmission from animals to man. Throughout the whole of the discussion there was hardly a dissentient voice against the contagiousness of tuberculosis. One speaker after another rose to affirm his belief in the dangers to the human race arising from the consumption of the milk and flesh of tuberculous animals—and this, too, from various countries—so that it is not surprising that the Congress should have adopted resolutions aimed especially at the hygienic precautions to be taken in this respect. It recommends the inclusion of tuberculosis in the list of contagious diseases of animals, and the seizure and destruction of the flesh of every tubercular beast, no matter what may be its appearance. It declared that such resolutions were applicable to all lands, since in every part the question of tuberculosis presents the same problems. Moreover, the Congress urged the spread of popular instruction, especially in country districts, respecting the precautionary methods for preventing tubercular contagion, the risks which are run by the infection of meat and milk coming from tuberculous cattle, and the measures to be taken for the disinfection of materials derived from phthisical patients. Lastly, the Congress held it imperative that dairies and dairy farms should be rigidly inspected.

“Thus, then, we have it categorically affirmed that tuberculosis is not only a contagious disease, but that one of its chief means of prevalence in mankind is by communication from animals of the bovine species. Yet, in spite of the evidence in favor of this view, the question is one which has not been absolutely proved. Experimentation has demonstrated without cavil that animals fed upon tubercular flesh, or inoculated with the virus or the bacillary cultures in every possible way, become victims to the disease. Morbid anatomy long since proved that within the body tubercle may spread from part to part by a process of infection. There are

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isolated cases of the accidental inoculation of human beings, with the resulting development of local tubercular lesions; and, lastly, there are a few instances where the disease has every appearance of having been directly transmitted from one individual to another. Nevertheless, the vast amount of tubercular disease, in one form or another, in which there is absolutely no evidence of its acquisition by infection, may well make us pause before assenting to propositions which, of necessity, imply that everywhere and in all circumstances the disease is transmissible by contagion.

"At the same time, while recognizing to the full the great lack of unimpeachable clinical evidence in support of the transference of tubercular disease from man to man, together with the grave obstacles in the way of measures to prevent contagion among the community, to say nothing of the inhumanity which would follow their adoption, it does seem highly rational to check the consumption of articles of food which are proved to be derived from tuberculous animals. \* \* \* We regard the meeting of this Congress as very important. It has given an impetus to the study of tubercular diseases which must bear fruitful results. It has demonstrated how great is the change that has taken place in our conception of this class of disease, and we do not doubt that from every point of view—hygienic, therapeutic, surgical as well as medical, and pathological—much gain will accrue; whilst we may look forward to 1890, when the next meeting will take place, under the presidency of M. Villemin, in the hope that in all these respects a distinct advance will have been assured."

"At the recent French Congress for the study of tuberculosis, certain propositions were presented by the President, M. Chauveau, and adopted, which relate to special prophylactic measures necessary to be observed in dealing with the contagious diseases of domestic animals, especially those which may be transmitted, to man. The French government, upon the adjournment of the Congress, with commendable alacrity adopted regulations suggested by the action of the Congress, which are to be enforced for the prevention of the transmission of tuberculosis from animals of the bovine species. Cattle are to be placed under the supervision of sanitary veterinary surgeons, and animals found to be tuberculous are to be isolated and sequestered, and when killed

must be killed in the presence of the Inspector, who must make a post-mortem examination. Meats obtained from such animals, when the lesions are definitely ascertained, are excluded from sale and are not even to be fed to animals, but must be destroyed. The sale of milk from tubercular cows is forbidden, though after being boiled it may be fed to animals. \* \* \*

"Tuberculosis being recognized as a contagious disease, and in all probability transmissible from animals of the bovine species to man, it is the duty of the State or general government to enforce stringent measures directed against the spread of this disease, and forbid the sale or use of meats from animals affected by it. As it is probable that infection is conveyed by alimentation, particularly by milk, the sale and use of milk from tubercular cows should be forbidden. In the absence of such a regulation, or its enforcement, safety lies in the practice of boiling the milk before using it."

"The President, M. Chauveau, finally presented the following propositions, which the Congress adopted :

"1st. It is necessary to place in the jurisdiction of the Boards of Health all questions having a relation to the contagious diseases of domestic animals, including even those that to-day do not appear to be transmitted to man. To vaccinia, glanders, hydrophobia, malignant carbuncle, tuberculosis, other infectious diseases can be added later, which will necessitate the same precaution.

"2d. It is necessary to use every possible means, including indemnities to the owners, for the general application of the principle of seizing and destroying totally all meats derived from tubercular animals, whatever may be the extent of the specific lesions found on those animals.

"3d. It is necessary to print simple instructions which are to be distributed in all cities and villages, and in which are contained the methods to prevent tubercular infection by alimentation, particularly by milk, and the manner of destroying the virulent qualities of the germs contained in the sputa, linen, beds, &c., of consumptive patients.

"4th. The cow-houses must be especially placed under the watch of an inspector, especially those that produce and furnish

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the milk used in alimentation, so that the contagious diseases from which they may suffer should not be communicated to man.

"5th. That tuberculosis be inscribed in all the sanitary laws or regulations of the world, as a contagious disease, necessitating special prophylactic measures."

(See further, as to the relation of human and bovine tuberculosis, Creighton, Transactions of International Medical Congress, 1881; Fleming on Tuberculosis, Pamphlet, Baillere, London; Tuberculosis, Drs. McGee and Klophele, Memphis, 1886; Bovine Tuberculosis, Blaine, Willard Asylum, N. Y.)

While we are of those who are slow to accept as proven any evidence of communicability not certified by clear and abundant clinical evidence, surely enough has been adduced to show that we have reached a period when greater precaution should be used. When the world-wide prevalence of consumption is recognized, and while our last national census shows it first in frequency in the list of deaths from all diseases, we cannot be too much on the alert in recognizing the relation of the condition of the flesh and milk of the bovine species to the extension of the disease. It is always to be borne in mind that if a disease is shown to be communicable it may also be shown to be difficult of communication. Or it may be shown that it is only communicable when it finds its proper surroundings and a proper soil, and that these are only found where there is neglect of proper sanitary precautions, or where the individual, by proper hygiene, could be protected from susceptibility; while, if the specific microphyte is the *contagium vivum*, we should use every precaution to remove or destroy it. We are also to bear in mind that there is a positive and encouraging field of operation, in rendering persons and places unsusceptible to attack. We have thus singled out human and bovine tuberculosis as fairly representative of diseases probably identical in men and animals, and probably communicable under some circumstances.

These observations are rendered of great importance, not only because of the gravity of the disease, but because tuberculosis is so prevalent among milch cows. A moderate English statement claims that from fifteen to twenty per cent. of all cows are af-

fected. In this State we have very frequently found the disease. It appears chiefly in stables where the cattle are tied in rows, and where ventilation is defective. The per cent. stated is larger than with us, but not larger than we believe to be the average in city dairies.

The facts should lead physicians to an inquiry as to the milk used by children; and often precaution will require that it be boiled. Also, it should be urged upon the attention of our legislators that this and other animal diseases hazardous to mankind are on the increase. The first effective measure of prevention to be adopted is competent veterinary inspection of all milch cattle kept in city limits. Boards of Health should be charged with this duty. The public have little idea of the number of city-kept cattle, and of the fact that a large proportion of them are diseased. If only city dairies could be properly cared for, we would soon diminish tuberculosis and other diseases.

We are to remember that this tuberculosis is far from standing alone. There are several diseases of mankind and of other animals in which relationship and probable interchangeability are claimed.

Two observations besides those as to tuberculosis are especially worthy of note. In the tenth report (1886) of this Board, page 63, and eleventh report, page 421, we noted the observations of Power and Klein as to the identity of scarlatina with a disease discovered in cows. These were afterwards disputed by Crookshank. A series of cases reported recently by Dr. Russell, Health Officer of Glasgow, as to an outbreak at Garnethill, bear a striking analogy to the Hendon cases. The milk supply of every family was inquired into. One hundred and seventy-two families, supplied by Dairy X, yielded ninety-five of the cases of illness, while one thousand three hundred and one families, supplied by other dairies, yielded but one case. A close inquiry and analysis of facts showed that milk X was not infected through a human medium. An examination by Dr. Russell and others revealed in the cows appearances resembling those described in the Hendon cases. Other experiments are being made, and it is too early to decide the full significance of these facts. It is, however, of import that Sir James Paget and various members of the Epidemiological Society of London

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accept the view that in some cases scarlet fever is derived from a disease occurring on the teats of cows.

### NOTES AS TO SOME OTHER ANIMAL DISEASES.

As to the communication of diphtheria from the lower animals, a sufficient number of facts have not yet been observed and classified. It is noted that disease among chickens, quite similar to diphtheria, often prevails at the time of an outbreak of diphtheria in some isolated family. Thus, Dr. Turner, of the Local Government Board, England, "considers this mode of diphtheric distribution possible," and cites cases to show that outbreaks of diphtheria have, in more than one instance, been coincident with the occurrence of "strangles" among horses. He also found in some of his official inquiries that when diphtheria was present in a district, the fowls suffered from fatal throat affections. (See *Sanitary Record*, June 15th, 1888, and July 16th, 1888.) Dr. Delthill claims that the frequency of diphtheritic affections in and near Paris is owing to the presence of badly-kept poultry. The same has been claimed by several observers here in this country. (See Prof. Whitaker, *Medical News*, Oct. 6th, 1888.) M. Menzies attributes an outbreak of diphtheria at Posilippo, near Naples, "to the patients having drunk water from a well into which the excrements of numerous fowls and pigeons had been washed by the rain." (See *British Medical Journal*, April 28th, 1888.)

The fact that cats are often the carriers of contagion, seems well established, but recently Dr. Low and Dr. Turner, of the Local Government Board, (1887) have adduced some significant facts to show that cats impart and contract diphtheria. (See article, *Sanitary Record*, June 15th, 1888, page 553.)

As to various other alleged intercommunicable diseases, we do not need to speak at length. In 1869, Dr. Thorne discovered that the milk from cows suffering from foot-and-mouth disease was capable of producing disease in those who partook of it. The fact is now fully recognized by all English physicians. Actinomyces is probably transmissible. Anthrax and glanders have long been recognized as thus communicable. (See, as to various animal diseases that are communicable, article by Ezra

M. Hunt, M. D., first report of Bureau of Animal Industry, Washington, D. C., 1884, pages 437-444.) Unusual prevalence of boils has seemed to be traceable to the use of diseased meat. When we consider our relations to animals, and some of the facts adduced, together with the well known aptitude of milk as the conveyancer of the specific poison of several diseases, we may well be on the alert in studying the relation of animals to the human diseases with which we, as sanitarians and physicians, have to deal.

## REPORT OF DR. HAWK AS TO GLANDERS.

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I submit the following report for 1888 :

### GLANDERS.

January 30. I visited a horse belonging to Mr. Ganden, Bound Brook, N. J., supposed to be affected with glanders, but upon examination I found it to be catarrh in the head.

February 13. I visited a horse belonging to Mrs. Crorsey, Afton, N. J., supposed to have glanders, but upon examination found it to be nasal gleet.

March 27. Visited Mr. R. Vincent's stable, Mount Pleasant Place ; he had two horses, one of which was affected with glanders. I ordered him killed.

May 23. I was called to Trenton to examine horses supposed to be affected with glanders. I found the horses on a farm out from Trenton. Upon examination I found them suffering from cerebro-spinal-meningitis.

July 30. Visited a horse belonging to the Newark and Elizabeth Horse Car Co., at Lyons Farms ; found him to be affected with glanders. I put the stable under quarantine.

August 1. I again visited the car stable at Lyons' Farms ; the horse I ordered killed, was killed on the premises and taken away. I examined all the remaining horses (13) in number, and found them all sound.

August 2. I visited the car stables at Lyons' Farms, and examined all the horses, forty-six in number, with the exception of four which were on the road, and found them all sound.

August 8. I visited a horse belonging to Mr. Geo. B. Har-



ri son, near Roseland, N. J., supposed to have glanders. I found it to be, upon examination, necrosis of the frontal bone.

August 17. Revisited car stables at Lyons' Farms and found the horses in good condition.

August 23. Visited the car stables at Elizabeth, found one horse with farcy.

August 25. Visited the stable of Mr. Carmer, Hilton, N. J., to examine a horse supposed to be affected with glanders. The horse had been destroyed before I arrived there, but from the description given I think he must have been affected with glanders. There were two other horses in the stable.

August 28. Revisited car stables at Elizabeth; examined all the horses, forty-five in number, and ordered one killed that was affected with glanders, and found one other with farcy.

September 4. Revisited car stables at Elizabeth, found one other case of glanders.

September 8. Revisited car stables at Elizabeth but found no new cases.

September 12. Revisited car stables at Elizabeth.

September 17. Revisited car stables at Elizabeth.

September 22. Revisited car stables at Elizabeth.

September 29. Revisited car stables at Elizabeth.

October 11. I was called to Dr. Mercer's, Monclair, N. J., to examine a horse supposed to have glanders, but the horse had been destroyed by order of Dr. Mercer before I reached there.

October 12. Revisited car stables at Elizabeth.

October 27. Revisited car stables at Elizabeth.

October 31. Revisited car stables at Elizabeth.

November 8. Revisited car stables at Elizabeth, found no new cases and the horses all in good condition.

November 10. Released the "N. & E. Car Stables" from quarantine.

November 12. I was called to examine twenty head of horses owned by John O'Roke, 42 Parrow street, Orange. I was notified by Dr. Dancer, of Orange, that there was glanders among these horses, and that the owner had disposed of two of them. I found one case of glanders, ordered him killed, and put the stable under partial quarantine.

November 18. Revisited the horses at Orange, examined them

REPORT AS TO GLANDERS.

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all, nineteen in number, found one new case. I ordered him killed in the presence of Dr. Dancer, and put the stable under quarantine by order of Dr. Hunt.

November 24. Revisited the horses at Orange.

December 1. Revisited the horses at Orange.

December 8. Revisited the horses at Orange.

December 15. Revisited the horses at Orange.

December 18. I again visited the horses at Orange, and ordered one horse killed that was affected with glanders.

December 22. Visited a stable belonging to John McManus, 402 Central avenue, Orange; I found one horse affected with glanders, and one had been killed the day before.

December 24. Revisited John McManus stable and put it under quarantine.

December 26. Revisited O'Roke stable Orange.

*To the State Board of Health :*

I submit the following report for 1888 :

PLEURO PNEUMONIA.

July 1. I visited a cow belonging to Mr. Miller, South Orange, supposed to be afflicted with pleuro pneumonia; upon examination I found it to be abscess in the throat.

August 10. I visited Carroll's abattoir, Jersey City, and witnessed the slaughtering of eight head of cattle; found them all sound, with the exception of one which had tuberculosis.

September 10. I visited Carroll's abattoir, Jersey City, and witnessed the slaughtering of thirteen head of cattle; there were five acute cases of pleuro pneumonia, and two chronic cases.

September 13. I visited Carroll's abattoir, Jersey City, and witnessed the slaughtering of fifteen head of cattle; there were five acute cases of pleuro pneumonia, and five chronic cases.

September 27. I visited Carroll's abattoir, Jersey City, to witness the slaughtering of some cattle at 2 o'clock; upon arriving there at the above time I found all the cattle had been slaughtered. A doctor that was present said there was one case of pleuro pneumonia among them, but not being there, I cannot say. The doctor did not know where the cattle came from.

October 4. I witnessed at the abbatoir, Jersey City, the slaughtering of one cow which was affected with acute pleuro-pneumonia. The cow belonged to Mrs. Trapper, 72 Monester Avenue, Jersey City.

October 9. I visited Carroll's abattoir to witness the slaughtering of twenty-two head of cattle; there were four acute cases of pleuro-pneumonia and one chronic case. The cattle belonged to Joseph Libermann at Seacaucus

## REPORT OF CASE BY DR. HILYARD, MT. HOLLY.

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I have been intending to write you for a long time the particulars in regards the outbreak of anthrax and also the Texas fever. July 21, I was called to visit farm of George Black, Mansfield township. I found one cow dead, and one other cow had died some ten days previous. I examined the balance of herd and found two others presenting quite an elevated temperature, one particularly decided. After holding post-mortem in the case of dead cow, I felt quite sure as to the trouble, but I called on Dr. Miller, at Camden, that night, and he agreeing with me, I called again at Mr. Black's on the 22d, and found the suspicious case, that is to say, the worse one, very sick with no further trouble in the general herd, which we had treated the day before. Adopting a preventive course, called again on 23d ; found the sick cow dead, so also the other suspicious case, the latter dying very suddenly. I continued my visits at frequent intervals for some two weeks, still persevering in our treatment of the general herd and no more deaths occurred. Making his loss four cows in all.

Arthur Taylor, of Medford township, called me to see a sick cow July 24 ; found her symptoms diagnostic of anthrax. I immediately slaughtered her by his consent, post mortem confirming the same. I found one other cow in herd with a temperature of 106°, otherwise normal. We began at once the same preventive treatment, losing no more stock to date.

### HYDROPHOBIA.

During the summer we have had quite a number of cases of hydrophobia in Southampton and Medford townships, costing the loss of some five or six cows and several dogs. The first dog

that we traced the disease to, and in fact the only one which did any harm, was owned by John Wright, of Medford township. he biting all the cows which were bitten, so also all the dogs, as all the dogs which were known to have associated with him were tied before they showed any symptoms of the disease and all of them have long since been killed.

The Texas fever, which first presented itself in the neighborhood of Columbus, this fall, resulted in the death of four cows and will end in law suit. No instance of any spread to our native cattle. It has been my privilege to examine post mortem some two or three cows which I inoculated for pleuro-pneumonia two years since, dying from different causes and found their lungs perfectly sound. I am watching these cases close.

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### SUMMARY.

In summing up the work and the reports of the year it may be said that, with the exception of Hudson county, there has been but little of plenro-pneumonia.

Swine plague has occurred in a few localities, but far less than formerly. It is a very active contagion, and still defies the investigators. Recently the United States government has appointed a very competent commission of experts to investigate it.

Tuberculosis is very common, especially among city-kept cattle. The farmers should seek such legislation as will do away with city dairies or place them under close inspection.

Glanders has prevailed in more localities than usual. Owners of affected horses should bear in mind that the law makes it their duty to investigate and kill at their own expense, the duty of the Board of Health being to see that the law is carried out. Local Boards of Health should be watchful as to any contagious animal diseases in their respective localities.

*Report of Cases Examined for Pleuro-Pneumonia, Outside of Hudson County, for 1888, by William Diamond, Chief Inspector, United States Bureau of Animal Industry.*

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STATE BOARD OF AGRICULTURE.

OWNER'S NAME.	ADDRESS.	No. in Herd.	No. Chronic, C. P. P.	No. Acute, C. P. P.	No. Tuber.	When Killed.	REMARKS.
Fisher, W. F .....	Sayreville, Middlesex Co.....	4	2	.....	.....	.....	.....
Fisher, W. F .....	Sayreville, Middlesex Co.....	4	2	.....	.....	.....	.....
Fisher, W. F .....	Sayreville, Middlesex Co.....	4	2	.....	.....	January 25...	Purchased and Slaughtered.
Meade, John.....	Sayreville, Middlesex Co.....	1	.....	1	.....	.....	.....
Meade, John.....	Sayreville, Middlesex Co.....	1	.....	1	.....	January 25...	Purchased and Slaughtered.
Backarack, L.....	Market street ferry, Camden...	6	1	.....	1	.....	.....
Backarack, L.....	Railroad stock yards, Camden.	1	1	.....	.....	January 28...	.....
Backarack, L.....	Railroad stock yards, Camden	6	.....	.....	2	.....	.....
Backarack, L.....	Foot of Vine street, Camden...	5	.....	2	.....	.....	Mr. Backarack keeps an offal
Backarack, L.....	Foot of Market street, Camden.	6	1	.....	.....	.....	house, and these were all dead
Feinberg, H.....	W. Fairview, Bergen Co.....	85	4	.....	.....	.....	cattle that he took from different places.
Feinberg, H.....	Fairview, Bergen Co.....	85	21	5	.....	April 14.....	Purchased and Slaughtered.
Frye, Samuel S.....	Stewartsville, Warren Co.....	7	.....	1	.....	.....	.....
Frye, Samuel S.....	Stewartsville, Warren Co.....	7	3	1	.....	.....	.....
Frye, Samuel S.....	Stewartsville, Warren Co.....	7	.....	4	.....	February 15.	Purchased and Slaughtered.
Hulsizer, P. F.....	Stewartsville, Warren Co.....	5	.....	2	.....	February 6...	Purchased and Slaughtered.
Crozier, C.....	Raritan island, Middlesex Co...	1	1	.....	.....	February 6...	Purchased and Slaughtered.
Wendroth, A., Sup't.....	Rending establishment, East Camden.	2	2	.....	.....	.....	Found dead.
Kitchen, W. H.....	Stewartsville, Warren Co.....	6	2	2	.....	.....	.....
Kitchen, W. H.....	Stewartsville, Warren Co.....	6	1	3	.....	February 15.	Purchased and Slaughtered,
Horner, Aaron.....	Near New Brunswick, Middlesex Co.	2	2	.....	.....	.....	.....
Horner, Aaron.....	Near New Brunswick, Middlesex Co.	2	1	1	.....	February 27.	Purchased and Slaughtered,

Griffiths, Joseph.....	East Norwood, Bergen Co.....	3	1	.....	.....	Purchased and Slaughtered.
Farr, Charles.....	Prospect Plains, Middlesex Co.	6	1	.....	February 21.	Purchased and Slaughtered.
Such, George.....	Near South Amboy, Middlesex Co.	22	14	.....	.....	.....
Such, George.....	Near South Amboy, Middlesex Co.	22	6	8	March 6.....	Purchased and Slaughtered.
Hartung, John.....	Stewartsville, Warren Co.....	1	.....	1	March 6.....	.....
Hartung, John.....	Stewartsville, Warren Co.....	1	.....	1	April 18.....	Purchased and Slaughtered.
Castner, Adam.....	Cooksville, Warren Co.....	13	.....	2	.....	.....
Dey, W.....	New Brunswick, Middlesex Co.	1	.....	1	.....	Found dead.
Hulse, George.....	Newton, Mercer Co.....	1	.....	1	.....	.....
Muller, Edward.....	Road to Mullica Hill near Woodbury, Gloucester Co.	13	.....	1	.....	.....
Levinson, J.....	South River, Middlesex Co. ...	3	.....	1	.....	.....
Levinson, J.....	South River, Middlesex Co.....	3	.....	1	.....	.....
Naphas, William.....	209 Pavonia street, Camden...	2	.....	1	.....	.....
Naphas, William.....	209 Pavonia street, Camden...	2	.....	1	.....	.....
Naphas, William.....	209 Pavonia street, Camden...	2	.....	1	March 31.....	Purchased and Slaughtered.
Butts, Albert.....	Road from Pemberton to Wright station, Burlington Co.	44	.....	4	.....	.....
Hancock, W. M.....	Road to Pennsgrove near Salem, Salem Co.	12	.....	2	.....	.....
Hancock, W. M. ....	Road to Pennsville, near Salem, Salem Co.	12	.....	2	.....	Purchased and Slaughtered.
Moon, Sarah.....	Poor House, near Yardsville, Mercer Co.	1	.....	1	died Mar. 29	.....
Pidcock, J. N.....	Whitehouse, Hunterdon Co....	29	6	.....	.....	This came to Jersey City abattoir for slaughter; we condemned the six head and purchased them.
Leventhal, A.....	Fairview, Bergen Co.....	38	6	3	1	April 11.....
Leventhal, A.....	Fairview, Bergen Co.....	38	9	3	.....	Purchased and Slaughtered.
Higgins, George H.....	Road to Toms River, near Cookstown, Burlington Co.	6	.....	1	.....	.....
Higgins, George H.....	Cookstown, Burlington Co.....	5	.....	2	.....	.....
Higgins, George H.....	Cookstown, Burlington Co.....	5	2	.....	.....	.....
Higgins, George H.....	Cookstown, Burlington Co.....	6	3	.....	.....	.....
Higgins, George H.....	Cookstown, Burlington Co.....	6	3	.....	May 10.....	Purchased and Slaughtered.



*Report of Cases Examined for Pleuro-Pneumonia, Outside of Hudson County, for 1888, &c — Continued*

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STATE BOARD OF AGRICULTURE.

OWNER'S NAME.	ADDRESS.	No. in Herd.	No. Chronic, C. P. P.	No. Acute, C. P. P.	No. Tuber.	When Killed.	REMARKS.
Hancock, William M.....	Road to Penn's Neck, near Salem.	14	8	2	.....	April 4.....	Purchased and Slaughtered.
Thompson, James.....	Andover, Sussex Co.....	13	.....	.....	3	.....	.....
Ulrich, Louis.....	Fairview, Bergen Co.....	44	23	4	.....	April 11.....	Purchased and Slaughtered.
Decker, William.....	South Orange, Essex Co.....	1	.....	.....	1	.....	.....
Decker, William.....	South Orange, Essex Co.....	1	.....	.....	1	.....	.....
Dunbar, James.....	Near Stelton, Middlesex Co.....	52	.....	.....	1	.....	.....
Cook, Mr.....	Near New Brunswick, Middlesex Co.	53	.....	.....	1	.....	.....
Meyer, Emil.....	Fairview, Bergen Co.....	31	6	1	.....	.....	.....
Meyer, Emil.....	Fairview, Bergen Co.....	31	7	1	.....	.....	Purchased and Slaughtered.
Mitchell, J. M.....	Near Acton station, Salem Co.	27	.....	.....	2	.....	.....
Doyle, W.....	Criskill, Bergen Co.....	22	.....	.....	3	.....	.....
Dunfee, Robert.....	Cookstown, Burlington Co.....	3	2	.....	.....	.....	.....
Dunfee, Robert.....	Cookstown, Burlington Co.....	3	.....	1	.....	.....	.....
Dunfee, Robert.....	Cookstown, Burlington Co.....	3	.....	1	.....	.....	Purchased and Slaughtered.
Harris, E.....	Cookstown, Burlington Co.....	16	.....	.....	1	.....	.....
Hoffman, E. A.....	Raritan River road, Middlesex Co.	13	.....	.....	1	.....	.....
Hoffman, E. A.....	Raritan River road, Middlesex Co.	14	.....	.....	1	.....	.....
Graham, James A.....	Pompton road, Pompton Plains.	18	.....	.....	5	.....	.....
Ware, Mark R.....	Main road, Bayside, Cumberland Co.	20	.....	.....	2	.....	.....
Ware, Mark R.....	Main road, Bayside, Cumberland Co.	20	.....	.....	4	.....	.....

Sheppard, P. G.....	Greenwich, Cumberland Co....	50	.....	1	.....	
Sheppard, P. G.....	Greenwich, Cumberland Co....	50	.....	3	.....	
Moore, J. C.....	Road to Woodstown, Mullica Hill.	13	.....	1	.....	
Davidson, George.....	Cranbury road, Middlesex Co.	3	.....	1	.....	
Horner, Edward.....	Bunny's road, near Camden ..	13	.....	1	.....	
Thompson, A. D.....	Somerville, Somerset Co. ....	11	.....	1	.....	
Craig, John T.....	Road to Haddonfield, near Milford.	40	.....	2	.....	
Craig, John T.....	Road to Haddonfield, near Milford.	40	.....	2	.....	
Cook, William.....	Road to Salem, near Pennsville.	23	.....	2	.....	
Little York Dairy Assoc'n..	Little York, Warren Co.....	164	.....	7	.....	
Preston, A. E.....	South street, Freehold, Monmouth Co.	2	1	.....	May 25.....	Purchased and Slaughtered
Emmons, James H.....	Near South street, Freehold, Monmouth Co.	3	.....	2	.....	May 25..... Purchased and Slaughtered
Johnson, C .....	Road to Elmer, Daretown, Salem Co.	21	.....	1	.....	
Sharp, Howard.....	Greenwich road, near Bridgeton.	12	.....	1	.....	
Elwell, Belford.....	Road to Bridgeton, near Snow Hall.	13	.....	1	.....	
Wallace, Robert.....	Road to Jerseyville, near Blue Balls.	8	.....	1	.....	
Clayton, B. J.....	Road to Farmingdale, Jerseyville.	11	.....	1	.....	
Walling, J. S .....	Big Wood road, near Freehold	10	.....	1	.....	
Britton, Charles.....	Road to Freehold, near Big Wood.	16	.....	2	.....	
Young, M .....	Near Franklin Park, Somerset Co.	14	.....	1	.....	
Sundry Owners.....	Market ferry yards, Camden...	86	.....	2	.....	
Williams, Thomas.....	Annandale, Hunterdon Co.....	22	.....	5	.....	
Voorhees, Mrs .....	Road to Manasquan, near Squankum.	6	.....	1	.....	

*Report of Cases Examined for Pleuro-Pneumonia, Outside of Hudson County, for 1888, &c.—Continued.*

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STATE BOARD OF AGRICULTURE.

OWNER'S NAME.	ADDRESS.	No. in Herd.	No. Chronic, C. P. P.	No. Acute, P. P.	No. Tuber.	When Killed.	REMARKS.
Daubmann, Jacob .....	Road to Camden, near Mt. Ephraim.	20	.....	.....	1	.....	
Haas, L. ....	Near New Durham, Bergen Co.	43	.....	.....	1	.....	
Schuler, L. ....	Near Morris Plains, Essex Co.	5	.....	.....	1	.....	
Miles, E. B. ....	Springdale road, near Newton.	27	.....	.....	1	.....	
Schloss, A. ....	Sea Girt, Monmouth Co. ....	8	.....	.....	1	.....	
Norris, Joseph. ....	Near Salem, Salem Co. ....	34	.....	.....	2	.....	
Mayhew, John. ....	Passaic, Passaic Co. ....	28	.....	.....	2	.....	
Uebbing, Joseph. ....	Hackensack plank road, Fairview	34	1	.....	.....	.....	
Uebbing, Joseph. ....	Hackensack plank road, Fairview	12	8	.....	.....	September 13	
Thompson, Adam .....	Near Monmouth Junction, Monmouth Co.	11	.....	.....	2	.....	
Hendrickson, Gilbert & Bro.	Freehold, Monmouth Co. ....	25	.....	2	.....	.....	Purchased and Slaughtered.
Hendrickson, Gilbert & Bro.	Freehold, Monmouth Co. ....	25	5	2	.....	.....	
Hendrickson, Gilbert & Bro.	Freehold, Monmouth Co. ....	25	9	.....	1	August 2	
Sundry Owners. ....	Near New Brunswick, Middlesex Co.	22	.....	.....	2	.....	
Bunting, George. ....	Near Stelton, Middlesex Co. ....	19	.....	.....	1	.....	
Atmann, John. ....	Near Milltown, Middlesex Co. ....	52	.....	.....	1	.....	
Stevenson, B. ....	Near Dayton, Middlesex Co. ....	14	.....	.....	1	.....	
Gray, M. ....	Near Metuchen, Middlesex Co. ....	8	.....	.....	1	.....	
Armstrong, Nelson. ....	Cross road, Smithburg and Blue Ball, Freehold.	21	.....	1	.....	.....	
Brown, J. B. ....	Near South River, Middlesex Co.	1	.....	.....	1	.....	

Wraga, Martin.....	Near Fairview, Bergen Co.....	36	4	3	.....	August 9....	Purchased and Slaughtered.
Acton, Henry.....	Near Salem, Salem Co.....	17	.....	.....	7	.....	
Acton, Henry.....	Salem, Salem Co.....	17	.....	.....	9	.....	
Acton, Henry.....	Salem, Salem Co.....	9	.....	.....	3	.....	
Powers, Edward Q.....	Lower Penn's Neck, 5 miles from Salem	14	.....	.....	1	.....	
Lowenthal, H.....	Road to Hackensack, Fairview.	36	3	1	.....	.....	
Lowenthal, H.....	Road to Hackensack, Fairview.	36	3	1	.....	.....	
Lowenthal, H.....	Road to Hackensack, Fairview.	35	4	2	.....	.....	
Lowenthal, H.....	Road to Hackensack, Fairview.	35	3	4	.....	October 6....	Purchased and Slaughtered.
Van Hise, S.....	South River, Middlesex Co.....	3	.....	.....	1	.....	
Allen, Collins.....	Mannington, 6 miles from Sa- lem.	12	.....	.....	1	.....	
Carpenter, S. P.....	Mannington, 3 miles from Sa- lem.	45	.....	.....	3	.....	
Morris, William.....	Two miles from Quinton, Sa- lem Co	.....	.....	.....	2	.....	
Gerard, James.....	Hamburg, Sussex Co.....	18	.....	.....	2	.....	
Stackhouse, James L.....	Elsinboro, 2 miles from Salem.	11	.....	.....	1	.....	
Newell, James.....	Mannington, 2 miles from Sa- lem.	19	.....	.....	1	.....	
Matthews, C. J.....	Blue Ball road, Freehold.....	5	.....	.....	1	.....	
Rogers, Mary Ann.....	Mannington, 1 mile from Hall- town.	19	.....	.....	4	.....	
Coytes, Charles.....	Coytesville, Bergen Co.....	19	1	1	.....	August 21...	Purchased and Slaughtered
Brunson, W.....	Three Mile Run, Middlesex Co.	7	.....	.....	1	.....	
Armstrong, John H.....	Freehold, Monmouth Co.....	20	.....	.....	1	.....	
Lammers, John.....	Blairstown, Warren Co.....	13	.....	.....	1	.....	
Anderson, John R.....	West Freehold road, West Freehold.	7	.....	.....	1	.....	
Mahoney, Dennis.....	Mannington, 5 miles from Sa- lem.	.....	.....	.....	1	.....	
Armstrong, R.....	South River, Middlesex Co.....	19	(1)	.....	.....	.....	Proved to be a case of tubercu- losis.
Armstrong, R.....	South River, Middlesex Co.....	14	.....	.....	3	.....	
Buck, Robert J.....	Hopewell, 1 mile from Bowen- town.	49	.....	.....	1	.....	
Thompson, George.....	Stewartsville, Warren Co.....	10	.....	.....	1	.....	

*Report Examined for Cases of Pleuro-Pneumonia, Outside of Hudson County, for 1888, &c.—Continued.*

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STATE BOARD OF AGRICULTURE.

OWNER'S NAME.	ADDRESS.	No. in Herd.	No Chronic, C. P. P.	No. Acute, C. P. P.	No. Tuber.	When Killed.	REMARKS.
Taylor, Samuel .....	Lower Penn's Neck, near Salem.	20	.....	.....	1	.....	J. P. Ridgway, owner, Shiloh.
Robinson, George .....	Quinton township, near Quinton.	19	.....	.....	2	.....	
Cumberland Fair .....	Bridgeton, Cumberland Co....	44	.....	.....	1	.....	
Cull, Hiram .....	Road to Woodstown, near Allowaystown	17	.....	.....	1	.....	
Smith, Henry.....	Pines, Smithburg, Monmouth Co.	5	.....	2	.....	October 13...	Purchased and Slaughtered
Pidevers, J. N.....	Near Readington, Hunterdon Co.	34	.....	.....	1	.....	
Leonard, John.....	Road from Woodbury to Mullica Hill, Gloucester Co.	1	.....	.....	1	.....	
Gaffney, James.....	Road to Alloway, Upper Alloways Creek	23	.....	.....	2	.....	
Story, Walter.....	Haddon township, Camden Co.	5	.....	.....	1	.....	
Workman, Abm. R.....	Delaware township, Camden Co.	22	.....	.....	1	.....	
Haines, Aaron.....	Upper Alloways Creek township, Salem Co.	10	.....	.....	2	.....	
Bauer, John.....	North Brunswick, Middlesex Co.	3	.....	.....	1	.....	
Dare, Mark R.....	Near Bayside, Greenwich township, Cumberland Co.	13	.....	.....	1	.....	
Bitters, John L.....	Road to Bridgeton, Hopewell, Cumberland Co.	16	.....	.....	1	.....	

McGalliard, Joseph .....	Road to Bridgeton, Hopewell, Cumberland Co.	5	.....	1	.....
Vaneman, Robert N .....	Road to Woodstown, Man- nington township.	16	.....	1	.....
Conover, John .....	Near Dean station, Middlesex Co.	7	.....	1	.....
Tice, Joseph D .....	Hopewell township, Cumber- land Co.	7	.....	1	.....
Tice, Joseph D .....	Hopewell township, Cumber- land Co.	7	.....	1	.....
Benner, Clement .....	Broadway, Salem.	8	.....	2	.....
Nicholson, Isaac R .....	Road from Camden to Marl- ton, Haddon township.	124	.....	1	.....
Pearson, Henry .....	Road Camden to Marlton, Delaware township.	7	.....	1	.....
Cook, Isaac .....	Bacon Neck road, Greenwich township.	21	.....	1	.....
Collard, James .....	Piscataway, Middlesex Co .....	10	.....	1	.....
Thompson, William .....	River road, Elsinboro town- ship, Salem Co.	20	.....	1	.....
Crispin, Eli W .....	Road to Auburn, near Sharps- town, Salem Co.	7	.....	1	.....
Strikes, De Witt .....	Monmouth Junction, Middle- sex Co.	1	.....	1	.....
Hunt, Richard .....	Bordentown, Burlington Co .....	17	.....	1	.....
O'Brien, John .....	Bacon Neck road, Greenwich township, Cumberland Co.	9	.....	1	.....
Hunt, Job .....	Near Rocky Hill, Middlesex Co.	10	.....	1	.....
Smalley, E. J .....	Road to Belvidere, Bridgeville, Warren Co.	27	.....	3	.....
Davis, Alvin E .....	Lower Alloway Creek, Salem Co.	3	.....	1	.....
Lant, Peter .....	Stelton, Middlesex Co .....	11	.....	1	.....
Brick, B. Clark .....	Near Marlton, Camden Co .....	8	.....	1	.....
Harms, Charles .....	North Brunswick, Middlesex Co.	5	.....	1	.....
Sundry Owners .....	Camden, Camden Co .....	37	.....	3	.....

*Report of Cases Examined for Pleuro-Pneumonia, Outside of Hudson County, for 1888, &c.—Continued.*

OWNER'S NAME.	ADDRESS.	No. in Herd.	No. Chronic, C. P. P.	No. Acute, C. P. P.	No. Tuber.	When Killed.	REMARKS.
Wood, Simon. ....	Stow Creek township, Cum- berland Co.	13	.....	.....	1	.....	
Compton, Daniel. ....	Bonhampton, Middlesex Co. ....	13	.....	.....	1	.....	
Sundry Owners. ....	Market ferries, Camden .....	28	.....	.....	3	.....	
Sparks, Peter. ....	Road to Pedricktown, Upper Penn's Neck.	7	.....	.....	1	.....	

N. B.—This Board does not vouch for correctness of diagnosis.

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## ADDRESS

BY HON. J. D. TAYLOR.

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## ADDRESS.

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BY HON. J. D. TAYLOR.

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*Mr. Chairman and Gentlemen :*

A few days since I had an invitation from some of the members of your society to come over here and talk to you on this occasion. I consented, with the distinct understanding that with the duties which I had daily to discharge, I would only be able to come over here and give you a talk. They consented to that and they consented to more. They consented that I should talk upon anything I thought proper.

I do not think I shall confine myself to any particular subject. I suppose you have had theories discussed here during your entire session, and having been in session for several days, these talks by specialists, familiar with the examination and research on various subjects, have given you more information on such subjects than I would be able to give you. I shall, therefore, do more in the way of making suggestions, perhaps, than in any other direction.

I did not refuse your invitation, because I feel under obligations to the farmers all over the country, and especially to the farmers of New Jersey, who had the goodness and wisdom, during the last year, to join hands with the farmers of my own State, because you sympathized with us in our demand for protection to the industry in which we are so deeply interested.

In regard to the training of farmers from an early period, so far as I discern, our agricultural colleges have not been a very great success in the way of educating farmers. I do not know

what your experience has been in New Jersey, but I know that other colleges have not been very successful. My opinion on this subject is that we should educate our farmers at an earlier period than heretofore in this country.

The college education comes too late to make a boy like to be a farmer. Our inclinations begin earlier in life. "As the twig is bent the tree is inclined." My judgment is, that if we want to make farmers, we should begin the work in the common schools of the country, where there should be a text book on agriculture, and where there should be taught the science of agriculture. In our common schools we now teach arithmetic, grammar, philosophy, algebra, geometry and trigonometry, but we never teach them anything about agriculture. It is remarkable how little a boy knows about his own father's farm, although raised on it, and how very little he knows of the science of agriculture. No one has ever written a book adapted to that purpose, whereas, if we had a book for use in our common schools, the size of Comstock's philosophy, in which should be taught the science of raising potatoes, and the science of cutting hay, and the science of building fences, and the science of all these things, it would be a book that would do good to the farmers' boys of this country. In my school days, I never learned any of the laws governing these matters, and I never dreamed, in all my earlier life, that there was a great deal of science in all these things. If the school boy of twelve years of age were to discuss in his school the question of the Irish potato—when to plant, and in what kind of ground to be planted, and when to be dug, and other matters pertaining to such crops, he would become more interested in his work, and he would soon be able to talk with his father about it, and in his every day life, he would become attached to his work, and the reasons for these things, so pertinent to his agricultural life, but if we leave these things until the young man is twenty-one or twenty-two years of age, and he is grown to manhood, it is too late for him to become fascinated with it, and, therefore, he will not become fascinated with farming. I handled clover hay from my boyhood, made it, cared for it and fed it, and all that kind of thing, and a year or two ago, in a farmer's institute, I heard a man lecturing on clover hay, and I learned from him

what I never learned before—and what you perhaps learned a good while ago—that a farmer can feed his horses on clover hay, if cut at the right time, all the year round, without feeding any corn. That struck me as being very important. I had fifteen horses to feed every day and I was feeding and burying away barrels of grain and hundreds of dollars of money, when I might be saving it in feeding in the way he suggested.

He said he had a large number of horses on his farm, and had not permitted a single work horse in five or six years to have a single quart of grain of any kind, and they were all fat, and he worked them hard and hauled them long distances. I had never heard of this before and knew nothing of it at all.

There is a study in cereals and in vegetables, of how and what to plant, and how to care for all these things, and a boy would do well to learn these things between the ages of twelve and twenty, so that he would be interested in all that pertains to agriculture, and there would be other advantages in that kind of study. You always do a good thing when you have a boy study something he can understand. It is not right that he should study all the time in the dark. If we expect to keep our sons on the farm, we must have them interested in these things. They must see the Science, the Philosophy, the Rhetoric, the Arithmetic and the Logic of Agriculture, or you cannot keep them at home. And, besides this, they must see some money in it, and there is money in it. Is it not strange that you see, in any locality, one man get rich, while half a dozen never accumulate a single dollar more than they have left them? At the end of twenty years, they are just where they started. I know, in my neighborhood, an Irishman who came over fresh from Ireland. He had not a dollar in the world, and in fifteen years he had one of the best farms in my county. He was a very poor lawyer, however, although a good farmer, and his title was found to be defective, and his big barn and his nice house and his farm and everything were taken from him. With all this, he was not discouraged, and went out into the very poorest part of the country and bought another farm, and when he died, a few years ago, he had cleared the farm of debt, and had a new house and a new barn on it, while for five miles in either direction, from his farm, the other farms were scarcely worth buying. He knew how to farm, and

he knew how to turn to advantage everything that he had, and he had fat cattle and fat horses, and fat crops, and was a great success. This was simply because he was an intelligent farmer. He was industrious, of course. Then there was a great many other things that he looked after closely to make his farm a success, and these things must be looked after by every farmer if he wishes to succeed.

They are a great many other things that we are to look after very carefully if we are going to keep the young men at home on the farm in this country. It is something more than to have a good house, and of course, I suppose you gentlemen have good houses here in New Jersey. We should have good farms, or we should try to make them good. They should be pleasant and attractive homes, with lawns and shade trees, and everything of that kind. I presume you all have these. You should have good roads also, and they should be kept in good repair, and sightly in appearance. I feel like scolding every place I go to, when I see poor roads, because in so few places I find the proper appreciation of good roads. There is no better investment that can be made than in first-class roads. There are generally too many roads, and they are bad and numerous both, and this is the trouble generally. What are you going to do with your sons and daughters in midwinter? Do you want to bury them for six months in the year? If you do, they will go to town and live. Have all the roads in your neighborhood for ten miles around, or for six miles around, every road a good road, over which you can travel in the stress of winter to the cities, if desired, so that you can go to church or to the lecture, or go visiting, and so the young people can move about from place to place in midwinter, instead of being buried for six months in the year, and having them dissatisfied and discontented. You must do something if you will preserve the dignity of your labor. If we are going to have the young men and young women of this country contented on the farm, as we should have them—for there is no more dignifying or more honorable calling in the world—there is nothing more creditable or more desirable, and, therefore, we should dignify our labor. We should make our homes and our barns and our buildings attractive as well as useful, and we must

## ADDRESS BY HON. J. D. TAYLOR.

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make the business lucrative, too, if we expect our sons and daughters to be contented. You want to widen out a little. You want to encourage every species of agriculture.

I referred a little while ago to our interest in Ohio, meaning principally the wool. You are just as much interested in this as we are in Ohio. You may not think so, but you are. If our industry goes, so that we cannot afford to follow it, we will do something else, make butter and cheese, or raise potatoes, and other vegetables, and place them alongside of those you are placing on the market. You ought to encourage a diversity of of agriculture, as well as a diversity of industry in general. Men are too apt to narrow down and think about their own interests, as if there were no other interests worth looking after. I notice that in Washington and I notice it everywhere. My friend, the chairman, who took such a conspicuous part in that long and laborious tariff discussion, and every gentleman interested in the debate, threw his whole soul into the discussion of their own particular interests, or the interests of their particular localities, as if there were nothing else in any other State, and as if their lives depended on it. We found it this way all the way through—too much so, at least; therefore, we are all interested in all the industries of the country; and if one industry cannot be made to pay, we will go into those industries that do. We are not isolated in our industry, and there is no isolated industry in the country. There is not an occupation anywhere, between the two oceans, in which every gentleman who sits before me is not interested, and this is the way it should be. You have followed up these industries, and you ought to look after and take care of them. Why, the time was here in New Jersey, I presume, when the young men had to go West, or I suppose Ohio would never have been settled but for that. You like to live near the ocean, and in the great states where they have such magnificent markets, but in earlier years it was a necessity for the young man and the young woman to go West. There was nothing else for them to do. There was nothing else in this country but agriculture at one time, the only occupation there was to enter, and almost all the surplus men and women had to go West, and engaged in the same occupation.

Going West in those days was a good deal like going to the grave. I remember in my boyhood watching the long line of mover's teams pass by, stopping along the road side, building fires for cooking purposes, sleeping in the wagons, and under the wagons and on the ground, and there were the fathers and mothers and sons and daughters, making their way to the West, in order to support their families, and rear and educate their children. It is not so now. You have great markets and more industries here; you have very largely the advantages of this country.

I want also to call your attention to the subject known as forestry. I am not going to discuss this question in all its bearings; my sole purpose is to call your attention to the great destruction of timber throughout the country. The very last report made by the Commissioner of Agriculture at Washington this year settles the fact that the consumption of timber is, at this very hour, twice the growth of timber in this country. While it is a disputed question as to its effect upon the quantity of rain fall, it is not disputed anywhere, by anybody, that the life of the people, and that the timber and moisture of the country, depends very much on the forests, which are being so steadily destroyed, and so rapidly wasting away. The proper distribution of rain fall is very largely controlled by this, and if we do not want to be compelled to do what they are doing in France and in Italy, and in various parts of Europe, where they are restoring their forests at an enormous expense since 1860, and in twenty-eight years the expense of this restoration has been thirty millions of dollars, and France has covered two hundred and fifty thousand acres of her mountain lands with timber, and also covered two hundred thousand acres of her sandy or plain lands with timber. This restoration of the forests has also largely restored the streams. It has restored streams which had hitherto been dried up and abandoned, and the same things are being done in other European countries. The same is true in China, and in all Europe; they are sadly experiencing what we have not, an experience that if we would not have, we must take care of our timber and wood lands. When I say take care of your timber and wood lands, I do not mean simply to preserve them. You might fence in fifty acres of land and

plant trees for the benefit of your children. It does not aid any country to let the present growth of timber stand, because the decay will be just the same in any event. The timber becomes ripe, and dies in the course of nature, and when ripe it should be cut off. What I want to see is, that the farmers shall restore the forests by the planting of trees, and keep on planting. If you want to do something for your children, and your children's children, the best thing you can do is to plant trees, and to plant timber.

I think I shall take the liberty, for I am privileged in this case—when I received, by the kindness of our friend here, through your Secretary, a copy of your annual report, I only had a few minutes to look at it, and I was very much interested in the work of your association. In looking through the report, I noticed that you discussed all sorts of matters. During the session of last year, I noticed that almost everything was brought up at times by somebody. In connection with this, I want to call your attention to five questions, and but very hastily, that you and I, and every farmer, and every citizen are very much interested in.

I said something a while ago in reference to education. That related necessarily to the education in the common schools of our country, in New Jersey, in Indiana, in Ohio, and in the West—the education of our children to be farmers in the near future. There is another matter we are very much interested in, and that is, that the time is coming—and there is no reason why farmers should not take the deepest interest in all great questions, and everything that concerns the sixty millions of people of which they are a part. It is a great mistake for the farmers of the country that they will run only the agriculture, and allow the doctors and the preachers and the shoemakers, and other professions, run all the balance of the country. That won't do. I have more faith in the fact that the farmers of this country are intelligent men, and look well after the nation, and that they are deeply interested in the welfare of the Republic, than in any other balance wheel I know of. Only to-day, I picked up the *Cincinnati Commercial*, published in Cincinnati, Ohio, and there I saw that the Ohio legislature has taken the legislation of Cincinnati out of the hands of the city. And we were driven to do that some



years ago because the city had become so corrupt that the value of the property of the people, and the lives of the people, were not secure, and therefore they had to appeal to the State at large to look after that kind of legislation. The necessity is somewhat true in the city of New York. The city government is becoming so corrupt that it is necessary to remove the power from the hands in which the power is now placed.

One of the questions to which I have alluded is this; that the time is coming when we must educate the illiterate from one end of this country to the other. You are interested in removing this fearful blight on the Republic. The illiterate hold the balance of power in this country. There are roaming now, on the western frontiers, forty thousand savages between the ages of six and sixteen, who ought to be in school, and who ought to be educated by compulsory process, if necessary. They have been a trouble to us for years; we have spent hundreds, and thousands, and millions of dollars in our dealings with the Indians, and the only way to take hold of the problem is to have every single Indian educated, not so much in mathematics and such things, but they should be educated in industrial schools; they should be taught to reap and sow, and to work the lands which have been given to them. We have an Indian School at Carlisle, Pa., and an Indian School at Hampton, Va. They are educated there, and they go back to their people as strangers. Some do good, while others take the blanket as they did before. They are too few. Educate all at once, and if necessary, double the standing army, and put every Indian child on the continent into school, and get rid of Indian wars, and Indian wigwams, and Indian massacres, and remove this blight permanently from the country.

There is another question. There are six or seven millions of black people in the Southern half of this country, who are mainly illiterate and uneducated, and yet they are a part of the Republic, a part of our constituency, and a part of the people, and control the country, and elect the officers of the Republic. Should not they be educated by compulsory process, if necessary? I believe in compulsory education anywhere and everywhere. We have such a law in our State, though it is not resorted too, because it is not necessary. In my judgment, compulsory educa-

tion is the counterpart of compulsory taxation. I must pay my share of the taxes whether I will or not, and if I pay to keep up the schools, why should I not demand that all children needing education shall attend that school? If we have compulsory taxation, we ought to have compulsory education.

There is another matter I shall allude to. This is a Republic, and we are citizens of it. And we have a grand country here. The title to your farm is good and secure to you and your children, and to your heirs, but not so in Turkey or Russia. The value of your farm and of your home depends upon the value of your country, and the security of the old flag, and therefore, you cannot afford to forget it, or ignore it, or be indifferent in regard to it. This is a government where the will of the people is omnipotent. It ought to be, and it will be, or the Republic will go down. We cannot afford to ignore this, for I read in this very report which I received to-day, the annual report from this society, that in a majority of the counties in this State—I think I read it, but am afraid to repeat it—that in the majority of the counties of your State, you could buy voters enough to control the election. Is there anything of that kind in the report? I hope it is not true. I was startled when I read that, and intended to bring it in here.

Mr. Dye: It is a preamble to a resolution, page 51.

Mr. Taylor: It is a lamentable truth that the ballot box is not as it ought to be. It is a lamentable fact, that you and I know to be true, that to-day the voice of the people is not omnipotent. I never met a man of any party to justify these proceedings, but it is a lamentable truth that six or seven millions of people are represented in Congress by the requisite number of Congressmen, and yet these people have nothing more to do with the selection of these men than you or I have who live a thousand miles away. It is one of the dangers of the Republic, one of the perils of the country. From the State of Georgia, for instance, there are ten men who sit there in the House. They are distinguished gentlemen, but the number of votes which these ten men received in Georgia aggregated only twenty-eight thousand. Twenty-eight thousand votes sent ten men, and these ten men outvote my friend and myself five times, and yet, in my district, it takes thirty-five thousand men to elect a Congressman

—seven thousand more men in my district to elect one man than in the whole State of Georgia for these ten men. It is a matter of history and a matter of record, and no one denies it. This is a question in which you are all interested. It is a great question and a great peril to this country, and one which we, as American citizens, will have to meet sooner or later. No delay will secure it. It will come one way or another.

There is another national question you are interested in—I have five of them. It is not to interfere with the value of your property or your farm, your house or your personal property. Nearly every annual report that comes from the Secretary of the Treasury, whether Democrat or Republican, shows this. This is the recommendation for the repeal of that statute which provides that there shall be coined, every single month, not less than two million dollars or more than four million dollars of money. That comes out almost always recommended by the President and Secretary of the Treasury. A great many people think it would be a good thing. You will remember, four years ago, on the 12th day of next month, President Cleveland, before he was inaugurated, addressed a letter to the House of Representatives, and to a committee of Congressmen, in which he urgently recommended the repeal of that law, and declared that unless the law was repealed—he thought the peril so imminent it would not do to wait until he was inaugurated, and it was understood in the writing of that letter, dated February 12, 1885, that he was reflecting the wishes and advice of Samuel J. Tilden. Mr. Tilden believed the peril was getting so great, he sent to London, and put a million dollars in bank there, and left it there, waiting for the result he felt sure must come, when there would be a premium upon gold, and when it would be a matter of speculation, and since Samuel J. Tilden's death, his administrators had to go to London and take out letters to get that million back to the United States, and it cost them thirty thousand dollars to do it. I allude to that to show that Cleveland and Tilden believed it. They had no partisan motive in what they were doing. They said that unless that law was repealed, and if this Government went on from month to month, coining from two to four millions of dollars each month, that gold would be exported, take wings, and fly across the sea

away to Europe, and we would have only silver, and that our metallic standard would be a silver standard, and nothing more.

Instead of gold going out of the country faster than it came in during all these years, gold has been coming into the country faster than it went out, and we have to-day more gold in the United States than at any time since Washington was inaugurated. The retention of this silver has augmented our gold, and increased our metallic wealth by millions and hundreds of millions. And the scientific fact is this—our most learned men say this, and I suppose it is true—that the mining and coining keeps pace with the growth of business, and increases the population, and therefore, values will never be disturbed, but if you resort to a silver standard, your values will diminish one-half. Your farms will diminish, and your properties will diminish one-half, and you will realize that silver is not alone sufficient to represent values.

We need the aggregate of gold and silver to sustain the values we have at this time.

Now, there is another question—and I venture upon that with a little bit of apprehension, and I hope you will excuse me—a question you, as farmers, are interested in, and that is the market. Where will you sell your crop? You can have good crops and an abundance of everything, but unless you have a good market your crops will avail you nothing. How will you get a good market? We have heard a great deal in the last year about the markets of the world, and I say it is not a political question generally. No party has a right to seize hold of and adopt this idea in which you and I, as business men, are deeply interested. In the Forty-seventh Congress, thirty-three Democrats voted every time for Protection and made Protection speeches. Some of them were from your State. I remember Mr. McAdoo for one. Therefore, I say it is not a political question. Mr. Charles Tupper, the great Canadian Minister of Finance, has advised Canada to copy our system of Protection, and it has been done, and to-day he says it has been satisfactory and brought prosperity to Canada, and in his annual report from year to year, from the time he adopted that system, he stands up before the Canadian Parliament and recommends and endorses and approves our system of protecting American homes,

and American markets, and American industries. And that is not all. Across the ocean Bismarck stood up before the German Reichstag and pointed with pride to the American Republic, as having grown during protection more marvelously than any other Nation or Kingdom or Republic since the Christian era. To-day this system of ours, this business system, this economic question, this industrial plan, is written indelibly on the statutes of Germany.

Importations pay duty when they enter that country as they do when they enter the United States.

But our farmers are more deeply interested in this question because the American market is their only market to a large extent. A great many things you will grow will not bear transportation. You do not realize here in New Jersey, as we do further West, how important a good market is. Your markets are not as good as they used to be, nor were ours as good as they are now. When a boy we had good lands and good crops. We raised hundreds and hundreds of barrels of apples and thousands of barrels of them lay rotting in the orchard. There was no market absolutely. A cow only brought seven or eight dollars, and a horse fifty or forty dollars, and men worked for twenty-five or thirty cents a day. Flour was \$1.50 a hundred. Butter seven or eight cents a pound, and eggs four cents a dozen. A man worked for eight dollars a month, and I have worked myself, when eighteen or nineteen, mowing with a scythe, for a quarter of a dollar a day, and then had to take an order for it. (Laughter). We did not have any market or any money. They are two things we lacked in that day. We had a few "shin plasters," and we dealt largely in "truck" and "stump-tail" money—bank notes that were good when you went to bed were dead broke when you got up for breakfast. (Laughter). Speaking of this reminds me of a story told me by a friend. Up in New Hampshire—that is, near Canada, this friend was riding along, and he was telling where he had been over in Canada looking around. They were selling eggs for seven or eight cents a dozen—he didn't remember the price. He said there was a lady sitting on the front seat, a tall, elderly lady, who seemed to be annoyed at him. She was very dignified, and he told a great many stories, but she never smiled. He came

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to the conclusion she was disgusted with his stories. Finally they came to talk about eggs, and he said that eggs had been selling for seven or eight cents a dozen, and that seemed to awaken some interest in the lady. And she said, "I would not sell my eggs for seven cents a dozen; it would not pay for the wear and tear on the hen." (Laughter).

We felt the need of markets in that country. We hauled our wheat forty or fifty miles to the canal, and got forty cents and thirty-seven and one-half cents a bushel.

You know here what a good market is, but we knew there what a good market was not. (Laughter.) The ladies in that day dressed in sunbonnets and calico dresses. They did not dress then like they do now, and we worked from five o'clock in the morning until seven or eight at night.

Now, if we want a good market, we must take care of the market we have, as a business proposition, and not a political proposition. These great industrial questions are questions that our farmers are all interested in. You get good prices for your butter, and your milk, and your eggs, and your corn, and your crops, and your fruit, and you get money for it, good money, good in Trenton and good in Canada, (laughter) and good on the Pacific ocean, and good upon the walls of China, and the entire world over, and we are getting plenty of it because we are keeping it at home. This is the great secret of American success during the last quarter of a century—keeping the money at home. I want to tell you about these things, and I want you to think about them. During the year 1884, the farmers of this country bought almost more than they sold, and the balance was paid to Europe and foreign countries in the coin of the country, in gold and silver, that was shipped across the sea, and the balance that was sent away was sixty millions of dollars, and the consequence was that at the end of the year we had \$60,000,000 less than we should have had. During a period of eighty-four years, from 1790 down to 1874, after the panic, during those eighty-four years, the balance of trade had been against us for seventy years. Three score years and ten we had been letting this amount of gold and silver go out of the country, and at the end of that period we were debtors to that extent. We took out of the mountains of California \$600,000,000 of



gold, and when the war opened, in 1861, there was not \$75,000,000 in the United States. More than \$500,000,000 of that very gold had gone out of the country to pay for the balance of trade against us. This is a business proposition and is not politics. Now, these men tell you, and they are business men only, they say that England has always the balance against her. This is true. If you look at the reports of exports and imports of the British Empire, you will find that for forty or fifty years the balance of trade has been against England, and they say it has not broken England up, and therefore, the balance of trade against the United States won't break the United States. That seems like a strong argument. It seems almost unanswerable, but I want to tell you an important fact. That which will break up the United States will not break England up. I will tell you why. We cannot cope with England in this direction, for this reason. When England loses \$250,000,000 of gold every year, because of her buying more merchandise than she sells, by her imports exceeding her exports, she can stand it, but we cannot. I will tell you why. England is the creditor nation of the world. She owns our State bonds, and our county bonds, our railroad bonds, our school bonds—millions and hundreds of millions and thousands of millions of dollars' worth. She owns the bonds of Germany and France, and Russia and Spain. She is the creditor nation of the world, and if the balance of trade is three hundred million dollars against her, what need she care, for she has six hundred million dollars coming in in the shape of interest on her moneys each year as the money she has loaned throughout the world. England was wise enough to become the creditor nation of the world, and accumulated this great wealth before she passed the first Free Trade measure. She gathered her riches through protective tariff laws, and then she began to cope in this way with other countries. We are the debtor nation, and therefore we are compelled to choose between bankruptcy and the protection of our homes and markets.

The time is not far distant when they will land cargoes of wheat in the cities of New York, Philadelphia and Baltimore, from India, under the amount of protection we have to-day, and these duties will have to go up in order to protect the farmers of

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this country. In India, where they grew no wheat scarcely a few years ago, they have had twenty-seven million acres under cultivation, and they produced last year two hundred and eighty-nine million bushels of wheat, nearly as much as is produced in the United States. We produced somewhere between four and five hundred million, and England is building railroads leading from India to London, as far as they can go. Fourteen thousand miles of railroad are being built and paid for by the British Government. They are determined to enable the people of England to procure their wheat cheaper than heretofore, and in India, where labor is seven or eight cents a day, and where the people live on rice and millet, two hundred and fifty millions of people will raise all the wheat the world can consume, if there is not some protection to the American farmer, and you will see that in the near future. If they increase as they have increased in this industry, in a few years they can land wheat at thirty-five cents a bushel, and on the American shore for very nearly the same price. How then can we get a dollar a bushel for our wheat?

I want to insist that this is a peril to business transactions, and that there is no question in this country in which the farmers are so deeply interested as they are, not only in the protection of American agriculture and farming products, but of every other industry upon the continent. We are receiving eighteen million dollars a year in farm products from Canada. Eighteen million dollars going out of this country now over to Canada, for farm products, that you people of New Jersey ought to be permitted to furnish. This money is going out of the country, and it robs us as well as the laborer. Take tin-plate for illustration. We are not making a single bit of tin-plate in this country to-day, and yet this industry will furnish employment for fifty thousand people, and if we made it at home, it would keep here eighteen million dollars annually and furnish employment for fifty thousand people who would buy your milk and your potatoes and your vegetables. Keep the money at home, and bring the people here, if need be, and do the work where it would do us the most good and where it would furnish employment for our people.

The farmer is more dependent on the home market than any one else. Much that you produce will not bear transportation,



and besides this, the transportation to the farmer is exceedingly expensive. Vegetables will not live long—they are short lived, and, therefore, you sell now ninety-two per cent. of all the agricultural products produced in market, and many people think we have protection enough. If we were permitted to raise all our own wool and if we were permitted to manufacture all our own iron, and all our own tin plate, and a few other things, we would have a market for every dollar's worth of agricultural products produced anywhere in the United States. That is the way to make a market for the farmer. The best home market is the market that is hard by, and near at home, a market to which you can send all you can raise, and people to whom you can sell your agricultural produce, but if the home market fail the foreign market will never take its place. I do not depreciate the foreign market. I am in favor of availing ourselves of it in one way, the only way in which it can be done in my judgment—build up our merchant marine. Whiten every sea with American ships, and fill every port with American flags. (Applause). Build ships all along the Atlantic coast, until we no longer pay out, as we do, \$150,000,000 every year to foreign ships, to carry our produce to foreign markets. If there is no other way we can get the markets of the world, we can get them in that way, and in no other way. Farmers of New Jersey, and the farmers of other States, should join hands with the farmers of California. The oceans should meet in this great country. From sea to sea there should be a common impulse. We should build up every American industry, because that would build up every farm and farm house in the country. There is no question in which the farmers are so deeply interested as in this great question of Protection.

Your chairman, coming here this evening, made this remark, "That when farmers are getting the best prices for their wheat, milk, butter and cheese, then we have the best and the greatest prosperity." There is nothing surer than that. He said, "when wheat was ninety cents a bushel, less money goes to the rural district than when it is a dollar a bushel. They felt the need of that ten per cent.; so, when the markets are good for agricultural products, and when the laborer is well paid, you know that is what makes the market of America. The laborer makes the

market, the men who toil and earn their bread by the sweat of their brow. The few people in New York and in this State and in Philadelphia do not make the American market. The toiling American, the laborer, if well paid, makes the market much better. Increase the wages of the laborer, and you will increase the market, not only for agricultural products, but for manufactures also. Reduce the laborer's wages from \$1.50 to \$1.00, and the men who work on your farm, reduce them from \$21.00 to \$14.00 per month, and make weekly wages from \$12.00 to \$9.00, and you cut off the amount of bread and butter he eats. You diminish on the table cloth and on the carpet in the parlor, the pictures on the walls and the comforts of life which he enjoys. We are all interested in paying good wages, and if we protect all these different industries, it means that we will get good prices for our agricultural products. We have a great country, and we should take care of it. It belongs to Americans, and Americans should take care of it and keep it. No people are more benefitted or concerned more deeply than the farmers of the country. In 1860 all the property of the United States was appraised, and it was ascertained that all the real estate, and that all the personal property, and all the stocks, and bonds and money, and the cattle and sheep in a thousand valleys, all the aggregate wealth in 1860 was sixteen billions of dollars, and to-day it is sixty-four billions of dollars and more. In this short period to the present time, how much have we increased our wealth? We have multiplied sixteen billions by four, and to-day there is in this country, in houses and lands, in money and property, in cattle and personal property, sixty-four billions of dollars worth of property. How long were we accumulating that sixteen billions? More than two hundred and fifty years. We had been accumulating from the time of the Pilgrim Fathers down to 1860, sixteen billions of dollars. Now, in the short space of twenty-eight years, we have increased that sixteen billions of dollars to sixty-four billions of dollars. Is not that remarkable? There is nothing in history like the growth of the United States for the last quarter of a century. Up to that time, ours was a fifth rate country and a fifth rate government. Germany was ahead of us, and Russia and France. We were away back, trailing along about fifth in the list of governments of the world.

How is it to-day? We produce more agricultural products than any other country in the world. More manufactures than any other country in the world. More gold than in all the vaults of all the countries on God's green earth to-night. We have more wealth of every kind than in any country on the face of the globe. The American flag to-night is away up in the zenith, far above all the flags of the world. Something has done this; yes, I repeat it, something has done this. Here is a remarkable growth and a remarkable accumulation of wealth. Better homes, better houses, better farms, better fences, better churches, better schools, and academies, and the people better educated and better clothed. What means all this? I tell you, we have got a good country and a good government and Republic. We have made too long a march towards the goal of wealth and prosperity, I tell you, to surrender up one single iota of what we have gained.

I urge you to consider these questions, gentlemen, not as political questions, but as questions of economy, questions that have to do with your farm and my farm, with your home and my home, with your children and my children. It reaches from the lakes to the Gulf and from the mountains to the sea. It is impossible for our country to be forgotten in this late hour, when we have surpassed all the nations of the earth, and all the histories ever written. We had better let well enough alone.

I thank you for listening thus carefully and closely for so long a time to my desultory remarks. I make these as suggestions only. I have not even consulted with my friend here. He is not responsible for anything I have said. My remarks have been extemporaneous, and of things I thought you would be interested in as deeply as I am.

Mr. Burrough: Mr. Chairman, I have been requested to ask that Mr. Taylor take the chair and introduce Congressman Buchanan to the Board.

Mr. Buchanan: I didn't come here to make an address, but only to come with the speaker and keep him company, and would, therefore, ask to be excused.

Mr. Taylor: I want to say (and it is not as a compliment to him that I say it) that he is a very valuable member of the American Congress, and has labored hard and eloquently

during the years I have known him. I take great pleasure in introducing Mr. Buchanan to the Board.

Mr. Buchanan: I did not come here for the purpose of making a speech. I have not even prepared a few impromptu remarks, but there are one or two things I want to refer to. I was thinking, as my friend was talking, and continually protesting that he was not speaking of political matters, why it is in this country we persist in dragging into the political arena every social and economic question. It is not about politics, but about business all the way through. I think it is the curse of our legislative bodies, from Common Council on down to Congress (laughter), that we legislate with reference to a probable present advantage, and not with reference to the necessities of the people. (Applause.) And the politicians are not all to blame for it, either. I notice that a lawyer politician, a manufacturer politician, a professional politician, are all just about the same as farmer politicians—they are all about the same when you get them in the same position. There is very little difference in them when they get into politics.

I say that the reason for this does not rest with the politician. The politician is very apt to catch the first dim whisper of the breeze of public opinion. No man can trim his sails quicker than he who wants votes, and just the moment the people will see that and rebuke it, just that moment it will stop and not before. The remedy lies with the people themselves. Let me give you an illustration right here at home. I do not say that this is a parallel case, but Warren county voted 600 odd majority for Local Option, and a month or two after sends two gentlemen engaged in the liquor business to vote for the repeal of the law which made Local Option. When that question was divorced, the moral sentiment spoke, and when it was mixed up, moral sentiment went to the dogs. Here is another striking illustration. Hunterdon county gave some 1,300 majority for two members to sit in the Legislature and vote for the repeal of the Local Option law. A month or two after, it gave 600 majority in favor of Local Option. When that question was divorced from partisan politics, they voted as they thought the interests of the county demanded they should vote, and these questions ought to be purely economic questions. When the American people will insist that they shall be purely

economic questions, and not bandied about as foot balls in the field of politics, we will have better management of the affairs of this country, and not till then. I said to your Chairman, I would give you some account of the condition of agricultural legislation in Congress. That is all I meant to say. This other you have got for nothing; (laughter) that is all extra, (laughter.) You are well informed as to the success of the efforts put forth in the passage of the oleomargarine law, but you may not be informed as to the number of efforts put forth during the present Congress, to secure the repeal of that act. Owing to the vigilance of our friend Mr. Hatch and his colleagues in the Committee of Agriculture, none of these bills have succeeded and no effort to repeal that legislation has received encouragement. There have been bills introduced to prevent the adulteration of food. I presume you are posted as to the character of these bills. I presume you know that there is hardly an article of food that is not adulterated to-day, some of them grossly adulterated after it leaves the farmers' hands, and before it reaches the consumer. Somewhere in the long line to the consumer, and before it is used, some one tampers with the product. If it is olive oil, they put in cotton seed oil. If it is cream of tartar, something else is used. Black pepper is adulterated with buckwheat hulls. All along the line, everything we consume is adulterated, and efforts have been made to secure these products from adulteration. For instance, the branding of lard when pure, as pure, and when adulterated, as adulterated. Legislation has been attempted in this direction but these efforts have been met with the most stubborn resistance of organized capital and organized effort, and so far there has been no legislation in this direction. All the attempts to protect the products of the farmer—the magnate of the soil—have been unavailing. The time is coming when indignation will demand that what is pure shall be "pure," and what is adulterated shall be "adulterated."

You may not know the condition of the bill to allow you a representative at the Council Board of the Nation. Amendments put on that bill in the Senate after it left the House have delayed the passage of it. Conferees have been appointed on the part of the House, and on the part of the Senate, and these con-

ferrees met, and they tried to settle the differences between the two houses, and when they settle these differences and unite in recommending them to the Senate and House, and if the House accepts, with all of the amendments the conferees have agreed upon, it is then acted upon, and if the Houses agree, it becomes a law and is sent to the President for his signature. That bill is now in conference. There is one difficulty about it, that is something of a scientific character. The question is in regard to the advisability of attaching these barons of scientific agriculture to the bill. The difficulty has not yet been digested but only a day or two ago I asked a member of the Committee of Agriculture as to the condition of the bill, and he said his belief was that these difficulties would soon be adjusted, and that the bill would be sent to the President for his signature, and that the farmers would have a representative around the Council Board of the nation—a representative of the agricultural interests of the country. (Applause.)

Another thing. I have been receiving, during the past two or three months, from all the Granges of the State, petitions for an increase of duty on certain agricultural products. I have replied to the secretaries of these Granges that I had received their letters and that their ideas were in accord with my own, but I believed it simply impossible to effect any legislation of that character at this session. I stated to them that I was in accord with these requests, because it does seem to me that this country is one of the greatest, and if the manufacturer is to be protected in his pottery, the farmer must be protected in his potatoes, and if the manufacturer is to be protected in his woolen cloth, the farmer must be protected in his wool. (Applause). You don't understand, perhaps, as those of us do who are down immediately at the front of the fight—you do not understand the efforts being made, not simply to prevent an increase in the amount of protection afforded you for your products by legislation, but the efforts that are being made constantly to diminish the extent of that protection. Believing that the interests here referred to were voiced in the address of your President a year or two ago, we were much struck with the necessity of increased protection in this regard, and I have no hesitation in replying to those communications which

reach me, that I am in accord with their desires upon this subject.

This is about all the legislation I think of at this moment in which the farmers, as farmers, are especially interested.

Coming up on the cars to-night, we met a gentlemen formerly of Ohio, now of the State of New York—a gentleman about as tall as Brother Taylor, and as stout as I am, (laughter) a magnificent specimen of manhood physically, (laughter.) He asked us where we were going. We told him to Trenton; that I was taking Brother Taylor there to talk to the farmers of New Jersey assembled by representation, in the annual session of their State Board of Agriculture—"The New Jersey State Board of Agriculture. Why, I know about that and its reports, and I want to say there is not a Board in this country whose reports circulate so much in the West, and over the country generally, as this does, and not a report that contains as much good as these reports." (Applause.)

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CIRCULAR  
TO  
Secretaries of Township Agricultural Societies, Granges, &c.

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## CIRCULAR

TO

### Secretaries of Township Agricultural Societies, Granges, &c.

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LINE OF INFORMATION SOUGHT, AS INDICATED BY STATE BOARD :

1. Name of your organization,.....  
Membership,..... Meetings held,.....  
Work done,.....  
.....
2. What are the wages paid adult farm-hands per month, with board?.....
3. What without board?.....
4. Do farmers generally board their help?.....
5. Are there more single than married men employed on the farm?.....
6. Are farm laborers native or foreign—*i. e.*, which class is in the majority?.....
7. How many silos are there in your township?.....
8. Is siloage gaining or losing favor among farmers?.....  
Have any new silos been built this year?.....
9. What crops are used for siloage?.....
10. How many of your farmers are depending on *soiling* rather than pasturing for the support of their cattle during the summer months?.....
11. Are root crops grown to any great extent as a winter feed?.....
12. Is the milk business on the increase or decrease?.....

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13. What crops are receiving *less* attention than they did ten years ago ?.....
14. What crops are receiving more attention ?.....  
.....
15. How many farmers are engaged in sheep business ?  
What are its discouragements ?.....
16. Is the raising and fattening of hogs for market on the increase or decrease ?.....
17. What per cent., if any, is lost by the hog cholera or other disease ?.....
18. Is the poultry interest receiving increased attention ?.....
19. What per cent. is lost by disease ?..... What is the prevailing disease ?.....
20. Do farmers generally fatten as many cattle for market as they did years ago ?.....  
Why ?.....
21. For keeping up their cattle supply, do farmers raise calves from their own stock for this purpose ?.....  
or buy northern or western calves ?.....or  
purchase western cattle ?.....
22. Do you know of any cases of cattle, horse or dog disease introduced by imported stock ?.....or stock from other States ?.....
23. What breed of cows is most for dairy purposes ?.....
24. Are there any creameries in your township ?.....  
How many ?.....
25. Has any *special* action been taken in your township looking to the *general* improvement of the roads and streets ?...  
.....
26. Are farmers, as a class, satisfied, or do they complain of their condition ?.....  
If complaining, what are some of the complaints made ?...  
.....
27. What, in your judgment, do farmers and agriculture most need to-day ?.....
28. Do the farmers in your county receive any benefit from the bulletins of the State Experiment Station ?.....  
How many read them ?.....

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29. Do the farmers appreciate the analyses of fertilizers made by the Station, with their market value and guarantee attached?.....

Do they use these analyses as a guide when purchasing fertilizers?.....

30. Is the Weather Signal Service used by your farmers as a guide in gathering their crops?..... If so, how many?.....

31. Have your farmers planted, as a market-crop, fruit trees, vines and small fruits of any kind? If so, to what extent?.....

32. Has the spraying of fruit trees and vines, to destroy injurious insects, been practiced in your locality, and with what success?.....

What poisonous solutions were used?

By order of the Executive Committee of the State Board of Agriculture.

FRANKLIN DYE,  
Secretary.



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REPORTS  
OF  
County Boards of Agriculture.

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## ATLANTIC COUNTY.

### ATLANTIC COUNTY BOARD OF AGRICULTURE.

#### OFFICERS FOR THE YEAR 1889.

<i>President</i> .....	GEORGE FREITAG.....	Egg Harbor, N. J.
<i>Vice President</i> .....	G. A. FREUDENTHAL.....	Egg Harbor City.
<i>Secretary</i> .....	V. P. HOFFMAN.....	Egg Harbor City.
<i>Treasurer</i> .....	WILLIAM BEHNS.....	Egg Harbor City.

#### BOARD OF DIRECTORS.

PHILIP BERGMAN.	CHAS. KRAUS.	B. H. MUELLER.
FRED. FIEDLER.	HERMAN TRISCH.	

#### DELEGATES FOR STATE BOARD.

V. P. HOFFMANN, two years.	H. TRISCH, one year.
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#### MEETINGS.

The regular meetings of the Board are held at Egg Harbor City on the first Friday in March, June, September and December.

### ANNUAL REPORT.

Our meetings are generally well attended, and great interest manifested in the chief topics in this vicinity ; the growing of grapes, berries and other small fruits ; diseases of plants and animals ; injurious insects and their extermination, &c.

It is to be regretted, though, that besides the Egg Harbor City Agricultural Society, not one of the Societies in the county shows any interest in the workings of the Board, by joining the same, and visiting its stated meetings, which are regularly advertised in every paper in the county.

There is one Fruit Grower's Union, and there are two Poultry Raisers' Societies at Hammonton ; one Fruit Gardener's Union



(organized last spring) in Galloway township; the Atlantic County Agricultural and Horticultural Association (Fair Association), and the old Egg Harbor City Agricultural Society, but only the last named has been upholding the County Board so far.

With great satisfaction I can state that a larger number of the citizens of the county than in previous years obliged me by returning the circulars I sent them, answered. Out of twenty-two there were nine, against three of last year :

From Hamilton township, J. L. Veal, P. M.

From Egg Harbor township, James Tilton.

From Mullica Hill township, Capt. Charles Sealmans.

From Galloway township, (Port Republic,) Richard L. Collins.

From Galloway township, Herman Kayser.

From Egg Harbor City, Egg Harbor City Agricultural Society, in session.

From Egg Harbor City, Atlantic County Board of Agriculture, in session.

Absecon and Hammonton townships returned the report not signed.

As far as Galloway and Mullica townships and Egg Harbor City are concerned, it may be safely stated that about three hundred and fifty acres of new land have been brought under cultivation during the last year, mostly for raising berries and forage plants.

In answering the questions in the circular of the State Board, I would say, the wages of farm laborers by the month vary from \$10 to \$15 per month, with board, and \$20 at Absecon. Without board, from seventy-five cents to \$1.50 per day. Board is mostly furnished to monthly help, but seldom to day laborers.

Only with the exceptions of Absecon, Egg Harbor and Hamilton townships, it has been stated that more married than single men are employed on the farms.

Most of the reports show that farm help is mostly native, especially monthly help; with the day laborers, more are foreign.

Questions from seven to ten have all been answered in the negative; no silos have been tried in this county.

Root crops for winter feed are grown in nearly all parts of the county, except at Port Republic, and in Hamilton township.

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Mr. R. C. Collins, of the former place, remarks that his answers were referring to the immediate vicinity of the same.

Mr. J. L. Veal, of May's Landing, Hamilton township, adds the following remarks to his report :

"This is not much of a farming community. The people live here from the salt meadows, cutting wood, and working in a cotton mill. The soil is light, but good for fruit, and all the people need to make it pay is a little capital and energy."

The milk business is reported increasing in Hamilton township and Egg Harbor City ; stationary in Galloway and Mullica townships, and decreasing in Egg Harbor township and Absecon.

Among the crops that receive less attention than ten years ago, may be mentioned wheat, rye and oats, and in some parts, corn and sweet potatoes. In Egg Harbor and the immediate vicinity, grapes. The culture of hops has disappeared entirely.

Corn, small fruits and vegetables are receiving more attention than formerly ; also, grass and clover where the soil is suitable.

Of all the reports, only Mullica township shows only one farmer engaged in raising sheep. The cause of discouragement in this line is the want of proper pasture, as land is too valuable to turn it into pasture ; the tariff on wool is too low, and dogs are too destructive.

The raising and fattening of hogs for market is, in most parts of the county, on the decrease. The direct causes being most probably the heavy losses suffered for a number of years by cholera. During the past season, however, few or no diseases have been observed in these parts, while in former years the losses amounted to fifty per cent. and even more.

The poultry interest receives increased attention everywhere in this county. That great centre of poultry raising—Hammonton—shows its most beneficial influence in this direction.

The gentleman from Hammonton says in his report :

"Artificial hatching is already a large business and is increasing rapidly. Thousands of dollars are invested in it, and thus far, with great success. Loss, about ten per cent. Paralysis in chickens and roup in hens, are the prevailing diseases."

The fattening of cattle for market has almost entirely ceased, owing to the laws prohibiting cattle to run at large, and that it does not pay, because it can be done cheaper in the West.

Farmers mostly raise calves from their own stock, very seldom import northern or western cows. Diseases introduced by imported stock are not known to us nor reported from any part of the county. Alderneys, Jersey grades, Holsteins and common stock bred to Alderney are the most popular breeds for dairy purposes ; no creameries are reported.

Roads in the county and streets in the towns are mostly in good (some in very good) condition. Hammonton has very fine streets and they are kept in good condition by a road overseer, at an expense of \$2,500 annually.

Galloway township is working it in the same manner, and has raised \$1,200.

Egg Harbor City expended \$1,000 for grading new streets and for repairs ; and about \$1,000 alone for putting the avenue in front of the Camden and Atlantic Railroad in fine order. About \$4,000 was spent for planting shade trees along the streets. They have a road roller and a road scraper, which are doing good service.

Mullica township also purchased a Pennock Road Machine.

Farmers, as a class, do not appear to be perfectly satisfied with their condition. In regard to their complaints, various answers were received :

Egg Harbor City complains of low prices for what they sell, and very high prices for what they have to buy.

Hamilton township : There is not a self-sustaining farm in the township. People have to depend somewhat upon gathering salt hay and cutting wood.

Hammonton : They complain of receiving less than their share of the prices paid by the consumer.

To Question 27, what do farmers and agriculturalists mostly need to-day ? I also prefer to give you some various answers literally.

Egg Harbor township : A very material decrease in tariff on those articles they are compelled to buy both for household and farm use.

Absecon : Better organizations, which would give more information in regard to raising and marketing crops.

Mullica township : Better tillage of the soil and increasing fertility of the same by raising of more cattle and sheep.

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Egg Harbor City : More manuring, and some capital.

Hammonton township : Capital. We are making it but slowly.

In regard to the bulletins of the State Experiment Stations, it may be said that farmers are benefitted by them, and that most of those who receive them, read them. They mostly appreciate the analysis of fertilizers, and use them as a guide in purchasing such.

May I be allowed to mention here, that the copies of the Annual Reports of the State Board are always gladly received and considered very desirable reading for the long winter evenings, and good material for discussion in meetings.

The Weather Signal Service can be used by those who are not too far distant from railroads, or have a Signal Station in town. Egg Harbor township says, "Do not know of any." But all along the railroads they are mostly guided and benefitted by them. We, in Egg Harbor City, are fortunate in having our own volunteer Signal Officer, Mr. H. Y. Postma, who is untiringly making his observations, punctually raising his flags, and not in the least discouraged when the following weather is belieing his signals.

Following is a summary of observations :

# STATE BOARD OF AGRICULTURE.

WAR DEPARTMENT, SIGNAL SERVICE, U. S. ARMY.

ANNUAL SUMMARY OF METEOROLOGICAL OBSERVATIONS, MADE BY H. Y. POSTMA,  
VOLUNTARY OBSERVER AT EGG HARBOR CITY, N. J., FOR THE  
YEAR ENDING NOVEMBER 30, 1888.

Months.	Mean pressure.	TEMPERATURE.			Mean relative humidity.	Total precipitation (rain and melted snow).	Total snowfall.	Remarks.
		Mean.	Max.	Min.				
1887.								
November.....	30.253	41.41	71.0	18.8	75	2.60	0.00	
December.....	30.312	34.72	58.50	10.4	80	5.04	3.50	
1888.								
January.....	30.380	26.49	54.2	1.1	70	4.93	3.80	First snow, Nov. 23d.
February.....	30.289	32.52	53.3	2.6	82	2.78	3.50	Last snow, March 25th.
March.....	30.261	34.82	68.3	3.5	75	5.98	14.00	Highest temp., June 23d.
April.....	30.329	46.77	86.2	25.5	77	3.37	0.00	Lowest temp., January 22d.
May.....	30.163	57.64	89.8	33.0	87	6.48	0.00	
June.....	30.684	67.33	96.4	45.0	80	2.04	0.00	Last frost, April 25th.
July.....	30.172	69.44	91.8	49.8	84	3.87	0.00	First frost, September 29th.
August.....	30.149	71.33	94.6	46.8	82	.58	0.00	
September.....	30.250	62.81	81.8	35.8	83	5.71	0.00	
October.....	30.235	48.95	70.6	27.4	84	5.02	0.00	
November.....	30.331	45.61	74.00	22.1	91	3.19	1.00	
Sums.....	362.955	598.43	919.5	303.0	975	50.99	25.80	
Averages.....	30.243	49.87	76.6	25.2	81	4.25	2.15	

Certified to as a correct copy of the duplicate records in my possession.

H. Y. POSTMA,  
Voluntary Observer.

## FRUIT TREES AND SMALL FRUITS.

There is a decided increase in planting fruit trees and small fruits of many kinds for market, but the planting of the grape has been greatly discouraged by the ravages of the black rot for the past three years. The raising of small fruit for market is carried on to a considerable extent along or near the railroads.

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In Hammonton it is almost the exclusive business, also to a great measure in Egg Harbor City, Galloway and Mullica townships. Captain Sealman reports from his county two hundred and fifty acres in vines, one hundred and five in small fruits and one hundred and twenty acres in fruit trees.

The spraying of fruit trees and vines for the purpose of destroying injurious insects does not seem to have been much practiced, but wherever it was done it was successful, as was reported by Captain Sealman, Mr. James Tilton, of Egg Harbor township, and the Egg Harbor City Agricultural Society.

The poisonous solutions used were sulphate of copper, London Purple, and most of all, Paris Green, which is also used with best success against the Colorado beetle.

The paper bags on grapes have also given great satisfaction, wherever they were applied in proper time, that is, immediately after blossoming. A few persons have put the bags on even before blossoming, and they say they had fine grapes.

The weather was favorable for the crops, generally, through spring and summer, and they turned out a great deal better than last year.

Wheat, rye and oats were not much cultivated around these parts, but wherever planted the crop was a tolerably good one. The corn crop may be put down as seventy-five per cent. of a full one.

White and sweet potatoes also gave a good harvest. Other vegetables and forage plants were very good.

Berries and pears were good crops, but the prices were low. Strawberries brought from five to eight cents per quart, blackberries varied from three and one-half to six cents; raspberries, from twelve to fourteen cents.

Grapes were a failure again, in consequence of the black rot and mildew. Vines which suffered never, or but little, before, such as Nocton's Virginia, Clinton, Claesenar, Cynthia, and others were also attacked this year.

The shipments of crops from Egg Harbor City, Mullica and Galloway townships, for statements of which I am indebted to Messrs. Heintz and Hess, station agents at Egg Harbor City, and Mr. Hack, of Germania Station, were as follows:

Strawberries.....	1,359,000 quarts.
Raspberries.....	4,850 quarts.
Blackberries.....	1,886,616 quarts.
Huckleberries.....	10,000 quarts.
Apples.....	25 barrels.
Sweet Potatoes.....	500 barrels
Cranberries (nearly).....	1,000 barrels

Last January a new stock company, called the Atlantic County Agricultural and Horticultural Association, was formed here, with the object of holding agricultural and horticultural fairs, and bring our annual fair to a more elevated standpoint.

They first purchased the buildings of the Egg Harbor City Agricultural Society at a moderate price. Every member of the latter society became shareholders at once in the new association by his right to such a portion of the property as the total sum of his payments to the society, during his membership, would warrant. Then they went on soliciting for new shareholders, in which they were rather successful for a beginning. They also bought a tract of land of about one hundred acres, for the purpose of building a race course and putting up the necessary buildings. But, the time being too short, they were compelled to hold their fair in the old quarters, and it proved very successful as to exhibits and visitors.

The exhibition of farm products was very fine, several parts of the State being represented, except the surrounding townships. There was a finer and much larger display of cattle than ever before. The exhibition of grapes and fruit was also very creditable, in spite of the black rot. Very fine wines were also exhibited, and, of course, tested and approved of. But the most attractive feature of the Fair was the splendid exhibition of fine poultry, for which we were mainly indebted to the zeal and kindness of the "Hammonton Farms."

In a financial way, the fair was not a success, owing to the great exertions made towards advertising, improving the locality, comfort for exhibitors and amusements.

A great improvement over the fairs of past years has been attained, and by further exertions, and other kindly help of neighboring townships, we hope to improve our fair still more in the future.

The officers of the association are a board of nine directors,

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who meet monthly and publicly. The association meets annually in January.

The old Egg Harbor City Agricultural Society continues to exist and to work for its original object: The promotion of Agriculture and Horticulture. They meet monthly.

Their present and lately elected officers are as follows:

<i>President</i> .....	GEORGE FRIETAG.
<i>Vice President</i> .....	PHILIP STEIGAUF.
<i>Secretary</i> .....	V. T. HOFFMAN.
<i>Treasurer</i> .....	FRED FIEDLER.

## BOARD OF TRUSTEES.

G. C. FREUDENTHAL,	J. C. BRAKE.	GEORGE OBERLE.
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The industries of Egg Harbor City, besides grape and fruit growing and wine making, are chiefly tailoring for manufacturers in Philadelphia and New York. Two canning factories have been working here this fall, therefore scarcely any tomatoes have been sent to market elsewhere.

In this connection, I should not fail to mention another interesting occupation which about ten persons are following in this town as a secondary help. It is the care of the honey bee. They all say that it pays well enough for the little trouble it makes. Honey is sold at from fifteen to twenty-five cents per pound, according to the quality and age, the older article being considered more wholesome than the fresh one.



## BURLINGTON COUNTY.

### BURLINGTON COUNTY BOARD OF AGRICULTURE.

#### OFFICERS FOR 1889.

<i>President</i> .....	SAMUEL R. LIPPINCOTT .....	Moorestown.
<i>Vice President</i> .....	ROBERT TAYLOR.....	Columbus.
<i>Secretary</i> .....	HENRY I. BUDD.....	Mount Holly.
<i>Treasurer</i> .....	JAMES LIPPINCOTT.....	Mount Holly.

#### BOARD OF DIRECTORS.

EMMOR ROBERTS, Burlington County Agricultural Society, P. O., Fellowship.  
SAMUEL C. DECOU, Moorestown Agricultural Society, P. O., Moorestown.  
EZRA ENGLE, Mount Laurel Farmers' Club, P. O., Masonville.  
JACOB D. CORNISH, Coopertown Progressive Farmers' Club, P. O., Beverly.  
JAMES W. DEACON, Mount Holly.  
EDMUND COOK, Pomona Grange, P. O., Burlington.  
ISAAH A. BALLINGER, Medford Grange, P. O., Medford.  
THOMAS B. GANDY, Mount Holly Grange, P. O., Mount Holly.  
FRANK T. ZELLEV, Columbus Grange, P. O., Jacksonville.  
ALFRED SATTERTHWAITE, Crosswicks Grange, P. O., Crosswicks.  
ALFRED BUDD, Pemberton Grange, P. O., Pemberton.  
JOSEPH LUNDY, Rancocas Grange, P. O., Rancocas.  
JOHN S. COLLINS, Moorestown Grange, P. O., Moorestown.  
NATHAN S. WRIGHT, Edgewood Grange, P. O., Burlington.  
JONATHAN B. KELSEY, Director at Large, P. O., Pemberton.

#### DELEGATES FOR STATE BOARD.

For two years .....JOSHUA FORSYTH.....Pemberton.  
For one year. ....ALFRED SATTERTHWAITE.....Crosswicks.

#### MEETINGS.

The regular meetings of the Board are held at Mount Holly, on the second Saturdays of August and December, at ten o'clock A. M.

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### ANNUAL REPORT.

BY HENRY I. BUDD.

The sessions of the Board were unusually interesting and attended by a large number of farmers, crowding the hall in which they were held to repletion. Many interesting papers were read and animated discussions followed, showing they were fully alive to the causes that were operating to depress or improve their condition. The following subjects engaged their attention and brought out many fine papers and instructive debates.

Is it profitable to make Milk in winter at the present prices?

Paper from Henry C. Lippincott, Marlton.

How to feed Cows to make them pay.

Paper from Horace Lippincott, Jobstown.

Ensilage and its Product.

Paper from Elwood Evans, Marlton.

Fertilizers and their Application.

Paper from Samuel R. Lippincott, Moorestown.

Fruits for this Section.

Paper from Samuel DeCou, Moorestown.

Ice Houses and Cold Storage.

Paper from John S. Collins, Moorestown.

Why does not the Farmer share in the prosperity of the Country?

Paper from William R. Lippincott, Fellowship.

Paper from Robert B. Engle, Mount Holly.

Is the Farmer to blame for his Condition?

Paper from Edmund Cook, Burlington.

Does the Farmer have more than an equal amount of taxation, direct and otherwise, and less encouragement than the manufacturing, trading, transporting or carrying interests of the country? If so, why?

Discussion opened by paper from Charles Parry, of Parry, N. J.

#### ORDER OF DISCUSSION.

Henry C. Lippincott, Marlton, made some statements which

demonstrated it was profitable to make milk in winter at the present prices. During a two weeks' feeding of twenty-three cows with bran and hay, he cleared \$28, after a deduction of all expenses. J. B. Warrick, of Hartford, sold in one week, from fourteen head, fed on hay, corn and bran, \$26.05 worth of milk. He manages to have his cows come in the first of September, believing that winter milk is more profitable than summer. Brewers' grains strongly recommended by both.

The following is Horace B. Lippincott's paper :

Those of you who were present at the last annual meeting of the board undoubtedly remember that I reluctantly accepted the position of chairman of a committee to look after the interests of the hay market and to endeavor to get the milk law repealed or modified.

My objections were, that I was not interested in the hay market and was opposed to interference with the milk law : for, from general observation, I believed it to be a good and just law, but, as the other members of the committee waited for me to call them together, and not wishing to detain the meeting, I joined them. After a short conference, we adjourned to meet in Camden at an appointed time, at which adjourned meeting, I believe, all of the committee, except Henry J. Irick, were present. We inquired into the interests of the hay market, but took no action until there should be a cause for it, when we were to meet again ; but, as I have never heard anything further, I suppose the change then talked of on the other side of the river has not been effected.

Having been almost alone at the annual meeting in defending the milk law, I did not expect and neither did I receive much help in the committee. We attended the State Board at Trenton, and there I found many friends to the law, as most all in the northern part and many in the southern portion of the State were opposed to any change in the law, the principal opposition coming from Burlington county, the most of which had been brought about by George Abbott's strenuous efforts to make dissatisfaction with the law, the repeal of which would benefit the milk dealers of Philadelphia. I have never heard of a dealer in this State trying to get it repealed. It is well known that he had articles printed and distributed throughout the county ; that he had a lengthy paper about the laws of France and England and the oppressed farmers of New Jersey, which he read before the County and State Boards, and that some of the leading milk dealers in Philadelphia were there to aid him in having repealed a law which prevents dishonesty and protects the infants and invalids of our cities.

Now, why should the milk dealers of Philadelphia be so anxious to blot from our statutes such a just and beneficial law ? Would they get a better quality of milk ? No. Would they get it for less price ? Not without it was watered. Then, what can be their object ? This I will endeavor to explain.

During the winter of 1887, the dairymen of Pennsylvania, some of whom are both determined and independent, made an effort to have a bill before their Legislature, similar to the New Jersey law, but there was one presented by a Board of Health in Philadelphia which took its place, and when the dealers, many of whom went to Harrisburg to defeat the bill, had accomplished their purpose, which they had boasted they would do, it was too late to present another. Now, if they could have enough in-

## BURLINGTON COUNTY.

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fluence in this State to have our law repealed before their Legislature convened and another bill came before it, the fact of the New Jersey law being erased from our statutes would have much weight there. Some may ask why I am so much interested in the Pennsylvania milk law. It is simply this: Much of the New Jersey milk goes to Philadelphia, the price of which is controlled by Philadelphia dealers. It is also known that a few years ago they put the price down in Camden by making threats to the dealers that if they did not lower the price they would run wagons there in opposition to them, thereby intimidating them and lowering the price. During my last four years of congenial associations with many of the leading dairymen of Pennsylvania, I have learned much of the milk trade and know that much skimmed milk and water are sold in Philadelphia as whole milk and that when milk is scarce, thousands of quarts of skimmed milk are daily received from the creameries, much of which is sold as whole milk, which imposes on the producer and aids the dealer in regulating the price to the farmer, but does not prevent their selling it wholesale for five, six, seven and eight cents per quart and even higher on some occasions.

Having found so much opposition to the law, through ignorance, by many, and perhaps dishonesty by a few, I resolved to make thorough investigations, and if I was wrong to change my actions. Soon after the meeting I purchased instruments, and whenever there was a possibility of any change, either through the weather or change of feed, have tested not only my own milk, but on many occasions have tested all the milk received on the Jobstown platform. When the State Inspector visited our station, we compared instruments and found mine correct. In order to be more positive of the value of the lactometer, I conceived the idea of having milk from different kinds of feed analyzed, for which I have made some severe tests with some of my cows, but have in no case found the lactometer as high as the analysis, which, to me, is sufficient evidence that my tests throughout the year have been correct, and I have found but one can that fell below twelve per cent. of solids and that had undoubtedly been watered by some one, for it was too far below to admit of any doubt, and but three cans that have been below thirteen per cent. of solids.

In my many experiments I have found that the poorer the quality of the feed, the smaller the quantity of milk, with less fat; but the legal per cent. of solids was always there, and any farmer having instruments and the knowledge of using them, can, if he be so disposed, water his milk every time and yet keep within the requirements of the law, but if he does not know how to use them, he had better not try it, as he might soon drop fifty dollars. But the milk dealer as well as the State is to be satisfied, and if he finds the milk not up to his ideas he does not want it, so the milk law is not the only trouble to the dissatisfied. Some may say that my statements are different from those made by George Abbott. That is true and both may be correct. His were made from milk after it had passed out of the farmers' hands, through transportation by rail, across the river and through the streets of Philadelphia, and he does not know that it was pure when it left the farm, while mine were made on the farm and at the station from which it was shipped. The following shows the results of experiments by analysis:

Cows.	Feed.	Fat.	Solids
Two cows.....	Pumpkins, corn fodder, short pasture.....	3.34	13.667
Two other cows.....	Brewers' grains dried and corn fodder.....	5.047	15.147
The same two.....	Bran and corn fodder.....	3.897	14.457
The same two.....	Sugar corn fodder only.....	3.84	12.707
Balance of herd.....	Bran, corn fodder and short pasture.....	3.897	13.797
Same herd.....	Dried brewers' grains, corn fodder and short pasture.....	3.977	13.947
One cow.....	Grain and corn fodder.....	3.44	13.147
Same cow.....	Cornstalks only.....	3.34	12.70
Two other cows.....	Fodder and grains.....	3.73	13.537
Same cows.....	Fodder and potatoes.....	3.60	13.60
Herd.....	Grains, fodder, short pasture, 1-14 water added.....	3.78	13.67
Herd.....	Same with one-half water added.....	3.53	12.45

The following is the result of my experiments on two cows with different kinds of feed in pounds and ounces. The weather was very pleasant until the last week, which was cold and blustery :

Grains.		Corn fodder.		Grains.		Bran.		Oats.		Grains	
Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.
31	2			32	7½	24	8	26	9	29	8
33	7½			32	5½	21	6	25	14½	27	8
34	5½	28	6½	32	6½	20	13	27	8½	30	13
33	1	27	½	33	12½	24	10½	28	11½	30	
35	7			29	13½	23	6½	27	5	31	2
33	½			40	15	25	9½	27	14½	30	14
200	7½			201	12½	141	5½	163	15	179	13

Elwood Evans, Marlton, spoke on "Ensilage and its Product." His silo has been in operation nearly two years. Instead of a pit in the ground and separate building, as was the former custom, he boarded up two bays of his barn alongside of and convenient to his cattle. The cost of preparing the bins was \$250, and they will hold about two hundred and sixty tons of ensilage. He last year filled them with the product of the fifteen acres, which produced at the rate of fifteen to twenty tons per acre. From it he fed forty-six cattle seven months, with the addition of the usual amount of bran, and the cattle came out better than they had on previous years with dry feed and relished it so much

## BURLINGTON COUNTY.

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they would not touch the best clover hay when offered with the ensilage. He thought the silo added about one-third to the value of the food. He cuts the fodder at the time the ear is passing out of the milk into the solid and is particular to cut it not more than one-quarter inch in length, this being very essential for perfect mastication and digestion.

The value of the product is much greater for being sweet instead of sour ensilage. The last affects the milk injuriously, the first improves its quality. To obtain it sweet the bins are only partially filled, then after great heat is developed by fermentation, filling is finished. It is never trod on or pressed with weights. After filling, loose cut hay or straw is thrown over the top; the result is a product sweet as grass, consequently more nutritious than the acid product of the first experiments.

John S. Collins, Moorestown, on "Ice Houses and Cold Storage." Had found it a good thing with plenty of ice. Fruit packed at the right time and carefully handled so as not to be bruised, can be kept an indefinite period without a loss of over one per cent. His experience has proved that it is better to allow the drippings of the ice to fall on the fruit, as it prevents shrinkage. He thinks the use of chemical compounds, to reduce temperature, will answer only in the large establishments, not on a small scale. The proper temperature to be maintained is from thirty-five to thirty-seven degrees.

Samuel C. DeCou, Moorestown, read an able paper on "Fruits for this section." Emmor Roberts' experience and observation was that fruits originating South do well in this section, while those from the North, especially Canada, do poorly.

Edmund Cook's paper :

I believe it is admitted by all present that the condition of the farmer is not prosperous; that farm property, both real and personal, is depreciating every year, and that farming as a business is less profitable than almost any other class, and that farmers as a class are getting poorer instead of laying something up for their needs when they most require it.

Farmers and their wives, as a whole, work as hard and more hours than any other calling. That being admitted, there is certainly something wrong somewhere, and somebody or something is to blame for this condition. I claim that agriculture is the foundation of all wealth in this great land of ours, and those occupied and interested in tilling the soil out-numbering almost all others in other businesses or callings, and while I claim that agriculture is the foundation of all wealth and prosperity, I wish it to be understood that I believe there is just as much necessity for the equal prosperity of

other interests to complete the structure of civilization of this the latter part of the nineteenth century, and that if one part of the edifice is made strong at the expense of other parts, the result must be disastrous to the whole and end in general ruin. The danger of fostering privileged classes is just as much in a republican form of government as under a monarchy or other centralized power, I know. I may be considered an alarmist, but, nevertheless, I feel it to be my duty to point out the danger as I see it, and feel that it stares us all in the face, and must be met sooner or later, and that is the danger of the influence that the money power is having over and controlling the affairs of the people, and if tolerated and allowed and be made respectable at no very distant day, hoodle will be proclaimed king and his power and authority in every way that the name of king, emperor or tyrant suggests. I make the proposition that the farmer is to blame for the condition he is in at the present time.

In the first place, the farmers of the country do not co-operate in their business as other business men do. The farmers are the only people that allow the buyer of their product to fix the price on it. We see every day combinations of others to fix the price on the articles they have to sell and on the price of the labor they will pay for manufacturing those articles, and they expect a great deal higher interest for their money invested in their business and a great deal higher pay for their personal skill and attention to that business than the farmers ever dream of. Other industries, where the prices obtained for their goods are not as large as they think it should be, they limit or stop production. Not so with the farmer; he goes on from year to year and raises all he can, regardless of his profit or loss, as long as he can, or as long as his money or his credit lasts. Therefore, I say that the farmer in that respect is to blame for his condition, and that he must adopt a better system of doing business before he can share in the general prosperity of the country.

I also blame the farmers for their prejudice in township, county, State and National affairs, and that they allow it to overcome their better judgment and serious consideration, and that any measure proposed by the real friends of the people, of no matter what party, if it does not come from the party they belong to they reject it, no matter how much it may be to their advantage to support that measure. The farmer does not look to that first law of nature, self-preservation. The farmers do not ask for what they are entitled to, that is, an equal chance and equal rights with others. We see many interests that, no matter where or when, if their unjust privileges are in danger of being taken from them, they leave nothing undone; they spend their money without limit to defeat that measure, and prevent equal distribution of those privileges where they of right belong, and the farmers from prejudice assist them to carry their point, and to keep their foot on the farmers and industrial classes of the country, and make the many pay tribute for the benefit of the few, and create a privileged class that will eventually rule the country if it does not now. I have already made this too long, but feeling sincerely that the farmers in this county are in a very unsatisfactory situation, generally working hard and getting but little pay for it (notwithstanding the fact that some leading papers of Philadelphia and of our own county have not heard of it) but such is the fact, that I believe those present will acknowledge that being the case, and to use the words of one of the greatest statesmen of our age: "It is a condition and not a theory that confronts us," and there is an irrepressible conflict between the privileged classes and those that are taxed to support them, and certainly we are to blame if we do not use the proper means given us to make our condition as good as others and not to foster and encourage other callings at our expense, but to work for equal rights and equal taxation, direct and otherwise, and no especial discrimination in favor of any.

EDMUND COOK.

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### Charles Parry's paper :

DOES THE FARMER HAVE MORE THAN AN EQUAL AMOUNT OF TAXATION, DIRECT AND OTHERWISE, AND LESS ENCOURAGEMENT THAN THE MANUFACTURING, TRADING, TRANSPORTING OR CARRYING INTERESTS OF THE COUNTRY? IF SO, WHY?

That farmers do not share to the extent that they should in the general prosperity of the country, is a proposition that does not admit of discussion. It is admitted on all sides, not only by farmers themselves, but by members of other professions as well. That it is so in the East, the farmers here present will bear witness ; that it is so in the West is amply proven by the large number of trust companies in all our eastern cities, with branches in every country town, whose only business it is to place mortgages on western farms.

It is a question whether any great amount of this depression is caused by our system of direct taxation. Yet it would seem just, that those properties wherein capital is utilized over and over again many times a year should be more heavily taxed than a farm where the great majority of crops take a year to mature. For instance, a sugar refinery turning out 3,000 to 4,000 barrels of refined sugar every day in the year, could bear a heavier rate of taxation than the fields of cane which only mature once a year ; or a cotton mill, using the product of thousands of acres of cotton, could bear a higher rate of tax than the fields of cotton themselves. This principle is carried out in the city market houses, where a farmer's stall is rented for \$40 per year, whereas a dealer is charged \$75 for the same stall. This is just, since a farmer can only utilize his capital once a year, while the dealer can turn his many times. If some such distinction could be introduced into our system of direct taxation it would be greatly to the farmer's advantage.

Again, it is a question whether professional men, such as lawyers, doctors, &c., should not be taxed on their professions. As a rule they enjoy large incomes from their professions, and yet pay no taxes upon them. Let me try to make this clear. Suppose two brothers are left \$5,000 apiece. One invests his in a farm ; that is his capital. The other spends his in obtaining an elaborate legal education. That is his capital. The lawyer rents an office, and the chances are that in the course of years he will enjoy five times the income of his farmer brother. Yet the farmer is heavily taxed on his capital, while the lawyer pays no tax on his. Why is this? The farmer works from 5 A. M. to 8 P. M. and then probably takes down a load to market at night. He sets out his cabbage in the rain and harvests under the burning sun. He lives on pork and cabbage and grows prematurely old from rheumatism and overwork. The lawyer, on the contrary, sits in an easy chair in his office from 9 to 3 ; charges his clients heavy fees ; grows portly from liberal doses of turkey and champagne, and finally is sent to the Legislature or Congress to adjust the tax laws, and, as is perfectly natural, lays the taxes upon others and exempts himself. However much the farmer may be discriminated against in the matter of direct taxation, he suffers much more from our system of indirect taxation. While our manufacturers are heavily protected to insure them large profits, farmers reap no benefit from the protective system. Everything that they buy, their clothing, their buildings, their furniture, their farming utensils and much of their food, is greatly increased in price by this system, while their crops are either not increased in value or actually diminished thereby. The price of farmers' produce, wheat, corn, cotton, tobacco, &c., is fixed in the markets of Europe. This price is the same,



whether the tariff is high or low. A German or English miller, when he buys our wheat, does not inquire whether tariffs are high or low in the United States. He asks whether American wheat is higher or lower than that grown in Russia or India. He will give just as much for our wheat, if our tariffs are low, as though they were high, and the price that these millers give regulates the price that is given in New York, Philadelphia and Chicago. And this dependence upon the foreign miller is every decade getting greater. To show this let me give a few export figures of wheat. The average yearly export from 1867 to 1871 was 26,000,000 bushels; from 1872 to 1876, 49,000,000 bushels per year; from 1877 to 1880, 97,000,000 bushels per year; from 1881 to 1885, 125,000,000 bushels per year. The exports of corn are increasing at about the same ratio. Hence, it is evident that we must accept the European price, less the freight, for our grain for an indefinite time to come.

Corn and wheat are the balance wheels of agriculture. The profits realized from these crops regulate the profits received from all others. Whenever fields of tomatoes, citrons or potatoes pay better than corn or wheat, the grain farmers increase their planting of these crops until the profits are forced down to a level with those of corn and wheat, or way below that level, as was the case the present year, when thousands of baskets of truck sold for one cent per basket and thousands of others could not be sold at all, but were dumped in the river or carted back home. To illustrate this, a certain farmer last year had one acre of citron that paid him handsomely. This year he increased his planting to ten acres, and the result was a heavy loss. Next year he will largely reduce his area of this crop.

Thus the profits of truck farming are in the end regulated by the profits realized from grain farming. And we have seen that this was entirely independent of tariff rates. So that no matter how high the tariffs they cannot add one dollar to the farmer's receipts. It would be better for the farmer if the tariffs were removed from his products for then the manufacturers would not have an excuse for maintaining such exorbitant rates upon their products. As it is at present, the tariff on farm products is offered to the farmers as a sop, to secure his consent to heavy duties on manufactured articles.

Whenever a manufacturer sells the farmer a coat, a box of glass, or other articles, he charges him double what he could get from a foreign buyer. But when a farmer sells to a manufacturer his wheat, corn or lard he has to take exactly the same price that the foreign buyer gives him. This is a one-sided arrangement that constantly works to the farmer's loss. What is the remedy? The popular remedy, and the only sensible one, would be to reduce all the tariffs to the lowest possible notch, consistent with the expenses of the government. This would have the effect of greatly reducing the farmer's expenses while maintaining or increasing its receipts. But from the results of the last election it appears that the country is not yet ready to adopt this course. Let us see what is the next best thing for the farmer. If this system of high tariff, which is only another name for mutual robbery, is to be perpetuated, then farmers ought to have their share of the spoils. They are compelled to furnish a heavy portion of the plunder, but at present take no part in its division. How can this be brought about?

It can be easily and justly accomplished by an *export premium on grain*. Let the government pay a premium of twenty cents per bushel on all wheat and ten cents per bushel on corn and other grain exported from our ports. This would have the effect of raising the price of every bushel of wheat grown in the United States twenty cents per bushel; and every bushel of corn and other grain ten cents per bushel. And this

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would be done at a moderate cost to the government. It is estimated that nine-tenths of all grain grown is consumed at home and only one-tenth exported. The government would only pay the premiums on the one-tenth exported, yet the farmers would receive the advance on the whole crop. Let us see what the figures would amount to. By the census of 1880 there were grown four hundred and sixty million bushels of wheat and twenty-two hundred million bushels of corn and other grain. Twenty cents per bushel on one-tenth of the wheat would amount to nine million dollars, and ten cents per bushel on one-tenth of the corn and other grain would amount to twenty-two million dollars, or a total of thirty-one million dollars cost to the government. Let us see what the benefit to the farmers would be. Four hundred and sixty million bushels of wheat at twenty cents per bushel would amount to \$90,000,000; twenty-two hundred million bushels corn and other grain at ten cents per bushel, would amount to \$220,000,000, a total of more than \$300,000,000, as a direct result of this policy, would be divided every year among the farmers. But the direct results are not the only ones, or even the principal ones, that would flow from this policy. As we have seen before, wheat and corn are the balance wheels of agriculture, the regulators of its profits. And whatever policy increases the profits of these cereals, would correspondingly increase the profits of every other crop. Let us take the low average of fifteen bushels per acre for wheat and thirty bushels for corn. This premium would increase the profits of these crops \$3 per acre, and through them the profit of the whole farm at a like ratio. As the acreage of cereals is less than half the total acreage of land under cultivation, it is safe to put the increase from other crops at a like amount, \$300,000,000, or a grand total of \$600,000,000 to be divided every year among the farmers of the United States as a result of this beneficent policy.

It may be proper to add that this is no new or untried theory. This policy has been adopted by several nations. Germany, especially, has pursued it for some time past, and by her export premium on sugar has stimulated her sugar industries to an enormous degree and by the same means has almost destroyed the sugar refineries of Great Britain.

When we consider that this large amount, more than six hundred millions of dollars, can be secured to the farmers, by an expenditure on the part of the government of only thirty-one millions of dollars, it would seem a wise and equitable thing to do. When we consider further that the whole of this thirty-one millions of dollars, that it is proposed to expend for the farmers, and much more besides, is every year wrested from the farmers and heaped up in the United States Treasury by the unequal working of our high tariffs, then not only wisdom but naked justice demands that the expenditure should be made for the farmers, in order that like good seed it might increase twenty-fold.

There is no doubt that pension agents, lobbyists and other Treasury thieves would oppose this policy. They regard the Treasury funds as their natural prey, and any plan to divert it from their pockets would meet with a fierce and determined opposition. But that this opposition can be overcome if farmers present a united front, cannot be doubted. They comprise nearly half the population of the country. Every other interest combines to secure legislation for its benefit, and why should not farmers? Let them demand with a united voice what they desire and it will be granted.

With this policy in operation, an era of prosperity would open to the farmer as resplendent as the past has been dark and gloomy.

Instead of being constantly haunted by promissory notes and mortgages the farmer at last could talk of bank balances and dividends ; but this vision seems so different from the present reality that I fear any longer to contemplate it.

CHARLES PARRY.

ANSWERS TO QUESTIONS.

The following are the answers to the questions propounded by the Executive Committee of the State Board of Agriculture. They are condensed from reports made by the Progressive Farmers' Club, of Coopertown ; Mt. Laurel Farmers' Club, Columbus, Moorestown, Medford and Mount Holly Granges ; Charles A. King, Jacksonville ; Henry C. Lippincott, Marlton ; Horace Lippincott, Jobstown ; Joel Wainwright, Jacobstown ; Thomas J. Bean, Moorestown, and verbal testimony to the writer from numerous farmers, together with observations made in travelling over the county :

- Question No. 1. The number of farmers' organizations in our county are thirteen ; the most of their meetings are held monthly, some weekly. Their membership numbers about 1,000. Work done is agricultural and economical discussions and co-operative purchases, etc.
- Q. No. 2. A. Wages paid adult farm hands per month, with board, \$10, \$12, \$15, \$16, \$18, \$20.
- Q. No. 3. A. Without board, \$1, \$1.25 per day, and \$20, \$22, \$24, \$25, \$26, \$30, \$35 per month.
- Q. No. 4. A. Farmers, except on the fruit and truck farms, generally board their help.
- Q. No. 5. A. There are more single than married men employed on the farms, but married men are the most reliable.
- Q. No. 6. A. There is more native than foreign help employed on the farms.
- Q. No. 7. A. There are twelve silos in our county.
- Q. No. 8. A. Siloage is gaining in favor among our farmers. Four silos have been built this year.
- Q. No. 9. A. Corn is used entirely for siloage.
- Q. No. 10. A. Many of our farmers are depending on soiling to supplement pasturing for the support of their milch cows during the summer months.

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- Q. No. 11. A. Root crops are not grown to any extent for a winter feed.
- Q. No. 12. A. The milk business is on the increase.
- Q. No. 13. A. The products that are receiving less attention than they did ten years ago are sheep, beef, veal, swine, turnips, strawberries, raspberries, blackberries, wheat, corn and oats.
- Q. No. 14. A. The products that are receiving more attention are, milk, potatoes and truck of all kinds, pears, peaches and grapes.
- Q. No. 15. A. About one-tenth of the farmers are engaged in the sheep business. The discouragements are low prices for wool, lambs, mutton ; inability to obtain early lambs and to compete with the West, South and dogs.
- Q. No. 16. A. The raising and fattening of hogs are on the decrease.
- Q. No. 17. A. During the past year there has been no loss by hog cholera.
- Q. No. 18. A. The poultry interest is receiving increased attention.
- Q. No. 19. A. The percentage of loss of poultry by disease is about one-quarter. The prevailing diseases are cholera, gapes and roupe.
- Q. No. 20. A. Farmers do not generally fatten as many cattle for market as they did years ago. It does not pay ; cannot compete with the prices of Chicago or western beef.
- Q. No. 21. A. For keeping up their cattle supply farmers raise a few from their own stock, buy western and northern calves and western cattle in about equal quantities.
- Q. No. 22. A. Do not know of any cases of cattle, horse or hog disease introduced by imported stock, or stock from other States.
- Q. No. 23. A. Holsteins, Guernseys, Jerseys and Mixed Jerseys are the most popular for dairy purposes.
- Q. No. 24. A. There are two creameries in our county, both of which have been quite busy the past season.
- Q. No. 25. A. There has been no special action taken in our county looking to the general improvement of the roads and streets.

- Q. No. 26. A. Farmers as a class are not satisfied. They complain of low, unremunerative prices ; inability to pay as high wages as other industries ; the depreciation of their farm values ; scarcity of female and male help ; low prices of produce, and high price of labor ; grain low priced ; markets overstocked with potatoes, sugar corn, tomatoes and melons. Where farmers do not complain they state frankly that current prices frequently do not meet cost of production and this has occurred so frequently that the selling price or actual value of their farms has as a consequence been greatly reduced, while the assessed valuation on which taxes are based has not been correspondingly reduced ; that the conditions of the markets are such that in selling the products of their farms, the cost of production as in manufacturing is not a considered factor in fixing prices. This latter is especially the case with our sandy land products.
- Q. No. 27. A. Farmers and agriculturists most need more money to clear up the increasing mortgages on their farms ; equal taxation, co-operation, organization, and competition in our local railroads. The only thing that seems available is more economy.
- Q. No. 28. A. Farmers in our county do receive considerable benefit from the bulletins of the State Experiment Station ; most of the farmers read them.
- Q. No. 29. A. Farmers do appreciate the analyses of fertilizers made by the station ; many use them as a guide when purchasing.
- Q. No. 30. A. A small number use the Weather Signal Service as a guide in gathering their crops ; their attention is each year more and more given to it.
- Q. No. 31. A. Farmers are planting largely peaches, pears and grapes to raise fruits for market, but very few are planting to sell the trees, vines, etc., for a market crop, outside of the professional nurseries, of which there are eight in our county.
- Q. No. 32. A. The spraying of fruit trees and vines to destroy injurious insects has been slightly practiced in our county. The poisonous preparations used are Paris

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Green and London Purple in solution. Some have used Paris Green mixed with plaster on apple trees and thought good results followed.

CROP REPORT.

Corn has been a large crop on high and well-drained land ; on low, poor, on account of the excessive moisture prevailing the whole season. The cost of farming has been greater, for moisture induced an excessive growth of weeds. The cool fall season has delayed the ripening until frost caught and injured where not in shock. The result is much soft and green corn not fit to crib. Its selling price is about fifty cents per bushel. The feeding value of the stalks is below the average on account of frost and mould, from an excessive moisture. Some farmers have had the largest yield ever known in our county, whole tillages yielding eighty bushels per acre.

Wheat, about three-fourths of a crop. Excessive moisture deteriorated both in growing and in shock. Price has improved, selling at about \$1.10 per bushel.

Rye, a full crop, 100. Sells at about seventy cents per bushel. Straw, \$12 to \$14 per ton.

Growing winter grain, although sowed late, looks well. A tardy winter has helped its growth.

Oats, a full crop, 100. Hay, two-thirds of a crop ; better on high than low land ; price, \$12 to \$14 per ton.

Young grass is very promising. Pasture in great profusion the whole season.

Potatoes, a large crop, both early and late. Have sold well, but prices now have a decreasing tendency.

Sweet potatoes, a good crop, rotted badly ; prices low.

Apples, a half crop, some full orchards, many bearing scarcely any ; prices have been good, a tendency to lower prices.

Peaches, a full crop, but full half wasted and rotted from the excessive moisture ; prices scarcely remunerative ; the increased planting has already reduced the price in local markets one half.

Cabbage crop about 200, the largest ever known ; impossible to market them all. The cities from Boston to Baltimore have

been filled to overflowing with them. The cabbage worms, for one season, left them to grow in peace. The result has been prices from one to two cents per head, and tons lying freezing and rotting in the fields.

Grapes, a moderate crop.

Pears, a good crop.

Cherries, Strawberries, Blackberries and Raspberries, about half crop.

Melons, a good crop and poor quality.

Tomatoes, a full crop; canners well supplied; many were killed by frost, the wet, cool weather delaying their ripening.

Asparagus, a good and paying crop.

Pea crop good and sold for fair prices.

Early Sugar Corn crop good, but prices were too low for profit.

The whole vegetable crop has been largely in excess of previous years, causing the markets to be so overcrowded that much was sold for one cent a basket or carted home or thrown into the Delaware river.

Poultry, a full crop; prices satisfactory—12 to 14c a lb.

Pork, a short crop; price 7c a lb.; no disease.

Sheep is getting to be each year a smaller industry, caused by low prices for wool and mutton and the uncertainty of obtaining early lambs, the only kind in which there is much profit.

Cranberries, a large crop, but many damaged berries; the price not as good as last year, but will bring the large growers a great deal of money; relatively pays better than any farming industry in this county.

Milk has been very plentiful. During the flush of the season nearly all the dairies had to keep a large part at home.

From the preceding reports we see the condition of the Burlington county farmer is anything but encouraging. Excessive moisture, scarcity and high price of labor, low prices for produce, decreasing prices for farms, increasing mortgages, the desertion of the farm by the farmers' and laborers' sons, all tend to make the prospect gloomy. When one considers the comparative nearness to the great markets of the Union, our condition should be far ahead of the western farmer. Yet land in California and most of the far western States is increasing in value and is far ahead of us in prices.

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The writer spent, during the past year, most of the winter and spring in California, and saw thousands of acres of land sell for from \$200 to \$400 per acre, for to raise fruits and vegetables, where vegetables did not pay the cost of marketing, and wine grapes sell for from \$6 to \$10 per ton, and the surplus products have to seek a market from two thousand to three thousand miles away from home, and much of it raised by irrigation by water brought at great expense from distant mountain streams. Yet thousands of eastern people have left the apparent better advantages of their old homes and taken their chances with these high priced lands.

Among the novelties produced this year for the benefit of the farmer is a combined osage orange and wire fence.

The Dayton Hedge Co. has this year sold several miles of it in our county.

It requires about three years to complete it.

The writer and his neighbor have set out about one mile for a boundary fence which has, this the first year, made rapid growth.

Its advantages seem to be its beauty. Its great strength and durability lasts for generations, takes but little room. Can cultivate and grow crops close to it. Is proof against large or small animals. Can be kept in order very easily, an average workman pruning one mile of it per day, and two or three prunings suffice for the year, and is as good as an ordinary fence.



BURLINGTON COUNTY AGRICULTURAL SOCIETY.

OFFICERS FOR 1889.

<i>President</i> .....	ISAAC FENNIMORE.....	Mount Holly.
<i>Vice President</i> .....	JUDSON C. GASKILL.....	Mount Holly.
<i>Recording Secretary</i> .....	JOHN B. COLLINS.....	Mount Holly.
<i>Corresponding Secretary</i> .....	HENRY I. BUDD.....	Mount Holly.
<i>Treasurer</i> .....	EDWARD B. JONES.....	Mount Holly.

BOARD OF DIRECTORS.

ISAAC FENNIMORE, Mount Holly.  
JUDSON C. GASKILL, Mount Holly.  
HENRY I. BUDD, Mount Holly.  
BENJAMIN F. DEACON, Mount Holly.  
JOSEPH WILLS, Raucocas.  
JOHN B. COLLINS, Mount Holly.  
HENRY ELLIS, Juliustown.  
SAMUEL H. CHAMBERS, Mount Holly.  
WILLIAM R. LIPPINCOTT, Cinnaminson.  
WILLIAM C. PARRY, Mount Holly.  
DAVIS C. WELLS, Pemberton.

FINANCE COMMITTEE.

EDWARD WILLS,                      ROBERT B. ENGLE,                      HENRY C. RISDON.

The annual meeting of the stockholders of the society was held at the court house, Mount Holly, on Saturday afternoon, January 12, 1889.

John B. Collins called the meeting to order. Henry J. Irick was elected chairman and John B. Collins, secretary.

The secretary's report of the last annual meeting was read and adopted.

The treasurer's report was next read as follows :

TREASURER'S REPORT FOR THE YEAR ENDING JANUARY 12, 1889

RECEIPTS.

Rent of ground for pasture.....	\$201 00
Amusements and privileges.....	1,725 44
Rent of refreshment stands.....	3,106 00
Entrance fees for horses.....	2,565 50
Admissions to grand stand .....	2,990 50

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Admissions to grounds.....	\$15,246 87
Exhibitors' tickets.....	106 50
Advertisements in schedule.....	792 35
Rents of stands inside exhibition building.....	357 35
Notes in bank, less discount.....	18,892 19
Materials sold.....	25 30
Public lunch counter.....	446 13
Crossing ring.....	144 00
Coat and package room.....	42 35
	<hr/>
	\$46,641 48

## PAYMENTS.

Balance due treasurer at last annual report.....	\$51 96
Sewer pipes and laying same.....	754 80
Two new exhibition buildings.....	1,468 72
New fire engine house.....	340 00
Repairs to floors, roofs and cases.....	2,700 00
Finishing grand stand.....	1,100 00
Painting and paints for exhibition buildings.....	1,600 00
Fair supplies and expenses.....	701 00
Printing.....	1,572 02
Printing schedules.....	792 10
Advertising in newspapers.....	851 12
Posters and flyers.....	824 00
Insurance.....	101 00
Postage.....	505 08
Stationery.....	60 00
Hay, straw and fodder.....	610 77
Use of steam fire engine.....	112 50
Engraving medals and diplomas and electrotypes.....	122 81
Decorating buildings.....	75 00
Society guest room.....	330 00
Public lunch counter.....	391 26
Salaries—Corresponding Secretary.....	\$500 00
Recording Secretary.....	500 00
Treasurer.....	250 00
	<hr/>
	1,250 00
Interest.....	359 46
Judges.....	206 50
Police.....	475 00
Clerks.....	490 00
Turnstile men.....	173 90
Detectives.....	99 00
Attendants and guards.....	680 00
Laborers and teams.....	454 05
Music.....	245 00
Telegraphing.....	18 25

STATE BOARD OF AGRICULTURE.

Rent of office.....	\$75 00
Freight and expressage.....	34 18
Legal and Legislative expenses.....	111 00
Water rent.....	45 00
National Trotting Association dues.....	56 00
State tax.....	4 00
Premiums.....	13,214 75
Amusements.....	825 00
Advertising fair of 1887.....	33 10
Notes paid.....	11,200 00
Balance on hand January 12, 1889.....	1,528 15
	<hr/>
	\$46,641 48

INDEBTEDNESS.

Notes outstanding.....	\$15,000 00
Less cash on hand.....	1,528 15
	<hr/>
	\$13,471 85

(Signed) EDWARD B. JONES.

The undersigned, members of the Finance Committee, having compared the treasurer's accounts with the vouchers, find the same correct. The balance of cash in the treasurer's hands at this date is \$1,528.15.

(Signed) JAMES LIPPINCOTT,  
JAMES W. DEACON.

The treasurer's report was accepted.

Henry I. Budd then read the directors' report, which was adopted. The report follows :

DIRECTORS' REPORT.

*To the President and Stockholders of the Burlington County Agricultural Society :*

In presenting our report for the past year we cannot give as favorable a financial statement as the almost uninterrupted success of the previous ten years would lead you to expect.

The political parades and excitements incidental to a Presidential campaign ; the wet, extremely cold, windy and unpleasant weather, prevailing through the whole of our fair week, necessitating fire in many of our buildings, lessened our attendance over 12,000, diminishing our receipts from this source, also from grand

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and refreshment stands, as compared with the past year, about \$7,000, as follows :

Loss from admissions.....	\$3,803 38
Loss from grand stand.....	1,636 75
Loss from refreshment stands.....	1,395 82

While on the other hand the constant demand for more space, the necessity for the preservation, repair and improvement of the older buildings, required us to incur the following outlays :

Two additional exhibit buildings, each 100x20 feet, costing...	\$1,468 70
Repairs to floors and roofs of old buildings, air areas, new cases and offices in same.....	2,700 00
Additions and repairs to grand stand.....	1,100 00
New engine house, pipe and fire plug.....	340 00
Painting buildings and fences.....	1,600 00
Sewers and drain pipes.....	754 84
Total.....	<u>\$7,963 54</u>

Leaving us with the finest, most complete equipment and in the best condition of any fair buildings and grounds in the Eastern States.

The fullest and finest exhibit in all departments ever spread upon our grounds was the partial reward and warrant for our expenditures, but failing to overcome the influences that operated against our attendance, we present you with an increased indebtedness amounting to \$6,471.85, which, added to the \$7000 balance of debt left over from last year, makes our total liabilities \$13,471.85.

Our receipts from all sources, outside of notes, were \$27,749.-29; last year, \$35,389.77, a decrease of \$7,640.48. Our Fair expenses were \$25,845.25, which leaves a balance of about \$2000 in favor of the conduct of the Fair.

Our premiums were \$13,214.75; last year, \$12,788.75, an increase of \$426.00.

Our guest building supplied 1153 meals, at a cost of \$330.09, or about 28 cents per meal, a decrease of 358 meals from last year.

Our grand stand has been improved and strengthened, by closing all the back and a portion of the ends and placing a post under the centre of each of the trusses that support the upper

story. As soon as our funds will warrant and a proper plan is devised, it will be policy to enclose the front to protect the interior from storms and consequent decay.

There is no apparent necessity for much of an outlay for a number of years.

A conservative policy, with improvements, expenses and premiums, will, in a couple of years, even with the reduced attendance of this, remove the present debt and then leave us free, if necessity requires, to broaden our buildings and increase our borders.

Dr. Parry reported that the committee appointed at the last meeting to endeavor to have a bill passed by the Legislature to obtain a State appropriation had been unsuccessful. The committee labored diligently and came very near being successful. If the bill had passed, the appropriation to this Society would have been about \$1,000. On motion, the directors were instructed to continue their efforts to secure the appropriation.

Edward Wills moved that a vote of thanks be tendered the officers and directors for their efficient work during the past year, which was carried.

The meeting then adjourned.

## CAMDEN COUNTY.

### CAMDEN COUNTY BOARD OF AGRICULTURE.

#### OFFICERS FOR THE YEAR 1889

<i>President</i> .....	I. W. NICHOLSON.....	Camden, N. J.
<i>Vice President</i> .....	JOEL HORNER.....	Merchantville, N. J.
<i>Secretary</i> .....	GEORGE T. HAINES.....	Haddonfield, N. J.
<i>Treasurer</i> .....	J. STOKES COLES.....	Haddonfield, N. J.

#### BOARD OF DIRECTORS.

E. BURROUGH, Haddon Grange, Merchantville, N. J.  
S. L. BURROUGH, Farmer's Association, Merchantville, N. J.  
A. E. KAIGHN, Delaware Township, Ellisburg, N. J.  
CHARLES E. ALBERTSON, Gloucester Township, Magnolia, N. J.  
D. W. HORNER, Stockton Township, Merchantville, N. J.

#### DELEGATES TO STATE BOARD.

ELWOOD EVANS.....	(Two years).....	Marlton, N. J.
JOHN A. MEREDITH.....	(One year).....	Haddonfield, N. J.

### COUNTY REPORT.

BY GEORGE T. HAINES.

In summarizing the answers to the questions sent out by the Executive Committee, it appears that the average wages paid farm hands are from \$14 to \$20 per month, with board, and from \$20 to \$30 without board. Farmers generally board their help in our county, although the practice of the help boarding themselves is growing more common of late. There appears to be more single men at work on farms than married, particularly by the month, and especially of the foreign help, of which Irish appears to predominate, and German next.

The use of silos is not generally endorsed or appreciated by farmers, as it has not been tested to satisfaction, except by a few who are in the milk business. There are seven in the county, three of which have been built the past year. Corn is generally used for filling.

None of our farmers depend entirely upon siloing their cattle during the summer. Some of the milk men raise green feed to help out the pasture if it proves scarce. Very few raise beets for winter use.

The milk business is rather on the increase.

Of late years farmers are failing to raise as much wheat, clover and potatoes, and have been turning their attention more to cabbage, tomatoes, cantaloupes and other perishable crops, which have been productive at times, but are uncertain.

There are very few farmers engaged in sheep raising. Dogs seem to be the great drawback.

The raising and fattening of hogs is very much on the decrease. No disease or hog cholera known in the county at present.

The raising of poultry appears to be on the increase, particularly where incubators are used. There is not as much disease as there was a few years ago. Some rouse and gapes, and occasionally cholera.

Farmers do not fatten as many cattle now as years ago, for several reasons ; one is, that the difference between the lean and fat beef is so small, owing in part to the Western competition, and another is, the milk interest is abolishing it ; and still another, there are more market crops grown, such as cereals, vegetables, small fruits, &c. Some few dairymen raise their own stock of cattle, but the greater part of them depend upon buying Western or New York State stock. As to the most profitable breed for dairy purposes, it depends a great deal upon what use you make of the dairy ; a butter dairy requires a different breed from a milk dairy, and still another for cheese, &c.

We have no creameries operated in our county.

There has been no special action taken looking to the general improvement of the roads, although the subject has been agitated, and is claiming considerable attention.

Farmers need more combined organization, better education,

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and more intelligent, concerted action, such as can only be had by active co-operation.

The bulletins from the State Experiment Station have been of great service to the farmers, although too few read them as thoroughly as would be profitable.

The analyses of fertilizers have been of great value to the farmer in many ways. He has the opportunity of knowing what ingredients he is applying to the land, and a manufacturer of a poor article cannot compete with a higher grade among intelligent farmers who read and study the analyses.

The Weather Signal Service is of comparatively recent origin, so much so that our farmers do not avail themselves of its advantages to a great extent.

The spraying of fruit trees and vines is not practiced to any great extent, but where experimented with it has proven very successful.

HADDON GRANGE.

Haddon Grange No. 38, P. of H., numbers one hundred and sixteen members. Meetings are held every week during the year, and are prospering. Our work consists principally in elevating the character and advancing prosperity in field and farm duties, by frequent discussions on all branches pertaining to our business, poultry included. We have found these discussion of great practical advantage. They broaden the mind and stimulate renewed interest in our business, and have been the means of instructing our members in more painstaking in the production of crops and care of animals.

We have succeeded financially by combining in purchasing most of our supplies for house and farm. From a social point of view it is a grand success; we look forward to grange day with pride and pleasure. One day in each month is devoted to literary work; the exercises consist of readings, declamations, dialogues and essays, and we find it a day of pleasure and instruction. It is of great benefit to our young members, and, in fact, to all.

CROP REPORTS.

*Corn.*—The corn crop was good. About the middle of corn



growing season a large yield was anticipated—stalks were extra large and healthy in appearance, but excessive rains later in the season injured the crop. The ears did not fill out to end, and grains shortened in depth; but crop was fully up to the general average. The crop will rate 100 per cent.

*Wheat.*—Not up to the general average. There was much late sowing, and it did not stand the winter well. Those seeding early had a fair crop. Crop rated about 80 per cent.

*Rye.*—Rye is not sown to any great extent, but more has been sown the last two years. Taking straw into consideration, as a market crop, it has been paying better than wheat. The crop of rye and straw was good, and will rate 95 per cent.

*Oats.*—Not many oats grown for market. The crop was fair, rating 75 per cent.

*Hay.*—Some extra heavy crops, but majority not up to the average, owing to dry weather early in the season. The young grass has started well, and promises well for next season. The pasture was good, and plenty of it during the whole season. The hay crop will rate 70 per cent.

*Potatoes.*—A majority of the farmers planted early and had fair crops, which sold early in the season at seventy-five and eighty cents per basket, and later at twenty-five cents; most sold at the latter figure. The crop will rate at 95 per cent.

*Sweet Potatoes.*—Yield moderate. Quality was not first-class, owing to excessive moisture. Prices were low, from twenty-five to forty cents per basket. Rate, 75 per cent.

*Apples.*—The apple crop was fair, but prices were extremely low. There was a very light market for them. The crop will rate 80 per cent.

*Peaches.*—The crop of early peaches was light, but there were some heavy late crops. Excessive moisture rotted nearly all of them and the crop was almost a total failure. Prices were good.

*Pears.*—There was a fair crop of pears, which sold well.

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*Grapes*.—There are not many grapes grown, as they have not been a paying crop, there being too much moisture, which caused mildew and rot.

*Strawberries*.—About a half crop and fair prices.

*Blackberries*.—A large crop.

*Raspberries*.—A fair crop.

*Watermelons*.—A moderate crop.

*Cantaloupes*.—A fair crop, but very low prices.

*Sugar Corn*.—The early crop was very fine and prices good. Second early was good, but prices very low.

*Cabbage*.—This was a good crop and an extra large acreage, but prices are extremely low.

*Milk*.—A full supply the whole season. The average price being three and one-half cents per quart.

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## PAPER ON ENTOMOLOGY.

BY I. W. NICHOLSON.

The potato crop suffered greatly from a mite of the genus *rhizoglyphus* ; from correspondence with Prof. Riley, the species has not been described. It is connected only with scabby potatoes, and not only detracts from their appearance, but from quality likewise. It can always be found in scabby potatoes before they are matured, that is, before the tops die, and rarely, if ever, found in them after maturity. The worse the potato is affected, the more of the insects can be found in it. A lens of some power is required, in order to be successful in finding them, and it is interesting to see how quickly they burrow into the potato when disturbed. It is very evident that they are reproduced in the potato, as with the aid of the microscope, the ovum and the young are plainly discernible.

The question arises, are they peculiar to the potato? If so, can anything be done to prevent their ravages? Some particular places in a patch sometimes suffer more from their ravages than others near by, and it is claimed they are worse in some kinds of manure than others ; if so, there is room for experiment, in order that something can be found as a preventative.

Potatoes affected with the scab, if planted, will produce the same kind and appear

worse each season, while those free from it, planted in a row only three feet away, are entirely free, which leads to the conclusion that the egg is deposited in the potato, is planted with the potato, and is hatched and enjoys life with the rootlets until the tuber is formed, when it attacks it. If this conclusion is correct, can a solution be found which will destroy the vitality of the egg, without affecting the germ of the potato?

Alkalies are particularly fatal to most insects of this kind and they are very moderate in cost, and should have a thorough trial, for who has not noticed the rapid increase in the quantity of these potatoes offered for sale in the markets.

But little more is known of the small fly (*Stromoxys*) which made its appearance within the last few years. It has greatly increased in numbers, so that the other flies are greatly outnumbered by it; it makes its appearance much earlier in the season, large numbers being observable as early as the 20th of May last, and continued to be an annoyance until about the 12th of October, when their departure was as sudden as their advent. So far, nothing appears to be known of their hibernation, or of their being attacked by any disease, like a fungoid growth. Should anyone discover anything of the kind, he will confer a favor upon science, by collecting a few samples and forwarding to an entomologist, or by introducing them into some localities where it (the disease) has not made its appearance, as such diseases seem to spread very rapidly and tend greatly to keep such plagues in check. Prof. Lintner, of the New York Experiment Station, has sent specimens to Europe for a name and their history, if they should happen to be known on that continent.

The damage done to the wheat crop, first observable in 1887, is done by a worm of the larvæ of the saw fly. It is becoming quite abundant, and promises to be very destructive to the crop. Its ravages extend to several States, viz: Ohio, Pennsylvania, New York, New Jersey, Indiana, Delaware and Maryland. There is but little of its life history known, and the time of its attack upon the crop renders a remedy an impossibility. It is believed that whilst their depredations continue they will average two stalks per day, and must necessarily entail great loss to the crop. This fly was not known to attack the wheat crop until within the last two years. There are no persons so well calculated to study the life history of insects as the agriculturist, as they are brought in contact with them every day, and the knowledge they would gain would be of great benefit to their class, as well as to science, and greatly increase the power of the methods employed for their extermination.

No doubt, in the search for grubs many times, the larvæ of the lady bug is found and killed after it has attacked and killed the grub; they are not so prepossessing in appearance as the mature beetles are, yet they are very active, and have very voracious appetites, and late in the season are very beneficial in keeping the larvæ of the potato beetle in check. As great friends as the lady bugs are, they have a parasite foe, which, after completely gutting them, drops out and spins a cocoon at its feet, holding it in a standing position; its vitality is so great that after its power to move is gone, it will remain alive, completely fettered by the silken cord of its parasite.

An inexpensive lens, such as is used by botanists, would greatly facilitate the observations of those who might feel inclined to make some study of insect life, and if that developed a taste, a medium-priced microscope (beware of the cheap ones) will be necessary in order to form a correct knowledge of the different stages of life, and the parasites that the different ones are affected by.

It would be of untold benefit to agriculturists, and greatly assist those employed by government, if some of the younger members of both sexes were to enter upon a practical study of the subject, at least.

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### ADORNMENT OF FARMERS' GROUNDS.

BY CHARLES W. TURNLEY.

[This essay was read in Camden, at the annual meeting of the Camden County Board of Agriculture, December , 1888, and published by request of the members.]

*Mr. President, Ladies and Gentlemen :*

At the solicitation of Hon. Edward Burrough, President of the State Board of Agriculture, I have prepared this paper for the purpose of awakening a greater interest among farmers and residents of rural districts in the adornment of their lawns and grounds with shrubs and flowers. It has been well said that the man who makes two blades of grass grow where only one grew before, is a public benefactor. And this is true. I will not stop to enumerate the number of uses to which grass is applied, but I ask, who does not appreciate a beautiful grass-plot, kept in order with a lawn mower? Now, further, who will estimate the worth of that man who gathers up the stones, casts up the highways, dots here an ornamental tree, here a flowering shrub, and there a beautiful bed of choice flowers, covering the trellis with clematis and other climbers. It cannot be denied that the average, if not the majority of farmers, show a gross neglect in the matter of floral adornment. In some cases uncertain tenancy prevents any considerable outlay for this purpose.

The pleasurable emotions which flowers are calculated to inspire in the inner man were designed by the Creator to correct the evil propensities in the creature, and elevate his thoughts by their beauty, simplicity and frailty.

As an instance, the flower mission does a laudable work in distributing to the sick and dying in the hospitals and penitentiaries these beautiful floral gems, laden with perfume and morning dew from heaven.

But to return to my subject—How to promote a taste for the beautiful in the surroundings of farm life. Science, literature and recent improvements in farm implements have wonderfully lessened the drudgery of the tiller of the soil, and so enough time is husbanded to tidy up the avenues to the outbuildings, remove the amount of debris usually found in such places.

Let us take a ride in the country and visit Mr. A's farm. We notice the soil is good, but the buildings badly arranged; the entrance gate, no longer supported by hinges, lies close to the wagon rut, with weeds growing between the slats. In the place of two flower-beds in front of mansion can be found on one side a wood pile and chopping block, on the other the remains of a wagon which broke down there about a decade ago. The wood might have been burnt and the iron sold.

At the kitchen door may be noticed the old pear tree blown over in a blizzard. As the tree falls so let it lay. We look in vain for flowers, though a plenteous crop of wild carrot appears in the pear orchard—enough to stock the State—while briars and noxious weeds move the headland well into the field. We ask, where are the flower beds? and receive the answer, we had more daisies in our grass field than all our neighbors put together.

I clip the following from the *Horticultural Art Journal*: The owner of a farm who permits the road that runs through or along his land to become unsightly with the wild growth of trees or weeds injures the value of his farm. Keeping the roadside in a neat condition will add considerable to the value of the land. The trees should be trimmed

to present a neat appearance, and certainly to prevent the limbs from obstructing travel. We have all seen roads on which this was not done, and can judge of the difference. Cut down and grub up the useless growths. Pay particular attention to the weeds, which, ripening their seed on the roadside, are not only unsightly, but they mean additional expense in cultivating the farm another year. It costs something to destroy weeds. Just as they begin to ripen their seeds, go out with a scythe and cut them down. It will be some of the best work that is done on the farm, and if practised for a few years will make quite a change in appearance for the better, and add to the value of the property. Nothing we know of presents such an unsightly appearance as an abandoned lot, where rank weeds are allowed to take possession. It not only mars the beauty of a well-kept neighbor's place, but is a real damage to the same.

Neighbor B, opposite, seems to be neater and more æsthetic. The hedge is all neatly trimmed, the walks clean and nicely gravelled, the barns and out-buildings have all been placed at the rear, convenient, but not unsightly; the evergreens are so placed as not to obstruct a full view of and from the house.

The lawn mower has just levelled the surface, and the air is redolent with the odor of the new mown grass. The flower beds are artistic and gorgeous, and yet no professional gardener is employed. Here is an instance of domestic economy, as the term husbandry implies, which delights the senses, gratifies and repays every one who cultivates flowers. The subject of horticulture is so broad and comprehensive, that to elucidate it fully would require an abler mind. But if I can awaken a practical love for neatness and adornment of country homes, the object of this essay will have been accomplished.

The florist is the twin brother to the farmer. One the horticulturist, and the other the agriculturist. The soil is the identical laboratory of both. Joys and sorrows, seed time and harvest, are common to both. Science assists both alike to make rapid strides in their respective callings. Our first parents were put in a garden and were required to dress it. And the cultivation and demand for flowers keep abreast with every other known industry of to-day.

It is very gratifying to report an increasing demand for fine flowers, some of my customers being well-to-do farmers. But allow me to say that persons of moderate means can have beautiful decorations at a nominal outlay. For the small amount of two dollars, judiciously spent, a large amount of seeds can be procured, and, if started early, wonderful results may be obtained. Those not wishing to start seeds can procure from some good florist such plants as their money and wants may require.

A few statistics may here be interesting:

In the Department of Agriculture for 1868 the report of Committee on Adornment states that the yearly sale of flowers in the United States amounts to over \$3,000,000, New York sales exceeding \$400,000, Boston, \$200,000. Plymouth county, Massachusetts, pays over \$5,000 per year for flowers.

About four years ago a few florists met in Chicago for the purpose of organizing a body to be called The Society of American Florists, and the fourth annual meeting, which I recently attended in New York, showed a membership of about twelve hundred, and about one thousand in attendance, which shows that a wonderful interest has been awakened in floral decorations.

It was there stated that, in 1840, Isaac Buchanan, who is still engaged in active business, carried daily his available stock in a large basket, to be sold at what is now the head of Wall street, and he considered it a good day's trade to take in \$2.00, while

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\$3.00 was an extra large sum for one day's sales. As late as 1871 two members of the firm of Pennock Brothers, Philadelphia, leading cut flower dealers of that city, came to New York in search of rosebuds for the Assembly ball, and after spending three days and visiting all the principal growers, returned with fifty-nine buds. Contrast that fact with the trade now, when the daily average of rosebuds sent to this city amounts to over 30,000, and when, instead of plants being brought to New York in baskets, more than one hundred large wagon loads are sent every market day in the spring to West street market alone, not to speak of the innumerable stands dotted all over the city. The increased demand has been equally marked in all the principal cities of the Union.

The number of plants and cut flowers for Easter, Children's Day, Decoration Day and school commencements, for churches, homes, schools and graves has been simply enormous. How beautiful to the student of nature is the handiwork of nature's Creator. While he declared that the thoughts of man's heart were only evil continually, Divinity kissed the earth, and its surface sparkled with countless floral gems of the most brilliant colors and exquisite fragrance.

"Full many a gem of purest ray serene,  
The dark unfathomed caves of ocean bear;  
Full many a flower is born to blush unseen,  
And waste its sweetness on the desert air."

In a word, then, I would say that it will handsomely repay you for all the outlay in ornamenting your grounds.

It was humorously hinted that the best way to keep your daughters home was to surround your farms with a high barb wire fence. I think the better plan would be to plant roses and choice flowers, and the delicate hand will become so busied that horticulture will be found the coveted employment of the fair sex, and the garden the resting place after your day's labor in the field is done.

And now, first, we often hear it said, I want to plant hardy shrubs, such as will not need any care. While some plants demand but little, all will thrive better with proper care. I would suggest as a partial list of hardy shrubs: *Althea*, in colors; *Calacanthus*, Sweet Shrub, *Pœny*, *Phlox*, *Daphne*, *Deutzia Gracilis*, *Exochorda Grandiflora*, *Forsythia*, *Fringe*, *Euonymous*, *Japan Quince*, *Lilac*, *Mock Orange*, *Privet California*, *Spiræas* in variety, *Tamarisk*, *Viburnum*, *Weigelia* in colors, *Hydrangeas* *Otaska*, *Thos. Hogg*.

A word or two about the culture of the *Hydrangea*. It requires moisture and shade, and should be planted only on the north exposure, being perfectly hardy, and if watered with manure water, will be one of the most attractive plants to be found. *Hydrangea Faniculata Grandiflora* requires all the sun it can get and rich soil.

Next in order I will name hardy climbers: *Wisteria*, *Clematis flammula*, *Jackmani*, *Passion Vine*, *Bignonia*, *Virginia Creeper*, *Honeysuckles* in variety.

### ROSES.

The rose has always been esteemed as the Queen of flowers. While it lacerates with its thorns it makes amends by its exquisite fragrance.

## STATE BOARD OF AGRICULTURE.

"The rose has been washed, just washed in the shower,  
Which Mary to Anna conveyed ;  
The copious moisture encumbered each flower  
As it bowed down its beautiful head."

Roses require rich soil and thrive best in a sunny exposure. Of the climbers I will name : Baltimore Belle, Climbing Hermosa, Prairie Queen, Seven Sisters, Russell's Cottage, Champney and Glorie de Dijon. It is not my intention to weary you by reciting all the roses sent out by growers, but giving you a list of some plants and seeds which possess decided merit, which are desirable and of easy cultivation.

### EVER BLOOMING GARDEN ROSES.

I will name Tea roses, Safrano, Bonsilene, Perles des Jardins, Marie Guillot, Comtesse de Labarthe. Hybrid Teas : Wm. F. Bennett, Duchesse of Edinburgh, Duke of Connaught. Hybrid Perpetual : American Beauty, Baron Bonstettin, Coquet des Alps, Appoline, Jacqueminot, La France, Madm. Chas. Wood, Magna Charta, Paul Neyron, Poëny, Prince Camille de Rohan, Victor Verdier, Bourbon, Hermosa, China, Agrippina.

### SEEDS.

Those wishing to sow seeds can select Pansies, Verbena, Lychnis, Mignonette, Stocks, Dianthus, Sweet William, Hollyhocks, Balsams, Primula, Phlox Drummondii. Of runners : Nasturtium, Sweet Peas, Ipomea, Cypress, Maurandia, Black Eyed Susan, Cobaea Scandens, Alleghany Vine, Gourds, Balsam Apple. The seedsman's annual will give you a still more extended list. But be it remembered, that as order is heaven's first law, so planting in the ground, order in arrangement and neatness in after cultivation are of great value to success, a due regard to distance apart, size and height, placing tall plants in the center or rear, and low plants near the walks, also proper blending of color. Foliage plants, as well as showy blooming ones, are adapted for massing, or for special color designs. Such as Coleus, Acharanthus, Acalapha, Amaranthus, and many others.

### BULBS AND TUBERS.

Early Crocus, Snow Drops, Hyacinths, Tulips, Narcissus Anemones, Lily of the Valley, Liliun Harris, or Easter Lily, Candidum, Auratum, many others, all hardy and of the most delightful fragrance. More tender varieties : Dahlia, Gladiolus, Oxalis, Cyclamen, Tuberose, all exceedingly showy, the last very odiferous. Said one : I don't like tuberose ; they smell like dead people. This person spent more money for cigars and whiskey than for flowers. The odor of the tuberose, instead of being identical with the odor emitted from a corpse, is attractive rather than repulsive and is largely used with other flowers to nullify the unpleasant atmosphere at funerals. Cultivation : deep, rich soil, frequent stirring the ground. Plant a good size bulb (after rubbing off the offsets) two inches below ground. Plant the largest offsets close together to make bulbs for following year. After the parent bulb has bloomed throw it away—it is worthless. If you do plant it, you will get no bloom for your trouble.



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### TULIPS AND HYACINTHS.

Plant this fall, between 15th of October and 1st of December, a bed each of Tulips and Hyacinths, and cover lightly with long manure at Christmas, and the gorgeous decoration which you will have next spring will more than compensate you for the small outlay.

Now, in conclusion, I have laid before you some practical hints by which the unskilled hand can, at a nominal cost, beautify his home surroundings, but be careful in attempting too much. If particular and special designs are required in landscape gardening or floriculture, call in the aid of professional skill, as the medical works all direct in sickness, give the patient mild purgatives, sudorifics or stringents as the case may be, but in cases of importance it is safer to consult an eminent physician.

While it is true that the regular daily routine of farm life must be attended to to provide a living for the family and farm operatives, and it would be unwise to be so carried away with floriculture as to neglect seed time and harvest in the field, enough time and help can be secured to improve the dilapidated state of our farm buildings and the neatness and ornamentation of the grounds in close proximity to our homes. It appears to me that if our National Congress were to award to the farmers by counties in the agricultural States a sum of money not less than \$200, to be used as a premium for the neatest and best tilled farm in the county, to be awarded by competent judges, that a portion of the surplus we hear so much of could be utilized among the rightful owners, and our agricultural interests would be largely promoted beside.

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## GARDENING.

BY RUDOLPHUS BINGHAM.

[Read before the last meeting of the Camden County Board of Agriculture and offered to the *Camden Democrat* for publication.]

The cultivators of the soil in our county may properly be divided into two classes. One to include grain, grass and dairy farmers, and the other those who grow vegetables and small fruits. The term "truck farming" is used in this locality, but, as trucking only applies to trafficking, its use as applied to cultivators of the soil is manifestly improper, and we shall include in the gardening class those who grow small fruits and vegetables, whether under glass, or in the open field.

In 1880 there were 950 farms in our county, containing 57,985 acres, or a fraction under 60 acres to the farm. The farms of the State in 1870 averaged 115 acres, and in 1880, 85 acres. As the population increases farms must be divided and improved methods adopted so as to produce even more food from the smaller divisions than was produced on the larger farms. Had not improved methods been adopted during the past few centuries in the countries of Asia and Europe the products of their soil would be insufficient for their support. Breadstuffs and meats may be transported from countries where there are more acres to the inhabitant. But small fruits and vegetables must be grown near the consumers. This division and more concentrated farming is a



condition of our county in a greater degree than in many others, for while there is the natural increase of farmers' families, the growth of the city and towns is absorbing much of our soil and peopling it with consumers. Not only must wet waste places be drained and cultivated, but what were formerly large farms must be divided into gardens and more intensely fertilized and cultivated. And for such purposes the natural conditions of our climate and soil are quite favorable. The slight elevation above tide water makes the transportation of fertilizing materials to, and of products from, comparatively easy. And when the system of piping as applied to oils from distant districts to the seaboard cities shall be applied to the taking the sewage from them, this small elevation will be still more appreciated. The sanitary condition of the city may be greatly improved and the products and wealth of the county largely increased by the same operation.

Manufacturers and miners collect statistical information of the amount consumed and the annual product and by agreement in their associations they limit the product or extend the borders of their supplies and thus prevent ruinous prices caused by over production. Such arrangements have been made to a limited extent by growers of peaches and small fruits, but vegetable growers, so far as we can learn, are without organization and in no way supplied with statistical information. The National census taken every decade gives the amount of grain, grass, corn, potatoes, horses, cattle, sheep, hogs, etc., but no report on vegetables, and our object in presenting this topic to your consideration is that such an interest may be awakened as will secure to this branch of industry the advantages which other branches enjoy.

Circumstances prevented us from making a general tour of the county to obtain from each one such information as we would like to have, and we have called on as many as practicable and invited them to aid with their judgment in making estimates on such points as we could not otherwise obtain.

Our average of estimates would make the number of acres used in all kinds of gardening, or vegetable growing, about one-half of the whole improved land in the county, or **28,492** acres. But we think this too high and conclude to use **20,000** acres as nearer to the true amount.

Taking round numbers for convenience, we have :

Grass and grain, **37,000** acres, @ \$20 ; for product, \$740,000.

Vegetables in fields, **19,962** acres, @ \$100 ; for product, \$1,996,200.

Vegetables in gardens and cold frames, thirty-five acres, @ \$200 ; for product \$7,000.

Vegetables under glass with heat, three acres, @ \$8,000 ; for product, \$24,000.

Total value of above products, **\$2,027,200.**

We have in our county as products from the soil by farming, such as the National Government reports, less than three-fourths of a million dollars, and in gardening, over two millions of dollars. This is but one county, and when we take the other counties of our State, which have also large percentages of gardening, we may see something of its importance to our State, and when other States are taken its importance in a national sense may be readily seen.

We have indicated three classes of gardening.

The larger class engaged in field culture of peas, potatoes, table corn, tomatoes, beans, etc., use from five to eight tons of manure or fertilizer per acre, work one hand, and receive in products about \$100 per acre.

The next class raise lettuce, radishes, spinach, beets, carrots, etc. They use from

## CAMDEN COUNTY.

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ten to forty tons of manure or fertilizer per acre, work one hand, and receive \$200 per acre. They use cold frames for some of their vegetables.

The other class are engaged in growing under glass, with the aid of artificial heat. They use over two hundred tons of manure per acre, two hundred tons of coal, and work eight hands; product, \$8,000 per acre.

Of this latter class one firm constitutes the greater part, having two and a half acres under glass and probably the best plant house plant in the country. They have added about ten thousand square feet of glass, and very much improved their houses during the past year. They estimate their sales during the past year at \$20,000. There has been an increase of twelve thousand or fifteen thousand square feet in additions or new houses by other parties, making the full increase of glass for artificial heat probably 25,000 square feet, or over one-half acre. There has also been an increase in cold frames.

We have some fine gardens of small fruits—cherries, grapes, blackberries, raspberries, strawberries, etc. One grower picked seven tons of cherries from four acres and five tons of grapes from five acres. Such fruits average from \$100 to \$150 per acre.

We found it difficult to get the average number of hands employed, as they vary so much by the system of picking peas, etc., and have given the number by the year. Although in field culture there is but little work during the winter season, and with artificial heat, but little work in summer. This somewhat adds to the difficulty in obtaining good hands at fair wages. And if the two classes of gardening were more nearly equal they would afford employment the year through. This labor difficulty suggests the improvement of machines for doing much of the work in field culture. We have arranged a cultivator so as to mark out four furrows, eighteen inches apart, for bush beans, beets, carrots, etc., and have found in the Lubin pulverizer the best cultivator for young or low growing plants. It is five feet in width, and by taking out two of the spring teeth, will work four eighteen inch rows. This comes nearer to hoeing than any machine we have met with.

For raising plants for field culture, about one sash per acre is used, or 20,000 in the county, at \$2 per sash, \$40,000, and one ton of manure to five sashes, 4,000 tons at a cost of \$3, \$12,000. This \$40,000 for capital, and an annual cost of \$12,000, seems to us a waste, as it is used but a few months in the year. A farmer who tried both manure and coal for heat told us the coal proved the cheaper plan.

In large plant houses one-half ton of coal heats one hundred square feet of sash, at a cost of \$2.50 for the entire winter.

The 20,000 sash now used for starting plants, at a cost of \$12,000, with manure heat for——months, could be heated with coal at a cost of \$12,000 for four months, and the crops grown before the house is required for starting plants for the field would more than pay for the coal and labor.

These calculations, made upon actual trials, in the ordinary way, show a great gain by using coal. And then, too, there would be four thousand tons of manure to be used for plant food which is now consumed as fuel.

One obstacle to the change is the cost of the plant house over the ordinary hot bed, and to this point we have directed our study for the past four years, and think we have designed a house which is built at considerably less cost, and that can be heated for about one-half the cost of ordinary hot houses. We completed one the 15th of last January, 26x124 feet, containing three thousand two hundred and twenty-four feet, and planted it with eight thousand lettuce, and a few other plants, and carried it through

the cold waves and blizzard with three tons of coal, or about one ton to one thousand square feet of surface.

The most economical plan of all for starting plants is the upper story of our dwellings, as there is no cost for heat there. We have started nearly all the plants we have used the past two seasons in the attic of the back building of our dwelling with only the surplus heat from the rooms below. We used iron bars and double thick glass of first quality and it cost about double what tin would, but a man in Pennsylvania who saw it put one on the back building of his house with wooden bars and No. 3 double thick glass at a cost of less than nine cents per square foot, or less, he wrote, than shingles or slate would have cost him.

The plant houses may be worked in ever so stormy or cold weather, when hot beds cannot be worked, and it requires less care and skill to manage them.

#### THE MARKET.

If many should engage in growing winter vegetables would the market be overstocked and the price very much reduced? Possibly it might, but it is hardly probable. We were shown lettuce in the Philadelphia market last winter from Boston and Florida on the same day, but had no difficulty in selling Camden county lettuce at \$6.00 per hundred heads, when that shipped from a distance was quoted at \$4.00 to \$5.00 per hundred.

The great vegetable section, the "Neck," is being built up so rapidly that our county will soon be required to supply its place in the Philadelphia and Camden markets.

## CUMBERLAND COUNTY.

### CUMBERLAND COUNTY BOARD OF AGRICULTURE.

*President*.....THOMAS E. HUNT.....Greenwich.  
*Secretary*.....W. O. GARRISON.....Bridgeton.  
*Treasurer*.....T. F. BAKER.....Bridgeton.

#### DELEGATES.

THOMAS E. HUNT.

W. O. GARRISON.

### REPORT.

The past year has brought disappointment and loss to many Cumberland county farmers.

The tomato crop, always an important crop, although grown at low prices, was nearly a failure. The cool, moist weather of summer kept back the ripening of the fruit, which was little more than half gathered when the frost stopped all gathering.

The yield of potatoes was good, but the prices have ruled so low that the profit and loss account, in many cases, balanced on the wrong side of the ledger. The problem now is to dispose of the thousands of bushels stored in the cellar. A careful estimate of the quantity now on hand, beyond the requirements for home consumption and seed, places the figure at from one hundred and sixty to one hundred and eighty thousand bushels.

The yield of corn was not up to the average.

Wheat gave a fair yield and has sold at prices that has made it more profitable than for several years.

Wages are high, when compared with the price of farm produce. Native, single men, who are in the majority among farm laborers, receive from \$16 to \$20 per month, with board. Married men, who board themselves, demand from \$20 to \$28 per month.

The dairy interest is making a rapid growth. This means im-

proved stock and increased attention to soiling for summer feed, and root growing for winter.

Silos are not growing in favor. No new ones have been reported this year.

Pork raising is again on the increase. Hog cholera, formerly a source of great loss, has almost disappeared. Loss from this cause has probably not exceeded two per cent.

Sheep raising does not receive general attention, not more than twenty per cent. of the farmers having any sheep on their premises. Cheap wool and worthless dogs are the principal cause of discouragement to those engaged in the business.

A large flock of Donset Horn sheep was imported by R. J. Buck, of Bridgeton, whose stock farm has done much to improve the breeds of cattle in its vicinity.

Poultry raising is on the increase. The displays of poultry at the county fair and at the poultry shows, are doing much for the introduction of pure breeds and improved methods of hatching and caring for chicks.

Many, who have only small town lots, are engaged in raising broilers and capons. Most farmers figure on the receipts from the poultry yard as an important item.

In common with other counties, we can justly complain of the condition of our public roads. The money expended and the results obtained, do not have a close relation to each other, and never can, while the present custom prevails of electing men for overseers of the road, who are not capable of managing a ten-acre farm.

The money raised for road purposes in the several townships, if judiciously expended, ought to make every mile of the public road as good as the average turnpike.

Landis township has put the whole of her road system under the management of an intelligent supervisor, who evidently aims to keep them in the best possible condition for the money at command. It is hoped that such changes will be made in the road law as will give better returns for the money expended.

The State Experiment Station is of more benefit in causing the manufacturers of fertilizers for sale in the State to make reliable material than as a guide to farmers in purchasing. Many of those who do consult the table of analysis make use only of

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the valuations as determined by an arbitrary standard of value, often misleading.

The man who disposes of coal ashes and Kainit, under a high sounding name, for \$45 per ton, finds his victims in those who have not seen the analysis of his goods, giving the value as less than \$2.

So far as the writer can learn, the farmers make but little use of the signal service reports.

The signal flags are displayed so late in the day that the change of weather reaches the farmer ahead of the prediction.

Orchards, vineyards and small fruits are sources of large revenue.

The experiments of the United States government in spraying trees and vines on the farm of Col. A. W. Pearson, of Vineland, were highly successful, and the report of same is worth the study of any who are interested in fruit culture.

The annual fair of the County Agricultural Society was successful. The membership of the society has reached nearly twelve hundred.

The Vineland Fair Association, and the South Jersey Poultry Association have both held successful exhibitions.

## ESSEX COUNTY.

### ESSEX COUNTY BOARD OF AGRICULTURE.

#### OFFICERS FOR 1889.

<i>President</i> .....	I. S. CRANE.....	Livingston.
<i>Vice President</i> .....	O. E. FREEMAN.....	Orange Valley.
<i>Secretary</i> .....	J. H. M. COOK.....	Caldwell.
<i>Treasurer</i> .....	A. E. HEDDEN.....	Verona.

#### DIRECTORS.

E. WILLIAMS.	FRANK GOBLE.	W. W. BURNETT.
R. C. CAMPBELL.		PETER BUTLER.

#### DELEGATES TO STATE BOARD.

O. E. FREEMAN,	WM. DIECKS.
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### ANNUAL REPORT.

J. H. M. COOK, SECRETARY.

As I am again expected to report the agricultural interests of Essex, and sum up the benefits of our county organization for our State Board of Agriculture, it seems but fair and proper for me to take this opportunity to say that on account of our peculiar situation, the value of our county to the State at large cannot be estimated by our agriculture.

We have, perhaps, a less acreage of farm land than any other county in the State, and by far the larger portion of our people are engaged in mercantile and manufacturing pursuits. But our small farms are well tilled, and while we cannot compete with our sister counties in the length and breadth of our farming operations, still the wealth and importance of our large cities accord us a very respectable place in the front and constitute us a very considerable factor in summing up the worth and importance of our grand old State.

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We rejoice in the agricultural prosperity of our State at large, and enjoy the luscious fruit and other substantial productions supplied to our market by the skill and industry of our Jersey farmers more favorably located for agriculture than we of Essex can ever hope to be.

Our fertile farms lying east of the range of mountains that run through the centre of our county, are fast being occupied by streets and dwellings to accommodate our business men of the large cities, and we farmers find ourselves surrounded with the wealth and luxury of city life.

This over-balancing of our county with population on the one side, while it has some advantage by way of furnishing a ready market for our produce, operates greatly to the disadvantage of the thinly populated portion, by the enhanced cost of living which it necessitates and the heavy taxation which it places upon our farms.

The farming land of Essex lies principally in Caldwell, Livingston, South Orange and Clinton townships, while Newark city, Orange, Bloomfield and Montclair, possess the population. Our laws provide that the county tax be levied upon the various wards and townships by the County Board of Assessors. This board is composed of one representative from each ward and one from each township, hence it is obvious that the representation of our farming districts is but a small minority in the Board of County Assessors.

This fact gives our city neighbors the power to raise the valuation of our townships as reported by our assessors, at their own discretion, and it is a luxury in which they freely indulge, in spite of the remonstrance of the few assessors from our townships.

We also find, upon further investigation, that real estate in our cities is assessed at about one-third of its actual value, while our farms are assessed at their actual value, and perhaps more than they would bring at a forced sale.

By these methods our cities generously shake off a large proportion of the county tax, and it falls upon our farming community. They think that our farms ought to keep pace with their building lots, that rise in value according to the demand for them, but our land is worth no more now, to raise corn and potatoes,



than it was years ago. Improved methods of fertilizing and better cultivation make our land more productive, but, because we are spending money upon our farms, and must continue this expense from year to year to keep our land in good condition, is surely no reason that we should be taxed unjustly.

The regular meetings of our Essex County Board are appointed to be held upon the first Wednesdays of March, June, September and December.

We find it difficult to secure a satisfactory attendance at our summer meeting, but a public lecture by Dr. Cook last spring, at Livingston, under the direction of our executive committee, was very well attended and greatly appreciated by all our people. The speaker informed us upon the working of our experimental station, and imparted very valuable information upon purchasing fertilizers suitable for our soil.

He also encouraged our farmers to believe that they might live to see the day when the Passaic valley would be drained out, and much of our valuable land now submerged would be reclaimed and cultivated.

Our September meeting did not have the usual attention of our members because they were all so enthusiastically engaged trying to save our country from political disaster that they had no time for agricultural thought. At our last meeting in December we meant business, and several matters of vital interest to our farmers were discussed at length and resolutions passed that we hope will secure our greatest benefit.

The first topic brought up for our consideration was the operation of the law known as the "Five County Act." This is a sectional enactment, that operates very unjustly to real estate owners in our county, as it provides that the holder of a mortgage shall not pay the tax upon it, but the farmer that gives the mortgage shall pay the full amount of the tax upon the property, and this, in addition to the regular rate of interest, six per cent., compels the owner of a mortgaged farm to pay about eight per cent. for the use of his land.

At this meeting we also considered the method of levying the tax for the drainage of the Passaic valley, which it is expected will be accomplished during the coming year.

We all agreed that, as this is a sanitary measure that will effect

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the whole community, at least a part of the expense should be assessed upon the counties at large which will be benefitted thereby, and it was unanimously voted that we request our State Board of Agriculture, through its legislative committee, to assist in securing such legislation as may be required for this purpose, and also to secure the repeal of the "Five County Act."

The injustice of proportioning the county tax was also considered at our last meeting, but we find ourselves at a loss to devise any means of correcting this evil, unless it be by dividing our county.

Our Board of Agriculture still retains its membership of earnest practical farmers. We are thorough patrons of husbandry, and believe there is a great benefit in organization, and we fully expect, by means of our connection with our State Board, to realize the enjoyment of all our rights, and to see perfect justice administered by all our laws. We consider our State Board of Agriculture an influential body that will exercise a power in our legislature for the best interest of our farmers, and thus, in time, our rights will be secured, and nothing more be heard of "bad legislation."

"Truth will conquer in the end,  
For round and round we run ;  
And right is ever uppermost,  
And justice ever will be done."

The agricultural enterprise of our people grows more diversified every year. Yet the production of milk continues to be the leading industry of our county, and the business of retailing it direct from the farm is found to be the most profitable method of disposing of it.

The floral industry of our county has been vigorously prosecuted in localities near our cities, and our florists are succeeding according to their skill and adaptability to such a delicate business.

Mr. Frank Goble, our florist in Verona, reports, "No increase in green house structures but rebuilding has been effected to some extent."

Lettuce and radishes are the staple vegetables for forcing during winter, although rhubarb, tomatoes and cucumbers are still grown to a considerable extent. The supply of lettuce and rad-

ishes has been fully up to the demand, consequently prices have lowered, and the growers receive less profit than formerly.

In the florists' line, excepting a short time just at Christmas, prices have been very low on nearly everything grown, and the feeling among our florists is that the supply of cut-flowers far exceeds the demand this season.

The depression is owing to too much glass and a change in style, which has changed to the filling of fancy baskets and vases with ferns, etc.

The question that now agitates our commercial growers is, what shall we grow for another winter that will pay better than what we have had this season.

A new insect has attacked the La France Rose in the green house, and the violet disease made its annual appearance last fall. It would seem that our State Experiment Station might help the florists by suggesting some remedy to assist them in combating this disease.

Agriculture is among the specialties gaining in favor with us, and like the flower culture, it is also a delicate business, that requires skillful manipulation and a good degree of acquaintance with the habits of the little workers to insure success.

But we believe there is more money in scientific bee-culture than there is in corn and potato culture.

Some seasons are more favorable for the honey flow than others, but much depends upon having the bees in good condition when the flow comes.

Our honey bees had a better chance this year than last, although the bees are really never to blame any year. Their industry has justly become proverbial, but the busy bees may, like some people, be very busy over nothing, and if there is no honey to gather they must work just as hard and harder to save themselves from starvation.

However, there is always some honey in summer time and if our bees have been properly attended they will be sure to find it. But the supply of honey fluctuates more than is generally supposed. The same flowers will be full of honey some days and at other times they will not contain any. It depends upon the weather, &c.

Our crop of white clover was unusually good this year, and it

yielded *sweetly*. My honey crop is nearly all gathered from clover. I began this season with twenty-four colonies of bees, and have taken about twelve hundred pounds of honey, all in the comb, but about two hundred pounds extracted from the the large frames.

My white clover honey was mostly stored in sections holding about a pound, and it was very fine.

My bees are well provided with honey in their hives for their winter feeding, and all in good condition for early spring work. Apple-blossom is the best flavored honey that we can have, and if our bees are only in a condition to work, and the weather favorable for the secretion of honey in the apple flowers, they will gather and store very rapidly the best white comb honey of all the year.

#### PRACTICAL FACTS.

Wages for farm hands range from twelve to fifteen dollars per month, with board. Without board, from twenty-five to thirty-two dollars per month. We often pay one dollar and a half per day.

Farmers generally board their hands. Seventy-five per cent. of the hands employed by the month are single men. Ninety per cent. are foreigners.

There are a few silos in our county, but the system of siloage seems not to be gaining in favor generally among our farmers.

Corn fodder is the principal crop we store in silos.

No farmers depend entirely upon soiling, but nearly all feed, to a great extent, grains, meal and fodder corn to milk cows during the summer.

Turnips are raised to some extent for winter feeding.

All the serials are receiving less attention. Crops that can be easily retailed, such as fruit and vegetables, are receiving more attention, also the cultivation of cut flowers. Hay is also considered one of our best crops.

Sheep are not raised; land is too valuable, and dogs too destructive. A very few hogs are fattened for market. Poultry is receiving increased attention. The prevailing disease is cholera, but it does not prevail to any great extent.

Farmers do not fatten cattle for market, because all the pasturage can be used to better advantage for milk cows. About fifty per cent. of all our cattle are raised on our farms.

We do not know of any disease among cattle. Opinions vary as to the best grade of cattle. Ayershire and Grade cattle are preferred by most farmers for milk, although some value Holsteins.

There are no creameries in our county

Most of our crops have yielded up to the average this year. The season has been better, by far, than last year, although the spring was late, and we could not plant early on account of rain. But during the harvest season we were favored with fair weather, and we stored an excellent yield of hay in good condition. Oats did not fill out heavy; too much straw.

Potatoes grew well, and would have been a heavy crop but for the rain in the fall, which occasioned considerable rot in fields that could not be dug out in time.

Some report yields of 350 bushels per acre. I dug from a measured plot of ground, containing 1,220 square yards, 84 bushels of good potatoes. It is reported from some parts of our county that the potatoes were seriously injured by the cucumber flea beetle, which was never known to attack the vines before. Their invasions were felt most seriously on the earlier and probably more tender and less vigorous varieties.

The Downing, a new early variety, seemed to be the first attacked. The leaves were so badly eaten at the season of blooming that growth was arrested and the vines died without falling. The Early Ohio and Thorburn suffered next in severity. Early Rose, Hebron, etc., following in this order. The New Queen, a new variety from Maine, resisted the beetles' onslaught most successfully and this resistance was manifest in the crop. It seems not unreasonable to suppose that but for this new invasion the yield would have been at least twenty-five per cent. better. In view of these results it is well to consider the propriety of changing frequently, not only the seed used but the variety also. New kinds with fresh blood possess a greater vitality and vigor for a time and these seem to be important factors in repelling not only insect depredations but the attack of fungi also.

Old established opinions and theories relative to the selec-

## ESSEX COUNTY.

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tion of seed of one's own growing, or even to a persistent use of old well-known varieties, though grown in a different locality, are gradually becoming unsettled, and the thoughtful investigating planter is being forced to the conclusion that the young blood and youthful vigor of new varieties are counting for more than formerly. The White Star, Burbank, &c., that have for a few years past been considered our heaviest yielders, have been completely distanced the past season in the great potato region of western New York by the remarkable performance of a new variety called Monroe Seedling, one man reporting that if he had confined his entire planting to this single variety it would been \$1,000 in his pocket. "Facts are stubborn things" and a few such arrest public attention, and cause thoughtful men to reflect and hold less tenaciously to old established opinions.

Essex county is becoming noted for the superiority of her vine products. At the State and county fairs the past season, Essex county grapes claimed the larger share of the premiums, and deserved, too, for the exhibit has never been surpassed in this section. Mr. Williams, the Secretary of the New Jersey Horticultural Society, succeeded in perfecting the largest and finest crop of Niagaras, probably, that has ever been produced. Notwithstanding the attack of fungi, which he fought vigorously, his success was phenomenal. A neighboring vineyard produced fruit by the ton that failed to mature.

Persistent care and attention to our crops seem the only hope for reward.

I estimate the yield of all our different crops as follows, taking 100 as the average :

Wheat.....	90
Rye.....	90
Oats.....	80
Corn.....	100
Hay.....	125
Potatoes.....	100
Cabbage.....	125
Apples.....	80
Peaches.....	90
Pears.....	40

Grapes.....	100
Blackberries.....	100
Raspberries.....	100
Strawberries.....	75
Melons.....	90

The road question is still under discussion, but nothing definite is accomplished. We are not acquainted with any satisfied farmers. They complain of high taxes, bad legislation, and the consequent impossibility of making money by farming as compared with other occupations. Farmers need more stringent laws to protect them against adulteration of food, and other commercial articles, also against the annoyance of trespass upon their lands. They also need free trade to enable them to buy in the cheapest market, which would also encourage an interchange of commercial products and open a wider market for produce.

The State bulletins are appreciated by our farmers and considered a benefit. They are read quite generally. The analyses of fertilizers by the station is a valuable guide in purchasing.

We are not very much benefitted by the Signal Service, for the shower frequently arrives before the mail.

## GLOUCESTER COUNTY.

### GLOUCESTER COUNTY BOARD OF AGRICULTURE.

#### OFFICERS FOR 1888.

<i>President</i> .....	THOMAS BORTON.....	Mullica Hill.
<i>Vice President</i> .....	JESSE S. BROWN.....	Mickletown.
<i>Secretary</i> .....	B. R. BLACK.....	Mullica Hill.
<i>Treasurer</i> .....	DAVIS S. ADAMS.....	Mickletown.

#### DIRECTORS.

AMOS GARDINER.....	Mullica Hill.
JOHN GAUNT.....	Mullica Hill.
DAVID BORTON.....	Mullica Hill.
S. M. PARKER.....	Swedesboro.
CHALKLEY DUELL.....	Wenonah.

#### DELEGATES TO STATE BOARD.

JESSE S. BROWN, (two years.)

B. R. BLACK, (one year.)

### COUNTY BOARD REPORT.

#### BY THE SECRETARY.

Our board has held one special and four regular meetings since we reported to the State Board last winter. At the special meeting, held in March, Eli Minch, of Shiloh, addressed a large and interested audience on "Potato and Peach Growing" At the November meeting, our State Secretary gave us some words of cheer and helped discuss the question of farm labor.

Considerable interest is manifested by those who attend our meetings, but their number is small compared with the number of farmers in the county. A county organization, to be truly representative, should have active members in all parts of the



county to awaken an interest among those who are indifferent, but it requires more time and effort than any of our members have felt able to give it.

It is suggested that, in order to create a more general interest, the Annual Report of the State Board be more widely circulated, and that farmers' meetings or institutes be held at two or three places in the county, under the auspices of the State officers. A special edition of the report might be issued, if necessary, which might be condensed, giving the discussions on important topics, addresses and valuable papers, leaving out the minor details of business, and containing the law by which the State and County Boards are established. Strange as it may appear, there is widespread ignorance in respect to the existence and purpose of these organizations.

Our members being interested in the growing of early potatoes as a money crop, the secretary suggested the making of a triple experiment for the purpose of answering the question, "Is there a better variety of early potatoes for our section than the Early Rose?" Seven of the newer varieties were selected and planted with the Early Rose as a standard of comparison. A peck of each variety was obtained, and five pounds of each of the varieties, given to three members of the Board, who agreed to make the experiment. They were instructed to give them all an equal chance, while each experimenter was free to select his own time and manner of planting, fertilizing and cultivation, and all were to report the results obtained. The reports were made at our August meeting, and an exhibition made of the different varieties at the same time.

The experiment was interesting and instructive, although not entirely conclusive in its results. It is reported here because it suggests a line of work that county boards can do for their own section quite as well, if not even better, than the State Experiment Station can do it for them. While such trials involve some expense and labor, the experimenters are repaid by the knowledge obtained in making them.

Farmers in Gloucester county are moderately prosperous. Sheriff's sales of real estate are not numerous, showing that farmers are at least "holding their own." The crops have been generally good. Prices of early potatoes and other early truck were

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good, and those who were so fortunate as to be ready to take advantage of the early market were liberally rewarded. Later in the season, prices were low for nearly all vegetable crops. Poultry and dairy products brought good returns throughout the year; this is especially true of butter and eggs.

The period of high prices for our staple products is of short duration. We have to compete early in the season with farmers south of us, and later on, with northern neighbors, and so we have but the little time between to call our own. We suffer likewise from lack of co-operation in disposing of our products, and fail to find the best markets. A great deal of the produce of our county is sold at the railroad stations, and at the wharves, to persons who are agents for wholesale dealers. These agents, if honest, are mostly irresponsible and if, for any cause, they fail to pay, the farmer has no redress, and may lose the returns of his entire crop. Very few dealers of this class pay cash for fruit and vegetables. For dairy and poultry products, we get the cash on delivery at our local markets, and this should be the rule for all products of the farm, when sold to irresponsible persons, at least. A large portion of the produce goes to the city to be sold on commission. With commission and all our expenses off, but little is left for the producer. While we cannot hope to reach our hands directly into the pockets of the consumer, we are hoping to find a way, through co-operative selling, by which we can get into the pocket of the man who sells it to him.

As to farm labor, the opinion prevails that wages are higher than farmers can afford to pay, considering the expenses of modern farming and the price of produce. For adult farm hands, the wages range from \$15 to \$20 with board; and from \$20 to \$30 without board. Day hands are paid \$1.25 per day with board, and \$1.50 per day without board, for ordinary work, but for harvest work they are paid from \$1.75 to \$2.00 per day. Monthly hands are generally boarded. About the same number of single and married men, and of native and foreign laborers are employed. The number of foreign laborers is increasing.

Siloage finds little favor; but one silo is reported in the county.

Soiling is not followed, except that fodder corn is grown to help out short pastures.

Roots for winter feeding are grown to a limited extent.

Reports indicate a slight increase in the milk business.

Less attention is paid to wheat and late potatoes than formerly. Low prices, owing to western competition, has led to the abandonment of wheat. Bugs, blight and a bad season have discouraged late potato raising.

Increased attention is given to the growing of tomatoes for canning, also to asparagus, celery and market garden truck generally. The area devoted to all cultivated crops is yearly increasing.

Not many sheep are raised. A few farmers raise early lambs successfully. In wool and mutton we cannot compete with other sections having better and cheaper pasturage. If this were not true, dogs would make sheep raising unprofitable.

The low price of pork has led to a decrease in the number of hogs fattened for market. Very few cases of cholera have been reported.

Reports are almost unanimous in regard to the decline in the business of fattening cattle for market. Western competition renders it unprofitable. The few cattle that are fattened are mostly New York and Western stock.

There are two creameries in the county.

Grade Jerseys and common stock are mostly used for dairy purposes.

The bulletins of the State Experiment Station are read by many of the farmers and appreciated for their information in regard to fertilizers, but it is hoped that other lines of investigation will be undertaken and the results reported, when the Station is fully equipped for business.

Our farmers are their own weather prophets, and get but little benefit from the Signal Service.

The growing of fruit, excepting of peaches and pears, is not on the increase.

Spraying of fruit trees to destroy insects has been attempted, but with poor success for the most part, due in most cases to lack of knowledge and for want of suitable apparatus.

As to the farmers of the county, some are quite well satisfied, and others complain a great deal of the hard lot they have. The causes of complaint are, low prices of produce, high taxes and high rates of interest, high prices of labor, fertilizers and of transportation.

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The remedies suggested for the evils are various. Among them are, a higher import duty on farm products, a lower rate of interest, organization, less legislation and lower taxes, and a higher standard of agriculture.

I close by quoting from a township report made by one of our enterprising farmers :

"Alm st every one has his panacea, or elixir of life, which, if applied in proper doses, would place the agriculture of the county in such a flourishing condition that all the farmers would make money. In my humble opinion we want more thoroughness and energy instilled into the farmers themselves, and all ideas of failure wiped out. For agriculture must live, being the foundation on which all other business is based. Farmers should see that societies formed for their benefit are sustained, and should associate themselves with some of them. In this section they should not raise crops that can be easily shipped, and can be grown cheaper further from market. Smaller farms, better cultivated, and the growing of crops that are in demand in our home markets, would go far towards making a better time for farmers."

## HUNTERDON COUNTY.

### HUNTERDON COUNTY BOARD OF AGRICULTURE.

#### OFFICERS OF THE BOARD FOR 1889.

<i>President</i> .....	V. R. MATTHEWS ..	Kingoes, N. J.
<i>Vice President</i> .....	J. B. FISHER.....	Sergeantsville, N. J.
<i>Secretary</i> .....	H. F. BODINE.....	Locktown, N. J.
<i>Treasurer</i> .....	E. E. HOLCOMBE.....	Mount Airy, N. J.

#### BOARD OF DIRECTORS AND SOCIETIES REPRESENTED.

URIAH SUTTON, Locktown Grange.  
JOSEPH HAGAMAN, Sergeantsville Grange.  
JOHN L. LEQUERE, Kingwood Grange.  
J. HUNT, Ringoes Grange.  
DAVID BODINE, Hunterdon County Pomona Grange.  
R. CASE, New Jersey Fruit Exchange.  
B. E. TINE, Hunterdon County Agricultural Society.

#### DELEGATES TO STATE BOARD

H. F. BODINE, (two years.)      JOSEPH HAGAMAN, (one year.)

### ANNUAL REPORT.

BY H. F. BODINE.

Our County Board has held but two meetings during the year, one on the third Saturday in August, in the Grange Hall at Sergeantsville. While the numbers were not large, we are glad to report an increased interest in the meeting. Mr. William R. Ward, Vice President of the State Board, was present, and addressed the farmers to the satisfaction of all. After the address, questions were asked of the speaker by members of the County Board, in reference to the raising of different crops, spraying fruit

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trees, &c., which elicited considerable discussion, proving, as we thought, profitable to all.

The second meeting was held at Ringoes on the third Saturday in December, in the hall of Ringoes' Grange. The attendance at this meeting, though small, was full of enthusiasm for the life of the County Board. Resolutions in reference to the repairing and working of roads, and also the propriety of abolishing the Board of Freeholders, and having their duties attended to by three commissioners, was freely discussed.

At a meeting in the afternoon, J. B. Rogers, of Newark, N. J., and Franklin Dye, Secretary of the State Board, were present, and addressed the farmers on the need of co-operation. The addresses were listened to with marked attention and were replete with useful information, and, we trust, lasting good was accomplished.

While we cannot report the interest in the meetings of our County Board that we would desire, it certainly has been greater than heretofore, and we sincerely trust that the farmers of our county will yet awake to their interests, and make these meetings what the State Board intended them to be. Arrangements are now being made to bring the different organizations into closer relations with each other by holding the next meeting of the County Board on the grounds of the new Agricultural Society, provided such arrangements can be effected, thereby better understanding each other's needs, and accomplishing a greater work.

After receiving the circulars sent out by the efficient Secretary of the State Board, I mailed to each township a copy, with the request that the questions be answered and returned to me, and in almost every case my request was complied with, and intelligent answers returned; to these I owe thanks.

There are but four townships out of the eighteen that reported any organization of farmers; three of these report Grange organizations, with good membership, and holding frequent meetings; and from one a fruit growers' exchange, independent of the New Jersey Fruit Exchange. From these townships we find our correspondents ready to give the fullest reports.

The work done by the Grange has been laid down in their "Declaration of Purposes," that of advancing the cause by laboring to accomplish the following objects:

To develop a better and higher manhood and womanhood among ourselves, to enhance the comforts and attractions of our homes, and strengthen our attachments to our pursuits, to foster mutual understanding and co-operation, to maintain inviolate our laws and to emulate each other in labor, to hasten the good time coming, to reduce our expenses, both individual and corporate, to buy less and produce more, in order to make our farms self-sustaining, to discontinue the credit system, the mortgage system and every other system tending to prodigality and bankruptcy.

There is also a Pomona Grange in the county, and the work done by it has exceeded the work of former years. At their regular meeting, in October, there are brought together the products of the farms and homes. These meetings are generally open, and are visited by the agriculturists of the neighborhood in which the meeting is held, the display of crops, fruits, &c., often comparing favorably with the exhibits made at our annual fairs, thus stimulating members to still greater activity and usefulness.

The past year has been one of considerable prosperity to our agriculturists. The wheat crop has been as good as ever produced in the county, and with a slight advance in price, has caused hope to return.

The oat crop was gathered in good condition, and while not as large as the crop of last year, it was fully as remunerative to the grower.

A large amount of hay was gathered, fully up to the record of any former year.

The average corn crop was very fair, some townships reporting an increased yield, while very few have fallen below, these occurring on account of the heavy rains on low lands.

On account of the large number of peach trees set out in the county, buckwheat is being largely increased, and the crop gathered was quite fair. Land set out in peach trees is generally planted with corn the first two years, and on the third, buckwheat is the usual crop; hence, in the winter season, this county is one for buckwheat cakes.

The potato crop was fully twice as large as last year, and al-

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though we had exceedingly wet weather, but little if any complaint has been made on account of rot.

There are five creameries in the county where butter and cheese are made. These are prospering fairly, but are not doing what they might if the farmers and dairymen would co-operate in sustaining them. Owing to the low price of grain for a number of years, evidently this is the better system of farming.

In addition to the above, there are the following creameries from which butter, milk and cream are sold in New York City. Three are near Lebanon station, on the line of the New Jersey Central Railroad, and are operated by Joseph Ramsey, George Clark and Luther Hoffman. Two are located near the station at Annandale, on the same railroad, and are operated by John C. Cramer and D. Smith. One at Clinton, operated by a Mr. Pinkey, of Brooklyn; one at California, operated by L. H. Trimmer; one at Middle Valley, operated by Clark and Hoffman; one at High Bridge, operated by Mr. Nanwright. These creameries average about five hundred gallons of milk daily.

A great deal of milk is produced and sold from the county, in New York City, heavy shipments being made from stations on the line of the Lehigh Valley and New Jersey Central Railroads.

The peach crop set heavy but owing partly to the late frosts in some localities it was almost an entire failure. I have not received figures from the various stations and cannot give any estimate of the crop that would be satisfactory.

The New Jersey Fruit Exchange was opened for the accommodation of sellers and buyers, and had it not been for the heavy storms that commenced with the opening of the season, and continuing until the close, success would have followed. Buyers were present from Hartford and New Haven, Connecticut; Montreal, Canada; Elmira and Albany, New York, and four other points, but owing to the fruit being tender they could not get it to their markets without a loss to themselves. This necessitated the closing of the Exchange much earlier than would otherwise have been done. Branch exchanges were located at Lambertville, White House Station and Lansdown. The average price received for peaches sold was about seventy cents per basket, net.



The Hunterdon County Fruit Exchange, located at Jutland, and independent of the New Jersey Fruit Exchange, sold through it about sixteen thousand baskets of peaches, at an average of fifty-eight cents per basket, net.

Through the energy of the committee from the Board of Directors of the New Jersey Exchange, a reduction in freight of two cents per basket on freight to the New York market was secured. I have a report from one grower who sold about one-half of his crop through the Exchange and shipped the remainder to the city to be sold on consignment. Striking an average on each lot sold, he finds that the fruit sold on the Exchange netted him ten cents more per basket than that sold on consignment. Now, while the reduction of two cents per basket in freight, and an advance of ten cents per basket in price, over any other market, may not seem large, yet, taking the crop of 1885, which was 150,000 baskets, and add twelve cents per basket, it makes a sum of \$18,000 saved on the crop of the county.

Surely the New Jersey Fruit Exchange has cause to congratulate itself on the progress already made.

It is estimated that more than 2,000,000 young trees were set out in the county last spring, the short crop of the past two years having no discouraging effect upon the growers.

The apple crop was large, owing to the fine size of the fruit, and it remained firmly on the trees until gathered. It was the largest crop of fine fruit that has been gathered for years.

Small fruits are grown for different markets, but it is difficult to get a report from the growers in this industry.

The following replies have been made by correspondents to questions sent out by the State Board, and we believe they are reliable :

Wages paid farm hands range from \$11 to \$15 per month with board, and from \$20 to \$24 without board. Our farmers generally board their help. There are more single than married men employed on the farm, and native born laborers are in the majority.

No silos reported.

Farmers are generally depending on pasturing for the support of their cattle during the summer months.

Root crops are not grown to any extent as a winter feed.

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The milk business is on the increase. Farmers generally are giving more attention to it and are more careful in the selection and care of their stock, knowing that the cow is a machine, and that it costs no more to keep a good machine than a poor one; the oil used on the machine, too, is better than formerly.

The crops that are mentioned as receiving less attention than ten years ago are flax, seed clover and in some localities oats. Those receiving more attention are corn, wheat and peaches.

Farmers are not largely engaged in raising sheep, as dairying, in many sections, has almost taken its place. The discouragements are, the low price of wool, worthless dogs, and, in many cases, the farmers complain of too close nipping of the young grass in early spring.

Raising and fattening of hogs is on the increase. The advance in the price of pork has given a fresh impetus to the industry. Our county has little, if any, disease to contend with in this direction, and the percentage of loss is very small.

The poultry business is also receiving increased interest and attention, but cholera, roup, gapes, &c., exist to quite an extent, reducing the profits, in some cases, to an alarming extent.

Farmers do not generally fatten as many cattle for market as they did years ago, because they cannot compete with the price of western beef. For keeping up their stock of cattle, they purchase large numbers of northern calves. Little complaint has been made of any disease among cattle. One drove from Canada was placed in quarantine, but they were subsequently sold at public sale to the farmers, and no complaints were made after the sale.

There has not been any special action taken looking to the improvement of roads, and with this great fault is found. We trust the State Board will yet devise some means that will assist the travelling public in this direction.

Farmers as a class are not satisfied with their condition; their complaints are many and varied, as high taxes, high tariff, incompetent help, low prices, &c.

It is evident that the farmers are not gathering to themselves an equal and just proportion of the general wealth. The agricultural interest being the one upon which all others depend, it is apparent that the farmers should receive a full share of the

country's increase of wealth. But it is true, a vast proportion of the tillers of the soil remain poor. The reasons for this are varied, and are found in the combination of capital, high taxes, high rates of interest, and high prices for what they buy, and low prices for what they are compelled to sell. They have but little to do in fixing the price of their products, and though they produce the chief part of the wealth of the country, this wealth is largely gathered by men who produce comparatively little, but by their manipulation fix prices for all. This state of affairs can only be adjusted by the farmers of the country by exercise of the ballot.

We believe that benefit is derived from the bulletins of the State Experiment Station, and would urge the importance of their being carefully studied by farmers generally. They also appreciate the analysis of fertilizers made and believe they are protected from almost worthless goods by a careful study of the same. They desire that the Station's work may be continued and be still more effectual.

Farmers are turning their attention to mixed farming, and are cultivating fruits, large and small.

Real estate has depreciated greatly in value in our county. The writer, having sold several farms during the fall, has had cause to note this matter carefully. In the fall of 1887, a farm of one hundred and thirty acres was sold for \$60 per acre, and the same was placed on the market this fall and sold for \$40 per acre. Another, sold five years ago for \$81.25, was sold this fall for \$53.65, and, while it is a fact that land has depreciated so greatly in value, taxes are as high, if not higher, than they were at the close of the war, and are increasing yearly. While farm land is low in price, as well as all the products of the soil, it is true that all official salaries have not been reduced in a just proportion to the reduction of farm products. When will the farmers learn to take care of themselves? Will it be when their land is sold from them for taxes? Or may we not hope that, through organization and co-operation, help may yet come? Only in this can we hope to succeed as farmers.

Mr. Rhutson Case, of Flemington, N. J., one of the most successful apiarians in our county, says, in reply to my inquiry as to the honey industry :

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I have no exact figures, except from my own apiary ; with this I will give figures in detail since I have been in the business. Commenced in the spring of 1881 with two stands, with the following results :

Spring of 1881, two stands, product 100 pounds.  
 Spring of 1882, three stands, product 200 pounds.  
 Spring of 1883, six stands, product 600 pounds.  
 Spring of 1884, twelve stands, product 1,200 pounds.  
 Spring of 1885, sixteen stands, product 600 pounds.  
 Spring of 1886, twenty-five stands, product 1,801 pounds.  
 Spring of 1887, thirty-four stands, product 520 pounds.  
 Spring of 1888, thirty-six stands, product 3,011 pounds.

This year the profits will foot up as follows :

Honey in bulk, sold at wholesale.....	\$300 00
Increase of 14 stands, worth \$5 per stand.....	70 00
Total.....	<u>\$370 00</u>

Expenses :

Labor and packages for honey.....	\$50 00
Profit.....	\$320 00

The profit averaged \$8.88 per stand, being a sum equal to the money invested in the plant.

In the fall of 1885, my apiary was badly wrecked by a cyclone and about half of it utterly destroyed. During these years I have also sold about twenty-five swarms, and have doubled up and run the swarms as they issued, and could have had one hundred and fifty swarms at this time, as easily as the fifty with which I go into winter quarters. I use the Electric Chaff hive and winter on summer stands.

Mr. W. W. Case, of Baptisttown, N. J., reports a spring count of sixty-two colonies ; lost during blizzard in March, four. Swarming commenced June 6th, and ended the 26th of same month. The number issued was eighteen, having at present eighty colonies. The white clover bloom was excellent, but was curtailed by wet weather. Buckwheat bloom was very good, but a short supply of honey from it on account of wet weather.

The crop taken was as follows :

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White clover.....	1,320
Extracted .....	282
Buckwheat comb.....	1,910
Total.....	3,512 pounds.

The average per colony was fifty pounds. All colonies gathered enough natural store for wintering. The season was a fair one and the crops sold at first-class prices.

These reports are intended to show that in these days of general depression there are a few farmers who are not confined to grain raising alone for support, but are seeking an income from various sources. Both of these reports are from successful peach growers and show a spirit of enterprise commendable to all.

The fall has been one of serious drawback to farmers, both in gathering the crop of corn and fall seeding. The rains commenced in the early part of September and continued until the present writing. The ground, the greater part of the time, was so wet that it was impossible to draw the corn and fodder from the fields, and the acreage of fall seeding has been greatly reduced from the same cause.

The new Hunterdon County Agricultural Society held their annual fair on September 25th to 28th, on the grounds formerly occupied by the old society, near Flemington, on the line of the Lehigh Valley Railroad. The different departments were well filled with exhibits. In the cattle department, there were more than could be accommodated with stalls. The horse stables were all filled. The poultry display was the finest ever made in the county. The same may be said of the vegetables. In the fruit department there was about the usual display, with some very fine samples. To the ladies of the county belongs the credit of making a display in their department equal to, if not excelling, any fair in the State.

The grounds are well located for holding a fair, the Lehigh Valley Railroad landing passengers at the entrance gates. The New Jersey Central Railroad and Pennsylvania Railroad bring passengers within a short distance of the grounds.

The following are the officers of the society :

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<i>President</i> .....	B. E. TINE.....	Stanton, N. J.
<i>Vice President</i> .....	F. S. HOLCOMBE.....	Mount Airy, N. J.
<i>Secretary</i> .....	H. G. CHAMBERLIN.....	Flemington, N. J.
<i>Treasurer</i> .....	M. K. EVERETT.....	Flemington, N. J.
<i>Superintendent of Grounds</i> ..	JAMES E. FISHER.....	Flemington, N. J.

### DIRECTORS.

JOSEPH HAINES,	B. E. TINE,	F. S. HOLCOMBE.
A. BLACKWELL,	R. H. MOORE,	J. E. CLARKHUFF,
	E. THOMPSON.	

The officers of the society are all men of integrity, and the society under the new management will, no doubt, be a success. There is no good reason why the agriculturists of the county should not make this fair one of the very best in the State, and with the co-operation of the County Board of Agriculture, we are assured of its success.

Our thanks are due to the different correspondents throughout the county, for prompt answers to questions and for valuable suggestions.

## MERCER COUNTY.

### MERCER COUNTY BOARD OF AGRICULTURE.

#### OFFICERS.

<i>President</i> .....	THEO. CUBBERLEY.....	Hamilton Square.
<i>Vice President</i> .....	J. M. DALRYMPLE.....	Hopewell.
<i>Secretary</i> .....	FRANKLIN DYE.....	Trenton.
<i>Treasurer</i> .....	H. R. WITHINGTON.....	Titusville.

#### DIRECTORS.

J. B. HORN.....	Woodsville.
J. V. GREEN.....	Wilburtha.
A. L. HOLCOMBE.....	Hopewell.
WILLIAM VAN PELT.....	Hopewell.
D. C. MCGALYARD.....	Trenton.
ISAAC DE COU.....	Trenton.
J. F. PHILLIPS.....	Lawrenceville.
THOMAS B. DE COU.....	Trenton.
WILLIAM S. RIGGS.....	Hightstown.
J. W. FLEMING.....	Titusville.

#### DELEGATES TO STATE BOARD.

- THEODORE CUBBERLEY, (for two years), to November, 1890.  
J. M. DALRYMPLE, (for one year), to November, 1889.

### REPORT.

BY THE SECRETARY.

#### COUNTY ORGANIZATIONS AND THEIR VALUE.

The organizations in the county are Hamilton Grange, at Hamilton Square; Ewing Grange, at Trenton Junction, Ewing township; Mercer Grange, at Hopewell; and Pennington

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Grange, Pennington. These are in working order and are doing a fair amount of work on behalf of the farmers of the neighborhood in which they are located, and through the Mercer Pomona Grange, in the ratio of the interest manifested in them. The Hamilton Agricultural Association is large and flourishing, and is a rallying point for the many farmers and fruit growers south of Trenton. Titusville has organized a Board of Agriculture during the past year, which bids fair to aid in the work of investigation and improvement in that section.

These seven organizations are auxiliaries to the county board, and it is to these the county board must look for support and counsel, as the State board must be supported and encouraged by the several county boards and other societies. The work is mutual and reciprocal throughout the State, and it is by helping one another in and through these different organizations that we will best advance our personal interests as farmers.

GENERAL OUTLOOK—VALUE OF ORGANIZATION—FARMING A SKILLED PROFESSION.

In Mercer county there seems to be a growing purpose on the part of some of the farmers to improve their present condition of depression by making all the possible resources on the farm that they can control help in maintaining their position as farmers, and sustaining their families by availing themselves of as much outside information as they can secure, both through the press, and by means of the farmer's organizations, and to secure, through legislation, if necessary, a reformation of existing inequalities of taxation, freight rates, adulterations and fraudulent imitations of farm products, of grocers' goods, chemicals, fertilizers, and other things, also, to suppress deceiving combinations or trusts that injure both producer and consumer for their own emolument; and it is a pity, a great pity, for the farmers, as a class, that more of them do not unite with the few who are trying to awaken and save this large and important industry from threatening ruin, which will eventually come, unless they do make an honest and persistent effort to improve the present condition of depression that has fallen like a pall over the farming interests of the land. But the facts are, that very few, com-



pared with the whole number, are members of farmers' organizations. The larger portion of them content themselves with hoping for better times "bye-and-bye," with an occasional growl at the farmer's hard times. It is presumed that if the farmers would pull together in certain directions *continuously*, the burdens named, with others that exist, would be removed, to a great extent at least. There is no better time, and there never has been a time so abounding, and increasing every day, with the very best and most needed information, both scientific and experimental, when the farmer, if he will, can make great advance in his profession. It sometimes happens that a period of oppression and depression will develop a man's character and resources towards perfection much faster and to a greater degree than will uniform prosperity. Occasionally it will bring ruin to the already weak and indolent. Such times, therefore, become "sifters," so to speak, to the class under discipline, and it is my firm conviction that this result will follow to our farmers. Some will become better and more intelligent farmers, and will take higher ground all the way through in their profession by means of increased intelligence, better methods, surer results and greater profit. This class will own the farms of the future and will lift the business to a higher and more respectable and honorable position among the callings. It is fast becoming, and is so regarded, not only as a business, but as a profession—a profession that requires a comprehensiveness of knowledge, and a daily originality of thought, that is required by but few others. But those in the farmer's calling to-day, who disregard the new necessities to progress, will fall behind in, if they do not fall out of, the business.

I content myself this year by presenting the proceedings and work of our County Board, as required by law, with the answers to the questions of the Executive Committee, condensed and averaged from township reports, and also a brief report of the Inter-State Fair, organized last spring. This association is an outgrowth, or an enlargement, of the Mercer County Fair Association, which it has absorbed. The capital invested is large. The grounds are favorably located on the Pennsylvania Railroad; the buildings are suitable, commodious and artistic; the enterprise is popular, and all it needs is a wise policy on the part of the management to make it permanent. Let them give us a competitive exhibi-

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tion in the interest of diversified agriculture, stock development, manufacturing, art and scientific progress, and divested of those questionable allurements that do not belong to such an enterprise, and both popularity and financial success will be assured.

## PROCEEDINGS OF COUNTY BOARD.

Mercer County Board of Agriculture has held the usual number of meetings during the year. The numbers in attendance at all the meetings were not so large as last year, but the interest in the subjects presented was equal to former occasions. The annual meeting of the Board was held in February. After the election of officers, a list of which is given, the Board considered the advisability of establishing a State Weather Service in Trenton, to be managed by a member of the Board. A committee was appointed to take the necessary action, if they deemed it expedient and of sufficient advantage to the farmers and fruit-growers to warrant the expense.

Eli Minch, Esq., of Shiloh, delivered an address on potato growing, giving his latest experience and views on the subject. The address was considered of much value, as the statements of practical experience must always be, to those engaged in like occupations, and all the more valuable, if such experience is the outgrowth of thoughtful, scientific, common sense research.

At the June meeting the increasing and important "Insects Injurious" question was presented, using the Fifteenth Annual Report of the State Board as text book and guide, in the discussions on the subject. Farmers who wish to grow fruit—as every farmer should do—begin to realize the necessity of some means, both cheap and simple, by which they may destroy the insect pests, and the report referred to is a text book to the ordinary farmer, as far as it goes, and is very helpful. President Burrough was present, and aided in the discussion of the subject.

The cream gathering question by the Cooley process, of the Vermont Farm Machine Company, was also set forth at length by Mr. Lester, of Troy Creamery, Pa. Those wishing light upon this subject, and a perfect process, will do well to consult the above.

Friend Coffin also exhibited and explained his automaticerator and cooler.

The Autumn meeting presented the usual county crop report.

A very complete and valuable address on profitable poultry raising and how to do it, was delivered by M. K. Boyer, Esq., of Hammonton.

The insect question was again taken up at this meeting, opened by an address by Prof. Geo. D. Hulst, of the State Experiment Station, and discussed at length. Both the addresses referred to were of great value to all who heard them, and were of far more value to the farmer, if he could see it, than the price of the day's work which he saved (?) by staying at home, meanwhile wondering how he could best increase the profits of the orchard and poultry yard. Space will not allow of even an extract of these addresses.

Delegates were appointed at this meeting to attend a delegate meeting, when called, to consider the advisability of forming a State Poultry Association.

The special meeting, held January 8th, 1889, was a very busy one. The question "Is it just to tax payers that all State property should be exempt from taxation" was discussed, after a paper on the same by J. A. Hendrickson, Esq., who cited the burdens of increasing taxation and decreasing profits from farm values and products, and that farmers needed relief in some way. In referring to his township (Ewing) he stated its total area at about twenty-five miles square; assessed valuation a little over one million dollars. In this township the State has purchased several hundred acres, and located a lunatic asylum, a reform school for girls, and other institutions, equal to about half the whole taxable value of the township, from which not a cent can be collected to aid the state, county, road or municipal tax, and in connection with the working force of these institutions is a class who are only assessed for poll tax, but who are ready to vote any amount from the tax payers of the township, whether just or not.

The school moneys of the State were also spoken of in connection with some extremely high valuations of farms, on which they were placed, and exempt from taxation at that. Other points in connection with this general subject were discussed, and though it was considered a matter deserving further and more

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general consideration, it was also deemed a subject that required great care in recommending changes.

"Roads and their Management," and the present "Freeholder System," were also discussed. The latter was presented by Captain Samuel Blish, of the Middlesex Board, who stated the action of his Board in the matter. The law, as offered by the Middlesex Board, was favorably considered. Hon. Geo. O. Vanderbilt spoke quite at length against the folly of a system that allows such a vast expenditure of the hard earned taxes, when by a change in the system, as is proposed, a large part of this could be saved to the tax payer. He stated the proposed plan is not an experiment—it is in operation in many of our States, both north and south, and it works to the satisfaction of all concerned. He is not speaking against the Freeholders, but the "System." On this subject, the Ewing Grange presented the following resolution :

*Resolved*, That the Ewing Grange recommend the Mercer County Board of Agriculture to co-operate with other County Boards in requesting the State Board of Agriculture to petition the Legislature to reduce the representatives of Boards of Freeholders in this State to three to each county, to be known as Commissioners, with compensation sufficient to amply pay them for their services.

The resolution was, on motion, accepted by the Board.

The ensilage question was considered by J. V. Green, Esq., of Wilburtha, who said it is one of growing value and importance, though not in general practice among farmers in this county. He can keep from three to five cows per acre with ensilage, while the hay from an acre will support but one, and the ensilage is worth more for feed than hay. Ensilage is now put in in better condition, is kept sweeter, and the work is done at a less expense than when its use was first introduced, and believes it can be grown and siloed for one dollar per ton. He prefers an early maturing corn for ensilage crop. It does not require an expensive building of stone or brick—a wooden structure will do. Weight of about one hundred pounds per square foot should be applied. He would feed it twice a day—common fodder at noon—other feed, &c., as ordinarily.

S. B. Ketcham spoke of the large number of cows—fifty head—kept on the State College farm by the "soiling system."

Capt. Blish said he knew them when they kept but seven or eight cows there, but by good feeding of green crops, they had increased their capabilities to the present figure. Their green feeds are rye for early and corn for the later season. All they buy is "grains" and "bran." "Prof. Cook is a very careful experimenter, and is skeptical until he has proven a question clear through."

Ralph Ege, Esq., ex-president of the board, delivered an address on "The present outlook for farmers, with suggestions as to securing better and more profitable results in the near future," which was of much practical value to those who heard it.

ANSWERS TO EXECUTIVE COMMITTEES' QUESTIONS.

To the questions sent out by the State Board Executive Committee, the following answers are returned, in brief :

Wages, without board, \$10 to \$16 per month ; with board, \$25 to \$30. Farmers generally board their help, which is mostly single men of foreign birth.

There are two silos in the county ; the subject has not received much attention.

Soiling, where dairying is practical, is an important aid in connection with the pasture for sustaining the milk supply. Corn is the chief product used.

Root crops are not grown for dairy cattle.

Dairying or milk producing is on the increase.

Cabbage and potato growing is increasing, while the old crops of wheat, rye and corn hold their own in most townships.

Peach growing in Hopewell is losing, owing to the short bearing life of the trees.

Sheep husbandry is losing from year to year and bids fair to soon become extinct. The discouragements are dogs and the growing dairy interests.

But one township mentions an increase in the pork product, and only one a loss, of 10 per cent., by cholera.

Poultry raising is coming to the front in some townships. The prevailing diseases are gapes, cholera and roup ; loss from two to fifty per cent.

Cattle fattening is not followed, owing to the small margin of

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profit—even if any—in it, and because of the more profitable dairy business. Mostly northern, some western cattle are bought to keep up the dairy herds. Few cattle are raised from the home stock for the purpose, as compared with the whole number. No cases of cattle disease introduced from such cattle imported. Jerseys and Holsteins are the most popular breeds—only one township reporting in favor of natives.

Four creameries are in operation in the county.

No special action, looking to the improvement of the roads, has been taken. One township only reports the purchase and use of a stone crusher for road improvement.

Farmers are not satisfied with their condition, but complain of it. One says—"They complain like thunder." The complaints are, low prices received for produce, high wages, high tax, unequal tariff, destruction of crops by insects, and (one says) "gunners." What they need is stated as equal taxation, equal tariff, greater demand and better prices, and one says—"some means whereby help can be procured for our wives."

Ewing says: The inroads made in that township by the growth of Trenton, and her demands in the way of asylums, reform schools, brick yards, potteries, and lastly, the Trenton Park, absorbing their farm lands, and these being able to pay high wages, the wages of farm help is driven up, while farm produce is low, and with no hope of an advance. Legislation has favored manufacturing and moneyed industries, regardless of farmers' needs or rights, he—the farmer—being remembered by the thoughtful assessor only; calls for equalization of burdens as well as favors, and general equal rights in legislation for all, as a great and pressing need.

Farmers generally receive the bulletins of the Experiment Station. Two townships report that they are read and appreciated, and are used to some extent as a guide in purchasing fertilizers. Two townships report—"But little read or appreciated."

Three townships report the Weather Service as of value, and used by farmers near post offices, and where daily papers containing probabilities are circulated. Three report adversely.

Fruit trees, vines and small fruit planting are on the increase, in some favored localities. Spraying is being introduced, and is

successful where properly done. London Purple and Paris Green solutions were used.

(The following record of the profits from a small dairy, with the statements and suggestions that follow, is worthy of careful consideration, showing as it does, not only what can be done with good management, but also the value of making careful farm records in each line of work. F. DYE.)

### REPORT OF J. G. LEAMING, HOPEWELL, N. J.

Copied from daily milk account book—milk sold in Philadelphia at wholesale—dry measure. It may be well to state that I have bought each year about three fresh cows and sold three fat ones at a sacrifice, or depreciation of about \$12 per head.

#### MILK ACCOUNT.

January.....	2,746	quarts....	4	cents.....	\$109 84
February.....	2,650	"	....4	"	106 00
March.....	3,788	"	....4	"	151 52
April.....	3,639	"	....4	"	146 36
May.....	4,069	"	....3½	"	142 41
June.....	4,488	"	....3	"	134 64
July.....	4,677	"	....3	"	140 31
August.....	4,790	"	....3	"	143 70
September....	4,043	"	....3	"	121 29
October.....	3,443	"	....4	"	137 72
November....	2,483	"	....4	"	99 32
December....	2,580	"	....4	"	103 20
<hr/>					
43,416					\$1,536 31
					Freight, 217 08
					<hr/>
					\$1,319 23
Sold at home, 4 cents,					12 36

#### VEAL ACCOUNT.

January .....	\$19 39
March.....	55 54
April .....	9 84



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June.....	\$17 40
July.....	21 12
October.....	10 36
November.....	11 00
December.....	14 24

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 \$158 89

Milk, less freight, 1,331 59

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 Total receipts, \$1,490 48

Average number of cows for the year, fifteen and five-sixths head.

Average yield per cow, \$94.13.

After looking over the statement as made, a person unacquainted with my manner of feeding would naturally say that in order to produce the amount of milk the cows must have been forced. But allow me to frankly answer, No. Not at any season of the year. During the season of grass I feed two quarts at each milking, equal parts in bulk of corn meal and wheat bran, and green corn when the grass is not sufficient to satisfy them without eating over the field more than half of the day. In order to keep a cow in perfect health, and get the full amount of nourishment from her feed, she must have, at least, one-third of her time, apart from her sleeping time, to chew her cud. During the months of foddering I feed three times a day, morning and evening, two quarts barley screenings and two quarts corn meal, and at noon one quart corn meal and one quart wheat bran and all the corn fodder and clover hay they want.

The water is arranged in such a way that they can get it as often as they want it during the day, and seldom falls below forty-five degrees during the winter. The stable is not freezing cold at any time during the winter, and is well ventilated.

My experience has taught me that the man who feeds corn to his cows because it is so mouldy that the hogs will not eat it, and the hay that the horses will not eat well because it is a little mouldy and colored with rain is not the kind of a man to get big returns from the dairy, but the reverse of this is what they need in order to give a big flow of milk. Feed has not been damaged in the least while being cured, and one of the most essential things



of all, in order to keep cows to a full flow of milk, is to have milkers that are capable of taking the milk from a cow in a very few minutes, and at the same time keep the cow perfectly quiet; do not force the small boys and girls to the milk stables, their hands are small and weak, and milking is not only tiresome, but really painful, and the consequence of the slow milking causes the cow to dry up, and at the end of the year, in making up the products of the dairy, they find that the amount is small, and the final conclusion is that "I guess the dairy business don't pay very well anyway."

For the year 1878, my dairy averaged \$93.70 per cow, and if I had kept a complete record for the last five years, as I have in the last two years, could show figures equally as good.

## INTER-STATE FAIR ASSOCIATION.

### SECRETARY'S REPORT.

The Inter-state Fair Association, of Trenton, was incorporated June 20th, 1888, the authorized amount of stock being \$100,000, divided into five thousand shares, at a par value of \$20 each.

The first meeting of stockholders was held on June 23rd, 1888; the first annual meeting on February 23rd, 1889, and the following officers were elected:

<i>President</i> .....	JOHN TAYLOR.
<i>Vice President</i> .....	RALPH EGE.
<i>Secretary</i> .....	JNO. GUILD MUIRHEAD.
<i>Treasurer</i> .....	E. C. HUTCHINSON.

### DIRECTORS.

HON. R. A. DONNELLY,	HON. H. C. KELSEY,
F. W. ROEHLING,	HENRY T. COOK,
FREDERICK WALTER,	J. H. HEIL,
FRANKLIN DYE,	WM. S. HANCOCK,
CHARLES V. BAMFORD,	R. B. KONGER,
AMOS B. HEADLY,	J. H. SCUDDER,
JOSEPH S. MOUNT,	CHARLES A. MAY,

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THOMAS B. DECOR,	LAWRENCE FARRELL,
L. B. KISON,	A. R. KUSER,
E. M. COFFIELD,	F. F. KATZENBACH,
WILLIAM S. LALOR,	GEORGE L. HOWELL,
H. LEON HUTCHINSON,	A. S. LEIGH,
H. C. STULL,	J. H. BLACKWELL,
J. W. SUTPHIN.	

The Association purchased a tract of land containing about 110 acres, in the township of Hamilton, near the city of Trenton, and upon the main line of the Pennsylvania Railroad, and have erected thereon a complete and commodious series of exhibition buildings, a grand stand, a half-mile track for speed purposes, &c., and all necessary stable accommodations.

The cost of plant, up to date of this report, has been as follows :

Real estate.....	\$19,771 61
Buildings and improvements.....	64,369 94
Machinery, tools and fixtures.....	2,372 57
Clerks and office expenses.....	375 00
Postage.....	92 60
Printing and advertising.....	103 84
Interest and discount.....	518 55
Salaries.....	500 00
Legal expenses.....	213 75
	<hr/>
	\$88,327 86

The first fair was held on Oct. 2d, 3d, 4th and 5th, and although the preparations for it were necessarily hurried and incomplete, it was successful, both as an exhibition and from a financial standpoint.

The gross amount of Fair receipts was \$26,361.61. The expenses \$18,427.26, leaving a net profit of \$7,934.35.

From this amount a dividend of five per cent. upon the stock issued was declared, and the balance remains in the treasury.

The dates fixed for the exhibition of 1889 are September 30th, and October 1st, 2d, 3d and 4th.

It will be seen from this brief outline that the preliminary work of establishing the association has been completed.

With the advantages which we enjoy in the point of location, our magnificent equipment in the way of grounds, buildings, track and stabling, there can be no doubt of the continued success of the corporation, and that a fair can and will be maintained, which will be a credit to the State, a benefit to the agricultural and trades interest of the county and surrounding country, and a source of profit to the stockholders.

JOHN GUILD MUIRHEAD,  
Rec. Secretary.

## MIDDLESEX COUNTY.

### OFFICERS FOR 1889.

<i>President</i> .....	Z. HENDERSON.....	Milltown, N. J.
<i>Vice President</i> .....	SAMUEL BLISH.....	New Brunswick, N. J.
<i>Secretary</i> .....	J. M. WHITE.....	New Brunswick, N. J.
<i>Treasurer</i> .....	C. E. D. PHILLIPS.....	New Brunswick, N. J.

### DIRECTORS.

CHARLES E. ELKINS .....	.....	New Brunswick, N. J.
J. G. CORTELYOU .....	.....	New Brunswick, N. J.
MATTHEW SNYDER.....	.....	New Brunswick, N. J.
GEORGE H COOK, L. L. D.....	.....	New Brunswick, N. J.
E. FARMER .....	.....	New Brunswick, N. J.
JOHN PIERSON.....	.....	Jamesburg, N. J.

### DIRECTORS IN STATE BOARD.

D. C. LEWIS.....	.....	Cranbury, N. J.
J. M. WHITE.....	.....	New Brunswick, N. J.

## ANNUAL REPORT.

BY J. M. WHITE.

We have in our county only one Agricultural Association, the Middlesex County Board of Agriculture, with forty-five members. It has held five meetings the past year, which have usually been very well attended, and a fair degree of interest has been manifested. The president, vice-president and secretary of the State Board of Agriculture have been present at some of these meetings and addressed its members, also Mr. Bingham, of Camden. There seems to be a general feeling among our farmers that the agricultural interests of our State are being advanced by the workings of the State Board and the State Experiment

Station, proof of which is found in the fact that this year seven members of our county board have made replies to the questions sent out by the State board, when but two or three replied last year. I give below the names and post-office addresses of the members who have replied: George W. Thompson, Stelton; Samuel Blish, New Brunswick; Matthew Snyder, New Brunswick; D. C. Lewis, Cranbury; John Pierson, Jamesburg; E. Farmer, New Brunswick; J. G. Cortelyou, New Brunswick.

A summing up of these reports results about as follows:

The work of the County Board for the last season has consisted chiefly in the discussion of questions of interest to agriculture in general, and how best to remedy evils growing out of the mismanagement of the affairs of our county, causing a burdensome taxation of its citizens.

Wages per month for adult farm hands, with board, ranges from \$6 to \$17, or an average of about \$12 to \$14, and without board from \$17 to \$25, or an average of \$21. Farmers usually board their help. There are more single than married men employed on farms, and one replies, "and that is one of the evils." The majority of the farm laborers are foreigners, or of foreign parentage.

There are but six or seven silos in the county. Siloage is not gaining in favor with the majority of farmers, and no new silos have been built during the past year. Corn, rye and clover are the crops mostly in use for siloage.

But few farmers, perhaps five or six, depend on soiling rather than pasturing for the support of their cattle during the summer months.

Root crops are not grown to any great extent for winter feed, although they are used by some.

The milk business is somewhat on the increase.

Buckwheat and oats are receiving less attention than ten years ago, and, in some sections, rye and wheat. Potatoes are generally receiving more attention, and, in some localities, grass, rye, cabbage and corn.

Very few farmers are reported engaged in the sheep business, the discouragements being destruction by dogs, expensive fences, want of knowledge of their value, free wool, high price of new sheep, and low price of wool.

MIDDLESEX COUNTY.

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The different townships are nearly equally divided as to the increase or decrease of raising and fattening of hogs for market. Only a small percentage of hogs are lost by cholera or other diseases.

Poultry raising is somewhat on the increase. Probably five to ten per cent. would cover all loss of poultry by disease, the prevailing diseases being cholera, roup, pip and gapes.

Farmers do not fatten so many cattle for market as they did some years ago, because they cannot successfully compete with the West in the production of beef. Farmers do not, to any extent, raise calves from their own stock to keep up their cattle supply, but often purchase western or northern stock for that purpose.

No cases of cattle, horse or hog disease are known arising from imported cattle, or stock from the other States.

The breeds of cows reported as most profitable for dairying purposes are the Jersey, Holstein and Durham.

There are no creameries in our county.

In some of the townships, special action has been taken for the improvement of the roads, in others, none. Some farmers complain of their condition, while others do not; perhaps the majority complain. Some of the complaints are that labor costs too much in comparison with the prices received for their products.

Some of the things needed by farmers and agriculturists are a reduction in local freights and an increase in freights from a distance, more diversified agriculture, cottage tenantry, a more practical knowledge as to how to feed and increase crops, more and better help, and more care and study in every department of the farmer's work.

Most of the farmers are benefitted by the bulletins of the State Experiment Station, and they are probably used by nearly all who receive them.

Farmers, to a greater or less degree, according to intelligence, appreciate the analysis of fertilizers made by the Station, with their market value attached, and many, if not the majority, are guided by them when purchasing fertilizers.

The Weather Signal Service is used by the farmers to some extent, as a guide in gathering crops, but the majority of them

are not yet educated to it; others are becoming influenced by these reports as time advances.

Farmers, to a small extent, have planted fruit trees and vines, and small fruits as a market crop. More attention has been paid to the planting of peach trees than to any other fruit.

The spraying of fruit trees and vines to destroy insects, has, in some localities of the county, been practiced to some extent, with good results. Paris green has been the poison generally used for the purpose.

The past season has been one of moderate prosperity for the farmer, although the weather has been more suitable to some crops than to others. The cool, damp weather of spring and early summer was favorable to grass and grain, and hay was a fair crop and fair quality, and to a large extent, secured in a fair condition. Oats, in most cases, were a fair crop, and well secured, although grains of all kinds were more or less injured in the stack.

Wheat and rye were good, where not killed by the winter.

Potatoes, throughout the county, were a large crop, and of excellent quality, and have been sold at fair prices, rarely going below fifty cents per bushel.

Corn was not generally as good as anticipated before harvesting.

Almost all fruits were injured by cold, wet weather, and although the yield was not large, the quality was poor and prices low.

Cabbage and turnips were good crops and of good quality, but sold very low.

The season for fall seeding was unfavorable, especially where the ground was low and flat, and many fields were left unplanted. Fall sown grain on well drained ground is promising well at present. The same may be said of early sown grass.

Taken as whole we think the past season must be counted as one of abundance and of moderate remuneration.

## MONMOUTH COUNTY.

### MONMOUTH COUNTY BOARD OF AGRICULTURE.

<i>President</i> .....	W. S. COMBS.....	Freehold.
<i>Vice President</i> .....	JOHN STATESIR.....	Colt's Neck.
<i>Treasurer</i> .....	JOHN B. CONOVER.....	Freehold.
<i>Secretary</i> .....	D. A. VANDERVEEK.....	Manalapan.

#### DIRECTORS.

JAMES H. BAIRD.....	Marlboro.
JOSIAH WOODWARD.....	Englishtown.
J. B. THOMPSON.....	Freehold
WILLIAM H. REED.....	Tennent.

#### DELEGATES.

JOHN H. DENISE.....	Freehold.
DAVID BAIRD.....	Manalapan.

### COUNTY REPORT.

BY D. D. DENISE.

In presenting this report, the question comes up with great force—Have we been doing all we could since our organization to advance the interests of the agriculturist? The question answered correctly would show that we are doing very little to promote the interest of this noble occupation.

The board has held four sessions during the year, which were but fairly attended, but the interest manifested by the practical farmers of the county and the discussions, which were upon practical topics, fully warrant our expectations, that in the future our meetings will be attended.

Programmes of each meeting have been prepared setting forth the subjects for discussion, and thoroughly circulated among the



farmers. It remains with them entirely to make these meetings productive of good.

One of the subjects discussed at the first meeting was, "Can our farms be kept in good strength and fertility for all crops, without the aid of stable manure?" W. S. Combs, of Freehold, related his experience in experimenting upon a piece of land for nine years, on part of which he had used stable manure, and on the other part he had used commercial fertilizers, and the commercial fertilizers had produced the best results with less expense. J. H. Denise and D. D. Denise related similar experiences.

At the second meeting several topics were discussed, one on "What is the proper depth to put in wheat?" It was decided that with the ground in proper condition one inch was the proper depth. The question of "What is the cause of black leaves on potato vines?" came up at the meeting, and the result of the discussion was the appointment of a committee to ascertain the cause, if possible, this disease being very general at the time.

The committee procured potato vines and leaves and forwarded them to Prof. Riley, at Washington, for examination, but have received no communication from him.

At the next meeting of the board the following resolution was passed, and requested to be sent to the State Board meeting :

WHEREAS, Owing to the prevalence of a disease attacking and destroying the vines of the potatoes in our county ; therefore, be it

*Resolved*, By the the Monmouth County Board of Agriculture, that the State Board of Agriculture use its influence with the Department at Washington and the Experiment Station of our own State that they may, if possible, show us the cause of, and give us a remedy for the disease.

Owing to the great increase of damage done by dogs to sheep and poultry, the Board feels the importance of enacting a law that will prevent it in a great measure, and present the following to the State Board for action :

A further supplement to an act entitled "An act for the preservation of sheep and poultry."

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That every person who shall own, keep or harbor any dog or dogs, bitch or bitches, shall have the same registered and numbered by the clerk of the township or ward in

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which the owner or person harboring the same shall reside, and shall place upon the neck of each dog or bitch so kept or harbored, a collar having engraved thereon, upon a metal surface, the name of the owner of said dog or bitch, and the registry number thereof, and it shall be lawful for any person to kill any dog or bitch found straying off the owner's premises, without such collar upon its neck.

2. And be it enacted, that it shall be the duty of the clerk of each township or ward in this State to provide a book for the purpose of registering the owner's name of every dog or bitch, and the number, numbering them in the order of the owner's applying for said registration, and giving to each person information of the registered number thereof, and for so doing shall receive the sum of ten cents for each dog or bitch thus registered. The person applying for registration shall pay the sum of one dollar for each dog or bitch thus registered, of which amount the clerk shall receive the sum of ten cents for each registration, the balance to be applied to paying damage done by dogs. In case of no damage, the same to be applied to the school fund. There shall be a penalty of ten dollars for each and every neglect or refusal of the said clerk so to register.

3. And be it enacted, that all acts and parts of acts inconsistent with the provisions of this act be and the same are hereby repealed.

4. And be it enacted, that this act shall take effect immediately.

The last meeting of the Board was addressed by Prof. Samuel Lockwood, of Freehold, on "Our Insect Friends and Foes," which was followed by a discussion on "Noxious Weeds."

ANSWERS TO QUESTIONS ASKED BY STATE BOARD.

1. Organizations.—Two Granges, one Agricultural Association and one Fruit Grower's Association. Membership, five hundred and ninety.

2. Wages per month, with board, \$15 to \$18.

3. Wages, without board, from \$28 to \$30 per month.

4. Farmers generally board their help.

5. More single than married men, for the reason that married men generally locate in the towns.

6. Farm labor is principally American born Irish, a few Germans and some colored.

7. One silo in the county.

8. Siloage is losing favor with the farmers.

9. Corn is used for siloage.

10. No farmers depending on soiling their cattle.

11. Root crops are being more grown as a winter feed, and if all farmers knew their value, more would grow them.

12. Milk business is on the increase, there being a demand for it at our summer resorts.

13. Wheat, oats and corn are receiving less attention than ten years ago.

14. Hay, potatoes, fruits and vegetables, especially tomatoes, are receiving more attention.

15. Many farmers have quit keeping sheep on account of the damage done by dogs, which are increasing in number.

16. Fattening hogs for market is decreasing.

17. There has been no loss by hog cholera or other disease.

18. The poultry interest is receiving increased attention.

19. Cholera is the prevailing disease, but there is little loss.

20. Farmers are fattening less cattle each year, on account of the low price at which Western beef is placed upon our markets.

21. Generally buy Northern calves, excepting those who keep thoroughbreds. Buy Western cattle to fatten.

22. No disease introduced by imported stock, but pleuro-pneumonia is introduced by stock from other States.

23. Natives are the most popular cows for general purposes although many keep Jersey stock.

24. There are two successful creameries.

25. No special action has been taken, looking to the general improvement of the roads.

26. Complaint is made of the manner in which the money is spent, as so little improvement is received for it. Also of the toll roads. Many think all roads should be free.

27. Farmers need lower taxes, lower wages and more co-operation in selling and buying and more home markets.

28. We receive benefit from Experiment Station.

29. All those who understand the analyses of fertilizers appreciate them and use them as a guide in purchasing.

30. Weather Signal Service not used.

31. Fruit trees, principally pears and small fruits, are on the increase.

32. Spraying of fruit trees and vines but little practiced, but where used has met with success. Paris Green is used.

#### CROPS.

*Apples.*—The apple crop was rather light and poor in quality, with the exception of the earlier varieties, which were a fair yield. Price from \$1.50 to \$2.00 per barrel.

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*Pears.*—This was an average crop, with quality of fruit very fair and prices good, ranging from \$2.50 to \$6 per barrel. The Keiffer was the largest yielder. A great many trees were planted the past fall.

*Peaches.*—The crop very light and of inferior quality. Very few trees net the past year.

*Small Fruits.*—Small fruits are being more extensively grown, as there is an increasing demand for them at our summer resorts, where they demand a price which leaves the producer a fair margin of profits.

*Wheat.*—The wheat crop was much below the average. The cause is unaccountable, for there was a good growth of straw, but upon thrashing, the yield was found to be very light. The largest yield I have heard of was grown by W. S. Combs, at Freehold. Upon a field of fifteen acres he had an average of twenty-eight bushels per acre. The fall sowing is looking very well at present, having made a good growth.

*Rye.*—In the rye crop, there was a good growth of straw, the heads were filled and the yield was fully up to the average. Charles M. Bruere, of Cream Ridge, harvested two hundred and sixteen bushels from six acres, an average of thirty-six bushels per acre, some of the straw being eight feet and two inches high. Straw is now selling for \$14 to \$15 per ton.

*Oats.*—These are so little grown that they can scarcely be called a crop in the county.

*Corn.*—Corn is not grown so extensively, as a crop, as in former years, but was a good crop on the average. Many farmers raise only enough for their own use, as other crops pay better. J. H. Denise reports, from a field of five acres, an average of eighty-three bushels per acre, the ground being manured and phosphated.

*Hay.*—The hay crop was the largest ever gathered in the county. The average yield being one hundred and ten per cent. J. H. Denise raised nineteen tons and nine hundred and twenty-

five pounds on five acres, an average of three tons and one thousand seven hundred and eighty-five pounds, being raised on a piece of ground that has been mowed for five years in succession and still in good condition. This shows that ground can be mowed for any number of years and still increase the yield by the use of fertilizers each year. He also reports, on forty-five acres, an average of three and one-fourth tons, equal to one hundred and forty-six and one-fourth tons, this having been mowed three and four years, all of which was fertilized or covered with manure.

*Potato.*—The potato crop was fully up to the average. It came up better than some years ago, and many fields yielded one hundred barrels per acre. Some of the later ones rotted somewhat. The average price was \$1.20 to \$1.50 per barrel.

*Tomato.*—The tomato crop was an average one, and would have been extra large had not the frost come so early. Tomato growing is increasing, and many farmers think it one of our best paying crops.

*Melons.*—The melon crop was very large, and quality good, but prices were very low.

Considerable attention is being paid to the raising of poultry, and it is increasing, there being a good market for it on our seashore.

Stock is in good condition and apparently no disease at present. We were visited last May with the first case of pleuropneumonia. It was found in five herds, and believed to be brought there by stock purchased in the fall or winter. Ten died and twenty-six were killed.

The sheep industry is still on the decrease, and unless we can secure better protection from dogs, we shall have to number it with the industries that have ceased, to make room for worthless dogs.

The increasing demand for milk is causing many to turn their attention to its production, which is more profitable than feeding stock and fattening calves.

The subject of roads is one in which the farmers feel a great

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interest—having good roads without being toll roads. Many believe that the county should own all the roads.

Each year, many of our farmers have made a desperate effort to outdo the previous years, and in these stirring times, while busy brains are thinking out the knotty problems that surround the bread winners in the world's great workshops, the same spirit of unrest has entered the modern practice of agriculturists. The first symptoms of improvement in this direction is to become dissatisfied with our present surroundings. That the farmers of Monmouth county have learned to become dissatisfied with the former environments, and are fully imbued with the spirit of progress and abreast of the times, is seen by the herds of improved breeds of all classes of live stock, of the improved machines for planting, cultivating and harvesting various crops, by the many co-operative measures entered into by our farmers to improve themselves materially and mentally, and not only to improve the standard of intelligence in their class, but to secure the increased comforts which an elevated intelligence always insists upon. It is to be regretted, however, that so many farmers do not have this spirit of progressiveness, but are content with the old ways laid down by their forefathers.

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### REPORT OF MONMOUTH FAIR ASSOCIATION.

BY C. D. B. FOREMAN, SECRETARY.

This year is the first in the existence of the association, and, in almost all respects, may be termed a most successful one.

The annual fair was held on the old fair grounds of the Monmouth County Agricultural Society, at Freehold, on September 25th, 26th and 27th. The exhibits were far superior to any ever held in the county, and visitors pronounced them fully equal to any in the State.

This great success is principally due to the faithful and untiring labors of the eleven directors, who, with but few exceptions, were earnestly interested in the cause.

The annual report of the treasurer showed on hand a balance

- , of \$462.28, notwithstanding a large amount had been expended upon the grounds in the way of permanent improvements during the past year. The premium list in all departments was most liberal, a fact which caused a very large and meritorious display in all departments.

The new Board of Directors recently elected for the coming year are as follows :

JOHN B. CONOVER, Freehold, N. J.  
JOHN V. N. WILLIS, Marlboro, N. J.  
CAPT. A. W. BRADSHAW, Lakewood, N. J.  
D. D. DENISE, Freehold, N. J.  
GEORGE W. BROWN, Long Branch, N. J.  
DAVID S. CRATER, Freehold, N. J.  
J. T. FIELD, Red Bank, N. J.  
O. C. BOGARDUS, Keyport, N. J.  
T. A. WARD, Freehold, N. J.  
HAL. ALLAIRE, ALLAIRE, N. J.  
LA FAYETTE CONOVER, Wickatunk, N. J.

We are unable to give the officers as the directors have not perfected an organization.

## MORRIS COUNTY.

### MORRIS COUNTY BOARD OF AGRICULTURE.

#### OFFICERS FOR THE YEAR 1889.

*President*.....HON. A. W. CUTLER.....Morristown.  
*Secretary*.....WILLIAM F. ELY.....Madison.  
*Treasurer*.....GEORGE COOK.....Hanover.

#### BOARD OF DIRECTORS.

M. M. COOK,	GEORGE W. FELCH,	HENRY W. YOUNG,
JOHN J. MITCHELL,	WILLIAM B. LINDSEY,	B. E. CONDITT,
WILLIAM JAMES,	OSCAR LINDSEY.	

#### DELEGATES TO STATE BOARD.

HON. A. W. CUTLER.

WILLIAM F. ELY.

### ANNUAL REPORT.

BY WILLIAM F. ELY.

The Morris County Board has held but one meeting the past year, but much more interest was shown than at any previous time, farmers attending from all directions, coming as far as ten or twelve miles. The probability is that a number of meetings will be held the ensuing year.

The meeting was presided over by Hon. A. W. Cutler, who introduced the first speaker, George W. Howell, one of the New Jersey State Commissioners on Drainage, who gave a very clear and interesting address on the drainage of the Passaic river and its tributaries, which was ordered to be printed in our annual report, as follows :



REPORT ON PASSAIC RIVER DRAINAGE BEFORE THE  
MORRIS COUNTY BOARD OF AGRICULTURE,  
AT AFTON, N. J., DECEMBER 19TH, 1888.

BY GEORGE W. HOWELL, C. E., COMMISSIONER.

The General Dainage Law, under which the Commissioners are acting, was passed by the legislature and approved March 8th, 1871. Under its provisions application was made to the Board of Managers of the Geological Survey by twenty-nine owners of land along the Passaic river and its tributaries, and the said Board of Managers, with the assistance of the State Geologist, proceeded to examine the tract, and as the result of such examination they deemed it expedient for the interests of the public, and of the land owners, that a plan of drainage should be adopted and carried out. Accordingly a plan was proposed by them, which, with maps, profiles and diagrams, was reported to the Supreme Court of New Jersey. Thereupon the Court appointed as commissioners for carrying out said plan, Aaron Robertson, John H. Anderson and George W. Howell, who were sworn January 11th, 1873.

The commissioners then proceeded to make arrangements for the necessary work required and reached a preliminary agreement with a certain contractor to perform the work and take in payment for the same the bonds to be issued by the commissioners under the act.

The plan adopted by the Board of Managers involved taking down the dam now owned by the Beattie Manufacturing Company to the amount of seven feet, taking out a reef of rocks in the bed of the Passaic river just above said dam, removing another reef of rocks about 1,000 feet above the dam, and excavating a channel in the bed of the river at Two Bridges, through a bar of earth and boulders, at the junction of the Pompton river with the Passaic.

This was deemed sufficient to remove quickly the freshet waters from the lands above.

For carrying out the work the Commissioners were empowered to issue bonds, redeemable after the completion of the work, from the proceeds of an assessment to be made by the Commis-

## MORRIS COUNTY.

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sioners upon lands benefitted. The area of the tract brought under contribution to the scheme, as defined by the Board of Managers of the Geological Survey, amounted to about 13,000 acres, and lay along the Passaic river between Little Falls and Lower Chatham, a distance of some twenty-two miles, along the Rockaway and Whippany rivers, and Troy brook and Black brook, and comprised portions of Morris, Essex and Passaic counties.

The financial crisis of 1873 brought matters to a stand-still, and nothing further was done until 1885, when Hon. Aaron Robertson resigned on account of increasing age and infirmities, Mr. John Anderson in the meantime being deceased. On application to the Supreme Court the vacant places on the Commission were filled by the appointment of Caleb M. Harrison, of Essex county, and Jacob H. Blauvelt, of Passaic county, who were sworn March 2d, 1886, and they, with George W. Howell, of Morris county, constitute the present Commission.

During the summer of 1886 the Commissioners heard testimony and the arguments of counsel, with a view to establishing the amount of damages to be awarded the Beattie Manufacturing Company, in compensation for the reduction of their dam and water power to the extent of seven feet. After careful consideration the Commissioners fixed the award on December 17th, 1886, at \$55,000. From this award the Beattie Manufacturing Company appealed. While this appeal was pending a modification of the original plan was proposed. This was fully discussed by the engineers and counsel, both of the Commissioners and the appellants, with the assistance, also, of some of the best hydraulic engineers of the country in consultation. The new plan was finally accepted by the Commissioners, and by them reported to the Board of Managers of the Geological Survey, with the recommendation that it be adopted by the Board. One of the Commissioners, with Prof. Geo. H. Cook, State Geologist, met the Board of Managers at the Executive Chamber in Trenton, February 29th, 1888, and explained the proposed change in the original plan.

After careful consideration the Board adopted the change as recommended by the Commissioners.

The Board then issued a notice that application would be

made to the Supreme Court on the twenty-eighth day of April, 1888, to approve of the proposed alterations and amendments to the plan of drainage as originally adopted. This notice also set forth in minute detail the amended plan, and was published for a period of four weeks in two newspapers, in each of the counties of Morris, Essex and Passaic, and was also posted for a like period in five public places in each of nine townships containing any of the flowed lands.

The notice is as follows :

NOTICE

Of Application to the Supreme Court to Approve of Certain Alterations and Amendments, in the Plan of Drainage of the Low Lands Lying Along the Passaic, Rockaway and Whippany Rivers, and Their Tributaries, in the Counties of Morris, Essex and Passaic.

Notice is hereby given that application will be made to the Supreme Court of this State, on Saturday, the twenty-eighth day of April next, at ten and one-half o'clock in the forenoon, at the State House, in the city of Trenton, on behalf of the Board of Geological Survey of the State of New Jersey, to approve certain alterations and amendments lately made by said Board in the original plan of drainage adopted by said Board, and filed in the office of the Clerk of said Court, on the twenty-sixth day of June, A. D. eighteen hundred and seventy-one, for the drainage of the low, wet and boggy lands lying along the Passaic river and its tributaries, between Lower Chatham and Little Falls, in the counties of Morris, Essex and Passaic.

The said alterations and amendments are substantially as follows :

1. The stone dam of the Beattie Manufacturing Company, referred to in said original plan, and standing between the head of the main fall in the Passaic River at Little Falls and the rock reef in said river next above said falls, to be reduced in height twenty inches for its entire extent, instead of seven feet, as provided for in said original plan, and to be provided with an opening and gates, which, when open, will afford a free water way twenty-five feet wide and sixteen feet deep below the crest of the dam when so reduced. The said gates to be opened for the free flow of freshet waters to an extent sufficient to keep the surface of the water in the river above the dam, in ordinary high water, down to the height of the top of the dam when so reduced. Provision to be made by continuing contract for opening said gates and keeping them open in high water so as to keep the water down as above specified.

2. The opening or channel through the dam of the width of twenty-five feet, and depth of sixteen feet at the dam, as aforesaid, to extend up the stream through the lower rock reef to deep water above the same, on a grade of about one foot in ten feet, and below the gates to drop about five feet, and extend down the stream to a point opposite, or nearly so, to the upper corner of the main stone mill; the bottom of said channel there to coincide with the present bed of the river, and to conform throughout to the grade line shown on the profile annexed to the said amendments and alterations, and now deposited in the office of the Clerk of the Supreme Court, being about one foot in seventy feet

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3. For the free delivery of the water from the lower end of the twenty-five feet channel, the river bed is to be excavated to the width of eighty feet, the excavation to extend to the main fall, and the bottom of said excavation to conform to the grade line last aforesaid.

4. A free channel to be provided through both the lower reef, near the said dam, and the upper reef about nine hundred feet above the same, to the width of not less than two hundred feet, or more than two hundred and fifty feet, and to the depth of not less than five feet, or more than six and one-third feet below the level of the crest of the said dam when so reduced.

5. The bar in the bed of the river, at Two Bridges, to be excavated to a width of not less than two hundred feet, or more than two hundred and fifty feet, and to the depth of not less than four feet, or more than five and one-third feet below the level of the crest of the said dam when so reduced, the excavation at that width and depth to extend from deep water below the said bar to a point above the junction of Pequannock river with the Passaic river, and thence at the same depth and to the width of one hundred feet to deep water above the bar.

6. Such other obstructions in the river, between the dam at Little Falls and the reef at Two Bridges, to be removed, as may be necessary to insure a clear water way of two hundred and fifty feet width, and a depth defined by a grade line, which, at the dam, shall not be less than five feet, or more than six and one-third feet, and at Two Bridges not less than four feet, or more than five and one-third feet below the level of the crest of the dam when reduced.

7. A cut-off channel to be excavated at Pine brook, to pass through the Slank bridge on the Morris county side of the river and to be seventy-five feet wide and five feet deep.

By order of the Board of Managers of the State Geological Survey.

WILLIAM M. FORCE,

Secretary.

Dated March 26th, 1888.

On the day stated, no objections being made, the Court issued an order approving the amendments and alterations adopted by the Board of Managers, as shown on the maps and profiles on file in the office of the Clerk of the Supreme Court, at Trenton, and in accordance with the plan set forth in the above notice.

The commissioners then proceeded to issue bonds, as authorized by the act, and are now engaged in placing them upon the market.

They also solicited proposals from a considerable number of well-known and reliable contractors, for performing the work required to carry out the proposed plan. In response to this call there have been received at the present time bids for the entire work from five reliable parties, and others are expected shortly.

When a sufficient number of the bonds are sold to warrant the commencement of the work, the commissioners propose to open the bids and award the contract and have the work pushed to completion as soon as practicable.

In order that the public might be fully informed as to the validity of the bonds, the commissioners requested their counsel, Henry C. Pitney, Esq., of Morristown, and R. V. Lindaberg, Esq., of Elizabeth, to give an opinion in relation thereto, which is as follows :

### OPINION.

The opinion of counsel is asked as to the validity of certain bonds about to be issued by George W. Howell, Caleb M. Harrison and Jacob H. Blauvelt, Commissioners appointed by the Supreme Court of New Jersey, under the Act of March 6, 1871, entitled "An Act to Provide for the Drainage of Lands," and the supplements thereto, to carry out the plan of drainage adopted by the said Commissioners and approved of by the said Court, for the drainage of lands lying on each side of the Passaic river and its tributaries between lower Chatham and Little Falls.

These bonds are to be paid by assessments upon about thirteen thousand acres of land, and their validity depends—first, upon the constitutionality of the Act above mentioned, and second, upon the correctness of the proceedings taken by the Commissioners.

The constitutionality of the Act of the Legislature and the resultant liability of the lands to assessment for the payment of the bonds, has been affirmed in the Supreme Court of this State in this case, in a decision reported in 6th Vroom's Reports, page 479, and in the Pequest case (a similar case under the same Act) in the Supreme Court, and in the Court of Errors and Appeals of this State, 10th Vroom, page 433 ; 12th Vroom, page 175 ; 13th Vroom, page 553 ; 14th Vroom, page 456, and in the Supreme Court of the United States, 114 U. S. Reports, page 606.

These decisions are final and conclusive upon the validity of the act.

As to the correctness of the proceedings, the undersigned have been counsel for the Commissioners in the said proceedings, and are, of course, familiar with them.

They have all been conducted with great care and in strict conformity with the act of the legislature, and we feel confident that they are unexceptionable in all respects.

The assessments for the moneys to pay the bonds in the Pequest case were enforced after spirited litigation.

Every exception that ingenious counsel could conceive of was taken and finally overruled by the highest Courts, and we deem it highly improbable that any land-owner will attempt to repeat the experiment in this case.

Our opinion is that the bonds are perfectly good in all respects.

HENRY C. PITNEY.

R. V. LINDABURY.

September 15th, 1888.

It is, as yet, impossible to state what the expense of the improvement will be. This can only be ascertained after the bids are opened, and the work done.

It is certain, however, that the expense by the modified plan will be very much less than by the original plan. No damages

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are to be paid to the Beattie Manufacturing company; the work of reducing the dam, and erecting and maintaining gates in the dam, is to be at the expense of said company, and the danger of protracted and troublesome litigation with them is removed.

It is expected that the work will be begun early in the spring of 1889, and finished, possibly, under favorable conditions, within a year.

Mr. Isaac Crane, of Essex county, offered the following :

WHEREAS, The Commissioners appointed by the Supreme Court to drain the overflowed lands of Essex, Passaic and Morris counties, have set forth in their report that, "There are upwards of fourteen thousand acres of this wet land, unhealthy to the population of said counties, by reason of the malarious exhalations arising therefrom," it is manifest that the said scheme for drainage becomes a sanitary measure, inasmuch as the general health of the people, the water supply of the cities, and the condition of the public roads throughout said counties will be greatly benefitted thereby; and,

WHEREAS, We hold that the cost of a public improvement should not entirely be borne by private individuals; therefore,

*Resolved*, That the provisions of assessing the entire cost of draining said wet lands upon the owners thereof, was unjust, and further

*Resolved*, That the State Board of Health be requested to take action upon the necessity of the Passaic river drainage from a sanitary point of view, and they be urged to prepare and procure the passage of a law or supplement, by which a certain percentage of the costs of drainage shall be assessed upon the whole property of the townships or counties as shall be benefitted by such drainage, and its assessment and collection be made a part of the general tax levy.

*Resolved*, That a supplement to the present law, making such provisions, should be immediately enacted.

Franklin Dye, Esq., Secretary of the State Board of Agriculture, then made an address upon the necessity of the revision of the road laws, which was ordered to be printed in our Annual Report, as follows :

ROADS AND ROAD MAKING.

ORIGIN.

Public roads, like most other fixtures in society, are the result of necessity. In sparsely populated and in semi-civilized countries roads are mere paths threading their

course around mountains, along streams, through forests, in such directions as affords the best natural passage to pedestrians, or the more fortunate rider of a horse, mule, camel or dromedary. Wheeled conveyances and increased population made, in course of time, wider, and State or public roads a necessity, for greater convenience of travel, and to prevent an encroachment on, and injury to, private property and agricultural products.

The primitive roads of some of the eastern countries are mere peasant paths. So, also, in parts of South America, where wheeled conveyances are unknown, heavy loads of cumbersome freight are strapped on either side of the beast, and so borne to their destination.

The "Indian paths" of this country were the highways of the aborigines, as they still are among the Indian tribes, and the earlier roads of our eastern frontier, and some of the streets in our older towns follow these circuitous and zig-zag ways.

#### VARIETY OF ROADS.

So various are the applications to which our common words are put, that the term "road" has come to designate a man's moral character, as "he is walking in a morally upright road," or the contrary, a bad and "downward" road.

Also, in mental accomplishments, a studious person is on the "road" to intellectual attainments, while a dilatory lad is on the "road" to perpetual ignorance.

So in social matters, a person of affable and agreeable manners is on the "road" to high social standing. This is alluded to, in passing, to bring to mind the importance of care and watchfulness in us all, and especially so on the part of our young people, lest we allow ourselves to be led away from the high road of moral, intellectual and social attainments, and fail of the great end of life.

I refer to this also to speak of the

#### INFLUENCE OF ROADS ON OUR MORAL CHARACTER.

You, no doubt, have heard people even swear when stalled with a load on a very bad road, and very often one result of this is abuse of the dumb beast, who has done all he could to overcome his driver's ignorance or carelessness, and the miserable so-called roads over which he is compelled to draw, by a considerate public, until prematurely worn out, he is turned on the commons to die.

The outcome of such mishaps (?) affects owners, drivers and sometimes others, with a sour temper; also, if in a hurry to catch a train or to keep an engagement, it is aggravating, to say the least, to be compelled to worry for an hour over a road which, if in proper condition, could be traversed in twenty minutes. Of the material loss occasioned by bad roads I will speak presently.

Bad roads affect adversely the community. Who does not like to ride over a good road, nicely kept, ditches clean, brush and briars conspicuous by their absence. I tell you, good roads affect the general public. They attract travel, and they make the residents have a better respect for themselves, and they enhance the value of adjoining property. Bad roads discourage people from travel; even farmers will not go into our commercial centres, either to buy or sell, oftener than is absolutely necessary, and thus, measurably, bad roads affect town trade adversely. A neighbor of mine once said, as we were passing some farms on a by-road, "Well, if I were compelled to live on that farm the remainder of my life, as the condition of accepting it as a gift, I would not have it."



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Crooked and bad roads occasion material loss, as well as loss of time and temper.

It seems hardly worth while to go two miles to reach a point we could as well make by going one mile. But some of our roads have become so interwoven with farm lines and boundaries, it would be a difficult matter to straighten them so as to give satisfaction, but where residents and improvements are few along the line of the road, and land of nearly equal value, roads ought to be made more direct. A good crooked road, however, is preferable to a bad straight road—very much preferable, and when we must have crooked roads, let us try and have them good.

Of the material losses we name the wear on the team. How many valuable horses and mules are worried to death, prematurely worn out, by dragging loads and traveling through mud, whereas, if our roads were in a civilized condition, (and good roads indicate a more advanced stage of civilization, even Christian civilization, for "a merciful man is merciful to his beast"), the length and service of their lives would, in many cases, be doubled. Is not this a great loss? Let us see. According to the last estimate, January, 1888, of the Department at Washington, we have in the United States and Territories, 13,172,936 horses, valued at \$71.82 per head, \$946,096,154; of mules, we have 2,191,727, valued at \$79.78 per head, \$174,853,563; aggregating \$1,120,949,717. For New Jersey we have, horses, 94,397; value per head (and New Jersey values her horses higher than any other State, except Massachusetts), \$105.46; making \$9,955,374. Of mules, we have 9,501; value per head, \$118.99; aggregating \$1,130,182. Total value of horses and mules, \$11,085,856. A horse is considered in his prime at seven; at twelve few want to buy him, unless he may have been previously well cared for, in which case he may do good work until fifteen or over. Suppose now that by having good roads, careful driving and right usage, we can add to a horse's life only one more good working year; this will obviate the necessity of buying another horse for one year longer.

Now the average prices of our horses being \$105.46, and the number being 94,297, will give us a saving on this small addition to his useful life annually \$49,776.87, or, to state it differently, the value of our horses being \$9,955,374, the interest on this sum for one year, at six per cent., is \$597,322.44. Assuming one-twelfth of \$9,955,374, or \$829,614.63, every year to keep up our supply. Now, by prolonging the horse's life one year we will save the interest on this amount for one year, or \$49,776.87 to the State. If we can add one year to the life of our mules, also putting his average life at twenty years, the total value being \$1,130,482, the interest on one-twentieth of this amount is \$3,391.44, for one year, which, added to the saving on the horses, gives us \$53,168.31, but this amount must not be idle. If used it will be worth its interest, which is \$3,190.09, and this added to the above gives \$56,358.40, or \$2,683.73 to each of our twenty-one counties annually, to expend on the roads.

Assuming that one-half of our horses and mules are in the harness every working day in the year, and that the harness cost \$12 per head, and will last twelve years, as now used, if by having good roads we can add to the life of the harness at this low estimate one more year, we will save to each county \$148.42 more annually (not adding interest to this amount), and this will give to each county \$2,832.15, or for the State \$59,475.15. The loss annually to our wagons by bad roads I will not bring into this estimate now, but it would bring the saving to each county in the State, by having good roads, with careful usage, above \$3,000 annually.



EXPENDED FOR ROAD REPAIRS IN 1887.

Where the amount for roads is not given in the expenditures of any township I have taken adjoining townships as the basis, or have halved the township expenses. The expenses for boroughs and cities are left out of this estimate, as also expenses for bridges, set down as such in township or county expenses; also snow bills and new roads, and I believe the estimate is substantially correct. From these figures we find there was expended last year in the State, exclusive of county bridges, city and borough streets, new roads and snow bills, the large sum of \$342,733 93 for repairing roads only.

Now, on the testimony of tax payers and road overseers, who are farmers, at the meeting of the State Board of Agriculture last winter, one-half of this amount is frittered away—virtually thrown away, so far as any benefit to the roads is concerned, by being expended at an unseasonable time of the year for road making, by a lack of knowledge on the part of so-called road overseers as to practical and scientific road making, by the use of poor material, from the want of systematic and proper drainage the township through, and by loafing instead of working, when nominally engaged in “working on the roads.” If this is a just estimate of the amount lost to taxpayers, and I do not doubt it, we have one-half of this amount to add to our saving on horses and harness by having good roads, which gives us \$174,893.21 to the State, and \$8,328.24 to each county annually; as now used, it is an absolute “waste fund,” principal and interest.

A nice sum to look at, indeed, and could we ever make a good and honest beginning at road making, practical, scientific, permanent, we would begin to realize what we could secure by such a course.

OBJECTS OF ROADS.

One of the primary objects of a public highway is, as I understand it, to facilitate travel. For a large portion of every year how many of our roads do this? Alas, experience says, but few. Our conception of a road, if formed from observation, will be a strip of land thrown open to the public, and fenced in on either side, through which the traveller may go as best he can to his objective point. But, does this fill the bill, so far as public roads are concerned?

We have made more progress in every other line of elevating and refining civilization than in the construction, repairing and beautifying of our public highways.

What hinders progress in this direction is not so much the need of systematic, wise laws, governing the subject, nor the need of money to build and improve our roads, as a wise and honest expenditure of the money raised.

BRIDGES. ETC.

In the line of road improvement our county bridges now form an iron oasis to the weary traveller, and they would also afford the tired beast a place to rest, if he were allowed to stop for awhile. In these, at least, we are building permanently, and the present generation is bearing the expense of the next.

But the roads. Ah, who will devise a plan? And who will see that it is carried out? And who will carry it through to perfect and permanent road making?

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### PRESENT LAWS.

Our present system of laws is as incongruous and inexplicable as are our court laws, or as the hieroglyphics on the obelisks of Egypt. Our laws on the whole subject of roads need re-adjustment and revision or abolition. They are a compilation of patches, put on the Colonial Road skeleton, one by one, since the Revolutionary period. Certainly we are now settled and know better what we need in this particular than we did one hundred years ago. It would seem wise, therefore, to construct a code of road laws to meet our existing wants, and the wants of the future. They should be as few and as simple as possible, consistent with the subject.

And yet, laws will not *make* the roads, be they never so good. But we need the incentives and limitations of the law in this direction of public improvement, as in others.

### HOW IMPROVE.

I do not feel myself competent to offer the requisite suggestions on so complex a subject.

First of all, expressed opinion seems to favor placing the entire responsibility for the roads in the hands of the township committees. They are the trustees of the township, so to speak, and the custodians of the tax-payers' money. The tax payers can reach them, and in whatever way the committee may decide to have the roads constructed and repaired, they should be held entirely responsible for the expenditure of the money and for the condition of the roads.

Again, the present overseer system should be abolished for obvious reasons. A dozen or more men, entirely independent of each other, will not work the roads of a township to the best advantage.

It sometimes occurs that a section of road is worked at the right season, and is in good condition, and the next section worked is ploughed and heaped, just before freezing weather, so that, while we might draw a fair load over the one section of road the other balks our whole progress for the whole winter.

Again, draining should be more extensive than it is, both under-draining and side-draining. Such work as this should be done under one general management. Side drains should not be made to hold water, but to carry it off as quickly as possible, else the water, while it may be shed from the surface of the road, soaks back into and under the road bed, to its permanent injury.

While shade trees contribute to the beauty of the general landscape, their number should be quite limited, close to the road bed; otherwise too much moisture will be held to maintain a fine driveway. This, too, should be in charge of the Township Committee.

### FENCES.

Road fences should either be abolished or constructed of material that will not collect every passing snow. It was formerly a common occurrence for neighbors to "turn out," free of charge, and open roads blockaded by snow drifts, but now men want pay for what they do, and as the road fence is not a necessity, at least as now constructed, if these were abolished we would have another saving for road improvement.

ENGINEERING SKILL.

There is no valid reason why our present knowledge in engineering skill and ability to execute our plans should not be applied to road making and building.

There is no obstacle to the course of a road that cannot be removed or bridged, and there are few places so soft that a substantial, enduring road bed cannot be made, if skill and right material are used. We need instructions in road making—a school for this purpose would not be out of place.

One thoroughly competent man to a township, having entire charge of road construction and repairs, of teams and of men, and accountable only to the Township Committee, will be worth far more to the roads, and necessarily to tax payers, than a dozen overseers (?) out of other professions, who have little time and less skill to devote to the work.

We have mountains and fields of stone, only awaiting a cheap and reliable crusher, from which we can supply the material for a substantial road. For experience, which is a good teacher, you are referred to the work in Union county. I adhere to the opinion that our first permanent improvements should be made on our leading thoroughfares. These are used by all; on these we have the longest drives to and from our commercial centres; on these we wish to take the heaviest loads and make the quickest time.

PRIVATE AID.

It seems to be fair play for all tax payers and users of roads that when any number or a fair majority of the property owners along a certain line of road are willing to give a specified amount of money, over and above the ordinary road tax, to permanently improve said road, the Township Committee should appropriate an equal sum. If a liberal tendency is shown in this direction, and also a disposition to carefully expend two-thirds, say, of the annual road appropriation, for a few years, on our main avenues of travel, they would soon become model roads, and a beginning will have been made that will inevitably lead, in our growing, populous State, to general and permanent improvement in our highways.

Some arrangement could be made under the law whereby these leading, most travelled and more important lines of road, could be permanently and soon improved, by allowing the Township Committees and the Freeholders in the county or counties, township or townships, through which such roads run, to condemn the same as county roads, with power to levy a tax to construct the same, by bonding the county or otherwise, one portion to be paid by the county and the other part by the townships most benefitted; a beginning would thus be made. Or, such roads could be condemned by a vote of the tax-payers and provision for their construction and maintenance arranged for in the several counties, as per local option.

To accomplish all that is needed, farmers and others must contribute their part in seeing to it that the work is well and honestly performed, and to the entire exclusion of all garbage or waste of any kind—lumber, wood, manure, brush piles, fence rails—everything. Keep the road clean, neat, safe and attractive to public travel.

And near our towns and cities the old tin pans, wash boilers, box lids and barrel hoops, with nails attached, to frighten and injure horses; let all such nuisances be prevented, under penalty, one-half to go the informer, or person procuring the arrest, and one-half to the road fund of the township.

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Our road laws certainly need revision, and it will take wisdom, time and patience to perfect them. Our method of working our roads, and the manner of expending the road money, need also thorough reformation. Let the two begin and continue together. The former will not avail much without the latter.

This paper, now too long, I will close, hoping some permanent benefit will result from the agitation of this question, and especially through the excellent committee appointed by the State Board of Agriculture.

MORRISTOWN, December 19, 1888.

A general discussion of the matter by the members, which was participated in by Dr. Ward, of Essex, one of the members of the Committee on the Revision of the Road Laws, and others, when the following resolution was unanimously adopted :

*Resolved*, That the township committee of each township shall have the supervision, management and control of the making and repairing of all roads in their township, and may do it by hire or by contract, and may appoint a competent person or persons to superintend the making and repairing of the roads, subject to the direction and approval of the town committee, and the town committee shall have power to purchase machinery, stone, gravel, material and other things necessary in the making, macadamizing and repairing said roads.

And the following amendment was adopted :

And the town committee may, at their discretion, permit farmers and other tax-payers (who may so desire), to work out a portion or all of their road tax, under the direction of the town committee, such tax-payers having given written notice of their desire so to do.

A discussion then took place upon the advantage of wide tires upon loaded and farm wagons, when it was recommended that the Committee on the Revision should incorporate in the law a section giving the town committee the power to remit a certain percentage of the road tax to each farmer who should use wide tires upon their farm wagons. The adoption of wide tires would prove beneficial to all farmers upon low grounds, and be of less injury in the wear and tear of roads.

With a vote of thanks to the speakers, Messrs. Howell and Dye, it was ordered that the Secretary incorporate their addresses in his report to the State Board, and that they be published in the proceedings of the State Board.

ANSWERS TO INFORMATION SOUGHT.

CHATHAM TOWNSHIP—ORGANIZATIONS AND WAGES.

1. Morris County Board of Agriculture meets once a year.  
Morris County Grange, No. 105, once a month.
2. Ten to fifteen dollars per month, with board.
3. Twenty-five to thirty dollars, without board.
4. Yes, farmers generally board their help.
5. About equal, single and married men, are employed.
6. More foreign than native help.
7. Five silos are reported.
8. All who had silos continue to use them, and report in their favor. They seem to be an established thing.
9. Nothing but corn is used for siloage.
10. Very few are depending upon soiling, exclusively, but most of the farmers are feeding grain, and at times, when pasture becomes short, use substitutes, such as green rye, corn, &c.
11. Some few have grown mangels, but the labor in raising them is so great, those who have tried them generally give up after one or two years trial. Turnips appear to be the only root crop grown, and which most of the milkmen of late have raised.
12. The past few years the milk business has stood about as it was, as the price has been so low, two and one-fourth cents in summer, and three and one-half in winter, for two or three months, is no inducement, and many would have given up but for a hope of a change for the better.
13. Broom corn is receiving less attention. Some years ago nearly every farmer in the township grew it, and many made it their principal crop. Some is now grown. Also  
*Wheat.*—Hardly an acre of wheat can now be found, where formerly almost every large farmer raised more than he needed for his own use. And the same is true of buckwheat. We see no more buckwheat grown, as formerly.  
*Rye.*—Quite an amount of rye is sown, as that is the best paying of any grain growing crop, the straw selling at about the same price as the best of hay, and has a ready market.  
Less corn, fewer potatoes, and, in fact, nearly all our crops are

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less grown, as the West and South are furnishing the markets so cheaply that we cannot make it pay to grow them any more. Many of the farmers now buy a great deal of corn, also corn and cob meal.

14. Hay and turnips are receiving more attention as the result of the farmers being engaged almost exclusively in producing milk, and the fact that of late no crops seem to be paying to raise for the prices they are bringing, taking the price of labor and the character of the help to be had, which is in and out door very unreliable, and the greatest trial many have.

Hay is the best paying crop we have, with a market near by at about \$20 per ton.

15. The assessor reports one flock in the township. Discouragements are low prices of wool. Many could not keep sheep unless they met with a change on the sheep question. A few years ago, there were many small flocks, and many would be glad to keep them now, were it not for dogs, with which the country is overrun—worthless curs as they are—about one dog to every ten persons, and the poorer and more worthless one is, the more dogs they keep.

18. Poultry business increasing.

19. No disease to speak of.

20. No. It was the custom, a few years ago, for most of the farmers to fatten one or more, and a great many made it their business to buy young cattle for this purpose, pasturing them and feeding them, and selling them for beeves. It appeared to be a paying business, for the persons so engaged seemed to be the most successful farmers we had. A great many bought steers, and after using them a few years, turned them off fat, having been useful in doing their farm work, and having increased in value. All this has been done away with, as it no longer pays—money would be lost, beef being so low—hides and tallow selling for about one-half the amount they formerly did.

If fattened cattle could be sold, as a few years ago, it would be a boon to the milkmen, as their poor milkers could be fattened to an advantage and would be one of the best paying things they could do, but now old cows have sold as low as \$5 to \$10, and it is considered a good price. With feed coming so

cheaply from the west, as at present, it would pay very well to fatten cattle if we had a market for them as we once had.

21. Very few raise calves.

The cows purchased are from Pennsylvania and New York.

22. No cases of disease from cattle brought from other States.

23. Grades of all kinds. The most popular breed of any is the kind the dairymen have.

Jerseys and their grades are acknowledged to be the best butter producers we have, but there is but little of it made.

Ayreshires seem to be a great favorite with the old dairymen, and Holsteins with beginners, who have plenty of money.

24. No creameries, but we have some farmers (and their wives) who are engaged in making butter, whose reputation stands so high that their butter is in demand at fifty to seventy-five cents per pound.

25. The Morris County Board had a meeting called for this purpose, with speakers from other counties, to get the views of the farmers. The result was to have the control of the roads placed in the hands of the Town Committee, with power to have the work done by contract or hire, and authority to purchase machinery and material for the making of roads, and taking title to gravel pits and quarries for the purpose of securing gravel and crushed stone for use upon the roads.

26. Not satisfied. All complain of inadequate prices for all products, unable to fatten stock at a profit, receiving comparatively nothing for beef, hides or tallow.

Unable to compete with the West in price of beef or grain ; also, unable to compete with South America, Australia and other countries who are allowed to bring into this country hides and skins free of duty.

27. Co-operation ; devising some plan by which the proceeds of the products of the farm may go into the pocket of the farmer instead of the middleman. Those who are in the milk business, to organize themselves in such a manner that those who produce the milk should realize at least one-half of the amount it is retailed for, and not have the farmer, who has \$5,000 devoted exclusively to producing an article, and giving ten times as much time, receiving less for producing a quart of milk than the one who has not \$500 invested, and not giving one-tenth of the time

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to selling the same, who, for his one-tenth of the capital and time, makes more in selling than the producer.

To improve not only their lands, but improve themselves, by meeting more at farmers' clubs, agricultural boards, and granges, and discussing subjects that might be of benefit to all attending. In all fruit localities, instead of selling their fruit to the cider mills for a price less than the cost of picking and transportation, to build themselves evaporators, thus securing remunerative prices for evaporated fruit, of which the production at the present time does not equal the demand.

28. Yes; farmers are benefitted by the Experiment Station bulletins.

29. The purchasers appreciate the analyses and use them.

30. Yes, and the great want is that all passenger trains should carry the weather signals, for farmers, as a rule, cannot secure the daily reports.

31. Very few are planting fruit trees and vines for market crops, the cost of picking is too great, and of late years the farmers, as a rule, have small families.



## SALEM COUNTY.

### SALEM COUNTY BOARD OF AGRICULTURE.

#### OFFICERS OF THE BOARD.

<i>President</i> .....	RICHARD COLES.....	Woodstown.
<i>Vice President</i> .....	DANIEL P. DORRELL.....	Alloway.
<i>Secretary</i> .....	H. C. PERRY.....	Alloway.
<i>Treasurer</i> .....	J. WALTER PANCOAST.....	Sharpstown.

#### DIRECTORS.

M. D. DICKINSON.....	Woodstown.
EDWIN L. BORTON.....	Woodstown.
CHARLES B. LOVELAND.....	Cohansey.
HENRY GARDINER.....	Sharpstown.
JOHN W. DICKINSON.....	Woodstown.
BENJAMIN F. STRAUGHEN.....	Pedricktown.

#### DIRECTORS IN STATE BOARD.

JOHN W. DICKINSON (one year).....	Woodstown.
RICHARD D. DUBOIS (two years).....	Salem.

#### SOCIETIES REPRESENTED.

West Jersey Agricultural and Horticultural Association has ninety-two shareholders; holds annual fair at Woodstown in September. Salem County Pomona Grange has sixty-three members; meets quarterly. Woodstown Grange, one hundred and forty-one members; meets weekly. Course's Landing Grange, twenty-three members; meets every two weeks. Pedricktown Grange, twenty-one members. Friesburg Grange, twenty-four members; meets weekly.

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ANNUAL REPORT.

BY H. C. PERRY.

Our County Board has held four meetings since my last report, and while the attendance has not been as large as was hoped, there has been much interest manifested by those who have been present. The farmers seem slow to appreciate the advantages to be obtained by organization.

The following are some of the subjects we discussed at our meetings: Insect Enemies, Fruit Trees, Fertilizers, Poultry Keeping, Milk Laws, Peach Yellows, Peach Exchange, &c., &c.

The following resolutions have been passed and referred to the State Board:

*Resolved*, That this County Board request the State Board to petition our legislature to establish a standard measure for milk.

*Resolved*, That we request the State Board of Agriculture to ask the legislature to so change the existing milk laws, as to abolish any required per cent. of solids, and make it similar to English law, by providing for frequent analysis of samples taken without warning, and the publication thereof in the public press.

At the April meeting, Franklin Dye, Secretary of the State Board, gave a very interesting and instructive address on the "Profitable Limit in Agricultural Pursuits."

At the meeting in October, P. H. Jacobs, editor of the "Poultry Keeper," read an excellent paper on the raising of chickens for broilers, as practiced in Hammonton. Louis Schaible read an interesting paper on "Little Things in Farming."

The committee appointed last year to co-operate with the Experiment Station to ascertain the relative value of phosphoric acid from bone black, and that from South Carolina rock, have continued the experiment this year, and the result will be published in the annual report of the Experiment Station.

On May 26th we held a combination sale of stock on the fair grounds at Woodstown, which proved quite successful. Several head of cattle and hogs were sold at fair prices.

GENERAL CONDITIONS OF AGRICULTURE.

Salem county, extending as it does from the Delaware river and bay on the west to the Maurice river on the east, has a variety of soils, from a light sand to a heavy clay, and is adapted to the growing of all kinds of crops that can be grown in this climate. The land bordering on the Delaware is well suited to the growing of sweet potatoes, watermelons and all kinds of truck. In the central part of the county the soil is capable of producing large crops of corn, wheat and grass, and dairying is carried on extensively.

There are seven creameries in the county, located as follows : Two in Pilesgrove, three in Upper Pittsgrove, one in Lower Alloways Creek and one in Quinton. There are also two large ice cream manufactories in Salem, which use large quantities of milk.

The milk business is on the increase throughout the county. The most popular breeds of cows are Jerseys for butter-making, and Holsteins for selling of milk. Root crops are not grown to any great extent as winter feed for stock. The silo and siloage have not claimed the attention of farmers to any great extent, only one silo having been built in the county, and that is not in use at the present time.

Very few, if any, depend on soiling, rather than pasturing, for the support of their cattle during the summer months. One reason for this is the high price and scarcity of labor, farm hands receiving from twelve to twenty-five dollars per month, and board, the average for the county being about seventeen dollars. In the trucking sections, they command from twenty to twenty-five dollars. Very few farm laborers board themselves ; those who do generally work by the day. The majority of the help are natives, both white and colored.

Wheat, oats and buckwheat are receiving less attention than ten years ago. Tomatoes, white potatoes and sweet potatoes and all kinds of truck are receiving more attention than formerly, especially tomatoes, which are being very largely grown for the canning factories, of which there are several in the county, the price paid the past season being six dollars per ton.

Comparatively few farmers keep sheep ; those who do make

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the raising of lambs for early market quite profitable. The principle discouragements are dogs, and want of pasture.

The raising and fattening of hogs for market is on the decrease. The hog cholera, or swine plague, has been very destructive in former years, but there has been very little in the county the past year ; probably not more than five per cent. have been lost by this disease.

The poultry interest is on the increase throughout the county ; the principal diseases are gapes, cholera and roup ; about twenty-five per cent. are lost by these diseases.

On account of western competition, there are not so many cattle fattened for market as formerly. For keeping up their cattle supply, a great many buy New York State calves ; a few, western cattle, and some, who have choice stock, raise their own calves and sell them to their neighbors, who raise them. Considerable attention is paid to the raising of registered stock. No cases of cattle, horse or hog diseases are reported as being introduced by imported stock.

Special attention looking to the general improvement of roads and streets has been taken in the townships of Oldmans, Pilesgrove, Pittsgrove and Upper and Lower Penn's Neck.

The farmers, as a class, are not satisfied with their condition. The following are some of the complaints made : " Low prices for produce," " scarcity of help," " high wages," " insects," " our roads are not in as good condition as the money we spend on them should warrant," " not enough pay for the labor performed," " too low a rate on capital invested," " trusts," " monopolies," " tariff tinkering," " excessive charges of railroads and middle men."

In answer to your question, "What in your judgment do farmers and agriculture most need ?" I have received the following :

Thorough organization, so that they may, in a measure, counteract the encroachments of monopolists. Better prices for their crops, and lower rates for fertilizers. Money, more reliable help, less wages. Free raw material and open markets for farmers. Better help, better markets and lower freights. A system of some kind to bring producers and consumers in closer relation. A better knowledge, generally, how to apply good

business principles to their calling. A largely increased volume of money in circulation.

The more intelligent farmers appreciate the analysis of fertilizers made at the Experiment Station, with their market value and guarantee attached, and use analysis as a guide when purchasing fertilizers. Very few use the weather signal as a guide in gathering their crops, as most of them live too far from the post-office and do not receive the reports in time to be benefitted thereby.

Fruit trees and vines have not been planted very largely throughout the county, except in a few localities. In Lower Alloway Creek, Mannington, and Lower Penns Neck townships peach trees have been planted to some extent. In the eastern part of Pittsgrove township there is a settlement of Russian Jews, who have planted small fruits quite extensively, and with success. Strawberries and grapes have been planted in Oldmans township.

The spraying of fruit trees and vines to destroy injurious insects has not been much practiced, with the exception of Paris Green on potatoes, for the Colorado beetle.

## OLDMANS TOWNSHIP.

REPORTED BY B. F. STRAUGHEN, PEDERICKTOWN.

Oldmans township contains 11,678 acres, 6,000 acres of which is improved land; the remainder is timber and bush land. The soil bordering on the river is light sand, the remainder is sandy loam, with clay subsoil, and is capable of the highest improvement. The inhabitants are engaged in truck farming, for which the soil is well adapted. The drainage of the township is good, there being ample fall to carry off all surplus water, so that but few cases of malaria occur.

The principal products are watermelons, sweet potatoes, white potatoes, cantaloupes, tomatoes and other vegetables and fruits. Also grain and hay, milk and butter. There are produced annually from 800,000 to 1,000,000 watermelons and cantaloupes; from 90,000 to 100,000 barrels of sweet potatoes,

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principally for the early markets ; about 150,000 heads of cabbage ; onions and other vegetables are also produced.

In grains, the township produces from 30,000 to 40,000 bushels of corn ; 10,000 to 12,000 bushels of wheat ; 300 bushels of rye ; 1,000 to 5,000 bushels of oats, and from 400 to 500 bushels of buckwheat. They also cut from 1,500 to 2,000 tons of hay.

The value of real estate in the township, according to last assessment, was \$627,370 ; the personal property, \$377,572.

The farmers, as a general rule, are contented and prosperous, although they complain somewhat of low prices and a scarcity of money.

The average prices of produce the past year were : Watermelons, \$6.00 per hundred ; cantaloupes, \$1.00 per barrel ; sweet potatoes, \$1.75 per barrel ; white potatoes, 40 cents per basket ; corn, 55 cents per bushel ; wheat, 95 cents ; rye, 60 cents ; oats, 35 cents per bushel. Butter, 25 cents per pound, and other products in the same proportion.

Improved land is worth from \$60.00 to \$100.00 per acre. Unimproved land from \$20.00 to \$60.00, according to situation and ease with which it can be gotten into cultivation.

I hereby beg leave to acknowledge the courtesy of the following gentlemen who have so kindly furnished material for reports on the condition of agriculture : B. F. Straughen, Pedricktown ; Henry Gardiner, Sharpstown ; E. G. Brick, Pennsgrove ; R. Woolman, Elmer ; Levi S. Pricket, Woodstown ; M. D. Dickinson, Woodstown ; Job Stretch, Hancock's Bridge ; James D. Lawson, Woodstown ; E. W. Lippincott, Woodstown ; Adam S. Graff, Elmer ; Louis Schaible, Shiloh ; Dr. C. P. Atkinson, Palatine ; Woodnut Pettit, Salem, and Ephraim Fowler, Salem.

## SOMERSET COUNTY.

### SOMERSET COUNTY BOARD OF AGRICULTURE.

<i>President</i> .....	A. A. CORTELYOU. ....	Neshanic Station.
<i>Vice President</i> .....	HON. CALVIN CORLE.....	Neshanic Station.
<i>Secretary</i> .....	WILLIAM S. POTTER.....	Somerville.
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#### DELEGATES.

DAVID C. VOORHEES.....	Blawenburg.
WILLIAM S. POTTER.....	Somerville.

### ANNUAL REPORT.

BY THE SECRETARY.

We have held three meetings during the year. The use of fertilizers, the most profitable crops to raise, the improvement of the roads and other matters have been discussed.

Our annual meeting was held on the 16th of February. Prof. Cook gave an excellent address on "The Workings of the Experiment Station and the use of Fertilizers."

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The circulars from your Secretary were sent out to the different townships and a summary of the answers are as follows :

The average wages paid adult farm hands per month, with board, is \$12 ; without board, \$20 to \$25. About an equal number of married and single men are employed. Foreign classes are in the majority.

There are five silos in the county. Reports say that silos are losing in favor with the farmers. No new silos built this year. Green corn, oats and clover are used for silage. None of our farmers depend upon soiling rather than pasturing for the support of their cattle during the summer months.

Root crops are not grown to any extent as a winter feed.

The milk business is reported on the increase, excepting in one township.

Wheat and almost all grain crops are receiving less attention than ten years ago. Fruit and vegetables, hay and dairy productions are receiving more attention.

Very few farmers are engaged in sheep raising. It costs too much for fencing, damages by dogs, low price of mutton and wool, are given as the reasons. One report says that sheep raising is considered injurious to mowing ground.

The raising and fattening of hogs is on the increase in some sections of the county, and in others, on the decrease. No hog cholera reported.

The poultry interest is increasing. Cholera and roup are the prevailing diseases. From five to twenty-five per cent are lost.

Not as many cattle fattened for market as a few years ago. The reasons given are stock cattle cost too much, and it does not pay to raise a young steer for beef. There is too little difference in the price per pound of the stock steer and the fatted one, and besides, the Chicago dressed beef and low freights shut out the market for home raised and slaughtered beef.

Farmers do not raise calves from their own stock to keep up their cattle supply, but buy Western and Northern stock, mostly the latter. No disease reported in our county from cattle from other States.

Three townships report Holsteins as the most popular breed for dairy purposes ; others, grade Jersey and Alderney.



Creameries are not on the increase. There are three in the county.

No special action has been taken for the general improvement of the roads and streets. The question of the new road law has been much discussed, and would be favorably received in this county. All say that most of the money raised by taxes for the roads is wasted, at least but temporary benefits received. The plan of forming up the road bed and covering all with broken stone is considered the only feasible plan.

Our farmers are not satisfied. The reasons given are, rate of interest too high, taxes too high, prices of products too low, insufficient home markets and wages high.

One report says, farmers ought to buy as many pounds of wheat bran as they raise pounds of corn, and feed it all for milk, also feed their clover hay and oats, and sell their timothy hay, wheat and milk with from fifty to one hundred spring pigs in the fall. In this way he says farmers would soon be on the high road to wealth. Another report says, farmers' and agriculturists' greatest need is more lime, barnyard manure and common sense; and another says, a more definite recognition and interest in agriculture by the general government.

Farmers generally receive benefit from the bulletins of the Experiment Station. All read them who receive them, and they appreciate the analysis of fertilizers, and to some extent, use them as a guide when purchasing.

The Weather Signal Service is used to a limited extent by our farmers as a guide in gathering their crops, and could be of greater service if bulletins were sent daily to every post-office, which was done at one time, but I am informed has been discontinued.

As a market crop, the peach and apple are planted quite extensively, but no vines or small fruits.

No spraying of fruit trees or vines has been practiced, excepting Paris Green on potato vines and hellebore on currant bushes.

A combined effort should be made by the State Board of Agriculture to better the present condition of the farmers.

First. To lower the rate of interest on farm mortgages, and,

Second. To lower the rate of farm tax, if possible.

Third. To improve the system of working the roads.

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Fourth. To create a righteous indignation against trusts, combines and monopolies, which will outlive the farmers, unless public sentiment can be roused to the necessity of the case, as to which is the fittest to survive.

Fifth. The spraying of trees with poisonous liquids to destroy insects.

Sixth. To show our appreciation of the Experiment Station, which has saved the farmers of New Jersey thousands of dollars.

Seventh. To boldly declare for any legislation, State or National, that will benefit the farmers, regardless of politics.

## SUSSEX COUNTY.

### SUSSEX COUNTY BOARD OF AGRICULTURE.

#### OFFICERS FOR 1888.

<i>President</i> .....	HON. THOMAS LAWRENCE.....	Hamburg, N. J.
<i>Treasurer</i> .....	THOMAS ARMSTRONG.....	Wantage, N. J.
<i>Secretary</i> .....	JOHN LOOMIS.....	Deckertown, N. J.

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B. K. JONES, Beaver Run, N. J.  
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### ANNUAL REPORT.

BY JOHN LOOMIS, SECRETARY.

At the annual meeting, held November 10th, 1888, the following named gentlemen were appointed delegates to the State Board of Agriculture: John Loomis and J. A. McBride.

Another year's report to the parent Agricultural Society of our State is due, reminding us of the many cares and anxieties of our

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business as agriculturists, and while we have had an abundant yield of almost all kinds of crops, the net results of the year, when turned into cash, are likely to be very unsatisfactory, as compensation for the great amount of labor and expense to accomplish so small net results, and our minds are naturally turned to the consideration of the question, why it is that the farmer of New Jersey is called upon to do so great an amount of hard labor, wearing out himself and family, year after year, and receiving so little compensation for it. The trouble is, though the agricultural interests of the country are the backbone of the whole of our nation's existence and success, there is not enough concentrated action among us to secure our just rights.

Let us consider for a little while some of the wrongs that we, in Sussex county, believe to exist, and that tend continually to destroy the agricultural interests of our State.

One of the wrongs that farmers have to contend with in New Jersey is the unreasonable amount of freight paid to get their produce to market. No State in the Union is so imposed upon, in the way of freight charges, as New Jersey. Corporations running through our State charge more for the delivery of our freight coming from the West, into the middle of our State, than to deliver it in New York or along the seaboard; and milk trains in our State, running in no case over seventy-five miles, cost us forty cents a can of forty quarts; and only thirty-two cents per can to run milk from Pennsylvania or New York—from two to three hundred miles—from sections where land is cheaper by fifty per cent. than ours, delivering the milk on the platform, at Hoboken or Jersey City. Again, when we are obliged to pay as much to run a car of feed twenty to fifty miles as the western farmer pays to run it two or three hundred miles, is it any wonder that our farmers complain of being neglected by the law making powers?

To make it plain, I will give a case coming under my own observation: A farmer, living in our neighborhood, keeps between sixty and seventy cows; he has three hundred and fifty acres of land, and averages about nine forty-quart cans of milk daily, the year round. For about one-third of the year he sold his milk at \$1.20 per can, the freight being forty cents per can, for less than seventy-five miles. Now, you see that the conveyance

of this milk costs just one-third of the amount received for it, the product from a farm costing thirty thousand dollars, leaving two-thirds to pay expenses of teams, milkers, men, cans furnished by farmer, cattle, wear and tear on buildings, fences, wagon, &c., and yet the carrier gets one-third of the proceeds for carrying it less than seventy-five miles to market. Is it any wonder that farmers are discouraged in their occupation? And they will be discouraged as long as our legislators allow corporations to control the farming interests of New Jersey by such outrageous charges. It is just about the same as a mortgage to these public carriers of twenty-five per cent. on every farm in New Jersey—a high toll, indeed, to pay for work performed by railroad corporations for the farmers.

Another matter that is agitating the minds of the people in Sussex county is the large amount of taxes required of them from year to year. It seems to many of them like paying rent for their own property. I am certainly at a loss to know why it is, as we pay indirectly very little State tax. My own opinion, as well as that of many others, is that the assessors are so poorly paid that they take but little pains to ascertain the amount of money loaned or the value of the personal property, as it requires considerable shrewdness to find out a man's assets and liabilities outside of his real estate, and as the assessor's pay is small he passes over his work with as little trouble as possible, and in that way, no doubt, thousands of dollars worth of property escapes taxation and the burden falls back on the owner of the lands. Truly, it may be said of the farmer, he has a hard row to hoe.

I would suggest, and I believe our only hope of getting out of the present depressed condition of affairs, is by fair legislation, protecting, somewhat, the farmers' interests and rights. This, of course, is not willingly done by those sent to represent us in the State Legislature, and there is no way but to concentrate our efforts and elect men who will look fairly to the interests of the farmer, as well as of corporations.

The Sussex County Agricultural Association earnestly request that the State Board of Agriculture take this matter in hand, and with the co-operation of the various county societies, endeavor to adjust these wrongs, so that the farming interests of New Jer-

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sey may be revived and protected, that we may be remunerated, in a fair degree, for the hard work of our families, and for the capital invested.

I notice, in looking over the various county reports of last year, that there is an admission, generally, of a fair yield of the various crops throughout the State, but the net results at the close of the year, after the products have been turned into cash, do not seem to be satisfactory in any county in the State. We all understand that with nearly all products raised by the agriculturists, the supply and demand govern the prices ; but, notwithstanding the low prices of our products, there seems to be a very great desire among farmers to increase their production and make the surplus still greater, thereby continuing the reduction in profits, and, also, by expending large sums of money for fertilizers. Seemingly, each one is trying to raise a larger crop than his neighbor, regardless of the cost of production, and thereby gain the name of being the greatest producer, on the same number of acres, whether he gets any clear money out of it or not.

The question is, how a farmer, with say one hundred acres of land, should manage, in order to produce certain results from crops for the least cost and labor in their production, and with the greatest profit to himself.

There has been, and is now, a great inclination towards theoretical farming. Farming by theory does very well for those who are fond of experiment, and have plenty of money, and to whom it makes but little difference whether their farming pays or not. They have the satisfaction of knowing the results of their experiments, which knowledge is sometimes of benefit to others, at least, and it is not all lost. But the farmer who is depending on farming for support, and who must realize, if possible, from the product of his labor, must not experiment too much, nor expend more to produce a crop than the crop is worth after being matured, especially so if he is on a rented farm or one worked on shares, as are many farmers in Sussex county. We all like to produce large crops, but can we ever, in New Jersey, expect to compete with the farmers of the West, either in raising pork, grain or producing of butter. or any other farm product, so long as we are called upon to pay

such excessive freights as we pay in New Jersey, and the bulk of the taxes that we, as agriculturists, seem obliged to pay? We in Sussex county are quite satisfied that if the personal property throughout the State were looked after one-half as sharply as the real estate has been, the farmer would be relieved of at least one-half the amount of taxes he now pays, and, also, if the legislators of New Jersey would do their duty to agriculturists of the State, in regulating the charges on all articles of freight carried through and out of the State, the farming interests would revive and a new day would dawn in their interests; but if we allow ourselves to be run over as we have done, just so long will our properties continue to decrease in value, and our pockets be rifled. The farmers of Sussex are ready for the contest, and we ask every county in the State, what say you? We hope to hear from the various organizations throughout the State, another year, in reference to these matters.

#### PRODUCTS OF OUR COUNTY DURING THE PAST YEAR.

The milk interest is increasing quite rapidly, and large quantities are shipped to New York daily. Probably over 600,000 forty-quart cans of milk, 20,000 cans of cream and 111,000 pounds of butter have been marketed the past year. Freight on forty-quart cans of milk to New York, forty cents each, or one cent per quart.

The peach interest is growing rapidly, and orchards are being started. Although the crop was not so large as the previous year, the prices have been better, averaging about one dollar or more per basket. Probably twenty to twenty-five thousand baskets marketed.

Pork raising is on the decline, as there were not more than fifty tons marketed this year.

Quite a large amount of skimmed milk cheese is made in the twelve creameries—about forty or fifty tons shipped.

Poultry raising is increasing, and is receiving more attention than formerly.

Potatoes have been a fair crop, but the continued rains hardened the ground so that many were small, but have kept well.

The apple crop in some parts of the county was good, and in others, small. They netted about \$1.10 per barrel.

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Strawberries, raspberries, cherries and all of the smaller fruits have been a light crop, and did not reach full size, as in some seasons.

Hay has been an exceedingly good crop this year, one and one-half to two tons per acre, and gathered generally in very good condition. Wheat has been a fair yield, averaging fifteen to sixteen bushels per acre. Rye averaged about twenty to twenty-five bushels per acre.

Cows have given a fair return in milk the past year. The net returns have been about two and three-fourths cents per quart, a very low price, when we take into consideration the interest on the land to produce it, and the large amount of labor to prepare it, and the handling of it. It is retailed by the middle man in New York at from eight to ten cents per quart; they actually make more money in a day with a horse and wagon than the farmer with four workmen, two teams, fifty cows and an outlay of thirty thousand dollars in land and buildings. This should not be.

To the questions sent out by the Executive Committee, answers from three townships, Wantage, Lafayette and one other, are given as follows:

Help, without board, is paid \$25 to \$30 per month; with board, \$15 to \$18.

Help is mostly single and is native.

One silo in the three townships.

No roots grown.

Milk business is increasing.

Rye and wheat falling off.

Fruit, potatoes and onions are receiving more attention.

One in four farmers have small flocks of sheep. Discouragements: low prices of wool, damage by dogs, and requiring stone fences.

Hog raising, decreasing—no diseases.

Poultry, increasing. Diseases, gapes and cholera. Loss of ten per cent.

Do not fatten as many cattle for market as formerly, but cows are fattened for market when not profitable for milk. Cause, milk and butter pay better. Keep up cattle supply by raising half home stock. Some cows are bought. Know of no diseases from



imported stock. The popular cattle for milk are Holsteins, for butter, Jerseys.

There are but three creameries—two in one township.

No special action for the improvement of roads, but plenty of talk.

Farmers are not satisfied. They complain of high freight, heavy taxes, lack of co-operation, and small profits. Need lower wages, more laborers, increase of duty on some products, legislation to regulate freights and equalize taxes, less expense in our courts for judges, and a general reduction in the salaries of office-holders in our counties.

Farmers receive, but cannot tell whether or not they are benefited by or read, the Experiment Station Bulletins.

They appreciate the Station's analysis of fertilizers.

Weather service is of but little use, as it comes too late.

Have planted fruit trees, &c., to a considerable extent.

No spraying done, except to potatoes and currants. Paris green and hellebore are the poisons used.

## UNION COUNTY.

### UNION COUNTY BOARD OF AGRICULTURE.

(Organized December 11th, 1868.)

#### OFFICERS FOR 1889.

*President*.....DENNIS LONG.....Irvington, N. J.  
*Secretary and Librarian*.....DENNIS C. CRANE.....Roselle, N. J.  
*Treasurer*.....ROBERT WOODRUFF.....Westfield, N. J.

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NOAH W. PARCELL.....Union, (P. O., Elizabeth, N. J.)  
DENNIS C. CRANE.....Roselle, N. J.

#### ALTERNATES.

J. L. BENEDICT.....Cranford, (P. O., Elizabeth, N. J.)  
BENJAMIN W. TUCKER.....Linden, (P. O., Elizabeth, N. J.)

### REPORT.

BY DENNIS C. CRANE.

#### ANSWERS TO QUESTIONS ASKED BY STATE BOARD.

We have but one farmers' organization in our county, the

Union County Board. It has a membership of forty-seven. The meetings are held on the first and third Thursday of each month, at the Court House, in Elizabeth, unless otherwise ordered by the Board. During 1888 seven meetings have been held for the discussion of farm topics, all during the winter and spring months. In April an all-day meeting was held. The subject of "Raising and Selling Milk" was discussed in the morning, and in the afternoon "Home and Commercial Fertilizers" received their attention. This was a well-attended and profitable meeting. Hon. Edward Burrough, President of the State Board, was present and gave an excellent address on the importance of our Government sustaining the duty on imported agricultural products. Mr. B. C. Sears, Superintendent of the New Jersey State farm, gave some of his experiences as a milk raiser and dealer and the wisdom of farmers' holding fast to their profession. Mr. P. T. Quinn, Secretary of the State Agricultural Society, spoke of the depressed condition of gardening and farming, compared with twenty years ago. Mr. William R. Wood, Vice President of the State Board, urged the farmers to sustain the Board and look on the bright side of farming. Several other strangers were present, who took part, and with the home talent, the time was well and fully spent.

In June, the annual family picnic and strawberry exhibition was held at the farm of the secretary. There was a large gathering of farmers, their wives and children. The weather was all that could be desired. Refreshments were abundant, and the speeches encouraging and calculated to excite good feeling. We contemplate holding several all-day meetings this winter in different parts of the county.

#### HIRED HELP.

The farm laborers are mostly foreign and generally ignorant of our language, ways of farming, and prove very unsatisfactory. Those that are good generally drift to the villages and towns, where they can get better wages than the farmer can afford, working by the day in gardens and factories. The "green" hands are generally single, board with the farmer, and receives from \$10 to \$15 per month. Those that board themselves receive from

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\$28 to \$35 per month. There are quite a number of colored people from the South in our county, some of whom are quite acceptable help. Castle Garden, in New York, and the intelligence offices there, are the principal places for obtaining help.

### SILOS.

Probably the number of silos in our county has not increased for several years back, not because our farmers condemn them. Those who have used them express faith in them, and claim that they help to make the milk business profitable. Cows need a succulent food in winter with the dry fodder. We believe ensilage can be raised cheaper than roots.

Experiments prove it to be a healthful and acceptable food, not injuriously affecting the milk. A very large quantity can be raised on an acre, and we believe they could be made, with us, a very profitable adjunct to many of our farms where milk is raised. In gathering clover or corn fodder, difficulty is experience in drying it without loss. By putting it directly into the silo, while green, this loss is entirely saved.

There are several reasons why more silos are not being built; the building of one, with the necessary machinery, requires more money than most of our small milk raisers feel like laying out. Beer grains are generally used, and are a handy, succulent, healthy and agreeable food, inclined to make milk, and can be bought cheaply at the breweries in Newark or Elizabeth, or on the cars at the depot, near by.

### SOILING AND OTHER QUESTIONS.

Nearly all our milk producers raise rye, clover and corn, sowed somewhat thinly in rows, to feed to their cows through the summer, in connection with pasture and beer grains. Turnips are grown for winter feeding, but very few other roots.

The production of milk has increased about in proportion to the increase in population.

There is no change in the variety or quantity of crops raised, from those of ten years ago.

Very few, if any, sheep are kept. Dogs are the chief obstacle.

But very few hogs are raised, as skimmed milk and buttermilk

are not as plenty as a few years ago; this, with the low price at which pork has been selling for some years back, has tended to stop the raising of it. We have not heard of any hog cholera or other disease.

There is no perceptible change in the number of farmers keeping poultry; probably twenty per cent. have died from roup, cholera and other diseases.

The fattening of cattle never received much attention in our county, beyond making beef of old and farrow cows. The low price of beef has tended to make less of it than formerly. There are not as many northern or western calves bought as some years ago. Thoroughbred bulls are kept, and calves from some of the best cows are raised. There is no disease among our horses, cattle or hogs that we know of, that has been introduced by imported stock or otherwise.

Very little butter is made in the county for selling. Milk is raised to sell in the towns and villages near by, for this purpose. The Ayreshire is probably the most profitable breed, and Holstein next. There are good and bad cows in all the breeds, and much depends upon the feeding. The grades are often the best for ordinary milk raisers. The Jersey and Guernsey are, no doubt, the best breeds for family purposes and butter making. We have some large and fine registered herds of these breeds, also a number of large dairy herds of Ayreshire.

There are no creameries in the county.

#### CONDITION OF FARMERS.

Grumblers do not, as a rule, excite our admiration, but in answer to your question, we believe farmers are not satisfied with their condition. The low prices at which they have been obliged to sell their products during the past ten or fifteen years, together with the increasing expenses in the way of living, labor, taxes, &c., has caused many of our native born farmers to give up and attempt something else, and many others to run more and more in debt each year, while those who have kept up and made progress it has been because of the favorable condition in which they were placed. Of those who are succeeding in farming in our county we might name two classes. The

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foreigners, who came among us some years ago as laborers. After years of working by the month and day and saving one or two hundred dollars they rented or bought a low priced farm, a team, some stock, and a few implements, and then commenced in earnest to get up in the world. Father, mother and children are working hard, early and late ; spend little or nothing for luxuries, clothing, churches, schools, or public improvements. Whenever an opportunity is afforded they work out by the day ; every dollar that can be saved goes towards paying off the mortgage on the place, or adding to the bank account. In their inordinate desire to add to their possessions they have taken from the rented farms, fertility, fences, wood, and out-buildings. The speculators, who own the farms and have lost, do not have our sympathy so much as the old homestead, the adjacent worthy farmer, and the community at large. We would feel more like commending the foreigner's ambition if he exhibited more regard for the rights of others and did not exert such a negative influence when wholesome reforms or public improvements are attempted.

The other class that are succeeding, and possibly are satisfied, are sons of old farmers, who, years ago, inherited their farms, or were helped in purchasing them. Blessed with vigorous health, good practical sense, and taking to themselves helpmeets for wives, they made farming their business, adopted the better ways of their fathers and neighbors. For years they have worked hard improving their places, and to-day are among our best citizens, well informed in matters pertaining to the farm, church and State. Most of them raise general farm crops.

On the sandy loam soils near the cities and towns, a specialty is made of milk, which the farmer sells himself, at retail, or to the middlemen ; also potatoes, cabbage, turnips and tomatoes are favorite crops on this soil. On the clay loam, hay and corn, with milk, are the paying crops.

The price of milk when retailed is from six to eight cents per quart. When sold at the door at wholesale it is two and three-fourths to four cents a quart. At these prices there is money in it only when closely and intelligently managed. The principal advantage of milk raising comes from pasturing rough land and converting into cash the rough fodder that would otherwise be

wasted. A large pile of manure is made, which in time helps to grow large crops. The cows are tended to mostly by men and boys before and after the day's work in the field. Raising milk gives work in the winter and brings in some money every week to pay hired help and store bills.

#### EXCESSIVE RAINS.

While the past season has been a growing one for crops, on high or underdrained ground, it has also been a very wet one. It afforded but little opportunity for planting, cultivating or harvesting. There was not the usual acreage of corn put in. In the fall, the continuous cloudy, rainy weather prevented it from ripening and drying; husking was not done until very late, and considerable of it moulded in the crib. Because of the ground being so wet, there was not so much timothy and fall grain sowed.

#### DRAWBACKS TO FARMING.

The risks of farming are many; probably no business has more. The causes are so varied that they come in no two years alike. The loss which comes from wear and tear of farm implements, decay and depreciation in value of improvements; the loss from accident, sickness and death of animals; the loss of crops from insects, vermin, excessive rains and drought; these, and many more, curtail the profits of the farm, until the farmers often feel at the end of the year that there is no reward for their labor. While many are unavoidable, and likely to happen to the most careful, some can be anticipated and guarded against, and the wise farmer will spend some of his capital for insurance. Of all the losses the farmers, as a class, are subjected to, probably none causes them greater loss than too much or too little rain.

#### UNDERDRAINING.

There is no way of insuring against loss from excessive rain so certain as underdraining. Surface draining with ditches is only partial, and it is not so lasting, neither has it the mechanical effect on the soil that well-laid tile draining has. Low land often has the richest soil, as for years it has received the wash of the

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higher lands, and the fertility has not been cropped out. When underdrained and thoroughly cultivated the sun and air deepen and disintegrate the soil, prepare dormant plant food and make the land profitable to cultivate for a life time. The advantages of underdraining are not as thoroughly appreciated as they ought to be. Two-thirds of the land in Union county needs underdraining, and if properly worked afterwards would pay annually a handsome dividend on the investment. Not only will the underdrains carry off the surface water, which is likely to drown out the crop, but it makes the land warmer, facilitates working it earlier in the spring and after heavy rains through the summer. They also keep the land from being surface washed. Rains and snows that absorb gases from the air and manure that is spread broadcast, is filtered through the soil and left there instead of washing away. Underdrained land stands the drought better, the neighborhood is healthier and there is comfort and satisfaction in growing and harvesting large crops and being secured against loss. The subject needs agitating, and as many parts of our county have earth that is well adapted for tile making, there should be two or three factories established in our county, located at convenient points, which would, no doubt, lessen the cost of the tile, and save carting a long distance. While we believe this is good advice for some of the farmers in our county, we believe there are a large number who will not heed it; among these are the speculators, renters and the discouraged farmer, also many practical farmers who understand its merits, but have not the necessary capital. If the money that is used annually in purchasing commercial fertilizers were spent in underdraining our farms, in ten years we believe we would be much better off.

## DROUTH.

Of the two extremes, wet weather and dry weather, we prefer the former. In a wet season crops may be drowned out on the low ground, but on the high ground they do not suffer much. In a dry season everything everywhere is parched and sickly; then the farmer or gardener wishes he could utilize the abundant supply of water under the surface twenty or fifty feet, or the



brook not far off, which is running to waste. Drouth can be very much mitigated by deep ploughing, thorough cultivation, high manuring and mulching, and the inducing of a rank growth early in the season in order to shade the ground. These are some of the simple, but not always effective methods. Moisture has two offices, one to give sap to the plant, and the other to make the ground soft so that the fibrous roots can penetrate and search out after food. To lose a crop by drouth is no small loss, especially if it be garden vegetables, fruit, or even general farm crops. Often from \$20 to \$100 is spent on an acre for plowing, planting, cultivating, and the use of the ground. The crop, if saved and sold, might yield double the above amounts. In every dry season, an extra price is usually realized, so it becomes the wise farmer to study whether he cannot, by irrigation, insure himself against drouth.

#### IRRIGATION.

Irrigation necessitates underdraining, for water cannot stand on the soil or stagnate. Irrigation is practiced largely out West and in other countries, and why might it not be adopted here by many farmers and gardeners. Those who have streams of water running through their farms, might, by a simple, inexpensive method, raise the water to such a height that it could be led to flow over their fields, and in a dry season increase the crop a hundred fold. The saving of one crop would often pay for the original outlay. Grass, especially, responds generously to such treatment. Many places have basins between small hills that could be made into reservoirs and filled with water during the rainy season.

#### WHAT ARE THE NEEDS OF AGRICULTURE TO-DAY?

This is a question upon which much might be said. That the agricultural interest is depressed, and farmers, as a class, are discouraged, because they do not receive a fair share of the rewards of labor, is evident to every intelligent observer. The law of supply and demand will always, more or less, govern prices. Farmers will have to submit to it, but to some extent they can control it. If they could more largely sell directly to the con-

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sumer, and get the middleman's profit, it would be something. We believe there should be in all our large towns and cities,

First. Better market facilities.

For the farmer and gardener to sell his produce at retail and wholesale, not simply permission to stand on the street or under a leaky shed, but ample, substantial buildings, comfortable and convenient, for man or beast, winter or summer, day or night. As we have said before we believe in making the County Board of Agriculture of some importance, clothing them with some power, and why not? Persons and commissions are appointed with power to spend public money, and why should not a body of farmers, all freeholders, one from each township of the county, have power by law to spend a certain sum of money for the common good of both city and county. Believing they should have the right, we suggest a law empowering them to rent, at the county's expense, or raise a sum of money by taxation, not exceeding \$500 for every one thousand inhabitants, to be spent by the Board in buying ground and erecting the necessary buildings for a public market in such places as they may think the public good requires, the appointment of a market superintendent and general management being in the hands of the Board. We believe that a public market in Elizabeth, Plainfield and Rahway, as above suggested, would help our farming interests and be welcomed by the consumers. As it is now, very little country produce is sold by the producer to the consumer; middlemen handle it nearly all. Often the farmer finds it necessary to travel up and down the length and breadth of the town, stopping at all the stores, and spending nearly the whole day before he succeeds in selling and giving away his load. He has been at the mercy of the storekeeper so often and so long, that he has become a beautiful specimen of meekness and humility. This the storekeeper recognizes and takes advantage of it.

Second. State and County Agricultural Boards should be fostered.

The farming interests can be greatly helped by these organizations, if the State will give the means to do it with. We believe that money so appropriated would be like "Casting bread upon the waters." We hope the day will come when the State and County Boards will be organized and the field of their usefulness

be so extended that they will have, not only one model State farm, but one in each county, where the facilities for testing new varieties of seeds, plants and animals and implements, are complete, and if found adapted to the locality, be economically disseminated ; where the best methods of planting, cultivating and harvesting shall be adopted ; where the youth who are agriculturally inclined can go to school and receive instruction in practical farming ; where the buildings necessary shall be built after the most improved plans for practical purposes, and containing conveniences that will be suggestive to the ordinary farmer. Such farms, if not handicapped with theoretical professors, drawing large salaries, but rather put in charge of practical, sensible, wideawake farmers, such as some of those we have in our Boards, it ought to be helpful and largely self-sustaining. The militia, public school, and centennial exhibitions receive aid, or valuable rights and privileges from the State. Why should not the farming interest have its share, especially when it is for the common good ; so we say, let us ask more largely of the powers that be, and do so with the assurance that it is our right. Our United States Government should sustain the tariff on imported agricultural products, and on some articles the duty should be increased.

Third. Better farming by the individual farmers.

While it is proper, to a certain extent, that the State and county should assume the control of matters which are for the good of all, it should not destroy the self-reliance of the individual, or the idea that he must earn his bread by the sweat of his brow. So, if, brother farmer, your circumstances and education compel you to be a farmer, and those of you whose love for country life will make you restless elsewhere, we say, look up and accept the situation ; there are pleasures for you and rewards in farming yet ; determine to make it a life work, and so plan for it. To be successful, it may be necessary that you give more attention to intelligent management, manuring, underdraining and cultivation. That you plant better seed, keep better stock and give them better care. Try to remedy these defects, if they exist, and study your individual taste ; the help your family can give and the crops best suited to your soil, the market at

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which you can sell, and then plant so as to have plenty to sell in the fall.

Do not let your faith, hope and activity be taken from you, neither depart from some of the plain, simple, economical ways of your fathers.

### REVISION OF THE ROAD LAW.

That our road law needs revision is generally admitted. As it now stands, it is like an unsorted lot of apples or potatoes, containing good, bad and indifferent features. The many township, county and State laws now on the statute books, with various amendments, should be superseded by a general State law, one that will be plain and simple, and meet the want of the present day in the different parts of the State. We are convinced that this is no easy task. Intelligent, practical men should be employed to draft a good law, for it is an important subject, affecting our common interest more largely than is generally supposed.

There has been a growing interest on the subject in our county, for several years. Our confusion over the road law, and the many incompetent overseers, who have wasted the money placed in their hands, has led to curtailing our general road tax, and raising in its stead a heavy special tax for buying and placing on the roads, after they are graded, crushed stone, overlying the centre from eight to twelve feet in width, and from six to ten inches in depth. In this way nearly half of our villages, and part of our main roads have been much improved, remaining hard and smooth the year round. The taxes are heavy, but very little complaint is made, and only by those who live in the outskirts of the town or district, and have to pay an equal proportion with those whose streets are improved. The roads not stoned are as bad as ever.

### COUNTY ROADS.

At present we are studying how to put the main roads of our county in the condition which the travel upon them demands. The opinion held by many is that roads should be divided into two classes, viz: County and township. The first to be maintained at the expense of the county and controlled by its officers,

and the by-roads to be kept in order by the township and in charge of its officers. As our Board of Chosen Freeholders have charge of the bridges and other county matters, it seems but proper that they should have charge of the roads, if the change is made. They represent the tax payers, one from each township, and are as likely to be worthy of confidence as any set of men we are likely to elect. One reason for taking our main roads out of the hands of the township is, that they frequently pass through townships that are indisposed or too poor financially to put them in the condition that the travel on them calls for. They need help, and the cities and towns outside, which are benefitted, should aid them.

WHO SHALL MAKE AND REPAIR THE ROADS?

It may look at first as though all roads passing through the country districts should be maintained by the property owners, especially as the cities and towns take care of their streets, but then, when we think there are ten carriages from the city using these roads for every country wagon or carriage, and also that good country roads invite people of means, who help build up the towns and cities, as well as the country, and the increased population buy and employ, and make business lively, especially for town people, we think it is only fair that they bear a part of the heavy tax. If we tax these towns for the purpose, we must give them a voice in saying how and where the money shall be spent.

TAXES, AND HOW RAISED.

We believe it would be well to guard against excessive taxation, and, therefore, would set some amount beyond which the county officials shall not go. In our county it is thought that no special tax in one year should be in excess of one-quarter of one per cent., and no bonds be issued, when the total indebtedness of the county shall exceed three per cent. of the assessed value of the real estate.

As considerably more than half of our county tax is raised in our cities, it follows, that should our county assume the entire cost, as is proposed by some, and be paid for, not by direct annual tax, but by issuing bonds falling due over a series of

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years, with a provision for a sinking fund, the principal cost will fall upon the cities and not on farm land. Those who live among us in future years will help pay for the improvement, while placing the tax on the township or county at large, if pursued, would simplify the collection and disbursement of the money, and would doubtless do away with not a little disputing over assessments. We are inclined to think a more just method would be to make assessments near by, when the improvements are made, the county at large paying one-half or two-thirds, as may be thought best. Roads that are already properly graded and stoned should have credit for the improvement. It might be well to divide the roads into sections of one mile, then those property owners for half a mile on each side of the borough or village that wishes to make improvements beyond what the county deems necessary, can, of themselves, come together and say what extra expense they wish to go to. If the majority vote to grade from fence to fence, or stone from gutter to gutter, they may do so, and assess the extra cost on the adjoining property, four-sixths on the property fronting on the road or street, (two-sixths on each side), and two-sixths on the land beyond three hundred feet and within a half mile of the road (one-sixth on each side).

## HOW MADE.

While it is not the purpose of this report to speak of the advantages of good roads, or tell how to build them, we think it well to guard against extravagant expenditure, and therefore, in framing a law, would go somewhat into detail, stating how and what shall and shall not be done. It would be money well spent to employ a surveyor to map out the road. The centres of the main roads should have an easy grade. Where there are hills, a sufficient portion should be cut out and carted to the lower lands, and nicely turnpiked before being covered with stone. If the soil is inclined to be wet or springy, one or two tile drains underneath the stone bed, the ditch filled with common field stone, and a water outlet at the end of every grade will help to keep the foundation solid, and a less thickness of stone will be required. Crushed trap rock from the hills in our county is the only material we find lasting and hard the year round. Most of our field

stone is of too soft a nature to stand the wear. Many of our conservative men think from eight to fifteen feet of the centre of our country roads a sufficient width for travel bed, and from six to ten inches in thickness of cracked stone. It needs re-dressing every two or three years. Stones larger than an egg are objectionable, even when put under the surface one foot. In time, the wagon wheels will wear off, and the heavy rains wash away the finer stone, and the frost and heavy teaming disturb and bring them to the surface, where they will be a nuisance.

Putting the work out by contract is often the most economical system. We are inclined to think the feature of the old law allowing the property owner or farmer to work out his road tax was not a bad one. He should be, and we believe he is interested in having good roads, especially in front of his own place, and as he has a team, and the paying of cash in the fall may be a hardship, we would retain this feature in the township system. Exact that the larger part of the work be done before the first of September, and a full and faithful day's work be given. Another advantage of dividing the work of grading and stoning the roads into mile sections is, it would give farmers of limited means a chance to bid for the work. The carting of the stone might be done in the winter season, when teams are mostly idle.

#### SIDE WALKS.

When the neighborhood demands it, compel land owners, or make it a part of the overseers' work to level off (not grade) the ground in front of their places, if it is not already done. The stone should be picked up and bushes grubbed up; fix a passable side walk on one side of the road, top dressing the soil with gravel, coal ashes, cinders, crushed stone, or boards if necessary, whichever the owner chooses, so long as he provides a safe and dry walk the year round. When the owner of the property adjacent and the town committee assumes the work, assess one-half on the side of the road where the walk is, and two-sixths on the land on the opposite side of the road, and one-sixth on the township at large; sow mixed grasses over all the ground, but the wagon track, and set out and protect shade trees, and have the ground all mowed over twice during the summer, June



## UNION COUNTY.

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and August. It might be well to allow townships or road districts the right to rent out the pasture on roads and commend to reliable persons who will carefully watch their animals, do the mowing and keep the foul weeds down, and be responsible for all damages their sheep or animals may do, only, however, by the permission of the township committee and property owners along the line of the road. Offer some inducements to property owners to set out shade trees on the side walks and protect them from injury. Offer some inducement for using broader tires on heavy wagons ; it is a good thing for the roads, if not for the horses and wagons. If we had a Prohibition Legislature we would advocate the right of every county to compel all brewers who send wagons out through the county to take out a license for each and every wagon. They have the right and do sue us when the roads do not suit them. No wagons wear out our roads faster than they do, and their coming does us no good.

The running of animals at large, even when watched, should be prohibited. Compel every man to fence in his animals except when necessary to drive them on the road, to and from pasture or market or for a reasonable purpose. Empower land owners or their servants to pound animals found loitering along the road. Let every farmer's barnyard be a pound if he wishes, he to notify the owner of the cattle immediately, as to where they are, amount of pound fees, and damages, if any.

If there is any dispute let it be settled, if possible, by two or three near neighbors. Let the proceedings for trying to prevent taking the animals to the pound or the taking them out of the pound without permission, be simple and severe for a second offence. Make the pound fees even money ; twenty-five cents for the one impounding the stock, twenty-five cents for letting in and letting out, and twenty-five cents a day or part of a day for keeping.

### OVERSEERS.

We must have some one whose business it is to look after the roads—some responsible head, both in our county and township system. If the work is done by contract, some one ought to see that the agreement is carried out. If the Town Committeemen or Chosen Freeholders inspect the work they have to be paid. To



our mind the chances are that the Overseer will give the most work for the money paid, if he is hired by the day. Pay Overseer's wages liberal enough to make it an object for an honest, capable man to accept the offer, and then stand by him when he is trying to do his duty. Put the nominating of the County Road Overseer in the hands of the County Board of Agriculture, the Board of Chosen Freeholders, if they will, to ratify the nomination. This will check the low lived politician, who works hard at the spring election for the man that will promise to work and vote for him in the Board meeting when appointments are made.

TEXT BOOK ON ROAD MAKING.

Our road system will never be what it should be until a standard for road making is established. As there are doctrines in the church which the preacher is expected to set forth, rules in arithmetic and grammar, which the school teacher is expected to teach, so there are principles and rules in road making which need to be observed, and road overseers should have a knowledge of them before they are appointed. We suggest that our State Board take steps to provide a text book on road making, make some provisions for educating a class of men in this particular branch of work, and require of all applicants for the position a certificate showing that they have the necessary knowledge and experience.

COUNTY BOARDS TO EXAMINE OVERSEERS.

Make our County Boards of Agriculture the examining committee. The low grade certificate to be given when they show that they are thoroughly acquainted with the text book, and let it entitle the holder to be an assistant overseer. The high grade to be given two years later, after practical experience, and they have proved themselves fully competent.

If the directors of the County Boards would hold quarterly meetings in different parts of the county and invite the overseers of the different townships to meet with them, inspect roads and discuss road making, we believe it would be a good thing. At the same time, the Directors could examine applicants for positions. The county should honor a bill for one day's work, both for the directors and overseers.

## WARREN COUNTY.

### WARREN COUNTY BOARD OF AGRICULTURE.

(Organized December 29th, 1888.)

#### OFFICERS FOR ONE YEAR.

*President*.....HON. WILLIAM FRITTS .....Washington, N. J.  
*Vice President*.....M. C. FLOMERFELT.....Danville, N. J.  
*Secretary*.....ALBERT SILVERTHORN.....Delaware, N. J.  
*Treasurer*.....SAMUEL READ.....Mount Hermon, N. J.

#### BOARD OF DIRECTORS.

JAMES C. CYPHERS, Hope, N. J.  
WILLIAM C. ADDIS, Delaware, N. J.  
ASA KINNEY, Belvidere, N. J.  
WILLIAM RIDDLE, New Hampton, N. J.  
G. K. McMURTRIE, Belvidere, N. J.  
JAMES VANNATTA, Roxbury, N. J.  
WILLIAM SHERRER, Bloomsburg, N. J.

#### DELEGATES TO STATE BOARD.

HON. WILLIAM FRITTS, (two years), Washington, N. J.  
WILLIAM SILVERTHORN, (one year), Belvidere, N. J.

### ANNUAL REPORT.

#### BY THE SECRETARY.

As our County Board was not organized until December 29th, 1888, we have not yet gotten in good working order, and have not the necessary information to make a full report.

The soil of Warren county is varied, composed of sandy and and clay loam, limestone, cobbles and slate ledges ; and produces

good crops of corn, wheat, rye, oats, buckwheat, potatoes, apples, pears, peaches and a variety of small fruits.

*Corn* was not quite an average crop, owing to the heavy fall of rain, though there were some extra good yields on the slate knolls, but on the low lands there was a great deal of soft. It is selling at forty cents per bushel.

*Wheat* was about an average crop, yielding from fifteen to twenty-five bushels per acre and selling for one dollar. The winter wheat looks fine at the present writing.

*Rye.* The crop of rye straw was very heavy, perhaps twenty-five per cent. above the average. The yield of grain was about an average one. Straw is worth from \$10 to \$12 per ton; grain, fifty-five cents per bushel. Hastings' paper mill, at Delaware, and the Warren Foundry, at Phillipsburg, make good markets for rye straw.

*Oats.*—About an average crop.

*Hay.*—About ten per cent. above an average crop and of the best quality. There has been an abundance of pasture and the young grass (clover and timothy) looks well in the stubble.

*Buckwheat.*—This was hardly half a crop and of poor quality, too much rain and cold wind when in blossom. Price, sixty-five to seventy-five cents.

*Potatoes.*—There was about two-thirds of a crop, they having rotted badly. Price, fifty to sixty cents per bushel.

*Apples.*—The apple crop was about twenty-five per cent. above the average. There were eight or ten thousand bushels shipped from Delaware, at an average of about thirty-three cents per bushel. Hundreds of bushels were wasted.

*Pears.*—Pears were an entire failure.

*Peaches.*—There was about one-tenth of a crop of peaches. There was too much rain and cold east wind and slight frosts when in blossom. Several new orchards were planted last

## WARREN COUNTY.

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spring. The borer is the greatest enemy of the peach in this section. This will be a great peach producing county in a few years if we can have the shipping accommodations. As it is at present we are obliged to ship in small lots by express, and the trainmen handle them like cord wood—they throw and pile them in any way, consequently they are so badly bruised and damaged when they reach the consumer that we cannot get good prices.

The raising of small fruits is increasing, and growers appear to be in good spirits, the principal hindrance being high rates of freight and scarcity of help.

Garden truck was generally good. There were about one hundred thousand bushels of onions raised on the Great Meadow (the drained Pequest Valley), the garden of Warren county.

*Nut Crop.*—The crop of chestnuts was good and they sold for \$3 per bushel. Walnuts and butternuts were a very light crop; they were worth about forty cents per bushel. Shellbarks were a failure; some years there are nearly three thousand bushels shipped from Delaware.

The past season has been favorable for the production of milk and butter. Creamery price for milk, from one and a half to three and a half cents per quart.

There are six or eight creameries in Warren county, but have not been able to ascertain the amount of their product, excepting one, the Vail, which states the average paid by New York dealers for the year ending January 1st, 1889, to be thirty-three and seven-eighths.

Creamery year will possibly run 875,000 quarts.

Of the above amount there has been shipped to the city, in cream, about two thousand cans, the balance milk. Very little cheese has been made.

More milk is produced than formerly, but less butter. Holsteins are preferred for producing milk, and Jerseys for butter.

Farmers depend mostly upon buying Western cattle, to replenish their dairies, which cost from \$35 to \$60 per head.

Do not know of any diseases among cattle. They are selling from \$40 to \$60 per head.

*Horses.*—The breeding of horses is increasing, and farmers are endeavoring to breed a larger class of horses than formerly. The demand for heavy draught horses is rapidly increasing. A large horse always sells for a fair price. A small one does not sell so well. Prices for horses range from \$50 to \$250.

*Sheep.*—The sheep industry has decreased fully one-half, owing chiefly to the damage done by dogs. Also, the low price of both mutton and wool. If it were not for the worthless dogs, there would be twenty-five per cent. more kept.

Farmers demand the repeal of the law prohibiting the killing of dogs doing them (the farmers) damage, and think it would be wise for the State to offer a small premium to the person or persons for killing dogs caught or seen worrying sheep, cattle, swine or poultry ; also, amending the law by giving appraisers of damage done by dog or dogs the authority to allow damage, when they believe that sheep or other stock are damaged by being worried or chased, and if any sheep are missing, when the dogs have bitten or killed any of the flock, and the owner of the flock proves that he had more sheep, the said appraisers are to allow damages for said missing ones. But the owner must make diligent search for them, and should he find them after the said damage be awarded, the amount of damage on sheep found to be returned.

There have been several sheep lost in this county in this way—some chased into the river and not found, and other found when too late to be appraised, and the owners had to lose them.

There are a few flocks of thoroughbred and improved sheep in this county, and there would be vast improvements, but for the damage done by dogs, as you can never get more than one-third or one-half of their value. Either the dogs or the sheep must go.

*Swine.*—Fewer have been raised during the past two years than formerly, owing to the hog plague and low prices, but think it has reached the turning point, as the plague seems to have about run its course, and if breeders will use some precaution, I think it will be a thing of the past.

Farmers, try to keep your hogs in a good thrifty condition, by feeding a variety of grain, with some roots and grass. Give them sulphur, salt and wood ashes occasionally. A good plan is

## WARREN COUNTY.

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to have a small box of it kept in the pen so they can lick some of it when they desire to. Sprinkle the floors of the pen and the hogs with a solution of carbolic acid, and give them from one to five drops of carbolic acid in their milk occasionally. If they seem stiff, give them a little turpentine, also bathe their backs with it, but if they commence to stagger and cough separate them at once from the others. If they are constive give injections of lard, turpentine and castor oil, also three drops of carbolic acid, but if their bowels are very loose give plenty of laudadun ; if they are small you can drench them, but give the large ones injections. Whitewash your pens with lime and a little sulphate of zinc. Should any die, bury at least two feet deep.

There are several breeds of thoroughbred hogs in the county, being Durocs, Berkshire, Yorkshire, Chester White, P. China, Jersey Reds, Cheshire and others.

From my experience and observation, the Jersey Reds and Chester Whites have withstood the plague the best.

*Fat hogs* are selling for from six and a half to eight cents per pound.

*Pigs for stock*, from \$3 to \$5. Registered stock, somewhat higher.

*Poultry*.—More poultry is raised than formerly. We have several breeders of fancy poultry who have been doing a large business.

Fully twenty per cent. are lost by cholera and roup. The gape worm destroys about one-half of the young chicks. Will some one give us a sure remedy, or, better still, a preventative ?

The only remedy practiced here is to take a horsehair and form it into a loop and insert it into the windpipe of the chicken and twist out the worms, which is a very cruel and tedious method.

Wages for farm hands, with board, vary from \$10 to \$15 per month. Without board, from \$15 to \$20. Our help are nearly all single men, with the exception of day laborers.

There are very few, if any, silos in use. Soiling is in its infancy.

We have very poor roads, although we expend about \$2,000 in each township yearly.

Taxes are high and will average about \$9 on the thousand.

Farmers as a class wear pretty long faces, and complain of hard times—high taxes, high prices for what they buy and the very low price they receive for their products, and the high rate of interest they are obliged to pay.

They demand an equality of taxes, and the rate of interest reduced to five per cent.

There are thousands of dollars sent from this county to the Western States, for which no tax is paid, but if a laboring man or poor widow has a hundred dollars they are taxed for all they have. Give the assessors more power to assess.

They demand, also, that the fees of our public servants be reduced, and that our law makers should endeavor to stop the forming of trusts or syndicates to monopolize the necessities of life, and rob both the producer and consumer.

Farmers need thorough organization, to demand their rights and obtain them.

Fertilizers are not used to any great extent. They seem like the "Indian's gun," more cost than profit. The extra yield does not pay the cost of the fertilizer.

We do not use the Signal Service as a guide in gathering our crops. The storms are generally here, or over, before we get the signal.

## AGRICULTURAL EXHIBITIONS FOR 1889.

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New Jersey State Agricultural Society, September 16th, 17th, 18th, 19th and 20th. W. M. Force, Secretary, Newark, N. J.

Burlington County Agricultural Society, October 7th, 8th, 9th, 10th, 11th, and 12th. H. I. Budd, Secretary, Mount Holly.

New Hunterdon County Agricultural Society, September 24th, 25th and 26th. H. G. Chamberlain, Secretary, Flemington, N. J.

Monmouth Fair Association, September 24th, 25th, 26th and 27th. Charles D. B. Forman, Secretary, Freehold, N. J.

Sussex County Agricultural Society, September 10th, 11th, 12th and 13th. Richard A. Learned, Secretary, Newton, N. J.

West Jersey Agricultural Fair Association, August 27th, 28th and 29th. James D. Lawson, Secretary, Woodstown, N. J.

Somerset County Agricultural Society, October 1st, 2d, 3d and 4th. William S. Potter, Secretary, Somerville, N. J.

Atlantic County Agricultural and Horticultural Society, September 21-24. V. P. Hoffman, Secretary, Egg Harbor City.

Inter-State Fair Association, September 30th, October 1st, 2d, 3d and 4th. Jno. Guild Muirhead, Secretary, Trenton, N. J.

Moorestown Agricultural and Industrial Society, June 6th, 7th and 8th. Henry W. Moore, Secretary, Moorestown, N. J.





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\* Owing to pressure of work, Prof. A. was prevented from revising his address in time for the annual report.—SECY.

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## ERRATA.

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In list of Directors, page 7.

Abram W. Duryea, P. O., New Durham.

E. Williams, P. O., Montclair.

J. B. Ward, P. O., Lyons Farms.

D. C. Voorhees, P. O., Blawenburgh.

J. N. Baldwin should be J. H. Baldwin.

Herman Frisch should be Herman Trisch.

Page 71. A. Southwaite should be A. Satterthwaite.

Page 32. Committee to audit Treasurer's Account, should be M. Bacon instead of M. Baker.

Page 57. National Bank of Agriculture should be National Board of Agriculture.

Page 69. J. S. Ward should be J. B. Ward.

