Document No. 25.

STATE OF NEW JERSEY.

TWENTIETH ANNUAL REPORT

OF THE

State Board of Agriculture

1892-1893.

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To the Governor and Legislature of New Jersey:

In accordance with the provisions of the act creating the State Board of Agriculture, adopted April 22d, 1884, I have the honor to present the annual report for 1892.

FRANKLIN DYE,
Secretary.

TRENTON, Mercer County, N. J., Feb. 20th, 1893.



8. 7. 6. 5. 4. 3. 2. 1. 9. 10. 11. 12. 13. 14. 15. 16. 17.

1. Governor Geo. T. Werts.

dward Burrough, President.
. F. Bodine, Executive Committee.
ohn T. Cox, Master State Grange.
hos. H. Dudley, Ex-Pres't State Board.
6. Dr. Jos. B. Ward, Legislative Committee.
7. D. C. Lewis, Director of Board.
8. V. P. Hoffman, Sec'y Atlantic Co. Board.
9. Franklin Dye, Secretary State Board.
10. D. D. Denise, Treasurer State Board.
11. W. R. Lippincott, Executive Committee.
12. Hon. B. E. Tine, Member of Legislature.
13. M. D. Dickinson, Secretary State Grange.
14. J. A. McBride, Ex-Senator.
15. Wm. R. Ward, Ex-Sec'y State Hor. Society.
16. J. H. Denise, Director of Board.
17. John Repp.

STATE BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

PRESIDENT.

Hon. EDWARD BURROUGH.....Camden.

VICE PRESIDENT.

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

TREASURER.

D. D. DENISE.....Freehold.

SECRETARY.

FRANKLIN DYE.....Trenton.

EXECUTIVE COMMITTEE.

WM. R. LIPPINCOTT.....Fellowship.
H. F. BODINE.....Locktown.
THEO. F. D. BAKER.....Bridgeton.

ALSO,

The President, Vice President, Secretary and Treasurer.

BOARD OF DIRECTORS

New Jersey State Board of Agriculture.

1893.

Term of Office from January 1st to January 1st.

Class A.

NAME.	ADDRESS.	ASSOCIATION.
EMMOR ROBERTS	Moorestown	Geological Survey.
Hon. THOS. H. DUDLEY	Camden	Board of Visitors, Agricultural College.
WM. R. WARD	Newark	

Class B.

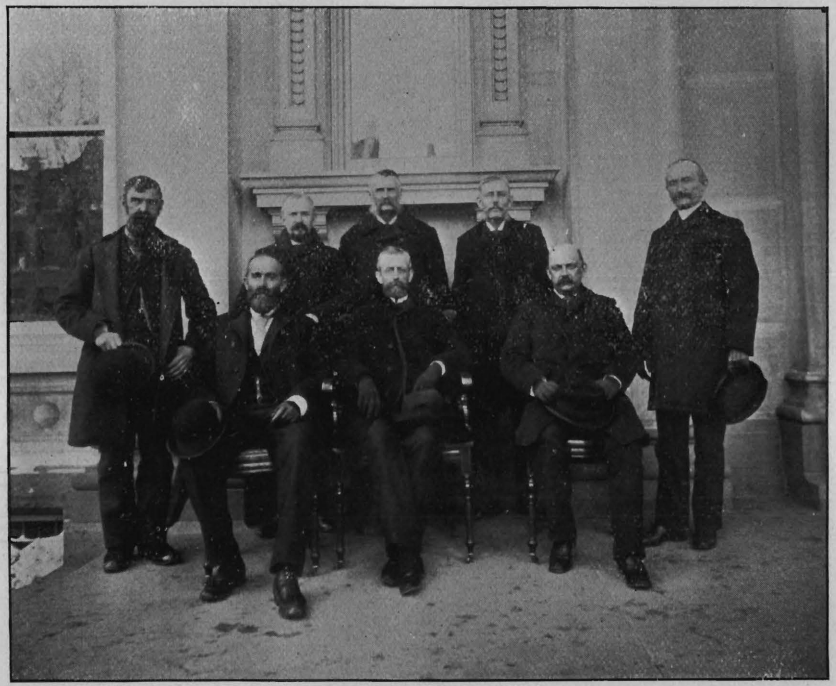
JAMES NEILSON	New Brunswick	Director Experiment Station.
E. B. VOORHEES	New Brunswick	Professor of Agriculture.
JOHN T. COX	Locktown	Master of State Grange, P. of H.
M. D. DICKINSON	Woodstown	Secretary State Grange, P. of H.

Class C.

Hon. THOS. H. DUDLEY	Camden	State Agricultural Society.
P. T. QUINN	Newark	
I. W. NICHOLSON	Camden	State Horticultural Society.
E. WILLIAMS	Montclair	
Dr. J. C. MAPLE	Trenton	N. J. State Poultry Association.
E. S. HAMILL	Jamesburg	
Jos. J. WHITE	Bordentown	American Cranberry Growers' Association.
Hon. A. J. RIDER	Trenton	
JOHN T. COX	Locktown	Hunterdon Pomona Grange.
THOS. BORTON	Mullica Hill	Gloucester Pomona Grange.
GEO. W. JESSUP	Cinnaminson	Burlington Pomona Grange.
D. C. LEWIS	Cranbury	Mercer Pomona Grange.
CLARK FLITCRAFT	Woodstown	Salem Pomona Grange.
GEORGE E. DE CAMP	Roseland	Central District Pomona Grange.

BOARD OF DIRECTORS.

NAME.	P. O. ADDRESS.	TERM.	ASSOCIATION.
V. P. HOFMANN	Egg Harbor City	2 years	Atlantic County Board.
WM. A. ELVINS	Hammonton	1 year	
GEO. L. GILLINGHAM	Moorestown	Alternate	Burlington County Board.
THOS. J. BEANS	Moorestown	1 year	
CHAS. C. STEVENSON	Blackwood	2 years	Camden County Board.
EDWARD S. HUSTON	Haddonfield	1 year	
THEO. F. D. BAKER	Bridgeton	2 years	Cumberland County Board.
W. O. GARRISON	Bridgeton	1 year	
CYRUS B. CRANE	Caldwell	2 years	Essex County Board.
AMOS W. HARRISON	Livingston	1 year	
DAVID BORTON	Mullica Hill	2 years	Gloucester County Board.
DAVID BROWN	Mickleton	1 year	
JAMES LANE	Readington	2 years	Hunterdon County Board.
Hon. B. F. TINE	Stanton	1 year	
S. B. KETCHAM	Pennington	2 years	Mercer County Board.
RALPH EGE	Hopewell	1 year	
ZENAS HENDERSON	Milltown	2 years	Middlesex County Board.
SAMUEL BLISH	New Brunswick	1 year	
L. F. G. SCHENCK	Marlboro	2 years	Monmouth County Board.
H. V. M. DENNIS	Freehold	1 year	
HENRY W. YOUNG	Afton	2 years	Morris County Board.
WM. F. ELY	Madison	1 year	
CHAS. M. RORER	Cassville	2 years	Ocean County Board.
M. G. POHL	Toms River	1 year	
EDWIN L. BORTON	Salem	2 years	Salem County Board.
EMPSON ATKINSON	Woodstown	1 year	
J. S. HOAGLAND	Harlingen	2 years	Somerset County Board.
JOSEPH FITZGA	Somerville	1 year	
THOMAS ARMSTRONG	Deckertown	2 years	Sussex County Board.
A. J. MCBRIDE	Unionville	1 year	
DENNIS C. CRANE	Westfield	2 years	Union County Board.
OGDEN WOODRUFF	Elizabeth	1 year	
ALBERT SILVERTON	Delaware	2 years	Warren County Board.
WM. O. WARD	Hainesburg	1 year	



7. 3. 2. 8. 1. 5. 4. 6.

Executive Committee of the New Jersey State Board of Agriculture.

1. Edward Burrough, President.
2. Prof. E. B. Voorhees, Vice President.
3. Franklin Dye, Secretary.
4. D. D. Denise, Treasurer.
5. T. F. D. Baker.
6. Wm. R. Lippincott.
7. H. F. Bodine.
8. Morris Bacon.

EXECUTIVE COMMITTEE'S REPORT.

To the New Jersey State Board of Agriculture:

The annual meetings of the State Board of Agriculture with their reports and records have become a sort of gauge for the State, on which is recorded the condition of agriculture from year to year. That the agriculture of the State is improving is manifest. Not that every farmer or every neighbornood is awake to the necessities of new demands, but many are. They realize that full prosperity cannot come to this industry unless it is conducted on the most approved methods of business management and intelligence. Where such is the case, results are full of encouragement. Such farmers lay everything that can be of use to them under tribute to their business. From such examples the possibilities of agriculture should be estimated, and not from that portion which is managed according to non-progressive ideas.

COLUMBIAN EXPOSITION.

Your Executive Committee have endeavored to advance the interests committed to their care in all respects so far as it was possible for them to do. Meetings have been held throughout the year, some of which were made necessary by the appointment of the State Board of Agriculture as the agent, through its Executive Committee, to collect, set up and maintain the agricultural and horticultural exhibits of the State at the Columbian Exposition next year. This work your committee agreed to assume, and the President of this Board was appointed to take charge of the matter conditionally, with such co-operation on the part of the committee as might seem to be needful. This work has been set in motion and has attained all the progress it has been possible to secure within the limited time at our command; for it must be borne in mind that the State Commission did not formally request the Board to assume this work until June 15th. Much remains to

be done, and we bespeak the co-operation of our farmers and fruit-growers throughout the State in securing for the exhibit such a display as shall do credit to the producers and to the State. The amount of money, however, set apart by the State Commission with which to procure, transport, set up and maintain the exhibit is entirely inadequate. Our distance from Chicago will necessarily increase the total expense. Application will be made to the Legislature for a sufficient sum to carry this enterprise through successfully, and your earnest co-operation and support is asked for this measure, for we had better not enter the field than to make an exhibit that will not do justice to our State.

STATE HORTICULTURAL SOCIETY.

The State Horticultural Society maintains its organization and is doing effective work in behalf of this important interest. It should be borne in mind that horticulture is a very important branch of our State industries, and one that should receive the cordial support of all fruit-growers in our State. When possible it would be a good thing to send delegates to the annual meeting of this Society from the County Boards of Agriculture. Such delegates could report back to their respective counties the proceedings of the meeting with much profit.

STATE POULTRY ASSOCIATION.

The State Poultry Association encountered some obstacles to its advancement soon after its organization which it has not, as yet, entirely overcome. The men now composing the Association are earnest and capable, and they evince a spirit of progress indicative of success. To become of general benefit the Association will need to direct its attention to the improvement in poultry-raising on the farm, as well as to the improvement of breeds along the fanciers' lines. Our poultry product is of immense value, and this is true of its professional branch and also as an adjunct to general farming. In the latter sense it is managed mainly by farmers' wives and daughters, and quite often from this source, through their efficiency, the profits of the farm are increased, as well as deficiencies from other crops made up.

AGRICULTURAL FAIRS IN NEW JERSEY.

Members of the Executive Committee visited a number of exhibitions throughout the State during the past season, with the double purpose of comparing the products of the year 1892 with those of 1891, and also to secure for the Chicago exhibit such articles of merit as could be preserved until the opening next spring. As to our State agricultural exhibitions, the displays made by farmers, farmers' wives and daughters were generally meritorious, and some of them of a high order. This is as it should be. Farmers should press to the front both as stockholders, exhibitors and managers of these societies, and aid in making them a proper place of resort by all respectable people, and as annually indicating the progress made in the several lines of agriculture, and of poultry and stock production. A good agricultural fair, properly conducted, is both entertaining and instructive, and the effort should be so to run them as to make the influence emanating therefrom elevating and helpful. The management of any of these societies but puts them in the way of ultimate financial ruin, when they cater to the depraved tastes of those whose native element is the pool-room, the gambling table and the whiskey shop, and who have no regard for the Sabbath, morality, or religion. We notice a falling off in some directions of agricultural machinery from the usual exhibits in this line. We believe this to be a mistake both on the part of manufacturers and of the Directors of our fairs. Plenty of machinery, and especially *machinery in motion*, always attracts sight-seers from the city as well as from the country, and for the manufacturer it affords an opportunity for advertising not offered in any other way.

We noticed at the Inter-State Fair, at Trenton, a steam plow exhibited by B. Gill & Sons, and operated each day of the Fair. It attracted many beholders. The character of its work seemed satisfactory, although the ground plowed was both hard and stony.

FREE MAIL DELIVERY.

We believe free mail delivery for rural residents, where the conditions of close population and good roads exist, has passed beyond the experimental stage. Let this Board at this annual meeting take such

action on the subject as will encourage the incoming administration at Washington to extend it as rapidly as possible among the farmers of this State.

CROP BULLETINS.

As the Legislature of 1892 appropriated $1,000 to maintain a State Weather Service, and as a part of the work of the Bureau is the weekly publication during the growing season, of a report on the conditions of the crops and the weather, but one or two such bulletins were published by our Secretary.

Whether any such bulletins shall be issued by the Secretary in the future will depend upon the importance of the information to be made known.

The New Jersey Weather Service, under the efficient management of E. W. McGann, Director, issued during the growing season of 1892, from the Central Office, State Experiment Station, at New Brunswick, N. J., a Weekly Crop Bulletin, each issue of which contained a brief summary of the climatic conditions, state of and progress made in crops, and also detailed reports from eighty (80) correspondents, representing the various districts of each of the counties of the State. Nineteen (19) bulletins were issued during the season, aggregating in number 28,500 copies. A copy of each bulletin was also furnished to the press of the State, the majority of which published the summary and extracts from the reports of nearby correspondents.

There is also a bulletin published each month during the year, which contains full and very valuable climatic data from fifty-seven (57) meteorological stations; 6,000 of these bulletins were issued during the year 1892.

The forecasts for weather and temperature are telegraphed daily to fifty (50) stations, and upon receipt of the telegrams, flags indicating the expected weather are displayed. These forecasts are also displayed, through the co-operation of the various railroads of the State, at each station.

Two hundred and seven (207) men are now daily engaged in performing gratuitous duties for this Service.

CROP YIELDS AND PRICES.

The year 1892 was not as productive as was 1891, but for most crops prices have been better. The yield being somewhat below an average good year has kept the markets freer from excessive supplies and stale products, as was the case during the abnormal harvests of 1891. As indicating to some extent the yields of the products named in the vicinity of Philadelphia and the prices received in that market, the following statements made by the member of the Executive Committee from Burlington county will be instructive:

The present year has been marked by an advance in the price of nearly every kind of perishable produce. The demand for fruit and berries kept the market pretty well cleared, and the growers received fair returns for anything of good quality. In some instances the fabulous prices of war times were obtained. Gooseberries sold at 10, 12 and 15 cents per quart in the wholesale market, and retailed as high as 20 and 24 cents. Currants sold at nearly the same rate, and blackberries retailed at 15 cents. With one or two exceptions tomatoes sold well during the whole season, and there was scarcely a glut in the market. Apples and pears brought encouraging prices to the grower, and the Keiffer came last as the crowning glory—golden in color and golden in price.

Cantaloupes, cabbage, sweet and white potatoes have kept in nearly parallel lines with fruits and berries, while poultry and dairy products have shown appreciable advances. Hogs have gone up in price beyond the farmers' most sanguine expectations, while hay is higher than last year. Wheat seems to be the only product in which there is no money.

A market man declared that for quick sales and fair prices the season had been the most satisfactory in many years' experience. When we compare this year with the previous one, and think of the quantities of perishable produce that could not be consumed; of the fine fruits that spoiled on the hands of the growers or were sold at prices that hardly paid expenses, how gratifying is the comparison. It would be difficult to regulate the distribution of supplies, but it is very important for farmers to watch the demands of the market. When certain products sell very low for a number of years farmers are very apt to neglect their cultivation, and we often see these same products suddenly advance to a high price, because their supply has

become limited. It is a good idea to find what the farmers are generally planting, but you can often draw conclusions much to your benefit by what they are *not* planting. Two or three years of good prices for produce invariably advance the price of land and increase the demand for farm property. The growing towns and cities require larger supplies, and the increased demand for milk has advanced the price of all other products connected with the herd; fat calves, particularly, have sold well throughout the season. The admission of American pork into France and Germany will be of great advantage to the Western farmer, and, taking a fair view of the situation, the farmer's prospects are not unfavorable, and the time may not be far distant when the capitalist will be able to realize a fair interest for money invested in farm property—for the general impression prevails that the bottom has been reached—and when farmers find they are beginning to ascend, and moving slowly ahead instead of settling back, you may look for a new era of prosperity, and peace and contentment will again reign in the rural homes of our land.

NEW PRODUCTS.

The Secretary calls attention to the great decrease in cereal crops in this State. This suggests the necessity of finding some profitable substitute. With this object in view some members of the Executive Committee visited a plot of sugar beets at Winslow, Atlantic county, grown on the premises of S. G. Rosengarten, Esq., to determine whether they can be grown, and if so with what per cent. of sugar to make them a profitable crop. Specimens of the Winslow product were analyzed by Prof. Voorhees, which yielded of sugar over 12 per cent. This is an encouragement to further experiment. If future crops should show a like result, it is possible that, with suitable encouragement by the general government, the beet-sugar industry may become a profitable branch of New Jersey agriculture, and all the more as this State lies within the sugar-beet area of the United States. Furthermore, this may be one of the crops suitable to south and central New Jersey lands that will bring them into profit agriculturally.

EXPERIMENT STATION.

The work of the Experiment Station has been pursued in lines of direct value to the farmers of the State. The investigations as to the best methods of buying and using manures and fertilizing materials are of great use in the purchase of supplies, while the analysis and publication of commercial brands prevent the sale of fraudulent products. The study of the various commercial feeds in reference to the preparation of economical rations, has also stimulated our dairy industry.

The study of the diseases of plants and injurious insects, and their prevention and extermination, has materially improved the condition of small-fruit farming and market-gardening. The value of these investigations pursued at the Station, and their direct usefulness in the practical every-day work of the farm, are now appreciated by the farmers in all sections of the State.

AGRICULTURAL EDUCATION.

Realizing to some extent the necessities of the case, both for the present and the future agriculture of the State, in the matter of education along agricultural lines, the State Board has, through its Executive Committee, endeavored to meet the existing demands. To do this they have sought the co-operation of the State Agricultural College and of the State Normal School. Both these institutions have cordially responded, and it remains for farmers themselves to say whether they will avail themselves of the new advantages. Addresses on agricultural subjects at County Boards and Farmers' Institutes, courses of lectures through the University Extension plan, and the short course on agriculture, are present advantages offered by the State Agricultural College. The management of the State Normal School has introduced lectures on agricultural science in Teachers' Institutes, and in the future more teachers will be qualified to impart instruction in the first principles of agriculture in country district schools.

A united effort by the farmers of a given neighborhood would enable them at a nominal expense to secure the services of such teachers. By this course foundations of agricultural education would

be laid early, and the thought of country boys directed to the study of agriculture instead of some other business, as is now so frequently the case.

And the "Short Course" at the Agricultural College is worthy of permanent patronage, affording, as it does, an opportunity for the young men of the farm to secure a comprehensive outline of agricultural science which can be put to immediate use.

This overture from the Faculty of the college should not be allowed to fail for want of co-operation by the farmers of the State.

ROAD IMPROVEMENT.

The growing interest manifested in the subject of road improvement led the Executive Committee to indorse the proposition of the Secretary to hold a State convention to consider this important question. The State Road Convention was held under the auspices of the State Board of Agriculture at the close of the nineteenth annual meeting. The interest manifested at that meeting shows that our people are becoming aroused to the necessity of road improvement. Since that convention, and to some extent as a result of it, the agitation of the subject has become well-nigh national. In many of the States steps have been taken to secure legislation helpful to road improvement, and, in some, candidates for election have been required to indorse in advance such legislation, in order to secure the support of their constituents.

Progress in (permanent) road-building, under the "State Aid" law has up to this date been slow. But a number of counties are moving in the matter, details of which movement will be presented, no doubt, by the President of the Board, who has the matter in charge. As a means of general enlightenment the committee thought it wise to issue a few hundred copies, in pamphlet, of the Road laws of this State which were considered of the most importance, and they are among the later enactments. Two of these at least—the Township Road act, chapter 84, and the State Aid act, chapters 201 and 215—are the outcome of the State Board of Agriculture through its Road Committee. The demand for the Road laws of New Jersey increases with the knowledge of our advanced road legislation, both within the State and throughout the country, and it is an evidence both of the wisdom of our laws and of the general awakening. The farmers of this

State may well take a deep and abiding interest in the subject of road improvement, for they are compelled to use the public highway for all purposes of travel and for transportation much more than manufacturers. The business of the latter is usually carried on near railroads or paved streets; not so the business of the farmer.

COUNTY BOARD AND INSTITUTE WORK.

From the report of the Secretary it will be seen that the County Boards are advancing. Many of them are making substantial progress in securing and diffusing intelligence connected with agricultural matters, both by the County Boards and by means of Farmers' Institutes. The Executive Committee will do all in their power to aid the officers of these organizations in the work committed to their care by the farmers of the several counties. The committee would urge County Secretaries and local committees, when arranging for meetings of the County Board or for Farmers' Institutes, in which they desire the assistance of the Secretary of the State Board, to confer with him long enough beforehand to enable him to secure desirable speakers and to prevent a duplication of meetings on the same date.

We coincide with the recommendation of the Secretary on this subject.

ORDER OF BUSINESS.

In arranging for the twentieth annual meeting we have endeavored to present such subjects as seem to be of immediate general importance. Destruction of property by lightning having been so prevalent during the past year, we decided, at the suggestion of a prominent farmer, to have the subject treated from the scientific standpoint, with the view of determining, if possible, the utility or non-utility of rods upon farm buildings.

The bird question as presented last year covered a broad field. Our desire is that at this meeting the subject may be confined more especially to our own State and territory immediately surrounding us, and to ascertain whether additional legislation may be needed for the preservation of our useful feathered friends.

The dairy question and the subject of fertilizers for farm crops are always important, and our desire is that they be fully discussed by the Board.

The increase in insect pests which are making havoc with so many crops—vegetable, fruit and cereal—and the rapidity with which fungous and other diseases of plants and fruits are spreading, impressed us with the importance of having these subjects presented so that our farmers may have the benefit of the latest investigations on these subjects. As to the matter of milk control, referred to in the Secretary's Report, so important do we consider this question that we have invited the State Dairy Commissioner to give us the results of his investigations.

Matters connected with road improvement and road legislation may all be presented at the session devoted to this subject. And it is our desire that the farmers of the State shall take an active part in such discussion.

We trust the addresses and discussion at this annual meeting, and the decisions of the Board, will all tend to place our business on a higher and more profitable plane, and tend to increase the respect for this organization and the class it represents, throughout the State.

REPORT OF COMMITTEE ON COUNTY BOARD REPORTS.

To the President and Members of the State Board of Agriculture:

Your Committee on County Board Reports, in discharge of the duty assigned them, find that one new Board has been organized during the year, leaving but four unorganized counties in the State, one of which (Hudson) we do not claim as an agricultural county.

It is very gratifying to see so many counties of our State swinging into line and swelling the ranks in the farmers' grand march toward a higher, more intelligent and progressive husbandry.

The reports are not all in as yet, but those received from the different organizations throughout the State indicate a generally-prosperous and hopeful condition, showing that our great and varied industry is fully abreast with the times, and that there is an encouraging progress all along the lines of improvement and development.

We are glad to report that our County Boards, so far as heard from, are increasing in interest and efficiency, that many of them are holding Farmers' Institutes and deriving great benefit from the investigations and scientific researches of the efficient and able corps of Professors and teachers of our Agricultural College and Experiment Station, and our only regret is that so many of our farmers do not avail themselves of the great advantages and privileges offered them through this channel, the practical results of which are becoming more apparent to all intelligent and thoughtful farmers and fruit-growers throughout our State.

This feature in connection with our County Boards cannot be too thoroughly urged as tending to greatly enhance their value to the farmer, making these meetings so interesting and instructive that no enterprising, progressive farmer can afford to absent himself from them.

The experience of those who have successfully contended with our insect pests, and the fungi and other diseases which devastate our fields, orchards and vineyards, being in itself sufficient to repay all the labor and inconvenience of attending the meetings, we would suggest that the plan of holding Institutes be given a trial in all those counties where there seems to be a lack of interest in the County Boards, believing that it will result in greatly strengthening those organizations and in adding to their efficiency, as well as to that of the State Board, which depends upon them for its continued growth and prosperity.

ATLANTIC COUNTY.

Atlantic sends a very complete and comprehensive report, and, including the statistical report, will prove very interesting. Your committee cannot find that they have held more than one meeting during the year, but we find them alive to the necessity of more local organizations, in order to have a more thorough dissemination of agricultural knowledge and more effective co-operation in the purchase of farm supplies.

The county reports a diminished yield of early farm products the past year in consequence of unfavorable weather, the only crop that found the weather favorable being the grape.

The county does not produce enough grain to supply the home demand for feeding purposes, and the farmers are turning their attention to the small fruits and vegetables for profit; being near Atlantic City, and the freight rates to that point being low, they find it a much better market than Philadelphia.

The farmers insist on having laws enacted and enforced that will afford better protection to insectivorous birds, and a law enacted that will check the spread of injurious insects, by compelling negligent farmers to destroy them more effectually.

They report the county as remarkably free from the contagious diseases of animals, and recommend the county as a desirable place of residence on account of its general healthfulness and the good returns attending a thorough and intelligent cultivation of the soil.

BURLINGTON COUNTY.

Burlington county reports but one meeting held during the year. Interest in the organization is on the increase, as evidenced by large attendance and detailed inquiries into subjects presented. Condition of the agriculturalist improved, as the reward for labor is enhanced over previous years through advanced prices.

Stock comparatively free from disease. Prices of pork products advanced 40 per cent. Milk interest rapidly increasing, also poultry-growing; making not only a market for the grain product of the farm, but a margin in the consumption of the coarser market feeds.

Vegetable crop medium in yield, but made profitable by good prices; same of the fruit crop. Suggestion as to irrigation worthy of consideration by the State Board. The insect family has a new recruit in the shape of a grain moth, and advise early threshing. Scarlet clover is receiving attention and experimental reports are ready for State Board. Would advise the holding of three or four meetings during the year.

CAMDEN COUNTY.

Camden county held two meetings during the year. At a special meeting held November 11th, 1892, the wheat moth and its ravages claimed attention. A general disposition was manifest to learn more of the habits of this destructive insect whose ravages have already caused much loss to the farmers of that county.

The most successful method of growing clover was considered, and it was generally conceded to grow clover successfully it would be necessary to abandon the general plan of sowing with winter grain, as astonishing and successful yields had been the result of sowing after a crop of early potatoes had been grown.

At annual meeting was entertained by President Burrough on the organization of the State Board of Agriculture. Poultry-raising with the incubator and brooder was considered, and the statement made that at this time the business is of doubtful profit. An address was delivered referring to the necessity of agricultural chemistry being taught in our public schools for the benefit of the farmer. President Burrough also, by request, addressed the meeting on the road agitation.

GLOUCESTER COUNTY.

Gloucester county held five meetings during the past year, four regular and one special, also held a Farmers' Institute, all of which were well attended, especially the Institute, which was full of interest and instructive. The questions "How can milk producers best maintain the fertility of their soil?" and "Benefits of the milk protective association to milk producers," were especially interesting because they come close home to the farmer; also "Noxious weeds and how to exterminate them" was ably discussed.

Among the questions discoursed upon at our County Board meeting were marketing our produce, expenses of our Freeholders in building unnecessary and expensive bridges; the good results of spraying for leaf-blight as well as fruit; experiments with home-mixed fertilizers, which is giving our farmers such good results, &c. The sweet potato crop, so extensively grown in this county, was unusually large with prices ruling high. The early tomato crop was much injured by the tomato worm, causing a heavy loss by their rotting, yet for the most part the crop paid well, as the price was good. Wheat-growing is on the decline, and the sowing of clover in among melons and after early potatoes is growing in practice, which generally insures a good crop of hay the next season. There is a general disposition with most farmers to take advantage of opportunities to get best results in farming.

HUNTERDON COUNTY.

Hunterdon County Board reports more interest in farmers' organizations than formerly. Have held three meetings during the year and also a farmers' picnic under the auspices of the Farmers' Alliance, at which several prominent speakers from this and other States had the privilege of addressing about five thousand people, and the first farmers' picnic held in the county was pronounced a grand success.

The county reports the fruit crop below the average in quantity but the quality, especially the peaches, considerably above the average. The latter crop aggregating 792,805 baskets, netting on the average sixty-three cents per basket, bringing into the county the handsome sum of $515,000 from this one source alone.

The county reports the crop of corn, oats, hay, potatoes and tomatoes much below an average in consequence of severe drought. The dairying business is receiving much more attention than for some years past, one new creamery being established and the old ones revived, and the business greatly increased, bringing many thousands of dollars into the hands of the farmers from this source and at the same time greatly enhancing the productiveness of their farms. This report is very able and comprehensive and is deserving of a much larger space in the report of this committee.

An able paper on "County Roads," by E. D. Leidy, M.D., is appended to the report and is well worthy of perusal by all thoughtful and intelligent farmers.

MERCER COUNTY.

Mercer county has held several meetings. Annual meeting very largely attended. Babcock milk-testing machine and the centrifugal separator exhibited. Addresses have been made on important subjects connected with the agriculture of the county by practical men and discussions followed each address. Emphasizes the value and importance of organization, giving the history of Princeton Agricultural Association in detail as of special interest. States that the average agriculture of the county is above the average for the State, but calls attention to some defects, as weed crops, hedge rows and unsightly roadways, as prevailing in some neighborhoods, which, while they are unsightly, also aid in the propagation and spread of foul seeds, fungus germs, &c.

While crops were not as large as last year, prices have been better for some products. A gradual decrease in acreage of cereals, which in wheat amounts to 797 acres; but the fact of an increased yield from the smaller area is given of 12,276 bushels, or 13.2 bushels per acre in 1879 and 16.2 in 1889.

The road question was discussed. While the farmers are in favor of good roads they do not favor contracting a large county debt for the construction of a few expensive roads in favored localities. Let the improvement be general as far as possible and the increased expenditures very gradual.

A new and flourishing industry has been established in the northeastern portion of the county during the year, by the organization of the Hopewell Valley Canning Company, which has put up

over 200,000 cans of tomatoes, and disposed of them at very satisfactory prices. The plant is owned almost exclusively by the farmers who produce the fruit, and promises to be a very thriving industry in that part of the county.

The Hopewell Creamery, which organization has been conducted by outside parties, has recently been purchased by two gentlemen who are residents of the place, and the business will be revived and extended so as to be a source of profit to the farmers and add greatly to the varied industries of that beautiful and highly-favored locality. Finally, the county has within its bounds some of the largest and best-endowed schools, colleges and seminaries in the country, and the railroad and market facilities are second to none in the State. The farmers are encouraged and hopeful, and are making the best of the situation.

MIDDLESEX COUNTY.

Middlesex county held four meetings and one Institute, with usual interest manifest. They are expecting to hold an Institute during the winter. The advantages of Farmers' Institutes, better roads, and free postal delivery claimed the attention of first meeting; at another, President Burrough spoke of the Columbian Exposition, and Prof. J. B. Smith encouraged the State Board to have some legislation that would encourage the investigation of insect injury. At another meeting, "Clover as a fertilizer" was a special subject. The present season almost all crops have suffered from drought, but he deficiency in crop has largely been supplied by generally good prices.

The fruit crop generally short, excepting pears. Strawberries an abundant crop; raspberries injured by blight, and blackberries by rust. Wheat, 90 per cent. of a crop—white potatoes are receiving more, and wheat and oats less attention than formerly.

Farmers are more interested in farmers' organizations than formerly, but a close study of the most approved methods of farming is necessary to accomplish the desired results.

MONMOUTH COUNTY.

Monmouth county sends greetings to the State Board with wishes for a prosperous and happy New Year. Four meetings have been

held during the year, each freighted with good results. Road question discussed at length, but no definite action reached. Brighter things in store for us, but would make haste slowly. Cause of depression in agriculture explained by L. F. Schenck. Copies of addresses asked for by Governor Abbett, Secretaries Blaine and Rusk. Best methods of disposing of farm products are being considered. Farmers of Monmouth boast not of the good things, but they wear a cheery countenance. Results of year's work satisfactory. The course of lectures by Prof. Voorhees were instructive and much appreciated. Farmers of the county are beginning to recognize the benefits of the experimental work done by the Station, and heartily commend the same, and also the helpful influence of the State Board which is being extended into the counties.

MORRIS COUNTY.

Your committee cannot learn from the report whether Morris has held any meetings during the year, except for the election of officers at their annual meeting in December.

We are inclined to the belief that they are not very enthusiastic in the support of their County Board, and we would recommend in their case, as in some others, the holding of a Farmers' Institute to revive the interest and increase the attendance and efficiency of their organization.

SALEM COUNTY.

Salem county held four meetings during the year. Attendance indicative of progress. Speakers presented their respective subjects with force and clearness.

The present status of agriculture about on a par with former years. Stock in good condition. Milk industry on the increase. Mixed husbandry recommended as most profitable. Our motto being "Always have something to sell." The new-comer, "the grain moth," has also infested this county. Road question discussed with special interest. Farmers are looking to State Board for assistance in this as in other matters.

SUSSEX COUNTY.

Sussex sends a lengthy and interesting report. Their seventh annual meeting largely attended at all the sessions, and a demand for more meetings in different portions of the county. A committee was appointed to take charge of such meetings the present winter. The farmers generally eager to learn the more improved methods now in vogue, which tend to increase their incomes.

The county reports an increasing tendency to abandon milk production for market, and return to a more diversified system, claiming that in marketing their milk they have been sending the wealth of their soil to the city and have not received an adequate return, and the fertility of their farms is being exhausted. They report an increasing interest in fruit production and truck-farming. Many thousand peach trees have been planted; dealers are looking to Sussex as a future source of supply. Although the county is remarkably well adapted to the production of cereals, they find them unprofitable, owing to the Western competition.

Altogether the past year has been one of steady progress toward more improved agriculture and they recommend that the farmers become manufacturers in their own line of business, and grow the best products and put them on the market in the most attractive and salable condition.

SOMERSET COUNTY.

Somerset County Board is yet in its infancy, having organized during last year. Report four meetings held, with increased attendance at each succeeding meeting. Good subjects were chosen for discussion and proper persons selected to open same. "Organization," in order that farmers may be better able to attend to their own business and not trust it to others. "Better roads," prepared by Mr. McBride, that farmers can better husband the time in transportation, thus allowing more space for the cultivation of the business arm of their industry. "Manures," by Professor Voorhees; through his happy style and methodical way of putting things his hearers had something to carry home with them. "Good seeds," introduced by Vice President D. C. Voorhees, emphasizing the necessity of planting only well-developed seeds. Last but not least, "Essentials to success

in farming," by Mr. Ketcham. This address fully set forth the fact that its author was master of the situation, as shown by the fruits of years of toil. All the foregoing topics were discussed by those present, in part, and the year's work closed with good results.

UNION COUNTY.

The Union County Board has held seven afternoon meetings during the year, and were addressed by Dr. Halsted and Prof. Voorhees, of the Experiment Station, and also by several practical farmers and fruit-growers from different portions of the State. In addition to the above meetings, one all-day session was held, at which the Board introduced the attractive feature of furnishing a dinner for all present. This could doubtless be adopted profitably by other Boards where there is a lack of interest and small attendance.

The county reports good crops. Corn, 80; wheat, 85; rye, 90; oats, 85; hay, 85; apples, 40; peaches, 40; and all small fruits, 100. Prices were satisfactory, and the farmers generally prosperous.

Union county agitated the subject of better roads several years ago, and now report 40 miles of well-graded roads, 36 feet wide, with 16 feet of Telford pavement in the center, giving a hard, smooth surface at all seasons of the year. In addition to this, they have half of the by-roads of the county improved with a coating of broken stone.

An interesting paper on relics and mementos of the past is attached to the report, which your committee recommend to be embodied in the report as of historical value in this memorial year.

Mementos of the Past.

While growing towns and villages and speculators in real estate are removing old-fashioned houses and outbuildings, orchards and well-cultivated fields, there still remain a few places where the descendants of the old residents live, and preserve with jealous care the mementos of the past. A visit to some of these lately, in the interest of the Chicago Fair, afforded the writer a good opportunity of seeing some of the old relics. Furniture with dragon feet, grandfather clocks, spinning-wheels, flax-brakes, fanning-mills, &c., &c., all over one hundred years old, some over two hundred. There was one article of special interest—an old wood-board plow, made and used by John

Miller in 1725, fifty years before the Revolution. It is still in a fair state of preservation. Mr. Miller came from Scotland in the year 1700 and bought a tract of land of Governor Carteret near what is now Cranford. Being by trade a blacksmith, in connection with farming, he made plows and sold them to his neighbors. Mr. B. L. Miller, a direct descendant, is the present owner of the homestead and plow. The shape and construction of the plow is very much after the pattern of those made to-day, except the wooden mould-board and land-side; these have a strip of iron on the outer edge, where the most wear comes. The share is of hammered iron and steel; while it is rather heavy to handle, it no doubt would, with a strong team of oxen, do pretty good rooting. A son of John Miller, a sea captain, also has the reputation of being the first to introduce broom-corn into this country. He brought the seed from Africa, his brother planted it, and thinking it would make a better broom than the common splint broom then in use, made some up, round, and sold them in New York. It grew to be quite a trade with him. While looking backward, we might say, our county, in the dark days of the Revolution, furnished many soldiers who fought bravely for our liberties. This section suffered severely. The enemy camped on Staten Island; they frequently made raids across the Sound and carried back the stock and crops of our farmers. In one effort of the British, with their hired Hessians, to reach Morristown, the headquarters of Washington, the farmers of Connecticut Farms successfully drove them back. It is related of the patriotic minister of that place that, finding his comrades out of wadding for ramming down the powder and bullets, went into the old stone church and got a number of Watts' singing-books; coming out he tore out the leaves, and with earnestness said, "Now, boys, give them Watts." Among those killed in cold blood was his wife. As in our day there seems to be those living among us who seem to be indifferent to the public welfare, so then there were tories who aided the enemy. Few of us realize and appreciate the sufferings, the trials, the hardships of those who struggled for our independence.

PRESIDENT'S ADDRESS.

GENTLEMEN—The wheel of time has made another revolution, and notwithstanding the advent of the comet we are still upon "terra firma." While our condition may not be as prosperous as we could wish, yet I know of no farming community, taken as a whole, that is more prosperous than the farmers of New Jersey. The intelligent manner in which we are feeding and cultivating the soil, and our close proximity to the great markets of the country, continue to keep our agricultural lands at a higher value per acre than those of any other State in the Union.

It is not my intention to detain you by any detailed statement on this matter; the reports of the Secretary and your Executive Committee have so fully covered the ground that there is but little left for me to enlarge upon, even had I the desire to do so.

The duties of the President of your Board during the past year have been the most arduous and exacting of any year in the history of the Board, and should these duties continue to increase it will soon be necessary to provide this officer with a clerk in order to meet the demands upon his time and keep up the correspondence incident thereto.

Soon after the adjournment of the last annual session, the Legislative Committee were directed to enter upon the duties that had been assigned them by the Board, and their report will no doubt convince you of the wisdom of their selection. I have no hesitation in saying that, backed by the influence of Governor Abbett, they were not only very successful in securing the legislation asked for, but also in preventing the passage of several obnoxious laws, and I recommend their continuance for another year.

Among the laws secured was a supplement to the law of 1891, whereby the duties conferred upon the Commissioner of Agriculture, under and by the provisions of the Road law, were conferred upon the President of the State Board of Agriculture, thus making the law giving State aid to public roads, effective. As soon as the supple-

ment became a law there was a general demand from the friends of the measure, in various sections of the State, to take advantage of the inducements offered by the law, to have improved roadways constructed in their several localities. Their demands led to a consultation with Governor Abbett as to the construction of the law regarding the most important points, and the methods to be employed in its enforcement.

The result was to greatly increase the labors and responsibilties of the President of the Board, the details of which I shall lay before you later in the session; these duties soon engaged my entire time and kept me busily employed. On June 1st a communication was received from the New Jersey Columbian World's Fair Commissioners, requesting the State Board of Agriculture to assume the duties of collecting and setting up the agricultural and horticultural exhibits of the State at the forthcoming exposition. This request, coming at such a late day, when the season was half over, and after the Board had abandoned the idea of having anything to do with the matter, and the Secretary had been granted a leave of absence to visit the Pacific Coast, and was thousands of miles away, and the Vice President had gone to Europe, and the members of the Executive Committee busy with their harvests, rendered my position somewhat embarrassing. An answer had to be given without delay; the members of the committee who were accessible were immediately summoned for a conference with the Commissioners. They responded with their usual promptness, and after a lengthy interview, and in consideration of the views of the Board as expressed at the annual meeting, they *reluctantly* consented to assume the responsibility, and instructed the President to take entire charge of the work of collecting and arranging the exhibits, both in the Agricultural and Horticultural Departments. I was, accordingly, compelled to enter upon the work at once, and whether we shall be able to meet your expectations or not, I beg you to remember that the season was half gone, and that not a single item had been specially prepared; consequently, what our exhibit represents is only such as can be acquired, at any time, under similar circumstances. Yet, it embraces an interesting and varied list of crops that are grown in New Jersey almost any season, many of which are profitable, and others no doubt could be made so, under favorable circumstances. The display in the Agricultural Department alone embraces already over four hundred separate exhibits, and the work of collecting is not yet completed.

The constant attention necessary to the fulfillment of these extra duties, prevented my giving as close attention to the work of the Board as has hitherto been my custom, and the work has fallen almost entirely upon the Secretary and the Executive Committee. The result of their labors has been manifested in the discharge of the duties devolved upon them. And it affords me great pleasure to acknowledge their valued and efficient services. I could consistently close my remarks here, were it not that there are a few matters to which I feel called upon to direct your attention.

IMPORT DUTIES.

Since our last meeting the voice of the people has been emphatically expressed upon National issues, and the policy of the incoming Congress has been announced to be that of repealing or reducing import duties on the necessaries of life, and, as the production of the necessaries is largely a part of your business, I deem it my duty to direct your attention to a few prominent features that are intimately connected with your business. The year 1886 is well remembered as a year of unprecedented yield of the hay crop throughout the country, and the Board of Agriculture directed the Secretary to correspond with the Secretaries of similar Boards in other States, and ascertain whether there was a shortage of the grass crop in any section that would be likely to afford a market for our surplus product. The universal response was that the crop was full, and our efforts to find a market for our hay was fruitless. Yet, notwithstanding this immense yield, there was imported into the United States, 92,118 tons of hay, valued at $1,035,533. This importation was under a duty of $2 per ton. In 1887 over 2,000,000 bushels of potatoes, from Ireland, Scotland and other countries, were imported, most of which were brought as ballast, under a duty of 15 cents per bushel, and retailed (after transportation from New York) in Washington City at 45 cents per bushel. About the same time the cabbage crop of the country was a failure, and our markets were fully supplied with cabbage from Holland, upon which no duty whatever was collected. During this same year 16,092,583 dozens of eggs, also free of duty, valued at $2,173,454. The invading of our markets by such enormous amounts of foreign products induced your Board to take an active part in the formation of the new revenue laws, to secure some relief from such unwarranted competition. The result

was that duties on these products were increased—to $4 per ton on hay, $3 per hundred on cabbage, 25 cents per bushel on potatoes, and 5 cents per dozen on eggs, and so on throughout the catalogue of farm products, as the following list will enable you to ascertain:

TABLE OF DUTIES ON FARM PRODUCTS.

ARTICLES.	OLD DUTY.	NEW DUTY.
Barley	10 cents per bushel	30 cents per bushel.
Buckwheat	10 per cent	15 cents per bushel.
Corn and oats	10 cents per bushel	15 cents per bushel.
Wheat	20 cents per bushel	25 cents per bushel.
Hops	8 cents per lb	15 cents per lb.
Butter and cheese	4 cents per lb	6 cents per lb.
Hay	$2 per ton	$4 per ton.
Straw	Free	30 per cent.
Eggs	Free	5 cents per dozen.
Broom corn	Free	$8 per ton.
Peas and beans	10 per cent	40 cents per bushel.
Nursery stock	Free	20 per cent.
Apples, fresh	Free	25 cents per bushel.
Apples, dry	Free	2 cents per pound.
Bacon and hams	2 cents per lb	5 cents per pound.
Beef and pork	1 cent per lb	2 cents per pound.
Mutton	10 per cent	2 cents per pound.
Poultry, live	Free	3 cents per pound.
Poultry, dressed	10 per cent	5 cents per pound.
Horses worth over $150	20 per cent	30 per cent.
Horses, others, and mules	20 per cent	$30 per head.
Cattle, yearlings	20 per cent	$2 per head.
Cattle over a year	20 per cent	$10 per head.
Hogs	20 per cent	$1.50 per head.
Sheep, yearlings	20 per cent	75 cents per head.
Sheep over a year	20 per cent	$1.50 per head.
Milk	10 per cent	5 cents per gallon.
Onions	10 per cent	40 cents per bushel.
Potatoes	15 cents per bushel	25 cents per bushel.
Other vegetables	10 per cent	25 per cent.
Tobacco, not stemmed	75 cents per lb	$2 per lb.
Tobacco, stemmed	$1 per pound	$2.75 per lb.
Fruit brandy	$2 per gallon	$2.50 per gallon.
Flax, hackled	$40 per ton	$67.20 per ton.
Hemp, hackled	$25 per ton	$50 per ton.
Wool:		
Class 1—		
Unwashed	10 and 12 cents per lb	11 cents per lb.
Washed	20 and 24 cents per lb	22 cents per lb.
Scoured	30 and 36 cents per lb	33 cents per lb.
Class 2—		
Unwashed	10 and 12 cents per lb	12 cents per lb.
Scoured	30 and 36 cents per lb	36 cents per lb.
Class 3, valued at	12 cents or less, 2½ cents per lb	13 cents or less, 32 p. c.
Class 3, valued at	Over 12 cents, 5 cents per lb	Over 13 cents, 50 p. c.
Bounty on American sugar	None	1¾ and 2 cents per lb.

Under the foregoing schedule of duties on farm products, the first calendar year, 1891, has shown a decrease in the importation of farm products of $26,570,493 below the importation of 1890; and besides putting a handsome sum of money into the treasury of the United States, it has stimulated prices in all farm products, except those that are absolutely crushed by overproduction.

Whether the increase in these duties has been of any benefit to the farmers of New Jersey you are fully competent to judge. And should you decide in the affirmative, I would urge you to be prompt and emphatic in the expression of your wishes on these matters. Had the present policy of protection to American industries prevailed at the last election I should unhesitatingly recommended you to have urged that a duty be placed upon bananas and other foreign fruits that have been instrumental in lessening the demand for our small fruits and other horticultural products, and any attempt to restrict the exportation of hog products should receive from you a prompt and emphatic protest. There are other matters now before Congress, and others to be introduced, that will demand your attention. I need only to remind you of the irrigation scheme of the West, and that the "Pure Food" and "Anti-Option" bills have not yet become laws, *and the free mail delivery* will demand your persistent efforts to secure its advantages; it is something you have a right to *demand*, and I urge you to continue the agitation until success crowns your efforts.

EDUCATION.

The question of teaching agriculture in our public schools is attracting much attention, and the discussion on the subject last year has borne fruit. The teachers of our public schools are preparing to take hold of the subject, and the matter occupied considerable of their attention at the County Institutes. This has no doubt been brought about through the influence of the members of the Board as District Trustees, and I trust they will continue the agitation.

Immediately after the annual meeting in 1892, this matter was referred to a committee consisting of the President, Secretary and Prof. Voorhees for further study and investigation, and with particular instructions to secure and examine text-books suitable for public school use. The committee gave the subject a great deal of attention and reported as follows:

1. That, in their opinion, a general diffusion of an accurate knowledge of the principles which underlie agriculture, and their application in practice, depends very largely upon the introduction of such specific studies in the public schools.

2. That all of the text-books examined (10), while in many respects excellent and suitable for this work, are lacking in one important particular, viz., they do not instruct in the application of the sciences concerned in agriculture.

3. We find that in the State Normal School and in other high schools which furnish our teachers for the public schools, instruction is given in those branches of science concerned in agriculture, viz., chemistry, botany, geology, &c.

4. In view of the above and being assured of the hearty co-operation of the Professors in the State Agricultural College, the committee is of the opinion that the publishing of a text-book specially adapted to our conditions and capable of being readily used by the average public school instructor, to be entirely practicable; that the cause is worthy of the effort and that the project should have the co-operation of the Board.

In addition to the above report of the committee, publishers have been communicated with who are willing to publish the work on satisfactory terms. The cost of publication, however, is beyond our means, even had we the authority under our law to incur the expense. I therefore recommend that you take suitable action to induce the Legislature to make a special appropriation for the publication of the work and anything along the lines indicated in the report of the committee.

This work should be published by authority of the Legislature under the auspices of the State Board of Agriculture.

SWILL MILK.

The dairy business of the State is now probably our largest agricultural industry. Its growth and development within the last decade are surprising, and the numerous parasitic enterprises that have sprung up, tending to hamper and injure it, might have been expected. The demands of the retail dealers for fifty per cent. of the gross receipts is extravagant and unjust, and fully warrants the efforts of the producers to place this commodity in the market on a

more equitable basis. I fully agree with the Secretary in urging the dairymen of the upper portion of the State to organize protective associations and unite with the brethren in the southern section of the State in their efforts to realize an equitable division of the profits. Organized opposition must be expected, and you should be prepared to meet it. I believe that an important factor in the success of their efforts on the part of our dairymen would be the guarantee of a pure, clean and healthful product from inspected herds; to accomplish which, a practical system of dairy and herd inspection should be inaugurated, that would be of great benefit to producers, dealers and consumers.

The keeping of cattle in stalls and pens, on liquid or fermenting food, and without exercise, within the corporate limits of cities and towns, is an evil that should be eradicated by heroic legislation. I have given considerable attention to this matter in particular for some years; and the visits I have made to such stables convince me that the attempts of health authorities to suppress such nuisances have proved fruitless of any substantial results. I am therefore forced to the conclusion that the safest and surest method would be the passage of a law forbidding the keeping of cattle within city limits; such a law could be so constructed as not to interfere with the keeping of a single cow by a resident in the outskirts, or on a legitimate farm that perchance should be located within the boundary of a city. The evil is a dangerous one and should be abolished.

DEBT-PAYING ASSOCIATION.

At your last meeting I called your attention to the advantages to be derived from debt or mortgage-paying associations. All that I then said I could reiterate to-day with emphasis, taking my own personal experience, through the medium of a building association as a guide. I feel that I can safely recommend this system of paying both the interest and principal in small monthly installments, to the thoughtful consideration of those now struggling under a load of mortgage indebtedness. There are a vast number of building and loan associations doing business in almost every section of the State, and I have nothing whatever to say against them, and could say much in their favor. Yet they have not as yet met the object that I am desirous to see inaugurated. Their name and tendencies are indicative

of building up, of buying a home, of furnishing a means of going in debt for that purpose, &c. I would have them formulate a system of acquiring mortgages, thus making it an object for those having incumbrances on their houses and farms, to become members of such associations, and lead them to a method by which they can gradually relieve themselves of debt. The great advantage would be the payment of the debt in small amounts.

There are many persons considered slow in paying their interest, because they have to raise quite a large sum at stated intervals, when by small monthly payments they would most likely accomplish the object without great inconvenience. Some of you may infer that I belong to a building and loan association, and I frankly admit that I do. I have been a member of such an association for over twenty-five years, and have paid off the indebtedness on my farm in this way. I have the interest of no particular association to recommend to you, and leave the matter for your consideration.

INSTITUTES.

The inauguration of the Institute work in connection with our County Boards of Agriculture is a popular and important feature of the work of the Board. The eagerness of our agriculturists and horticulturists to obtain information that is presented to them in the work of these Institutes is very gratifying to me and the Executive Committee, whose valuable assistance is recognized throughout the State. The continuance of this work must be secured, and in order to prevent confusion of arrangements, I would recommend that you instruct your Executive Committee to take entire charge of this matter, with a view of having the Secretary become the Institute officer, and see that the work is systematically and efficiently carried out.

INFLUENCE EXERTED BY GOVERNOR ABBETT.

During the year the Board has made rapid strides in usefulness, and its influence is now felt and sought after in many ways. I can but feel that this has been accomplished by the conservatism of your demands and the unity and determination shown to secure your rights. While seeking our own we have not sought to destroy others, while demanding recognition we have recognized others, and the result is

gratifying. I should be ungrateful if, in closing my remarks, I should fail to recognize the valuable services extended to us through and by the influence of Governor Abbett. He has evinced the greatest interest, not only in the work of the Board and its desire to advance the agricultural industries of the State, but also in the farmers themselves. During his administration we have secured the passage of laws of great advantage to us. Through his influence we have abolished the Overseers of the Highways, we have a Board of Equalization of Taxation, we have enacted the first law in the United States granting State aid to public roads. All of these laws are now in practical operation, and under their protection we are assured of a respectful hearing and speedy adjustment of unequal assessments, and our State will soon have the best system of improving and maintaining our highways, and a greater number of miles of Macadam and Telford roads than any other State in the Union. While His Excellency was the first Governor to approve a State Aid law, he is also the first Governor to appropriate State money for that purpose. On the 27th day of December, 1892, we apportioned to Middlesex county the sum of $20,661.55, as the State's portion, in payment for permanent stone roads in that county. While, in the retirement of Governor Abbett, we are deprived of the services of a strong friend, I feel that we shall have as able an assistant in his successor.

In the collecting of the agricultural exhibits for the World's Fair I have been brought in closer connection with the methods used by our people in their husbandry than ever before. I have visited many counties and county fairs, have sought out and obtained information hitherto dormant, and, in passing through and meeting the people of nine of our neighboring States, I am convinced that agriculture in New Jersey is no longer following the lead of her sister States but that *we are leading*, through the teachings of our Experiment Station, and the readiness and intelligence with which improved methods are taken hold of and applied, have taken us from the ranks as "file-coverers" and placed us in the front. We have reached this position by meriting it. Our fields drank the blood of our Revolutionary sires, and their sons have jealously guarded her honor; peace and prosperity reign within her borders and the proud star of New Jersey shines bright in the constellation of the Union.

REPORT OF THE SECRETARY.

To the Governor, the Legislature, and the State Board of Agriculture:

Agriculture in New Jersey is steadily advancing to a higher degree of efficiency and productiveness. Causes contributing to this result are investigation into the laws that govern in the reproduction and growth of agricultural products, increasing intelligence in the cultivation, manuring and handling of farm crops, and in the care and feeding of farm stock. This forward movement is as yet local. But it has extended far enough to reveal the need there is for a further advancement on these lines, and the possibilities before the farmers of the State, when that advance shall become general.

How can general improvement be secured? By co-operation among farmers, by organization, by securing lectures from scientists and advanced agriculturalists on practical farm topics, and by discussion and experimentation.

Any person competent to judge of the efficiency of the different methods of agriculture practiced throughout the State must be convinced that intelligence in the management of farming affairs *pays*, and is as needful in this as in other occupations. When will farmers, *as a class*, recognize and act upon this fact?

In certain neighborhoods, embracing in some instances almost an entire county, where farmers are moving on the progressive lines intimated, their general thrift and financial prosperity are beyond question. But where the opposite course is pursued, its baneful effects cannot be concealed; nor is the cause of profitless agriculture difficult to find.

The large yields per acre secured by many farmers in the State should serve as an incentive to those who seldom reach paying results. Every farmer should have an ideal, far enough ahead to be among the possibilities, and yet not so far as to discourage effort. The possible maximum average yield per acre has not yet been reached, and the aim to produce larger returns should be extended to all crops, includ-

ing the dairy. Concentration of labor on a *smaller* acreage and concentration of manure to the reduced area will, in both particulars, be a saving, and will often result in a larger and better yield than is usually obtained from the more extended tillage. Furthermore, such a course will release to other crops, to stock-raising, or rest, much land that has been cultivated at a loss. But even if the same acreage is devoted to the several crops in the future as in the past, the effort to increase the yield per acre is worthy of intelligent, systematic trial.

FRUIT PRODUCTS.

In this connection I call attention to our fruit industry. In view of clearly-demonstrated facts pertaining to more profitable fruit culture, and the uniform yields of perfect fruit realized by some growers, the majority of our orchards are discreditable to their owners, to the industry and to the State. New Jersey, by natural adaptation and by location, is a fruit State. No State in the Union produces fruit of such generally excellent flavor as is produced here. But our markets are becoming more fastidious, and justly so, for who would willingly buy, even at a reduced price, knotty, worm-eaten fruit of inferior size and flavor, produced on starved, unhealthy trees, when the perfect article can be obtained?

The apple, pear and peach at least should receive immediate, general attention. When, by intelligent management, the life of the peach tree can be extended to twelve or even fifteen years of vigorous productiveness, as is done by some growers in New Jersey, it seems unwise to attempt their growth along the lines of present averages. The apple and pear tree too, by judicious feeding and cultivation, and by means of spraying against insect pests, can be made to produce attractive fruit at paying prices. And *attractiveness counts as value*, whatever the commodity exposed for sale may be.

Producers should remember this fact when cleaning, assorting and packing their several crops for market, and have each division so uniformly well done as to challenge the attention of the buyer and secure his patronage.

CARE OF ORCHARDS.

A serious mistake is sometimes made by some owners of orchards in non-productive seasons, by relinquishing care, cultivation and manure. With proper attention in such seasons, the trees are enabled

to store up such strength and vigor as will enable them to produce a perfect crop in a bearing year. In fact, trees cannot so effectually do so in a bearing year, hence the importance of good treatment in an "off year." That this is so must be apparent to most observers. Furthermore, a neglected and starved orchard becomes a breeding-pen for insect pests and fungus germs, and this of itself should stimulate owners to thorough work. How many owners of peach orchards regretted, during the past season of paying prices, their neglect of their orchards during the year 1890!

MARKETING.

Another matter as important as increased production is a better system of marketing farm crops. The possible advantages which might result from marketing the staple crops of a given section or county, through a central agency, would seem to warrant a trial of the plan. It is encouraging to know that the thought of the best farmers in the State is turned to this subject. The New Jersey Dairymen's Protective Association seems to have demonstrated that farmers can, if they will, successfully unite in securing better prices for what they produce, and this without increasing the cost to the consumer. But this movement, in order to become a *permanent success, will have to be made general;* for so long as dairy products can be procured of other farmers more remote from the market, and transported at such rates as to be put in competition with organized farmers who are contending for the market, it will be done.

The dairymen in the northern part of the State will have to form a mutual protective association if they ever expect to realize a just profit from their exacting business. There is no other remedy. Transportation companies will not willingly decrease freight rates below what the business can be made to bear, neither will dealers cease their exactions of both producer and consumer as long as they submit. Farmers should unite, also, in earnest endeavor to break up competition against country dairies by the so-called dairies of our cities. The product issuing from these establishments, the stock used for its manufacture, the conditions under which it is produced, all show the business as carried on to be irregular. Aside from the fact that it is brought into competition with the usually wholesome product of the farm, it is a constant menace to the health of all those who use it. A number of investigations of this and kindred impositions against the

consumers, as well as against the producers of healthful foods, have been made by the Executive Committee, and the subject has been referred to in previous reports. Dr. E. M. Hunt, the Secretary of the State Board of Health, also called attention to it in his report of last year. The business has assumed such magnitude that the State Dairy Commissioner has begun an investigation of the matter, which he will present for your consideration at this meeting.

COST OF PRODUCTION.

The cost of production, also, should be determined with more definiteness than it is; the question of profits can only be ascertained when this is known. The items that enter into the cost are many, and each one must be credited with its just share. This point settled, the total value of the resultant product from each of the several lines of work followed must be as strictly recorded. Then, and then only, can we tell which of our acres, stock or products pay, and how much, and which do not. We should "keep book" with our farms, fields, fertilizers, crops, stock, feeds, &c. By this course expenditures that bring no profitable return can be found and eliminated, and those that are a source of revenue nourished and increased.

REDUCTION IN CEREAL CROPS.

The year 1892, though not so prolific in crop yields as was its predecessor, has, notwithstanding this fact, been more remunerative pecuniarily to the farmers of the State, as some crops have brought higher prices than were realized last year. The cereals generally have been low, wheat ruinously so. This product, by means of excessive production, or by means of speculation, or both, has declined so much that it has ceased to be a paying crop, and statistics show a marked falling off in the acreage devoted to its production. But the decrease is not confined to wheat alone; all the cereals have declined in acreage. In 1889 the total area in cereals in the State was 601,357 acres, while in 1879 there were devoted to these crops 773,375 acres; a decrease during the decade named of 172,018 acres, or 22.24 per cent. The decrease for the crops named is as follows: Corn, 76,907 acres; rye, 28,780; wheat, 28,190; buckwheat, 21,853; oats, 16,095, and barley, 193 acres. (For decrease by counties, see Table I.)

TABLE I.

Showing the Acreage and Yield of the Cereals, by Counties and for the State, in 1879 and in 1889, with the Differences in Acreage and Yield for the Two Periods.

COUNTIES.	BARLEY.		BUCKWHEAT.		INDIAN CORN.		OATS.		RYE.		WHEAT.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Atlantic—1879	.....	.....	103	777	4,519	98,173	90	1,569	616	4,675	872	10,519
1889	.....	.....	19	172	2,751	63,970	115	1,652	235	2,070	89	1,152
Decrease	.....	.....	84	605	1,768	34,203	*25	83	381	2,605	783	9,367
Bergen—1879	.....	.....	1,204	17,135	6,074	178,002	2,250	49,587	3,228	40,372	584	9,189
1889	2	20	261	3,525	3,573	103,453	1,028	19,681	2,624	33,725	149	2,385
Decrease	*2	*20	943	13,610	2,501	74,549	1,222	29,906	604	6,647	435	6,804
Burlington—1879	.....	.....	674	9,059	34,030	1,256,523	4,237	131,663	13,495	135,149	15,072	241,412
1889	.....	.....	116	1,378	27,748	951,750	4,426	122,704	16,529	156,407	10,662	193,069
Decrease	.....	.....	558	7,681	6,282	304,773	*189	8,959	*3,034	*21,258	4,410	48,343
Camden—1879	.....	.....	111	1,007	8,250	284,555	438	12,558	2,688	23,198	3,949	67,604
1889	.....	.....	9	76	6,534	243,150	345	7,988	2,825	28,811	2,984	56,183
Decrease	.....	.....	102	931	1,716	41,405	93	4,570	*137	5,613	965	11,421
Cape May—1879	.....	.....	16	174	4,996	116,428	335	5,080	39	269	1,543	18,196
1889	.....	.....	15	99	4,587	114,550	636	9,969	42	270	217	2,608
Decrease	.....	.....	1	75	409	1,878	*301	*4,889	*3	*1	1,326	15,588
Cumberland—1879	9	128	281	3,162	20,339	602,546	2,445	63,324	629	4,131	8,744	157,952
1889	.....	.....	20	105	15,677	491,590	2,219	51,818	362	2,786	7,116	117,037
Decrease	*9	*128	261	3,057	5,262	110,956	226	12,006	267	1,345	1,628	40,915

*Increase.

TABLE I.—Continued.

Showing the Acreage and Yield of the Cereals, by Counties and for the State, in 1879 and in 1889, with the Differences in Acreage and Yield for the Two Periods.

COUNTIES.	BARLEY.		BUCKWHEAT.		INDIAN CORN.		OATS.		RYE.		WHEAT.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Essex—1879	5	50	215	2,741	2,211	92,664	924	28,010	616	9,707	427	8,461
1889	20	544	39	332	657	23,230	401	10,400	296	4,580	108	1,742
Decrease	*15	*494	176	2,409	1,554	69,434	520	17,610	320	5,199	319	6,719
Gloucester—1879	.....	.....	445	4,666	19,156	675,653	1,349	29,299	3,568	27,478	11,233	108,154
1889	.....	.....	108	995	16,657	590,602	1,261	24,619	3,773	29,358	6,958	85,027
Decrease	.....	.....	337	3,671	2,499	85,051	88	4,680	*205	*1,885	4,275	23,127
Hudson—1879	.....	.....	.....	.....	65	2,656	.....	.....	.....	.....	.....	.....
1889	.....	.....	.....	.....	1	20	.....	.....	.....	.....	.....	.....
Decrease	.....	.....	.....	.....	64	2,636	.....	.....	.....	.....	.....	.....
Hunterdon—1879	137	2,225	5,741	82,099	42,343	1,252,598	29,584	854,852	11,057	87,418	21,365	234,795
1889	11	283	2,911	16,692	34,789	936,585	26,034	581,341	7,019	61,398	18,527	234,627
Decrease	126	1,942	2,830	65,407	7,554	316,013	3,550	273,511	4,038	26,020	2,838	168
Mercer—1879	.....	.....	913	9,373	21,673	702,937	12,899	396,570	5,107	54,284	11,985	158,417
1889	.....	.....	61	215	18,158	604,510	11,665	296,247	4,579	52,976	11,188	181,793
Decrease	.....	.....	852	9,158	3,515	98,427	1,234	100,323	528	1,308	797	*23,376
Middlesex—1879	7	68	1,051	10,536	19,738	597,491	9,651	247,080	4,749	52,283	8,197	112,973
1889	1	16	88	835	13,584	432,784	7,793	194,692	4,763	61,303	6,315	103,085
Decrease	6	52	963	9,701	6,154	164,707	1,858	52,388	*14	*9,070	1,882	9,888

*Increase.

TABLE I.—Continued.

Showing the Acreage and Yield of the Cereals, by Counties and for the State, in 1879 and in 1889, with the Differences in Acreage and Yield for the Two Periods.

COUNTIES.	BARLEY.		BUCKWHEAT.		INDIAN CORN.		OATS.		RYE.		WHEAT.	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Monmouth—1879	10	240	515	5,389	30,385	1,048,940	5,314	149,769	12,489	133,560	12,369	179,421
1889	.....	.....	48	306	24,085	875,847	3,642	96,875	13,589	158,443	8,122	153,471
Decrease	10	240	467	5,083	6,300	173,093	1,672	52,894	*1,100	*24,883	4,247	25,950
Morris—1879	35	844	5,281	57,937	18,579	651,352	13,634	377,576	4,818	41,723	4,889	58,257
1889	8	120	1,959	16,703	13,751	457,832	11,290	247,133	3,434	33,944	3,738	41,936
Decrease	27	724	3,322	41,234	4,828	193,520	2,344	130,443	1,384	7,779	1,151	16,321
Ocean—1879	.....	.....	229	2,249	4,626	137,277	433	10,629	2,348	17,807	1,151	12,149
1889	.....	.....	59	367	3,545	101,145	360	7,257	2,502	18,850	203	2,590
Decrease	.....	.....	170	1,882	1,081	36,132	73	3,372	*154	*1,043	948	9,559
Passaic—1879	.....	.....	1,318	17,643	3,169	97,427	1,573	36,209	1,767	21,825	350	5,538
1889	.....	.....	696	9,143	1,690	50,226	1,014	20,302	1,023	15,427	151	2,848
Decrease	.....	.....	622	8,500	1,479	47,201	559	15,907	744	6,398	199	2,690
Salem—1879	.....	.....	321	3,785	30,460	1,064,227	5,315	142,729	601	3,716	20,256	269,670
1889	.....	.....	30	346	23,253	828,036	5,170	112,425	289	2,329	16,834	252,657
Decrease	.....	.....	291	3,439	7,207	236,191	145	30,304	312	1,387	3,422	17,013
Somerset—1879	13	181	1,079	12,485	25,655	727,683	20,711	547,220	6,572	56,429	13,974	137,619
1889	.....	.....	369	2,358	20,553	590,210	18,826	467,248	5,068	51,064	11,339	145,770
Decrease	13	181	710	10,127	5,102	137,473	1,885	79,972	1,504	5,365	2,635	*8,151

*Increase.

TABLE I.—Continued.

Showing the Acreage and Yield of the Cereals, by Counties and for the State, in 1879 and in 1889, with the Differences in Acreags and Yield for the Two Periods.

COUNTIES.	BARLEY.		BUCKWHEAT.		INDIAN CORN.		OATS.		RYE.		WHEAT,	
	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.	Acres.	Bushels.
Sussex—1879	9	181	8,016	119,899	17,354	571,484	10,641	229,537	13,498	98,300	3,138	30,560
1889	5	60	3,628	35,977	11,890	398,737	9,986	222,675	6,796	70,471	1,859	18,606
Decrease	4	121	4,388	83,922	5,464	172,747	655	6,862	6,702	27,829	1,279	11,954
Union—1879	.....	.....	335	4,442	3,256	122,166	1,424	38,690	527	6,897	334	4,962
1889	.....	.....	13	188	1,792	61,877	922	20,847	446	6,737	95	1,210
Decrease	.....	.....	322	4,254	1,464	60,289	502	17,843	81	160	239	3,752
Warren—1879	15	174	7,525	101,856	27,677	869,923	14,165	358,622	17,613	129,898	9,328	80,891
1889	.....	.....	3,071	24,814	22,973	716,907	14,191	321,920	1,051	83,100	14,916	225,586
Decrease	15	174	4,454	77,042	4,704	153,116	*26	36,702	16,562	46,798	*5,588	*144,695
Total for State in 1879	240	4,091	35,373	466,414	344,555	11,150,705	137,422	3,710,573	106,025	949,064	149,760	1,901,739
1889	47	1,043	13,520	114,626	267,648	8,637,011	121,327	2,387,293	77,245	874,049	121,570	1,823,382
Total decrease in 10 years	193	3,048	21,853	351,788	76,907	2,513,694	16,095	873,280	28,780	75,015	28,190	78,357

*Increase.

The above table is made up from the United States Census Report of 1879 and 1889, and it is placed thus in immediate contrast with the differences in acreage and production for the crops named, by counties, for ready reference. The table will repay study.

It will be noticed in some instances that although the acreage has been increased, the yield per acre has declined since 1879. This is true in the case of oats. Rye shows but little advance in yield per acre in any county, irrespective of increased area. Wheat, on the other hand, has advanced in some counties. Warren has increased her acreage very largely, and with it the yield per acre has gone up from 8.6 bushels per acre in 1879 to 15.1 bushels in 1889. And nearly every county shows an increase per acre since 1879. Monmouth, Passaic and Camden have the highest average yield per acre, being 18.95, 18.86, 18.82 bushels respectively. Burlington, 18.10. Essex has gone down in yield per acre, but equals Middlesex and Mercer. The latter county has declined in wheat area 797 acres, but has increased her total yield 12,276 bushels, being an increase per acre from 13.21 bushels in 1879 to 16.24 bushels in 1889. It will be observed that the increased yield per acre since 1879 has not been sufficient to overcome the reduction in yield caused by the reduction in area for the State; but had the increase in other counties equaled that in Mercer, the total yield for the State would have been in *excess* of that of 1879, notwithstanding the reduction of the wheat area of 28,190 acres during the decade.

Other points connected with crops presented are left for the study of those interested.

TABLE II.

FROM U. S. CENSUS BULLETIN No. 303, NOVEMBER 8TH, 1892.

Average Yield of Cereals per Acre.

STATES.	Barley.	Buckwheat.	Indian Corn.	Oats.	Rye.	Wheat.
New York	23.53	16.70	30.63	27.44	12 94	17.95
Pennsylvania	23.57	14.58	33.79	27.63	11.14	16.38
New Jersey	22.19	*8.48	32.27	*23.39	*11.32	15.00
Maryland	22.96	12.78	25.44	20.36	10 28	16.35
District of Columbia	.....	10.00	30.82	21.76	9.90	20.00
*Average Yield per Acre in 1892 for N. J.	.....	12.5	.....	27.2	13.5	.....

The decrease in cereal production in New Jersey, as compared with the adjoining States, New York and Pennsylvania, is 16.40 per cent. greater in New Jersey than it is in Pennsylvania, and 10.51 per cent. greater than it is in New York. These figures and comparisons suggest an inquiry which calls for explanation.

How has it been possible for New Jersey farmers during a period of only ten years to decrease their acreage of grain cultivation 22.24 per cent. and so much more than adjoining States?

The abandonment of grain-growing in New Jersey is not altogether due to decline in price, although, as in the case of wheat, it is largely due to that cause, but to the fact that other crops have been introduced which pay better. These 172,018 acres abandoned from grain growing are not "abandoned land." The more intelligent farmers of the State are ever on the alert to better their condition by improving their business all along the line, and the extent of the change is largely due to this progressive spirit. Furthermore, the greater decrease in New Jersey over adjoining States from grain-growing, which here has given place to other better-paying crops, is due to the superior, near-by markets enjoyed by the New Jersey farmers. This fact is worthy of reiteration, although it has been stated in previous reports. One of the products receiving more attention is that of the dairy. On most lands suitable to the business, in proximity to New York, Philadelphia and New Jersey sea-side resorts, there is a marked increase in dairy products and a growing improvement in the breeding and management of dairy cattle. Our location, our markets, and the *needs of our farmers* demand that this industry be increased and improved in every possible, legitimate way. Poultry, white and sweet potatoes, melons, market-garden crops and fruits are also increasing in extent and value yearly.

AGRICULTURE IN THE PINES.

Reference was made in my last report to the hitherto unoccupied land in some of our southern counties. By means of the Governor's message of 1890, and through the annual reports of the State Board of Agriculture, the attention of colonizers and immigrants has been directed to those counties, and settlements have been started which give every assurance of permanence and prosperity.

It is a fact worthy of *publication* and *emphasis* that in no State in

the Union are farm lands and improved farms so cheap as they are in New Jersey. Considering our advantages, they are marvelously so; and I can only account for this state of things from the fact that manufacturing and commercial interests, both within and immediately surrounding the State, have attracted the young men of the farm away from the business of their fathers. Further, because of this the "old people" wish to sell the farm (being no longer capable of running it), and at a very low price, as there are so few buyers. Meanwhile buyers by the thousands are pressing on to the "advertised lands" of the Far West, not knowing that superior advantages exist here in the East.

A SPECIAL REPORT.

I reiterate my desire, stated in previous reports, to prepare and publish a report on the agricultural resources of New Jersey in detail. Time and observation tend to confirm me in the view that such a report would be of incalculable value to our State.

It would be a satisfaction to any person interested in agriculture, or our State resources and possibilities, to be able to refer to a report that contained such information in detail, by counties. But more especially such a report would be of the utmost value as a guide to worthy settlers. It would, first, direct their attention to the fact that New Jersey has thousands of acres of land adapted to some branch of agriculture, for sale at low prices, and in proximity to the best markets on the continent. Second, it would enable such immigrant or intending purchaser to make an intelligent selection of such lands as he might deem adapted to the branch or branches of agriculture he intended to follow. Third, it would create a demand for farm lands within our borders, which would inevitably increase the value of present farms.

Such a report would be published in separate form as a part of the report of the State Board of Agriculture, and no additional expense would be required for that. But for the collection of data, preparation of maps, and such additional clerical assistance as might be needful, a small appropriation would be required, such amount to be expended under the supervision and with the approval of the Governor and the Executive Committee of the Board.

STATE AND COUNTY WORK.

The efforts of the Executive Committee is constantly directed to secure to the farming interests of the State that growing improvement and prosperity contemplated in the law constituting the Boards. These efforts are meeting with the cordial appreciation and indorsement of the farmers.

The most advanced dairymen, farmers and fruit-growers and the ablest agricultural scientists have been engaged to address the State Board on the lines named in the preceding sections. Such addresses being printed in full in the annual report, have a wide circulation throughout the State, and the effect produced, both from the annual meeting and the perusal of the report, is to arouse inquiry and investigation, which inevitably lead to better results. So also in the County Board meetings, and in the Farmers' Institutes. In many of the County Boards, progress is very marked. The officers are diligent in holding meetings and securing addresses and discussions on such subjects as are of most interest to the locality represented. An outgrowth and an enlargement of the County Board are the Farmers' Institutes. These are increasing in popularity and usefulness. They usually run through two days, and include four and sometimes five sessions. Essex, Sussex, Hunterdon, Middlesex, Gloucester, Cumberland, Salem and Burlington counties have thus far availed themselves of this form of education. Monmouth has enjoyed a series of twelve lectures under the auspices of the County Board by means of the University Extension Lecture Course of the State Agricultural College. Moorestown Grange, Burlington county, has conducted a similar course, and other meetings, both of the Institute and University Extension Course, are being arranged for during the present winter, throughout the State. The valuable services of our Professor of Agriculture, E. B. Voorhees, and his co-workers, Drs. John B. Smith and Byron D. Halsted, have been instrumental in making the meetings named fruitful in practical results. Their experiments and investigations carried on during the year among the farmers throughout the State have a fitting culmination and summing up at those meetings, and all farmers who attend may have the benefit of the lessons learned. To make this work more effectual throughout the State, it would be well if arrangements for proposed meetings were made by the County Secretaries and committees with

the Secretary of the State Board early in the fall. By this means the best talent could be secured in time to make ample preparation, and farmers could make their plans so as to attend and take part in the meetings in other counties as well as their own; such general outline of the work for the State, for the fall and winter at least, to be published and distributed among the local organizations. The need for such early arrangement is emphasized by the fact of our great diversity of climate, soil, and products, all of which make it necessary that discrimination be used in selecting subjects and engaging speakers.

An addition to the usual agricultural questions discussed at farmers' meetings during the past year, is that of road improvement. This is one of the most important to rural residents, as they are compelled to use the roads at all seasons of the year, no matter what condition they may be in. It is very desirable that a beginning be made in improved road management throughout the entire State, as nothing will so enhance the value of rural property as will good roads and neatly-kept roadways; and, first of all, to secure a better method of draining, grading, forming and keeping in repair our common dirt roads. Will not all owners and users of horses unite in the humane and elevating movement for better roads?

THE OUTLOOK.

The signs for the future of agriculture in New Jersey are encouraging. Nearly all our reports this year concur in the assurance that the farmers' prospects are not unfavorable, that solid ground has at last been reached upon which the progressive farmer will be able to build up a substantial structure for himself and family through the years to come. But calculations of profit should be based upon the present value of farms. What is lost in shrinkage of values is irretrievably gone, in all probability, to owners who purchased at war prices, and it will afford greater peace of mind to so consider it. If, therefore, calculations of expense and profit are made on the basis of actual values, it will be found that most of our enterprising, intelligent farmers are realizing a fair profit from their business. Obstacles to a full prosperity still exist, however, which, so long as they continue, will retard its progress in that direction. Some of these are debt, too high a rate of interest, constantly increasing taxation,

scarcity of efficient farm help, available help too costly for its ability to do farm work, neglect of home resources, inattention to crop diversification and disregard of organization and co-operation.

QUESTIONS TO COUNTY BOARDS.

The subjoined questions were appended to the statistical blanks sent to the several counties. For convenience of reference the answers received are summarized and placed with this report.

The answers given are suggestive, as in the decrease in farm laborers. The tendency of the laboring class is to town and city life.

The decrease in cereal products, as shown in Table II., is confirmed by these annual reports.

Spraying fruit trees and vines to destroy insect pests is a new demand which farmers and fruit-growers have to meet.

The improvement of our roads is engaging the careful, conservative consideration of the farmers as never before.

Organization, too, is growing.

"The greatest need of agriculture" is well covered in the answers given, and if farmers would unite to secure the things deemed most needful and to overcome such influences as are injurious to their business, as stated in the answers, and not give up until they win, the millennium of agriculture would soon dawn.

Question 1. Is the number of farm laborers evidently on the increase or decrease? Eight counties—Burlington, Hunterdon, Mercer, Monmouth, Morris, Salem and Union—answer, decrease. Camden, no change. Why? The general cause given is the establishment of manufactories which give them work amid the superior attractions of town life, and it is supposed the laborer thinks he is getting higher wages in other employment. Gloucester county only reports increase in farm hands, and gives as a reason that they pay double the wages paid in Maryland and Virginia.

Question 2. Are farm wages higher or lower than they were five years ago? Burlington and Mercer, higher. The other counties named above, "about the same." Wages per month, with board, vary from $12 in Union to $21 in Gloucester—average, $16.90. Without board, from $20 to $35 per month—average, $29. Depending somewhat in both cases upon the character of the work to be done.

Question 3. What crops are receiving more attention than five years ago? Tree fruit, potatoes, dairy products, cabbage, hay, early vegetables, small fruits and market-garden crops. Crops receiving less attention are the cereals, except in Hunterdon.

Question 4. In either case is this owing to larger or smaller profits, or to increased or diminished productiveness? The cause is attributed to diminished productiveness in some cases, but generally to the low price received for grain.

Question 5. If the latter, what causes have led to failure of crop? Salem says, rust or fungous growth.

Question 6. Is the spraying of fruit trees and vines, to destroy injurious insects, on the increase among farmers in your locality? Seven counties reply in the affirmative.

Question 7. Are farmers taking more interest than formerly in the subject of improved roads? Nine counties reply "They are," "Much more," &c.

Question 8. What can farmers as a class do, in your judgment, to improve their condition and advance their interests? Burlington—Study the markets, improve the roads, more thoroughly organize. Camden—Build better roads. Gloucester—Educate, organize, lower rate of interest. Hunterdon—By controlling legislation and proper co-operation. Mercer—Co-operate in buying and selling. Morris—Get out of the ruts. Salem—Organize for their own protection. Monmouth—More intelligence in farming.

Question 9. Are farmers taking a deeper practical interest in the subject of farmers' organizations? Burlington—In some sections a little, in others a great deal. The milk producers are thoroughly organized. The other counties named above, with the exception of Camden, reply in the affirmative.

Question 10. What, in your judgment, is the greatest need of agriculture to-day? Burlington—An increase in circulating medium, lower taxes, better prices for meat and grain, more faith in the verity of the "Word," "The hand of the diligent maketh rich." More appreciation of that which is enjoyable in his environments, more insistance that other industries and interests shall play fair, more resolute demands that the money supplied by taxes shall be expended with the same judiciousness and economy that made its acquisition possible, and shall not be used to satisfy official greed or promote party aggrandizement. Camden—Curtailed productions. Gloucester

—Suppression of the traffic in intoxicants, increase in circulating medium, lower rate of interest; farmers should fix the price for their products, and not try to undersell each other; produce should not be so generally consigned to the already overloaded trade centers; farmers should endeavor to secure a more general distribution of their produce. Hunterdon—Cheaper fertilizers, lower rates, and equal rights. Mercer—Better prices, which farmers must co-operate to secure; by general, intelligent organization and co-operation they could greatly advance their business. Monmouth—Lower taxes on farm lands, lower freight rates. Morris—Brains. Salem—Education. Union—Keep up the tariff, let well enough alone; put in office good, efficient men only; cut down the extravagant salaries.

ABANDONED FARM INVESTIGATION.

By direction of the Governor, the further investigation of this matter was transferred from the Bureau of Statistics of Labor and Industries to the State Board of Agriculture. As far as I have been able to do so, I have secured definite information on the lines of investigation suggested by the Governor, and the report will appear in supplemental form with this annual report.

THE LIGHTNING-ROD QUESTION.

The Chair—It affords me much pleasure to introduce Prof. Van Dyck to the Board.

ADDRESS BY PROF. F. C. VAN DYCK, NEW BRUNSWICK, N. J.

Mr. President and Gentlemen of the Board—Allow me to say that I appreciate most highly the honor and the opportunity of addressing you. On behalf of myself and in justice to myself, I will say that I thoroughly appreciate the responsibility of speaking on a topic like this, and I think I shall show you by what I say that I feel the importance of showing clearly every step about which I venture to make any statement.

The subject of lightning protection has engaged the attention of many people, ever since Franklin showed that electricity and lightning were one and the same thing, differing merely in degree. The proper insulation for protection from this electricity or lightning has varied from time to time. Views have differed to such an extent that men like Faraday, and other practical men of such repute as Harris, have differed in their opinions on the subject to such an extent as to criticise remarks made by each other, as in the instance where a gentleman told Faraday that Harris had said the surface of a rod was very important, and Faraday said Harris knew nothing about it; this was repeated to Harris, when he said "Faraday knows nothing about it" [laughter], and each of them might be said to be an authority on the subject—the one a laboratory authority, and the other had seen things outside in the world. It happens in this particular phase that Faraday was wrong, while Harris was wrong in other phases, and in some of the aspects of what I expect to say I may be wrong too. [Laughter.] The best we can do is to speak from the fullest knowledge we have, and to show the ground on which we speak, and then those who hear

us, or see what we have to show, have a fuller chance to know the basis on which the opinions were formed.

I will ask your indulgence a few moments while I repeat a few experiments, such as we have all seen in our common schools. Though we have seen these experiments we are likely to have forgotten them, or if we remember the facts we fail to see the bearing they have as freshly as we once did. I will rehearse some of the very simple things we are supposed to have seen in our school days, though as many of the schools are conducted many of us have no opportunity of seeing them.

The first step ought to be, of course, to define "electricity," but it looks as if that would be the last step we shall take in the history of the science. No one, certainly, has ever given a definition of "electricity" comparable with the definitions given of "light" and "heat" and "water."

The Professor then conducted a number of experiments, which showed the fundamental facts of frictional electricity, viz., electrification by friction and induction, distinction between conductors and non-conductors, discharging effect of points, protective effect of inclosures made of conducting material, and the construction of condensers.

The points specially shown were:

First. Good conductors will not permit large charges at high pressure to traverse them instantly, hence discharges may spring across air-gaps of relatively large resistance in preference to following good conductors.

Second. Sudden discharges cause a general disturbance of electrical equilibrium in all neighboring bodies, thus causing flashes between things which are not in the path of the principal discharge.

Third. Arranging two plates to represent a cloud separated by air from the earth, and placing on the lower plate a point and a knob to represent a building with and one without a lightning-rod, it was shown that the character of the charge in the cloud decided whether the point would or would not protect the knob.

A charged cloud gradually moving up would be discharged by a point on the earth, but a cloud suddenly overcharged from another discharges itself upon the nearest objects indifferently. The experi-

ments showed that a lightning-rod cannot be depended upon to act as a drain-pipe to draw off the charges of clouds, except when the charge is moderate and the cloud comes up slowly.

The practical inferences were:

First. Ordinary lightning-rods are good so far as they go, but do not afford absolute protection.

Second. Absolute security can be attained only by complete inclosure in a conducting envelope, massive enough not to be melted by the discharge.

Third. A reasonable approximation to such a complete shield may be made by running heavy wires over all corners and angles of a building, avoiding sharp bends and bad joints, and carrying all the wires to a good ground connection. As heated air is a particularly good path for lightning, chimneys should be wired on all angles and the wires carried across the top. Along the wires should be numerous points slightly raised above the general level, rather than a few elevated points.

Fourth. Projecting metal fittings, such as piazza roofs, should be connected at both ends to the lightning-rods.

A Member—How far will a rod attract the current?

Prof. Van Dyck—The rule has been given variously. The points should be in a prominent place, but don't raise them four feet and expect them to protect a certain area for each foot in height. That is fallacious. Don't trust the rod to protect an area greater than its own height, and probably not that much—probably not more than half its height in the distance around it.

A Member—I know of a building which had five points, and a point not five feet high, within fifty feet of it, was struck.

Prof. Van Dyck—I can give another instance, where a lamp-post was close to a stone wall, with an arm running out over the stone wall; a great hole was knocked in the stone wall, and the lamp-post was not struck at all. There is no actual attraction that we know of. In these very sudden cases they don't carry once in a thousand times, perhaps. They are so rare. A man is willing to run one chance in a million, and he can stand it one chance in a thousand, but when it gets one in a hundred he may feel uneasy [laughter]; it makes him nervous. If we put up these rods we are doing all we can reasonably be expected to do, short of living in an iron cage. [Laughter.]

A Member—Are tall trees in the vicinity any protection?

Prof. Van Dyck—Yes, sir; where the discharge comes gradually they are. All points attract then, but we cannot say that points attract for these sudden discharges. We have a right to expect from the nature of our experiments here to-night that if we had more points the dome would not have been struck.

A Member—I have had three trees struck in the vicinity of my buildings.

Prof. Van Dyck—The same thing happened at my father's house, where a large pear tree was struck on one occasion. The other time the rod took it all and the tree was not struck.

Prof. Smock—I would like to ask a question which pertains to our practice. I think in cities lightning-rods are generally dispensed with. Are there not facts on record showing greater liability to these lightning strokes in the country than in the city?

Prof. Van Dyck—I think that is the case, and with few exceptions this is so. In the town of Peter Maritzburg, with 20,000 inhabitants, the damage was so great there was universal terror; the suddenness there was so great that the roughness of many houses was not sufficient to protect them, and they were obliged to put up many lightning-rods over the town. In our climate the roughness of ordinary buildings is sufficient. It also seems the closer the houses are the less liability.

Mr. Blish—Will the climate or temperature have any effect? Near the equator I have seen discharge after discharge, but nothing was struck.

Prof. Van Dyck—There has been considerable said about that; I was obliged to leave that out, because there was too much ground to cover. It comes under the head of tornadoes, the difference being between those of a horizontal axis and those of a vertical axis, the discharge taking place along the line of the axis of the storm; of course with a vertical axis the stroke reaches the ground, while with a horizontal axis the stroke is lost on the air itself.

Mr. Collins—Do I understand you would not continue the practice of putting up these rods as formerly put up?

Prof. Van Dyck—I can only say what I have heard through the reports of lightning-rod conferences and the reports of specialists of the old and new schools, and both sides appear to agree—the old school claims that a properly-constructed rod is absolute protection,

and the new school claims that, while it is not absolute it is desirable. Gentlemen, don't suppose it is a complete protection, for it can't be had without putting iron or metal all around you. You can get measurable protection with plenty of points, or with plenty of wires, but don't think one good drain-pipe will do it. Have a lot of small drain-pipes to be smashed, but not one large one.

The Secretary—What about a metal roof?

Prof. Van Dyck—A metal roof connected to the ground through the drain-pipes is of some account. There seems to be a majority of people in favor of it, but there is quite a minority against it. I can safely say the majority are in favor of it. These have the pipes connected to the roof and to the ground at the corners. Piazza roofs connected at one end and not at the other are not properly arranged.

Mr. Collins—I think during the difference of opinion on this subject the people in our neighborhood have neglected this matter, and I had hoped you would tell us what to do.

Prof. Van Dyck—I told you the kind of protection we needed—put metal roof, sides and floors to your houses; this is what you need for perfect protection. [Laughter.] It is simply a question of expense; how much does it pay to do it?

A Member—Is a slate roof more protection than a shingle roof?

Prof. Van Dyck—I cannot say; I know I work at a slate table, and never bother about making any metallic connection for it, and it does well.

A vote of thanks was given the Professor for his very interesting remarks and illustrations.

NEW AGRICULTURAL IMPROVEMENT IN SOUTHERN NEW JERSEY.

The Chair—It affords me great pleasure to introduce Mr. Francis B. Lee, of Trenton, to the Board, who will speak to you on some of the phases of agricultural development in our State.

ADDRESS BY FRANCIS B. LEE.

To most people—with their minds strongly influenced by Alladin-like stories of Western progress, of town-building in the trans-Mississippi country, of Rocky Mountain gold fields, and of agricultural interests of the Pacific Slope—the question of development of lands along the Atlantic sea-board until very recently had become absolutely an idle dream. The tidal-wave of emigration, sweeping over the East, left many sections of the cis-Appalachian country in a status quite as primitive as that which once gave an abiding place to the colonial forefathers. Particularly true was this when one considers that portion of our State commonly called South Jersey—a somewhat indefinite term depending upon usage, but generally considered to embrace all that territory south of a line drawn from Trenton to the Amboys. As a matter of fact, large sections of this South Jersey had been developed in early times, more particularly in the valley of the lower Delaware and upon both banks of its various tributaries which enter the noble stream between Trenton and Cape May. Before the Revolution, fertile farms and plantations gave a distinctively agricultural character to the lesser valleys of the Crosswicks, Assiscunk, Rancocas, Big Timber, Old Man's, Salem, Cohansey, the Asveticons, or Maurice river, Dennis and other creeks, all of which served as means of communication with the outside world and played an important part as factors of food-supply to colonial farmers. Likewise upon the sea-coast, near the banks of the large, sluggish

rivers and creeks between Cape May and Sandy Hook, were similar "clearings," which extended in irregular chains toward the interior. Therefore, so much of South Jersey as lies in the tide-water district is to be excepted from the general charge of being a "desert." However, there is left the "ridge," which separates the river tributaries from the ocean tributaries, and it is this long and irregularly-shaped tract of land, covered with pine and oak, that has remained until the present day largely unoccupied and untilled.

Making a particularly local application of the matter, one finds that this high land extends into Cape May county, in general forming an obtuse triangle, with the apex pointing to the end of the peninsula. In no place in the county is the elevation over one hundred feet, the average being about twenty-five feet above sea-level.

The soil is a sandy loam, much of it underlaid by a good clay and supporting a vigorous growth of oak and pine timber. To remove a popular fallacy, it may be said that in no sense is this portion of Cape May a "barren," for it has within itself the elements of great productiveness. Vineland—the wonder-town of South Jersey—the creation of the brain and energy of Charles K. Landis, who saw in similar soil the basis of a great agricultural enterprise, is a striking example of the fecundity of lower Jersey land when once properly cultivated.

The Cape May and Millville railroad, now a part of the West Jersey system, was opened in the early summer of 1863, and was designed to connect the two towns, giving Cape May a through route to Camden. Upon this road, fifty-six miles from Philadelphia and twenty-five miles from Cape May, was located the station of Woodbine, which consisted for nearly three decades of four or five houses. Woodbine was the center of stage routes to Tuckahoe and Dennisville, and beyond this no enterprise existed. At the first, William Smith Townsend, Jeremiah Van Rensselaer, who were very instrumental in projecting the enterprise, together with the builder of the railroad, Charles B. Dungan, endeavored to "push" the town and had laid out streets, but the property became involved in litigation, and Woodbine remained, after all their efforts, nothing more than a station in the woods.

THE BARON DE HIRSCH SETTLEMENT.

The history of Semitic oppression extending over centuries in the Slav and Germanic countries, the various schemes for relief, the growth of the vast De Hirsch fortune, and the ultimate plan of Baron Maurico De Hirsch for colonizing his outcast brethren, would be a twice-told tale were it repeated here. Suffice to say, among the sites selected for colonies of refugees were certain points in New Jersey, and among them Woodbine. At that time, two years and a half ago, Woodbine was the property of John Moore, Esq., the owner of the large glass manufacturing plant at Clayton, N. J. Moreover, the Woodbine tract was of irregular shape, lying upon both sides of the railroad, and was the remnant of large holdings, years ago the property of the Ridgeway, Townsend, Ludlam, Leaming, Lawrence, Holmes, and other colonial families. In all, the tract consisted of fifty-three hundred acres. Negotiations resulted in the transfer of Mr. Moore's interest, the matter being under the control of the following gentlemen, who constitute the trustees of the De Hirsch fund in America:

Dr. Julius Goldman, New York, President; Judge M. S. Isaacs, New York, Treasurer; J. G. Huffman, New York, Secretary; Henry Rice, New York; Jacob Sheiff, New York; Jesse Seligman, New York; Oscar Strauss, New York; Messrs. Huchenberger and Sulsberger, Philadelphia.

From this list of trustees the "Woodbine Land and Improvement Company" was formed, consisting of Dr. Julius Goldman, Judge M. S. Isaacs and J. G. Huffman. Upon the 28th day of August, 1891, the settlement was finally established.

WOODBINE OF TO-DAY.

When the trustees of the De Hirsch fund purchased the Woodbine tract they found it wooded with a sturdy growth of pine and oak timber and underbrush, the lowlands or "spung" being covered with wild grass and bushes. Under the intelligent and energetic management of the local superintendent, H. L. Sabsovich, a graduate of the Polytechnic School, Zurich, Switzerland, and recently chemist in the experimental station of the University of Colorado, the fall and winter

were spent in land-clearing, the timber being sent to market as a source of revenue and the underbrush reserved for firewood. Temporary structures near the station accommodated the Hebrew workingmen until spring house-building time arrived. Surveys located the town as near as may be in the center of the tract, whilst the farms lay without. The town plot itself consists of fifteen hundred and thirty-six lots, each fifty by one hundred and fifty feet. Avenue De Hirsch, in the center of which is the West Jersey railroad, divides the town in two, giving thirty-two blocks on either side. The streets, which form perfect rectangles, are named for American presidents, poets and statesmen, chief among which, crossing De Hirsch avenue at the railroad station, is Washington. Around the town plot the tract is cut up into thirty-acre farms, and the outlying lowlands are to be reserved for pasturage, all of which reminds one strongly of the prevailing Germanic type of mediæval English village settlements, copied later in New England town sites; that is to say, the congested population in the center, the farm-land next, and the pasture lots on the outer rim. So actively has the work progressed that during the first year there have been cleared about six hundred and fifty acres of farm-lands, together with one hundred acres of farm roads, equal to about twelve miles of driveways. In town plots and streets one hundred and seventy acres have been wrested from nature. The houses which have been constructed were occupied during the fall, and numbered in the town about twenty-five. Of these there were four different styles erected by the company, costing from $850 to $1,300. The smallest have four rooms, the largest seven. Every attention has been paid to the ends so necessary to be secured in small houses for workingmen—artistic excellence, usefulness, standard materials, and cheapness. The best plaster, hard-wood finish, good plumbing, and scientific ventilation mark these structures. The same is true of the farm-houses, of which, on the first of last October, sixty-four had been completed. The farm-houses cost about $600, and are not quite as elaborate but are as well built. During the present winter sixty more houses will adorn the tract, so that by the spring of '93 the Hebrews will probably have one hundred and fifty houses in Woodbine.

Furnishing means of employment is the cloak factory of Meyer Jonasson & Co., of New York, where 150 people are engaged. A clothing factory has already been built, whilst cutlery, knitting, and cigar manufactories are soon to add to the creditable evidences of

material progress. Anticipating the demands of transient travel a handsome new hotel, located in the center of the tract, has been built at a cost of $7,300. The house is thoroughly equipped. An electric plant to furnish light and power has been instituted in what two years ago was a wilderness. In addition to this, the railroad company recognizing that Woodbine has become a notable point on the line to the shore, has built a station to accommodate the traffic and has established the latest improvements to keep in pace with the progressive spirit of the settlement.

Turning to the town, it is a relief to notice that the pleasing characteristic of foreign cities, the spirit of improvement upon a more æsthetic side, will not be lacking in Woodbine. The driveways are of sufficient width, whilst the sidewalks, magnificently broad, are lined with double rows of young poplars and maples, which give promise of future beauty. The main avenues are well graded and are 100 feet wide. In the early spring, grass will be sown and lime will be used to neutralize the acidity of the new soil. Upon the southeast side of the town, a park has been reserved and walks cut through the forests of oak and pine.

Architecturally, the public buildings of the town will also be worthy of attention. A synagogue is to be erected, and public schools are now being built. It is a project, warmly indorsed by the managers, that one of these educational institutions be of an industrial character together with an agricultural experimental station. A Russian bath-house for public use will be a wise innovation. Indeed, the plan and scope of the work may be estimated from the fact that a quarter of a million of Baron De Hirsch's money is already spent so successfully in Woodbine.

From the fact that our knowledge of the Hebrew people, during mediæval and modern times, has been derived almost exclusively from the history of legislation against them in nearly all countries excepting our own, opinions concerning their capabilities are often biased, if not absolutely warped, by prejudice. It has been generally said and believed that the Hebrew cannot farm. Credence in this statement would receive a severe shock at Woodbine. Here are gathered people from lower Russia who have been farmers for generations, and finding a soil similar to that in the land of their nativity, they have met with phenomenal success. During the year, every *farmer planted at least 250* fruit trees, one acre of grapes and one and

Mr. Blish—I move a vote of thanks to Mr. Lee for his valuable and interesting address.

Carried.

The Chair—A year or two ago I took occasion to lay before you my personal observations of the condition of these settlements in South Jersey. I was more than satisfied, more than gratified, with what I saw of the advancement of this portion of the State, and I am prepared to accept Mr. Lee's statements in their entirety.

BIRDS BENEFICIAL AND INJURIOUS TO AGRICULTURE.

The Chair—It affords me much pleasure to introduce Dr. B. H. Warren, who will now talk to you about birds as related to agriculture.

ADDRESS BY DR. B. H. WARREN, STATE ORNITHOLOGIST, PENNSYLVANIA.

Mr. President and Gentlemen of the New Jersey State Board of Agriculture—It affords me great pleasure to have the privilege of addressing you, a representative body of agriculturalists from this great commonwealth, and knowing, as I do, that the agriculturists in many sections of the country have by their united efforts succeeded in having passed such laws as will afford better protection to birds. I am satisfied that if the members of this Board make a determined endeavor they can secure legislation which will be highly beneficial to the agricultural interests of this commonwealth in the way of securing better laws for the protection of beneficial birds.

I come from a State which, until within a few years, manifested little interest in the subject of birds, but through the energetic efforts of the State Board of Agriculture, we have to-day, in Pennsylvania, as good laws concerning the protection of our feathered inhabitants as any State in the Union.

Now, how will or can you arouse a popular interest in birds? I will tell you how Pennsylvania succeeded in this. It was by conducting systematic and intelligent observations concerning the feeding habits of birds, and publishing, under the auspices of the State Board of Agriculture, in a special report, the results of these labors, thus showing to the people of our commonwealth what should be protected, and what species deserved to be destroyed. It seems to me that New Jersey, if she is anxious to arouse a popular interest in this question,

had better follow the example of Pennsylvania, and of several other States in the Union, and publish, under the direction of this State Board of Agriculture, reports in this particular line. You have able ornithologists, men who have devoted years to this special work. Mr. S. N. Rhoads, who will follow me, is a gentleman who has devoted much attention to the economic relations of birds, and you have also other competent ornithologists, all or any of whom would be able to give you most trustworthy reports.

It is only within a few years that the food of birds has received special attention at the hands of ornithologists. We have, as you know, connected with the National Department of Agriculture, a department of ornithology, which is doing good work throughout the country. It may, perhaps, be, to some of you who have not devoted much time to the study of birds, surprising to know that you have in this commonwealth over 300 different species of birds—about 340, I am told. Certain of these birds are found with you only during the winter season, and such birds are termed winter residents. These winter residents, for the most part, breed in high northern latitudes, and on the approach of cold weather migrate southward. Others have their winter abodes in the South, and these, on the approach of spring, migrate northward, and rear their young in this State, and these are termed summer residents. The bluebird, the robin and the wren are familiar examples of these. Then you have the birds which are termed the spring and fall migrants. These birds, or many of them, migrate far northward and rear their young in the high latitudes. Then, again, you have another class of birds which are termed stragglers by ornithologists, and such birds are found here only at rare intervals. The European woodcock is an example of this.

We have two classes of birds. The water birds are not of particular interest to farmers, though it is true that some of them, like the heron or the common fly-up-the-creek, feed on insects, and the same is true of the sand-pipers, yet, collectively considered, they are not of special interest to agriculturists, but the land birds, or many of them, are of particular service to farmers. The great majority of them are serviceable to farmers, and their true life-histories should be studied carefully.

One of the most important families to which I will refer, and one in which you as farmers and fruit-growers are interested, is the sparrow tribe. You have in New Jersey over thirty different varieties of

sparrows, and these birds, with few exceptions, are not detrimental, but there is a member of this sparrow tribe which is highly detrimental, and which should be destroyed. It is hardly necessary for me to particularize this bird, for it is, as you all know, the so-called English sparrow. The English sparrow was introduced into this country many years ago under the popular belief that he would be beneficial in freeing trees, &c., of noxious insects. This sparrow has increased with alarming rapidity, and instead of being found serviceable, he has proven himself a curse. Careful investigations of naturalists in all sections of the country prove conclusively that the English sparrow is highly detrimental to agricultural and horticultural interests. In brief, the food of the English sparrow consists mainly of the following articles:

In the winter months he subsists on a diet of seeds and cereals, and when this diet is not readily obtainable he feeds, in the spring, on buds and blossoms of various fruit and shade trees. The apple, pear, peach and plum buds are eagerly devoured, as are also the different garden-trucks, and in some sections serious damage is done in this way. The English sparrow is also carnivorous to some extent, and has been known to prey on the young of other species. In some sections where grapes are grown the sparrow has been observed to destroy almost the entire crop. In some instances they feed only on the pulp of the grape, while in other cases they have no desire to prey on the pulp, but tear open the grape to get at the seed, which they devour. In the late summer and autumn, when the grains are ripening, they assemble in immense flocks, and attack the growing cereals. In some sections, in the vicinity of large towns, it has been found impossible to raise a crop of wheat, because of the ravages of these birds. The sparrows not only destroy the wheat by eating it, but, when ripening, they fly on the stalks, and they knock off three-fourths as much more by their wings as they eat. In this way they destroy large quantities of wheat. They also destroy corn; they attack the corn in the milk and tear open the husk; what they do not eat is left exposed to the ravages of insects and to atmospheric changes.

There are other sparrows which do more or less damage, but the damage which the several other members of the sparrow family do is inconsiderable and hardly worth mentioning, in consideration of the good they do by the destruction of noxious insects. It has been recommended in many sections of the country, and in quite a number

of cities as well, that bounties be paid for killing the English sparrow, but the paying of a premium on the head of an English sparrow is not wise, unless you can formulate some act of Assembly to prevent fraud. You have over three hundred kinds of birds, and there are, I believe, at least one hundred of these which would be killed as sparrows if a premium was offered for the English sparrow. If you gentlemen have any idea of offering a bounty I beg of you to exercise great care, for bounty acts, as usually drawn, are bad.

The woodpecker family is one concerning which there is much difference of opinion. There is a popular idea that woodpeckers do much damage by reason of the destruction which they occasion in orchards. The little downy woodpecker is called "sapsucker," under the popular belief that he feeds almost exclusively on the sap of trees, especially that of apple trees. For the sake of illustration I may say we have two classes of woodpeckers, one the insect-eaters and the other the sapsuckers. Here I may say the woodpeckers feed on insects and on fruit of different kinds, but the damage they do, except in rare instances, is not worthy of consideration. If you make an examination of an insect-eating woodpecker, like the familiar red-headed woodpecker, for example; if you shoot one of these woodpeckers and open his mouth and make an examination of his tongue you will find the tongue capable of being elongated or extended, and if you examine the end of the tongue you will find for a distance of perhaps half an inch it is spear-like in its appearance; there will also be found numerous barbs similar to those found on small fish hooks. This is a condition which is peculiar to the insect-eating woodpecker, as I have termed it. I mentioned to you that the tongue was capable of considerable extension, and the reason is this—the tongue bone branches out in two horns; these two horns are controlled by voluntary muscles, and the woodpecker is enabled to thrust his tongue forward and secure, by the aid of these barbs, largely, the insect prey upon which he principally subsists.

Now, what condition do you find in the other species, the sapsucking species, so called? The yellow-bellied woodpecker is a bird of passage in the spring and fall months, and to the best of my information the damage he does in this locality (New Jersey) is very slight. This may be said of one species of sap-sucking birds, but in the north the yellow-bellied sapsucker does considerable damage. An examination of his tongue will reveal these facts. If you kill one and open

his bill you will find the tongue is capable of but little extension, and in place of the horny, barbed condition, you will find numerous brush-like filaments, which are especially adapted to taking up the sap on which this species feeds, to a ruinous extent in some sections of the country. In the North it has been found that this particular species, where it is abundant in the summer time, does serious damage by destroying whole areas of forest. They feed by perforating the tree and tearing out the soft inner bark, which they eat. In other portions of the country they have been known to ruin apple trees by the perforations which they make.

The little downy woodpecker is not an enemy in the fruit orchard. He is a friend who goes there with the intention of destroying insects, and not to feed on the sap of your favorite fruit tree, and he should, therefore, be protected.

The other birds to which I shall refer briefly, are the crow, the blackbirds and the jays. The jay is a great egg devourer, and does much damage by pillaging the nests of various kinds of small wild birds. It is a question in the minds of many ornithological specialists, who have studied his history, whether or not he does not do much more damage than good. It is true that the bluejay is omnivorous and preys to some extent on noxious kinds of insect life, yet his egg-devouring habits—and he devours the young of different species of small birds—makes the evidence rather against him.

The crow—the common American crow—with whom every farmer here is familiar, is a bird which has many friends and numerous enemies. The crow, like the bluejay, is omnivorous. He does some good—and in our investigations we have paid particular attention to him—and we think he is not a friend of the agriculturist. This is not yet positively established perhaps, but I will say that the investigations, as far as conducted, are against this familiar resident of your corn-fields.

You have several varieties of blackbirds in this State. You have the red-wing, or swamp blackbird, the crow blackbird, and the rusty blackbird. The last-named bird is found here only as a temporary passenger. The bobolink or reedbird is also included among the blackbirds. The crow blackbird, at some seasons of the year, is highly serviceable. It is true he visits the corn-fields and does some little damage, but his visits are more beneficial than detrimental; that is, his visits in the spring. I made an examination of the craws and stomachs of a number of blackbirds killed in the field of one of my

farmer friends. He invited me to go out with him and help him kill a lot of them, as he thought they were pulling up his corn, and doing considerable damage to his crop. In the course of a couple of hours we killed, if I remember rightly, 31 blackbirds that appeared to be feeding on his corn, which was perhaps 1½ or 2 inches above the ground. I immediately took the birds and opened their stomachs and craws, and I found that but one of the entire number had any corn in its stomach. The majority of them, 19 of them, had only cut-worms, and cut-worms, as you know, are detrimental to any man's corn-field, if abundant. As many as 30 cut-worms, of various sizes, were taken from the viscera of one crow blackbird. I mention these facts to show that he is not always there for an evil purpose. In some parts of the country, in the latter part of the summer, and in the early autumn, they do much damage to the cereals, especially to the corn, and in some sections of the South especially, they with other of the blackbirds do serious damage to the growing crops. They with other species, are known as ricebirds in the rice-growing States, and the damage they do to the rice crop amounts to about $2,000,000 per annum. Thus, a bird in one section may be serviceable, and in another highly detrimental.

The red-wing blackbird is universally beneficial during the breeding season and should be protected, although in the rice-growing States he is not a friend of the planter. The crow blackbird is like the crow, in that he has a taste for the eggs of other birds, and this is a bad trait.

Now we come to the very important class of birds known as birds of prey. Such are the eagle, the hawk, and the owl. The birds of prey have, until within a very few years past, been universally regarded as enemies of the farmer, the fruit-grower, the sportsman, and the poultryman, for, by common consent, it was thought that these birds fed only on poultry, game, and small wild birds. So universal was this popular belief that in 1885 the Legislature of Pennsylvania, with the sanction, it is said, of many of the leading agriculturists of our commonwealth, passed an act which was known as the "Scalp act" of 1885. This act of Assembly offered premiums, ranging from fifty cents to $2 each, to be paid for the heads of various species of hawks, owls, and certain mammals. Wolves, foxes, minks, wildcats and weasels were included in the offer. In the remarkably short period of about nine months the Commonwealth of Pennsylvania

paid out nearly $150,000 in bounties. About $80,000 of this sum was paid for the heads of birds which were believed to have been taken from the bodies of hawks and owls. The State Board of Agriculture, owing to numerous complaints received from all parts of the State concerning the operations of this act, which was then believed by many to be unjust, caused a careful investigation with regard to the true economic relations of the birds to the farmers' interests, which, it was alleged, the birds of prey interfered with. An officer of the State Board of Agriculture secured the bodies of over six hundred hawks and owls, on which premiums had been paid. Understand, gentlemen, this hawk and owl clause was placed in the bill because it was almost universally believed that these birds without exception were prejudicial to agriculture. This officer of the State Board obtained the bodies of over six hundred birds upon which premiums had been paid—hawks and owls—and he carefully investigated, by post-mortem dissection of the contents of their viscera, and he was astounded when he ascertained that 95 per cent. of the food-materials they subsisted upon consisted, not of poultry and game, but of field-mice and different forms of noxious insects. When these facts were presented, first to the State Board, and then to the Legislature, it is unnecessary to say that the act, as regards birds of prey, was repealed in its entirety. I want to give you briefly a little statement in regard to popular ignorance. It will carry out what I previously said as to the importance of publishing reliable information concerning the true history of birds and mammals found in your commonwealth.

This act of 1885 in Pennsylvania made provision that certain mammals, or animals, as they are commonly spoken of, viz., wolves, wildcats, minks, skunks, weasels and foxes, should be paid for. Of course, the majority of these animals are detrimental to the agricultural and game interests of the State, but what was the result? Under different scalp acts in Pennsylvania a wonderful amount of fraud was perpetrated in various sections of the State. Of course, certain scalp-hunters intended to practice fraud, but the County Commissioners, or those whose duty it was to pay the bounties for these animals, committed fraud through ignorance—certainly not, it is believed, intentionally. In one county where they boasted of their intelligence, and where one of the County Commissioners was said to be a naturalist, over $3,000 were paid to a party of scalp-hunters, five

in number, for the heads of various birds and animals. An investigation showed that but a small part of this money had been properly paid. The investigations conducted showed that these County Commissioners had paid nearly the whole amount for the skin of an old mule and an old buffalo-robe [laughter], thus clearly demonstrating that this local naturalist was unable to tell the difference between a mule-skin and the head of a fox or wolf. [Laughter.] This is one illustration where the bounty act was detrimental. In the border county of Crawford over $10,000 were paid in bounties, and it was ascertained that, not only in that county, but in other border counties, they were paying premiums on mammals and birds killed in adjacent States. In the Buckeye State, certain individuals, according to current rumor, made a specialty of gathering the eggs of hawks and owls, and bringing them over into Pennsylvania and hatching them out under their hens. [Laughter.] One resident of Delaware had a large number of steel and other traps, and he caught animals and brought them over into Pennsylvania, and killed them and collected the bounties—the law specified that they must be killed in Pennsylvania. [Laughter.] It is an easy matter for a man familiar with the habits of these animals to set his traps so as to catch them. This man would bring his catch across the Delaware line before killing them, thus complying with the letter of the law, and in this way he made quite a good living. I can show you how profitable one red fox was in Pennsylvania. In one of the counties a hunter killed a fox, took the scalp and collected the bounty. He left the fox lie, and another party of hunters came along, and took the pelt, and cut it up into sixty pieces and collected the bounty on all of them. [Laughter.] This fox was good for sixty-one bounties. I mention briefly these facts in connection with the operation of the scalp act, so that you, gentlemen, if it is your intention to offer bounties for the killing of birds or mammals you must first take occasion to instruct your people with regard to these birds and other animals—arouse a popular interest, and then, if a bounty act is passed, make it stringent, so that frauds cannot be perpetrated.

I have been asked to speak briefly of birds known to destroy English sparrows. Several species of hawks and owls are destroyers of English sparrows, but about the habitations of men, the screech-owl and sparrow-hawk, the smallest of all the hawk family, and lastly, the butcher-bird or shrike—a bird very similar in its general

appearance to the mocking-bird—so named on account of it habit of impaling its prey, small birds, grasshoppers, &c., on thorns of trees—these are the most effective destroyers of the English sparrow. One species of the butcher-bird is rather common, I understand, in this section in the winter season. The screech-owl is a beneficial bird; he preys mainly on mice, and now that sparrows have increased to such an alarming extent it has been found in the cities, and to some extent in the rural districts, that these owls are very beneficial in destroying the English sparrow.

I also, by request, will say a few words in regard to the smallest of all our species of birds—the humming-bird. There are, it is stated, about 450 species of these birds known to science. Of these, but one species occurs east of the Mississippi river, and that particular species is the one known as the ruby-throated humming-bird. Humming-birds are peculiar to America, and their center of abundance is in the tropical portions of the continent. There is a popular, but greatly mistaken idea, that this bird feeds exclusively on the sweets of flowers. This is not correct. It is true the little humming-bird will feed on honey, but investigations have proven that the major portion of his food consists of small insects. Prof. Riley, of Washington, D. C., examined 50 of these little birds, and found that nine-tenths of their food consisted of minute spiders and beetles. It is a bird that should be protected.

I have already occupied more time than I intended, but shall be pleased to reply to any interrogatories, concerning the subject of birds, which may be asked.

Mr. Beans—I understand there are two species of sparrow in England. It is said that we imported the wrong sparrow; the one which is beneficial is known as the hedge sparrow; they feed on insects, and are helpful to agriculture; and it would be beneficial to import them. What can you say about the hedge sparrow?

Dr. Warren—You are correct, there are two species; the English sparrow is the larger one. The name "English" is misleading, as it would indicate the bird is peculiar to England, when it is not—it is found very generally throughout Europe. As I have previously intimated, there are several species of sparrows in Pennsylvania, but the majority of them are beneficial. They prey largely upon noxious insects, at certain periods of the year, particularly when breeding, and at other times on the seeds of various grasses and noxious weeds.

Hence they are beneficial, and merit your protection. The species of sparrows introduced from England have become naturalized and are thriving, but unfortunately the one most detrimental thrives the best.

Mr. Williams—I move a vote of thanks to Dr. Warren, for his very entertaining and instructive address.

The motion was agreed to.

THE ECONOMIC RELATION OF BIRDS TO AGRICULTURE, ETC.

The Chair—We will follow this address with another on "The Economic Relation of Birds to Agriculture, with Suggestions for State Legislation." I have the pleasure of introducing Mr. Rhoads, who will address you.

ADDRESS BY SAMUEL N. RHOADS, HADDONFIELD, N. J.

The question expressed in the foregoing title has, of late years, become one of such growing importance to Eastern farmers, and has been so actively investigated by our neighboring States, that it needs no prefatory introduction to the notice of this Board. On the other hand, it is surprising that the farmers of New Jersey, in view of her foremost position in the rank of agricultural States, should have been content to take a subordinate place in this important matter.

The object of this paper will be to outline briefly the past and present status of bird economics as they relate to agriculture, sketching the advance in our knowledge in that department of science during the last ten years, and considering the application of this knowledge in the interests of the farming classes. In this connection the past and present bird legislation in this country, protective or otherwise, will also be touched upon, and recommendations for future action, based on the body of experience now at our disposal, will be presented for the consideration of the Board.

The value of insectivorous birds to the tiller of the soil has been more or less recognized since the most remote antiquity, and we find frequent allusions to it in all literatures up to the present time.

Occasionally some one with a more patient and observing spirit has noted the vast number of insects destroyed by a single pair of birds in a day, or a lively public discussion of opinions would be

conducted on the merits and demerits of crows, blackbirds and cedar-birds.

Owing to the thoroughly unscientific nature of these discussions, and the prevailing amount of prejudice and sentiment indulged in by the contestants, they were of little value. Hence we see, as a result of this agitation, the many noxious and unavailing laws passed by Legislatures throughout the United States, so inapplicable as to render enforcement impossible, or even to increase the evil they were designed to prevent. It is true that in this State the West Jersey Game Protective Association did much to enforce, not only the game laws, but indirectly to make people respect the act of 1869, preventing the destruction of "insectivorous, small and harmless birds." Game birds and game laws, however, have no direct bearing on the subject now before us, and shall be left out of our further discussions on this topic.

About ten years ago Prof. Forbes, of the Illinois Board of Agriculture, began the first public scientific investigation of the food habits of birds made in this country. His labors in this direction were chiefly confined to the so-called "insectivorous" birds, and resulted in the tabulation and publication of the bills of fare of several of our commoner species.

Soon after this, in 1884, the American Ornithologists' Union appointed a committee on bird protection, whose business it was to examine thoroughly into the economic and æsthetic value of our birds, and after determining the amount and causes of their destruction, to recommend proper forms of legislation for the preservation of useful and extermination of noxious species. The work carried on by this committee proved of so valuable and extensive a nature that it was finally made a division of the United States Department of Agriculture, with a special appropriation of money to continue, on a more extensive scale, the experiments already begun.

Soon after this, in 1888, Mr. B. H. Warren was appointed State Ornithologist of the Pennsylvania Board of Agriculture, and ordered to prepare a collection of the native birds of the State and investigate their food habits with a view to publishing a complete work on Pennsylvania ornithology for free distribution among farmers, schools and libraries of the commonwealth. In 1889 appeared the results of his work in an abridged edition, which, owing to a mistake in the appropriation, was entirely inadequate, both in quality and number of

copies, to do much good. The Legislature next year ordered an extension of the work, increasing its size to 450 pages, its illustrations to 100 colored plates, representing 160 species, and the number of copies to 19,000.

As a further result of Mr. Warren's labors the Legislature passed a law repealing the scalp act of 1885 and making it an indictable offense for a person at any time to kill or trap any wild bird or take their eggs or young (except those already provided for in the game laws), with penalty of from ten to fifty dollars. I shall speak more fully of the provisions of this act farther on. Cotemporary with these efforts, the still existing committee of the "A. O. U.," aforementioned, seconded by the Audubon and Agassiz Societies, awakened a wonderful public interest in regard to the destruction of birds for millinery purposes. This traffic, stimulated by fashion, had assumed such immense proportions in 1887 and 1888, that it had already effected the extermination, not only of many of our more ornamental water birds in the East, but had extended its greed to many of the most useful species about our homes. The combined efforts of the bird-lovers finally found expression in New York and Massachusetts (?) in the much-needed laws which now adorn their statute-books.

The plan of investigation into the food habits of our birds, conducted by the United States Department of Agriculture, was to divide their work into two classes of inquiry—first, laboratory work; second, field work. The former furnished the *evidence*, the latter, in large degree, the *opinions*, upon which the department based its decisions. In the laboratory, analysis and identification were made, by experts, of the contents of several thousand bird stomachs, collected by the corps of employed and volunteer assistants, stationed in various parts of the United States. The field work was conducted mainly through correspondence with competent, unprejudiced observers throughout the country, to whom circulars and blanks were sent for the filling in of desired information concerning life-history, food habits, and general conduct of debatable species. These reports were carefully tabulated and summarized by the department, and the results published for the public use.

The English sparrow and the crow were respectively made the subjects of special inquiry, and form the topics of separate bulletins of the department.

I regret that in this connection I can do only the briefest justice to

these reports, recommending to the furthur inquiry of the Board the special publications of the United States Department of Agriculture, Warren's "Birds of Pennsylvania," and the Pennsylvania Agricultural Reports for 1888 and 1889.

The value of *insectivorous* birds has always been considered more a question of degree of usefulness than of wholly good or wholly bad. Owing to the ever-variable conditions in which our useful birds are situated, it is impossible to determine their comparative value as species, and we are fully satisfied, when it is found that a species is not an out-and-out enemy, to give it the benefit of the doubt and call it our friend. With the possible exception of the crow and jay, and the unqualified exception of the English sparrow, all other birds popularly termed "insectivorous" in the eastern part of the State are now conceded by competent critics and experts to be beneficial.

This includes, regardless of the opinion of many, the oft-despised red-wing and crow blackbirds and the cedar-bird, a trio which show at certain seasons an unfortunate love for corn and cherries, set off, in the case of the grackle, by a tragic background of sucked eggs. But a pennyworth of pine-tar and ingenuity in the first case, and of double-entry book-keeping in all three, will show a yearly balance to the birds' credit astonishing enough to silence the most skeptical.

In a lengthy paper on the food of crows, Mr. W. B. Barrows says the warmest friends of this bird claim three points in its favor:

1. The habit of destroying injurious insects.
2. The habit of catching mice.
3. The habit of eating carrion.

Of these, the first two are valid recommendations; the last is purely negative, because it is notorious that all the carrion they do eat is so much stolen from our ill-fed scavenger, the turkey vulture. Next follows a list of injuries inflicted upon us by crows. They are:

1. Destruction of sprouting, immature and ripened grain, especially Indian corn.
2. Destruction of ripe and ripening fruits.
3. Destruction of various other vegetable products, such as cabbages, potatoes, peanuts and melons.
4. Destruction of eggs and young of poultry.
5. Destruction of eggs and young of wild birds.

6. Distribution of noxious seeds, especially of the sumac and poison-ivy.

Waiving all other accusations against the crow, let me consider a moment the significance of its habit of destroying eggs and young birds. Did I not appreciate the need of overwhelming evidence to convict and scientifically condemn any of our native birds, I should confess surprise that Mr. Barrows is still on the fence regarding the crow question. He declares he must have more evidence and stomachs before a final verdict, though his paper would seem to have already found enough evidence to hang or otherwise annihilate all the crows in New Jersey. During three months in the year the sacrifice of young birds and eggs by a single pair of crows is frightful. I have watched a pair regularly visit the breeding-grounds of red-wing starlings and despoil a dozen nests of a forenoon, in spite of my shouts and the combined attacks of the infuriated parents. Their pillage of the nests of robins, wood thrushes, leadbirds, orioles and other species building in exposed situations is not confined to the woodland; they visit our yards for that purpose, and even vanquish and despoil the valiant kingbird of his treasures.

What the crow accomplishes by willful murder the English sparrow largely effects by persecution. The sparrow not only ousts many of our native birds from their homes, depriving us of their services and joyous presence, but by persistent worry, renders so abortive the nesting of those which are able to remain with us, that their numbers are not only apparently but actually diminishing.

Those of our birds which the sparrow forces to forsake the protective neighborhood of our dwellings find themselves at a disadvantage in the wildwood, and, unable to cope with the altered conditions of their environment, ultimately perish. The native birds and the native Indians of America, at the present time, furnish one of the strangest parallels known to modern evolution. More sense and less sentiment on our part is the only remedy against their extinction.

The most interesting phase of the work carried on by the United States Department of Agriculture refers to the food habits of hawks and owls, birds popularly classed among the most noxious of animals. In some States these were included under the ban of special legislation for the extermination of noxious mammals, the "Scalp act" of Pennsylvania, passed so late as 1885, being a notable example.

Dr. A. K. Fisher's report of the examination of over a thousand stomachs, representing 28 species of rapacious birds, shows that only five, the sharp-shinned, Cooper's, pigeon and duck-hawks, and the great horned owl, subsist chiefly on birds, while the rest feed principally, and some almost exclusively, on insects and mice.

We now come to the question of legislation on this important subject.

Independently of our game laws, the bird laws operative in New Jersey were, first, that approved March 30th, 1869, entitled "An act to prevent the destruction of insectivorous, small and harmless birds, within the State." This repealed a similar act of March 6th, 1850.

It includes all land birds, great or small (not game birds), regarded as harmless in their habits, also the fish-hawk and turkey-buzzard, but excepts eagles, hawks, owls, and members of the crow family. It also prohibits the robbing of the nests of birds so protected. The fine for violation is not less than ten nor more than twenty dollars. This act also repealed the supplement of March 9th, 1869.

March 27th, 1874, an act was passed, consolidating all former acts relating to game and insectivorous birds. Sections 11, 12 and 13 of this act relate to the subject in hand. They are in substance as follows:

Section 11 of Consolidation act of March 27th, 1874.—No person shall at any time, within this State, kill, trap or expose for sale, or have unlawfully in possession after same is killed, any night-hawk, whippoorwill, sparrow, thrush, lark, finch, martin, barn-swallow, woodpecker, flicker, robin, oriole, red or cardinal-bird, cedar-bird, tanager, bluebird, catbird, or any other insectivorous bird, under a penalty of five dollars for each.

Sec. 12. Section 11 shall not apply to any person who shall kill any bird for the purpose of scientific investigation, or to have the same stuffed and set up as a specimen.

Sec. 13. Against destroying of nests of eggs of any wild bird, save of a predatory character.

Approved March 27th, 1874.

March 9th, 1885, the English sparrow nuisance had reached such proportions, that a special act was passed exempting that species from legal protection.

These New Jersey laws were similar to the majority in operation in the United States previous to the recent agitation in bird legislation, which has affected the statutes of some Eastern States since 1885, especially those of New York, Pennsylvania and Massachusetts.

I will close this paper by a summary largely taken from Hon. George B. Sennett's address on bird legislation, made before the Pennsylvania State Board of Agriculture:

"In an economic sense, birds may be divided into three classes, viz., good, bad and questionable.

"The bad birds are those who do infinitely more harm than good, and when so denounced by proper authority, should be outlawed by common consent and their numbers held in check by the most efficient means known. To this class the English sparrow (*Passer domesticus*) has alone been adjudged, and that after years of study and consideration of testimony from thousands of witnesses from all parts of the land.

"The questionable birds are those whose habits are sometimes good and sometimes bad, and against whom, at best, not enough testimony has been brought to light to warrant in condemning.

"In this class are the crows, blackbirds, jays, and a very few of the birds of prey. Formerly, most if not all of the birds of this class were denied the benefit of the doubt and shot, but in recent careful and more thorough investigation, quite a revolution has taken place in our estimate of these birds, and in the light of to-day we feel it safer to give them the benefits of the doubt and protect them along with the good birds.

"We have now reduced our legal wants to two, viz.:

"1. Protection for all non-game birds except the English or house sparrow.

"2. The outlawing and destruction of the English sparrow.

"Let us see against what abuses we must fortify our proposed bill for protection:

"*First.* We must put a stop to the work of the feather collector, who, for the use of the milliner, slaughters our insectivorous birds of the finest plumage and sweetest song.

"*Second.* We must put a stop to the nest-robbing, stringing of eggs upon straws, and the too-frequent use of firearms, pea-shooters and such. Our best birds suffer to an enormous extent from this source, and nothing but the law and its stringent enforcement will remedy this long-standing evil.

"*Third.* The indiscriminate killing of birds and collecting of eggs

in the name of science. There is no desire on our part to check or to embarrass in any way the most thorough scientific investigation, but under the plea 'for scientific purposes' there is too little discrimination for the good either of birds or science. It is to prevent the abuse of this privilege and to assist honest collectors that we recommend the issuing of permits to well-meaning and deserving persons of suitable age. This plan is now in vogue in the State of New York, and works well.

"Our second general want is easily expressed, but the outlawing and extermination of the English sparrow is not so easily done. The sparrow evil has its counterpart in the Canada thistle evil, and the longer we put off doing something definite the worse the evil becomes."

Mr. Sennett then gives extracts from Dr. Merriam's report, issued by the United States Department of Agriculture, relating to the extermination of the English sparrow. Dr. Merriam strongly objects to a "bounty system." He says:

"1. The offer of a bounty appeals mainly, if not entirely, to men or boys who have no further interest in birds of any kind than that inspired by their cash values, hence very many valuable birds will be killed.

"2. The ordinary safe methods of shooting and trapping are too slow to be profitable, and all sparrow-killers will be tempted to use other methods—especially the most powerful and dangerous poisons. In this way domesticated birds and animals are sure to suffer, and even human life may be endangered; while the wholesale use of such poisons without regard to the seasons will result in the death of many species of wild birds.

"3. Sparrows being most abundant in towns and cities, where fire-arms cannot be used, poison is certain to be resorted to at all seasons and by the most irresponsible people.

"4. With regard to expense, a low bounty of one or two cents per head would be useless, and any higher bounty impracticable. The first is practically demonstrated in the Michigan law and its results, and the second by the Montana law on prairie-dogs and ground-squirrels.

"If it is estimated that there are over 40,000,000 sparrows in the United States to start with, and we were given five years to exterminate them and their increase, the bounty at five cents apiece would amount to over $11,000,000. This is a result of the investigations of the National Government, and shows that the offer of a premium on sparrow scalps of *one cent* each in any of our Eastern commonwealths

would, to accomplish anything like extermination, 'bankrupt the State.'

"In Montana, an act providing a bounty of ten cents each on prairie-dogs and five cents each on ground-squirrels, in six months cost the State $50,000, without any perceptible diminution in their numbers, and as the money was exhausted, a special session of the Legislature was called to repeal the law.

"The following recommendations are made by the department to the legislative bodies of the various States:

"1. The immediate repeal of all existing laws which afford protection to the English sparrow.

"2. The enactments of laws legalizing the killing of the English sparrow at all seasons of the year, and the destruction of its nests, eggs and young.

"3. The enactment of laws making it a misdemeanor, punishable by fine or imprisonment, or both—(*a*) to intentionally give food or shelter to the English sparrow, except with a view to its ultimate destruction; (*b*) to introduce or aid in introducing it into new localities; (*c*) to interfere with persons, means or appliances engaged in or designed for its destruction or the destruction of its nests, eggs or young.

"4. The enactment of laws protecting the great northern shrike or butcher-bird, the sparrow-hawk and the screech-owl, which species live largely on the English sparrow.

"5. The enactment of laws providing for the appointment of at least one person holding civil office * * * in each town or village * * * whose duty it shall be to destroy * * * English sparrows in the streets and parks and other places where the use of firearms is not permitted."

So much for the English sparrow in particular. The following act, combining these ideas with those previously pointed out, is considered the most desirable form of law for our State:

An Act for the protection of birds, their nests and eggs.

Section 1. No person shall at any time within the State kill, trap, or expose for sale after the same has been killed, poison or drug, snare or catch any wild bird other than a game bird in any of the counties of this commonwealth. For the purposes of this act the following shall be considered game birds: The *Anatidæ*, commonly known as swans, geese, brant, river and sea-ducks; the *Rallidæ*, commonly known as rails, coots, mud-hens and gallinules; the *Limicolæ*, commonly known as shore-birds, surf-birds, plovers, woodcock, snipe,

sandpipers, tallers and curlews; the *Gallinæ*, commonly known as wild turkeys, grouse, prairie chickens, pheasants, partridges and quails.

Sec. 2. No person shall take or needlessly destroy the nests or eggs of any song or wild birds.

Sec. 3. Sections one and two of this act shall not apply to any persons holding a certificate giving the right to take birds and their nests and eggs for scientific purposes, as provided for in section four of this act.

Sec. 4. Certificates may be granted by the prothonotary of any county in the commonwealth to any properly accredited person of the age of eighteen years or upward, permitting the holder thereof to collect birds, their nests or eggs, for strictly scientific purposes. In order to obtain such certificate the applicant for the same must present to the prothonotary written testimony from two well-known scientific men, testifying to the good character and fitness of said applicant to be entrusted with such privileges; must pay to said prothonotary the sum of one dollar to defray the necessary expense attending the granting of such certificate, and must file with said prothonotary a properly executed bond in the sum of fifty dollars, signed by two responsible citizens of the commonwealth as sureties. This bond shall be forfeited to the commonwealth, and the certificate become void, upon proof that the holder of such certificate has killed any bird or taken the nest of any bird for other than the purposes named in sections three and four of this act, and shall be further subject for each such offense to the penalties provided therefor in section seven of this act.

Sec. 5. The certificates authorized by this act, shall be in force for one year only, from the date of their issue, and shall not be transferable.

Sec. 6. The English or European house-sparrow (*Passer domesticus*) is not included among the birds protected by this act.

Sec. 7. Any person or persons violating any of the provisions of this act shall be deemed guilty of a misdemeanor, punishable by imprisonment in the county jail of not less than five nor more than thirty days, or by a fine of not less than ten nor more than fifty dollars, or both, at the discretion of the court.

Sec. 8. It shall also be a misdemeanor, under the same penalties mentioned in section seven—(*a*) to intentionally give food or shelter to the English sparrow, except with a view to its ultimate destruction; (*b*) to introduce or aid in introducing it into new localities; (*c*) to interfere

with persons, means or appliances engaged in or designed for its destruction, or the destruction of its nest, eggs or young.

Sec. 9. In all actions for the recovery of penalties under this act, one-half of the recovery shall belong to the plaintiff, and the remainder shall be paid to the County Treasurer of the county where the offense was committed.

Sec. 10. There shall be appointed [here state how] a citizen of this State who is an expert naturalist, who shall be the State Ornithologist, who shall serve at least two years or until his successor can be appointed, who shall receive a salary per annum [here state amount], who shall give the necessary bonds [here state amount] for all moneys, collections of natural history and archives entrusted to his care, and who shall devote his time exclusively to the interests of economic ornithology within the commonwealth.

Sec. 11. All acts or parts of acts inconsistent with or contrary to the provisions of this act are hereby repealed.

With the exceptions of Sections 8 and 10, this act was passed by the State of New York in 1877 (?), and by the State of Pennsylvania in 1889. Section 8, relating to the harboring and protection of sparrows in defiance of law, was passed by New York's Legislature the year following its passage of the act.

Previous to the passage of the Pennsylvania act, Mr. Warren had been appointed State Ornithologist, so that all the sections of the act, as I have given it, are now in successful operation in the sister States.

Should the Legislature and State Board of Agriculture of New Jersey see fit to inquire more carefully into the important questions briefly considered in this paper, and seek to add to the sum of scientific knowledge already attained, there yet remains a wide field for research.

Among the topics most demanding consideration in our State are the following:

1. (*a*) The establishment of a co-operative system among several adjoining States for the united extermination of the English sparrow; (*b*) the passage by these States of uniform laws providing for the appointment and maintenance in each of a sufficient corps of sparrow-hunters, (*c*) whose duty it shall be, not only to carry on the destruction of young and old birds, with their nests and eggs, throughout the year, but who shall also enlist and encourage the voluntary services

of persons throughout their respective counties, instruct them in the most efficient methods of extermination, and enforce the laws regarding the willful harboring or encouragement of these birds.

2. The appointment of certain persons residing along our sea-coast, whose business it shall be to enforce the laws against the destruction of gulls, terns and other ornamental sea-birds, and the robbing of their eggs during the breeding season.

3. A more thorough examination of the status of the crow in its relation to the agriculture of this State, and to examine its title to the protection accorded it in other States.

4. The reprint and publication by the State, in a modified form adapted to the needs of the present occasion and of the ornithology of New Jersey, of Warren's book on the "Birds of Pennsylvania." Also the free and liberal distribution of this work among all classes in the commonwealth more directly interested, especially those most requiring enlightenment on the subject of bird economics.

The Secretary—It seems to me this is a very important question. The increase of insect pests is on every hand, and birds have been our best friends. The subject is of sufficient importance to have our careful consideration, and I would suggest that this paper, with the recommendations made, be referred to a special committee of three, to take up the recommendations and report to the Board next year, with a view to securing protection for beneficial birds, and also with a view to securing, ultimately, a State Ornithologist.

The motion was agreed to, and a vote of thanks was extended to Mr. Rhoads for his able and valuable paper.

(For discussion of the above subject and of the laws of trespass, see minutes.)

FORESTS OF NEW JERSEY.

BY PROF. JOHN C. SMOCK, STATE GEOLOGIST.

The Chair—It gives me pleasure at this point in our proceedings to introduce Prof. John C. Smock to the Board. The Professor will speak to us of the forests of New Jersey.

AREA AND DISTRIBUTION OF FOREST.

The distribution of the forested area of the State is shown by the sheets of the Atlas of New Jersey, the surveys for which were completed in 1887. The area, as computed from these surveys, amounts to 3,234 square miles, or, in acres, to 2,069,819 out of the total of 4,809,218 acres of land surface. This aggregate represents all lots and tracts of ten acres and upwards. It is therefore not in excess of the whole forested area, inasmuch as there are many small lots less than ten acres in extent, which are not included in this total amount. No later estimates based on wide field observations could alter these figures, and hence they are to be accepted as authoritative. In fact, they are valuable to-day, because of the slight changes which are observed in the wooded areas. It is interesting to note that the statistics of the Tenth United States Census, for New Jersey, shows that in 1880, there were in the State 2,330,000 acres of forest, which is less than 8 per cent. above the total area derived from the topographic surveys. The cleared upland surface is in the ratio of 24 to 20, or the latter is equal to 46 per cent. of the whole upland, or 43 per cent. of the total surface. But the distribution varies greatly in the different parts of the State. And for a study of the forests of the State, the great natural divisions based upon geologic features may be used. They are:

I. The Kittatinny mountain.
II. The Kittatinny valley.
III. The Highlands, or crystalline rock formations.
IV. The Highland valleys or palæozoic formations.
V. The red-sandstone plain.
VI. The trap-rock ridges.
VII. The clay and greensand-marl belts.
VIII. The coastal plain, or the pine belt.

In this scheme the Upper Delaware or Minisink valley is omitted, as it is so narrow and is only 41 miles long, from Port Jervis to the Delaware Water Gap. It may be viewed as the lower slope, or foot of the Kittatinny or Blue mountain. It also lacks homogeneity in structure and surface rocks, and is consequently so diverse in its soils, that generalized statements respecting it are scarcely possible or applicable to it as a whole. The larger part of the valley of the Delaware is cleared, and the wooded area is confined to the more rocky surface and to the steep hillsides. The lower slope of the Kittatinny or Blue mountain is generally wooded.

I. The Kittatinny or Blue Mountain range is a steeply sloping, single ridge, and is noted for its flinty soil and its rocky surface. A small part of it is in farms, and it is doubtful if the whole range were not best in wood and devoted to the production of wood. With the hard wood there is some pitch pine, hemlock and white pine, but fires ravage this mountain range so frequently, that little valuable timber is found on it. Charcoal-burning and huckleberry-picking follow in the train of fires, and leave little hope of any wood crop of value. The area included in this mountain range is approximately 140 square miles, or about 90,000 acres.

II. The Kittatinny valley extends across the State from the Orange county and New York line, southwest, forty miles, to the Delaware river, and having a breadth of ten to thirteen miles. It is all embraced in Sussex and Warren counties. Although the surface is much modified by streams and by minor depressions, it is essentially a broad valley, lying between the Kittatinny mountain and the Highlands. The predominant rock formations are limestone and slate, and they produce two well-marked types of soil, whose tree-coverings are also characteristic of them; the limestone favoring the growth of white

oaks, hickories, ash and maple, and rarely pine or hemlock, whereas on the slate there are more conifers, although not predominant, with maple, cherry, birch and poplar. The valley is noted for its agricultural wealth, and particularly as a dairy region. Hence the clearing of the forests has been extensive, and such as to leave only small swampy tracts and rocky or stony lots in woods. There is more wood on the slate than on the limestone, and more near the Kittatinny or Blue mountain than on the southeastern border. While the forested area is, on the average, 22 per cent. of the whole, it is 13 per cent. only in Wantage, Lafayette and Newton townships, 20 to 25 per cent. of the central and southwest-central townships, and 28 to 35 per cent. of Blairstown and Hardwick.

III. The Highlands, or the crystalline rock region, is characterized by much diversity of surface and soil. It may be divided into a northeast or drift-covered part and a southwest or driftless part. The stony nature of the former preclude profitable farming in many places, and so the timber was left to grow. The demands of the large iron works, even at an early day, for fuel with which to smelt their ores, also served to keep large tracts in forests. The decline of the charcoal-iron industry has made the demand for wood less active, and as a result these tracts are to-day more heavily timbered than they were several decades ago. The southwestern part of the Highlands is more suited to tillage and pasturage, and a much larger area is there cleared, and the forest is but little over 30 per cent. of the whole and is confined to the steeper mountain slopes and the more rocky surfaces. To the northeast the timber area is about 80 per cent. of the surface. Although there is a wide range in the trees growing on these Highlands, the chestnut is the most common, and is noted here for its thrifty growth and for its value as a timber tree. It appears to be especially well adapted to the well-drained, coarse-grained, granitic and gneiss rock soils and to the hillsides on these rocks.

IV. The Highland valleys, or palæozoic formations, are here grouped as one, although not connected or adjacent, but interlocked with the hills and mountains of the Highlands. Their names suggest at once their geographical relations. They are Sparta, Vernon, Pequest, Pohatcong, Musconetcong, German-Longwood and Wanaque valleys. They resemble in some respects the Kittatinny valley, and

what has been said above under that head is applicable to them. In some of them the clearing has swept away nearly all the timber, as in the noted Musconetcong and the Lower Pohatcong valleys. In these the forested area amounts to less than $1\frac{5}{10}$ per cent. of the whole, and there is probably no more cleared-up or less-wooded district in our country than these valleys. Deforestation has certainly reached its limit in them. Of course, the situation between wooded Highland ranges is such as to afford a timber-supply within one to five miles distant, and many farms here have no wood-lots at home. The fertility of the soil on these limestone bottoms and the railway facilities have combined against the woods, and the latter have retreated up the hillsides. It may be noted, in passing, that forestry in these valleys is not a factor in the development of their resources.

V. The red-sandstone plain, like the Highlands, has its northeastern or drift-covered and its southwestern or driftless parts, and a line from Morristown by Madison and Plainfield to Perth Amboy separates them. Within the belt, whose dimensions are sixty-seven miles in length and sixteen to thirty miles in breadth, there are the trap-rock ridges. They afford timber to the lowlands of this belt. The area in forest is small, amounting in all of Somerset county to 14 per cent., and in Hunterdon and Mercer counties to not more than 10 per cent. In Franklin and Montgomery townships it is about 5 per cent.; in Branchburg, one acre in eighty only. To the northeast the percentage rises to 30, and to 50 in Bergen county. Farms here in many localities have distant wood-lots, miles away on the trap-rock ridges. The forests left on the red shale and red sandstone consist almost exclusively of hard wood, oaks and hickories abounding. There is very little pine of any kind. That the deforestation has here advanced beyond the proper and most economic limits is without doubt in the mind of the writer. It would be extravagant to assert that this belt is in places approaching the condition of a desert, and yet under the severe conditions of a prolonged drought a few years ago the approach appeared to have been begun. The dried-up summer brooks, the torrential floods, the parched and baked soil, the wind-swept stretches of field are phenomena all too often seen. And it is proper to note that this forest limit is far below that of continental European countries, where a far-sighted and prudent forest management governs and protects the forest.

VI. The trap-rock ridges constitute the landmarks in this plain and are, as a rule, in wood, having small clearings, isolated farms, or areas near the thickly-settled valleys and cities, and where suburban demands have transformed the rough mountain side or crest into parks and country seats. On account of the thin soil-covering over wide stretches, the trees are scraggy and stunted, but generally the timber is of fair quality. Oaks predominate, but there is not so much hickory or ash as on the red shale and red sandstone. These ridges serve as local feeders of fuel and timber to the adjacent lowland country. They appear to be destined to remain for a long time in this forested condition. As a part of the whole red sandstone belt and included in it, they serve to raise the percentage in forest to 30 at the northeast and 12 at the southwest.

VII. The clay and greensand-marl belt of the State makes up nearly one-fifth of its surface. It is so varied in its soil, that the forest has no marked characteristics. And both evergreen and deciduous trees are common, and in general this is a belt of more mixed timber trees, as its flora is more varied than that of the northern parts of the State. On account of the productiveness of the soil, the farms in some of the townships of Monmouth, Mercer, Burlington and Salem have little or no wood on them. Upper Freehold has less than 4 per cent. in forest; the three contiguous townships, Mansfield, Springfield and Chesterfield, have less than 1,800 acres of forest in a total area of 48,000 acres. Pilesgrove, Salem county, has less than 5 per cent. Haddon in Camden, 1.6 per cent. On the more sandy parts, as in eastern Middlesex county, there remain 40 to 60 per cent. of the area in forest. As a whole, perhaps one-third is still forested, but as here shown the timber is irregularly distributed, and much of it is in large tracts in Middlesex and Monmouth counties, although the larger portion is in the scattered wood-lots of the many farms in the belt. Excepting these larger tracts, the supply is scarcely more than equal to local demands.

VIII. The coastal plain, or pines, is the largest division and it has the largest forest area, and is practically the forest belt of the State. As its name would indicate, the pine, and the pitch pine is the predominant tree, although the oak grows nearly everywhere with it. The varying kinds of soil, from clay to coarse-grained and gravelly or pebbly sand, offer very diverse conditions, and hence the

tree growth varies—white oaks on white-oak bottoms, mixed pine and oak upon the sandy soils, and pine alone upon the nearly pure sand soils. The sandy soils predominate, however, as do the pines. In the swamp-lands, the white cedar appears as a most valuable timber tree. Of this belt, within the limits of Monmouth county, 50 per cent. is cleared; in Ocean county only 13 per cent. of the upland is in farms and cleared; in Burlington the percentage is 10; in Camden and Gloucester it is 25 and 30 respectively; in Atlantic 11; in Cumberland 30; and in Salem 63. Hamilton township, as an example, has but 2 per cent. of its area cleared. Woodland, Burlington county, has one acre in 185 cleared. The total area of this division of the State is 1,785,687 acres of upland, or 39 per cent. of the whole upland surface of the State, and 1,347,389 acres are still in forest. Or in other words, the forested area here is nearly two-thirds that of the State. Nearly all of it is in large tracts and not in wood-lots—in farms—and hence its importance and value in the questions of forest management and economy. This division of the State into natural groups or districts might include the sea-beaches as distinct from the coastal plain, but it is too small and unimportant, excepting as its tree-covering protects the beach against the winds and the shifting of the hills or dunes. The forestry question on them is one of the protective, rather than of an economic character.

In this review of the extent and nature of the forests in the several divisions of the State, the distribution has been referred to, and from these statements the summary may be here given that two-thirds of the forests are in the southeastern or pine region of the State. Of the remaining third nearly one-half is on the northern Highlands, leaving about 400,000 acres of woodland distributed over the other natural divisions. If the Kittatinny mountain be excluded, the remainder (320,000 acres) may be said to be in the agricultural divisions.

FOREST MANAGEMENT AND ECONOMY.

If New Jersey were the property of one man, he might, after much deliberation and with great foresight, draw the boundaries of what acres should be given to tillage, to dairying or pasturage, and to forests—in a word, the land to wood as a crop as well as to wheat; he might designate the lines of wind-belts to protect the level open

country, the tracts too poor for profitable tillage as desirable to be kept in forest, the rocky and stony surface as better fitted to produce trees, the steep hillsides and mountain slopes as necessary to be clothed with forest for the protection of the soil; and finally, he might so arrange this distribution of his forest that natural laws should not be violated, and that the greatest economy of all his domain should be wisely considered and conserved. But many men are here and not as joint proprietors. In the face of this condition of many proprietors, and of small tracts, the outgrowth or evolution of a complex train of circumstances, it is wise to proceed slowly and with much consideration of public good and private rights, and the writer does not propose or recommend any legislative measures. On the part of the State more information of a specific and practical kind is wanted, which existing State Boards can collect. We need to know more of the nature and value of the forested tracts, and of the age, size and kind of timber standing on them. Maps showing the location of the forest are wanted. Details as to the value of timber in all parts of the State, the uses for wood in various localities, the cost of production and the profits of wood as a crop, are urgently needed for the information of the people. As it is, there is a wide range in the prevailing opinions of practical men about the value of wood. Some would be so radical as to assert that woodland has no value, and very few have any figures which can be used to prove that wood is at all a profitable crop. Many in our rural population look upon woodland as so much waste-land, which is at length to be converted into farms. That wood is a crop, and wood an agricultural staple, is not recognized.

As individual owners of the soil, and tenants husbanding its resources, there is work for all to do. The proper distribution of forest and farm-land is a question which every farmer should consider carefully. There is waste-land to-day upon nearly every farm in the State, which is producing little or nothing. In the northern part, the rough ledges that crop out at frequent intervals, and boulder-strewn areas disfigure the landscape, and serve too often as nurseries of noxious weeds and worthless brush. They ought to be clothed with trees for æsthetic if not for more utilitarian reasons. In the same district there are side-hills and mountain-fields whose faces are deeply scarred with gullies, where torrents of water run down in heavy rainfalls. They can be healed by tree-planting and by a restoration of natural

conditions. Then again there are fields so stony that tillage requires an expenditure of extra labor to pick off some of the superabundant stone, and to encumber the field divisions with great winrows of cobbles and boulders. The cultivation of much of this land is attended with little profit, as the general poverty of building, farm equipment, and the tenants themselves, more forcibly show than words can do. These fields ought to be relegated to forest. In the central part of the State, and particularly in the valley of the Raritan, there is too little forest, and over wide stretches no wind-breaks—nothing to arrest the onward sweep of the cold blasts of winter or the torrid waves of summer. A single row of trees, or better, here and there a narrow belt of some evergreen trees, would pay well in the protection thus afforded to the arable land. In the southern-central part of the State the waste-land along the streams is large, and few farms are wholly free from such waste-land. At present it is generally in brush or open wood, where cattle roam, and the growth of wood on it is of little value. Much of this kind of land might be devoted to locust, black walnut, chestnut, pecan-nut, or to trees producing valuable timber, or both timber and crops of nuts. In any case it were better left alone to nature than to be treated, as is so generally the case, as waste-land. It is in the southern and southeastern parts of the State that forestry may be considered entirely apart from agriculture. But owing to the dangers from forest fires, this property has become the most insecure of any in our State. And the fires are destroying not only the wood, but also the vegetable matter in the soil, impoverishing the land for future availability as crop-producing. The losses by fires have been estimated as much as $1,000,000 in a year, in the consumption of wood and in the damage done to standing timber. The problem is a difficult one—to repress the frequent fires and to promote the security of timber, and so give value to the forest in that part of the State. The clearing of greater areas and the transformation of "pines" into market-garden farms have been suggested by the writer. Perhaps the greatest need is an influx of sturdy, industrious and patient foreign immigrants to clear and cultivate the oak-lands and break up these great tracts with cordons of clearings, across which fires may not pass.

The last suggestion for individual consideration is the profitableness of tree-planting and timber-growing. Of course, the individual reaps the benefits which come from an amelioration of climate extremes,

from the improvement of the landscape in an æsthetic point of view, and from the many indirect benefits arising from a proper distribution of forest and field, and from their prudent management and effective oversight, but it is too much to expect that the many will be patriotic enough to plant and care for their neighbors, or even for their children. 'Man, as a rule, cares to sow only where he will reap; and the harvest is very far off to him who plants the oak or beech, or even the birch and pine." Every encouragement is necessary to stimulate the farmer to care more for his woodland—to give trees some attention as well as his crops, or, at least, to protect growing timber against possible fires, against cattle or other stock, and in felling timber to do so with some plan whereby damage be not done to the trees which are to be left standing. The profit in wood depends so much upon care that in many cases there is none because of indifferent care or total lack of attention. Nature is so generous in her seeding of land that man has often no planting to do. In fact, we should have no forests if we had to plant the trees, since in spite of all the planting of government lands in the West and the plantings of arbor days, these are an infinitesimal part of the great nurseries of young trees which are springing up all over our land, and growing almost without care and in spite of the plough and the depredations of cattle and the ravage of fire. What is needed is less work in direct planting and more care of growing trees. The profit of chestnut timber upon our Highlands, of locust in the marl region, and of the common pitch pine in South Jersey have been published in some of our State reports.

Looking to the future, the near exhaustion of the more choice virgin timber resources of the United States is confronting us;* and Great Britain is draining the available supplies of Europe which are accessible to her. It is not here asserted that wood may become scarce and high priced, and that it is altogether indispensable in our arts, for modern times have witnessed a revolution in fuel and in building, and the earth has great beds and deep veins of metallic ores which remain to be worked and fashioned for the manifold needs of man. But that the future demand for valuable lumber and for fuel will increase and cause higher prices is to be expected, and he who plants

* The consumption of wood increases in the United States at the rate of 30 per cent. in every decade, whereas at least sixty years is necessary to grow trees large enough to cut profitably and for lumber.

or protects the young wood is doing a work which may enrich him and contribute to the welfare of a State.

Perhaps the strongest argument in favor of more attention to woodland and to the protection of wood is in the general excess of land devoted to farming. Not that, in the aggregate, there is too much, but that concentration of effort and more intensive farming is wanted. And it is believed that in general farmers cultivate larger areas than they are prepared to do. It is not necessary to mention causes which result in this overstriding of the land. Whatever they may be it is certain that the same capital and the same outlay of labor put upon less land, be it one-half or two-thirds as much, or any other reduction, would give as large a yield and more profit. Argument upon this point is superfluous, since the increased production of farms and the aggregate for the State in agricultural staples and market-garden crops are proofs of what is done on the same or nearly the same ground as was done fifty or more years ago. In a word, less land is really wanted in farms than was years ago, unless our population increases in the rural districts and affords more help and a subdivision of land in smaller plots. This surplus or excess might be well utilized for wood. It may be even assumed that its timber product be of little or no value. In that case the advantage of the more intensive system would be profitable to the farmer surrendering a part of his place to the growth of the forest and also to the community. In this way every farmer can do something for his advantage directly and for the State. He may plant or allow to grow the trees which shall be a source of income, a legacy to his children or others, and a benefit to the State.

GOOD SEED.

The Chair—A practical farmer of Somerset county has kindly consented to give us his views as to the value of good seed. I am pleased to introduce Mr. D. C. Voorhees to the Board.

ADDRESS BY DAVID C. VOORHEES.

Mr. President and Gentlemen of the State Board of Agriculture—I have a very plain subject to give you, but, I hope, a practical one. First, I shall speak of the importance of good seeds, and then how to obtain them.

During my experience in agriculture, I have seen many forcible illustrations of seeds, which I shall classify as *good, bad* and *indifferent.*

I think the virtues of *good seeds* may, perhaps, be better illustrated by showing some of the results of *indifferent* seed; by this I mean a mixture of *good* and *bad* seed.

To illustrate, I once had an offer to go into partnership with a young city friend, who was just starting as a farmer, in a scheme to make money easily by the purchase, at twenty cents per bushel, of some 50 bushels of onion seed (?). He said the seed belonged to a young farmer of two years' experience, and that it was plump and fresh. I promised my friend I would investigate the matter very carefully. Onion seed was worth at that time $4 per pound, and if we bought this lot at the price asked it would cost us $10 only, while to sell it at the current price of $4 per pound would net us—50 bushels at 50 pounds to the bushel—$10,000.

On personal inspection I found this immense pile of my friend's onion seed was *cockle*, a pestiferous weed, familiar to all farmers.

To get some practical good from this incident was now my purpose, so I asked the grower how much wheat he had from that pile; he said, 100 bushels, which he sold at a mill near by for $1.80 a

bushel, but good wheat was worth, at the same time, $2 a bushel. Further inquires revealed the fact that this crop was grown on 15 acres of ordinarly good land that cost him $100 an acre.

With proper seed, this young man should have grown 15 bushels of good wheat per acre.

A comparison shows first, 15 acres of wheat at 6⅔ bushels would be 100 bushels, which at $1.80 per bushel would give $180; and 15 acres at 15 bushels per acre would be 225 bushels at $2 a bushel, $450.

Of course we all agree upon the importance of *good seed*, but many are not as careful as they should be in selecting the best seeds, and especially the kinds adapted to their locality, as this is an important factor in determining the result, whether it shall be profit or loss. Every missing hill, occasioned by poor seed, is a total loss, both of crop, labor and manure.

I saw, a few years ago, at the Somerset County Fair, an exhibit of first-prize egg-plants, which, for size, color and fairness, I had never seen equaled. A friend of mine procured one of those prize-takers, and the next year produced fruit of equal size and fairness. So much for pedigree seeds. Then, aside from profit, what a pleasure it is to see a crop growing, matured and harvested, where each individual seed or plant is perfect. Again, the importance of good seed is apparent when we think of the injury resulting from bad seed. For instance, oats full of Canada thistle or grass seed that will contaminate your meadows for years with daisy, carrot, buckhorn, or plantain.

How can we get the *good seed?* To do this will cost you time, labor and money and even furnish you a chance for some scientific research, but it will be both profitable and interesting.

I would recommend, as far as possible, for the farmers to develop their own seeds, for then they would know beyond a doubt as to their purity and adaptability to their soil and climate. Very many questions come in as to whether varieties can be improved. Do seeds degenerate, or, as the farmers say, run out? And why do we meet with so many disappointments?

We are all very apt to be carried away with marvelously-described new things, which, in the end, often turn out to be old ones with new names.

An editorial by a leading seed firm, who have been in the business over a century, says:

"It really seems as if the creature man was as anxious to be deceived in seeds as in quack medicines, for we do not hesitate to declare, upon our reputation as seedsmen of repute, that nine-tenths of the so-called new sorts advertised at high prices are, so far as merit goes, rank humbugs, and it is time the public were told so."

There is an adage that "like produces like," which is very true when applied to seeds.

Have a *standard*, and try to develop the points you are aiming at, when saving your own seed.

You cannot be too careful, for occasionally you will find a slight trace of impure blood has crept in that will surprise you later on. This is done by the *bees* carrying the pollen from a neighbor's field and depositing it on your pedigree plant, which result may not make much of a showing the first year, but the next the bastard will be full-fledged.

A number of years ago I carefully examined a field of corn raised by an old-fashioned farmer. I was impressed by the large proportion of stalks that produced *two* well-developed ears. I inquired what variety it was; he said his father planted it years ago, and it grew well for him. I asked how he saved his seed; he said he went through his field after the corn was fully matured, and while it was standing selected only the stalks on which were two large, perfect ears with uniform color, form, depth of kernel and the earliest to ripen, and he had been doing this for years. I must say his work was a success.

Wheat, which furnishes "the staff of life" for the world and has been grown for thousands of years, is not yet run out; in fact, where judicious care has been taken in the selection of seed, it has improved.

Oats are susceptible to improvement, but occasionally we must get some new seed grown further north, as our seasons are too hot and too dry for this crop.

In purchasing seeds of the leading cereals grown on our farms, we have a chance to form something of an estimate by their appearance, but when we come to purchase seeds for vegetables and root crops we have not even this slight guide to go by, but must rely solely on the seed dealer.

One attempt at improving seeds is questionable, even if you do produce some marvelous samples. I refer to hybridization. Although this is scientific and has resulted in many beautiful flowers of new

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form and color, the farm and garden seeds have received little benefit from this process, and for the reason you cannot get your variety *fixed*—something not desirable will be continually cropping out.

I believe in good seed, pedigree seed—in fact, the best obtainable.

Some people have a mania for change of seed.

Most all potato-growers think that to raise the crop successfully, you must buy Maine-grown potatoes to plant.

I never knew them to inquire whether the Maine people purchased new potatoes every year from Halifax.

I do not wish to say one word against the good people of Maine, but from experience I find they can get as many varieties in one barrel as the average Jerseyman.

Potatoes are susceptible to improvement by the selection of tubers and good culture, but only to a very limited degree, as they are not the seed proper of the plant.

The main advance has been by new seedlings.

The best one ever brought out was the "Early Rose," which variety has been worth millions of dollars to the people of the United States. To raise the best possible crop of potatoes, you must have the first sprouts that form to grow.

Nature's first efforts are always the most successful in the whole line of vegetation. It may be a difficult matter to keep seed potatoes from developing sprouts prematurely, but it can be done. The average grower of potatoes plants early, and of course they mature early and are stored often in cellars too warm, and if the light strikes them Nature asserts herself and by midwinter the sprouts begin to form; these the farmer usually rubs off—a very unnatural thing for seed purposes, but all right to keep them in eatable condition.

To keep potatoes back from germination should be our aim. If those who wish to increase their crop of potatoes from 25 to 100 per cent. (and who does not) will simply bury those intended for seed—which should be well selected, smooth, medium size, and pure as to variety—by placing them on high ground, making up a well-rounded mound, and cover with a layer of straw and a moderate one of earth, they will be successful. Apples, roots, &c., can also be kept in this way. To prevent groundy taste, inclose the fruits or potatoes in tight boxes or barrels before burying them. If you have the time, test a few of the latest novelties, but do not expect too much.

In buying seed, purchase of your nearest neighbor or some other farmer, first, provided they have the goods you want. Next, buy of a reliable seed dealer.

Do not buy of any dealer because his price seems low, for they may be old seeds that have lived out their days of usefulness. With seeds, as with everything else, do not expect to get more than one hundred cents' worth for one dollar.

Growers needing seeds for their market-gardens are generally more careful as to their purity and freshness than the farmers, but rarely plant the best varieties, because they say these do not grow nor yield as well. Besides, the buyers do not appreciate and will not pay more for quality of product, as peas are peas; and sweet corn, sweet corn.

This may be true to a certain extent, but it is an easy thing to educate the public taste to a higher standard.

The farmers have no excuse in this direction, they should plant only the best and more of them, and give better culture, which will materially add to the economy, health and happiness of their households. I have heard farmers say they had no time to take care of a garden; I wonder how such people can spare the time for their meals.

While we are speaking of seeds, I would be remiss not to refer to flower seeds. Flowers adorn rural homes, and what volumes they speak to the travelers on our highways, of the taste and refinement of the farmer's family! And in choosing flowers, make a full selection of the old-fashioned favorites.

How many reasons the farmers have for contentment and happiness, being in touch with Nature, which is ever suggesting Nature's God!

He is a benefactor who improves the seeds, those little germs that represent the farm crops.

Then let us sow only good seed, for $200,000,000 are lost every year in the United States by bad seed and weeds.

HOG-RAISING FROM A BUSINESS STANDPOINT.

The following paper on "Hog-Raising from a Business Standpoint," by A. K. Warthman, of Philadelphia, Pa., was handed in and ordered printed in the report:

The subject of live-stock raising is a most interesting one, and to make it successful financially requires a vast amount of study and experience.

We would like to make a few suggestions as to hog-raising from a purely business standpoint, with the view of benefiting the farmer as well as ourselves, and contend, if followed on a purely business basis, should be made to pay the farmer equally as well, if not better, than some of his other products.

Our firm has had thirty years' experience in the slaughtering of hogs and distribution of hog products; and as to the kind of hog required, we think our experience worth something, and we see no reason why the hog should not be raised as successfully East as West, and have gone to some considerable trouble to collect information on the subject.

Lean meat being preferable to fat, makes the medium-weight hog preferable to the heavy; and the most desirable hog for commercial purposes is the one weighing from 175 pounds to 225 pounds.

In our opinion the mistake of the New Jersey hog-raiser is in his competing to raise a pen of hogs heavier than his neighbors. This may seem wrong logic to many of the farmers, but it is our purpose to try and convince him of his error.

Commercially, extremely fat pork is undesirable, and light meats command a premium over heavy, except in a few localities.

You cannot fail to agree with me that the larger percentage of hog products is distributed by the large cities to the cities themselves, sur-

rounding towns and for export; to that class of trade you will have to cater if you want to make a success of hog-raising. Various business methods have been revolutionized simply because of the demands of trade, and yours is no exception to the rule.

We assert that a greater quantity of pigs (as you call them) averaging, say, 200 pounds, can be raised at no more cost than a small quantity of hogs, averaging 400 pounds or more, and that the former can be marketed with more ease and yield more dollars to the hundredweight than the latter; and that you will be able to raise two crops where you now raise one.

We have letters from the best of authority on this subject, who have made many experiments with a view of ascertaining which kind of hog paid best to raise. Their experience teaches them that as a hog will gain more in weight from 2 to 8 months than he will from 8 months on up to 12 months or more, it pays better to market them younger.

You have the largest Eastern markets within easy access—New York, Philadelphia and Baltimore handling, annually, between three and four millions of hogs, and not counting Jersey City, Newark, Trenton, Camden and Wilmington. Of this quantity (as closely as we can calculate), but 10 per cent. is furnished by the adjoining counties, so that you have a large field to supply.

To further support the suggestion of raising two crops instead of one, is the fact that 60 per cent. of the hogs are killed in large cities during the summer months, and on them a better price can be realized than on those marketed during the winter months—at least such has been the rule in seven of the last nine years—so that pigs farrowed during September and October can be marketed in June and July, and those farrowed during May can be marketed during December and January. This is a point we would draw your attention to closely, and give you food for thought.

We do not advise farmers to rush into hog-raising because of the high prices prevalent this winter, but to make it a continuous industry the year round; not to raise a quantity one year and little or none the next.

The successful merchant does not abandon his business because of its failing to pay him one or two years—it only tends to make him study it closer, to discover any wrong methods, if any exist, and remedy them.

Another point is that the slaughterers and cutters of hogs prefer to buy them alive, not dressed, as has been your custom of selling them.

By this method of selling, you would avoid the trouble and expense of killing; the city slaughterer being able to realize more from the offal than the farmer, and by buying nearer home there would be less shrinkage in transit than from the West; and the farmer gets paid for all they weigh, either at the point of shipment or destination, and realizes more than by slaughtering them himself.

The old custom of killing during the fall and winter only has been changed by the improved methods of refrigeration.

The summer killing in the West, for the season of 1890 and 1891, exceeded the winter by 1,400,000 hogs, while that of the summer of 1892, notwithstanding the large falling off in the supply during the later months, was less than 1,000,000 behind the winter; while in the cities of New York, Philadelphia and Baltimore alone, the summer killing exceeded that of the winter by 736,969 hogs. The better prices obtained during the late summer months of 1892 would no doubt compensate the farmer for the expense of carrying the young pigs through the winter.

We are only one of many slaughterers who buy hogs all the year through, killing from 1,500 to 5,000 weekly, the quantity varying because of price or demand. We interest ourselves in this question because we think we should obtain our supply (or at least a majority of it) nearer home, have as neat an animal, and save money by a less shrinkage in weight.

We will be pleased to mail the information we have obtained to any one sending us his address, or through the Secretary of your county agricultural society. It is interesting reading, giving you facts and figures as to the cost of raising hogs by different manners of feeding, from birth to the age of marketing.

MANAGEMENT OF THE SMALL DAIRY.

The Chair—We have with us Prof. I. P. Roberts, of Cornell University, Ithaca, N. Y., who will now address you on dairy management. It affords me much pleasure to introduce Prof. Roberts to the Board.

ADDRESS OF PROF. I. P. ROBERTS.

Mr. Chairman and Gentlemen of the Board—My friend from Rutgers College has set the example of giving a little of his personal history before proceeding with his regular address. That may or may not be a good plan, but whether it is or not, I will, at least for the once, adopt it and follow the example of so illustrious a man as President Scott.

He told you he was the product of three farms. I am afraid you will be ashamed of me when I tell you I am the product of your State Prison here in Trenton. [Laughter.] This will shock you very much, but in one sense it is true. Forty-three years ago last September I was in your State Prison. I did not stay a great while; like many others, I left as soon as I could. [Laughter.] I was a green, gawky, tow-haired boy who had never been out of his native county, and I thought I would like to visit New Jersey. My father had told me what fine people you were, and then, too, some of my relatives were living in this section. After much persuasion my mother gave me permission to go and see my grandfather, provided I would earn the necessary money to do so. I had a little knowledge of carpentering, so I went out and worked for one dollar a day and earned the money, and then I said to her, "Now, I have got the money, I am going to New Jersey." I had never seen a great city, so when I got to New York I was about as green and frightened a boy as you can imagine. One of my old acquaintances kept a fruit store on Broadway. I had

the number of the place, and I started out to find him. Shortly I found I was going the wrong way. I knew everybody was looking at me, and if they saw me turn and go back with that great big carpet-bag they would know I was a greeny, so I went on to the next street-crossing, then crossed over and walked back, found the number and staid with my friend. This may not be interesting to you, but it was to me at the time. That journey changed the whole course of my life. Somehow it gave me a broader view. I saw there was something else in the world besides the little farm.

Then I came to your town here and went all over it. While my uncle was selling his products I went through your prison, and it was well conducted, from what I can remember of it. I am of New Jersey blood, and I am glad and proud of it. To the good mother you brought up here in New Jersey I owe all that I am; she taught me the multiplication table at her knees before daylight; the "black sheep" of the family—the boy that could not learn—the mother saved. You have 10,000 such boys in your country, who have a college education within their grasp, without the struggle that I and so many others had to make. Everything has been provided for them, but somehow or other we have failed to infuse into the life-blood of the farm-boy a love for something that is higher than money. Your Senator has said the farm-boy has a right to the best, and should be satisfied only with the best, and he is right. Let us make men first and farmers afterwards—or rather, make men and farmers at the same time.

Your Agricultural College, as I know, is in about the same position as Cornell—obliged to carry a large number of students free of tuition. At Cornell University 512 students must be educated free. As the average cost per student per year is over $150, this would bring in $76,800 if they paid tuition. The actual income from the Land Grant act is but $18,000; the rest of our vast wealth has come from the wisdom of Ezra Cornell and other benefactors of Cornell University. The university receives from this land grant $18,000 per year, and returns to the State the equivalent of $76,800. I don't wonder that the President of your college comes here and asks the State for aid. What is the State for, if not to educate and protect her citizens?

Before reading the paper I have prepared on small dairies, I want to say that you men who raise such large crops of wheat, 42 bushels

per acre, and 70 bushels of corn, cannot learn much from me. [Laughter.] You have your business pretty well learned, but there are thousands of people all over the land who are keeping small dairies, and these we want to reach. However, I care more about the farm-boy than about the dairy. If 14.3 bushels of wheat is the average yield per acre in New Jersey, and you can raise 42 bushels per acre, something must be wrong somewhere. So with your corn; 70 bushels per acre were raised by some, but the average of this great corn State, with its warm sunshine and magnificent skies, was but 31.6 bushels per acre. What becomes of the fellow at the last end of the poor row? Possibly he may have raised 5 or 8 bushels per acre. Last year the American farm-boy raised rows of corn which, if stretched out end to end, would have reached the sun, 95,000,000 of miles away, and 85,000,000 of miles back again. I don't wonder he got tired. [Laughter.] He went up and down that row of 95,000,000 of miles, and 85,000,000 of miles added, to plough and to cultivate it ten times for each mile of row. Now, if you send your boys to college they will help to shorten that row. [Laughter.] They can cut off the 85,000,000 of miles, and still raise just as much corn on the 95,000,000 of miles as we are now raising.

You should diversify your agriculture. You are surrounded by great cities, with vast numbers of wealthy people, and dwell under the finest government on the face of the earth [applause], and these people want a variety of good food. You must turn your attention from corn to horticulture. There is more money in one acre of cabbage or one early lamb than in 40 acres of wheat at 10 bushels per acre. Everything is open to the farm-boy of to-day. There never was such a time nor such a place as New Jersey for young men to start in agriculture. [Applause].

One of our boys from Cornell has located within nine miles of Trenton, because he says it is the best place he can find. It is close to Philadelphia and New York; if he wants high prices and ready markets, he must reach the large cities early. I do not want to make you vain [laughter], but I tell you it is a good deal easier to make a living here in New Jersey than on the fertile prairies of the far Northwest. And yet I would advise the boys not to farm poor land; farm good land; if it is not so naturally, make it so. Better pay $1,000 an acre for good land and make something out of it, than vegetate on a sand-hill; leave the sand-hill for the city fellow to

summer on. [Laughter.] When I say a sand-hill, I mean poor sand; even sweet potatoes won't grow in the moon. [Laughter.] You want land that contains plant-food to grow them; if you make money out of them, I suppose it don't matter whether you grow them in sand or in the moon. [Laughter.] But, to my subject.

The small home-dairy can and should be managed with more skill than the large one, because the owner has entire care and supervision of all the details which, taken together, form the great factor of failure or success. Then, too, the small dairy may be bred, selected and handled with such skill that the average profits of each cow will exceed those of the large dairy. The owner of the small dairy has more opportunity to discover and select the best animals; so, other things being equal, the man keeping a small dairy may, if he will, have a greater income per cow than the owner of a large one. Again, as now practiced, selling milk to the dealer or the cheese-maker tends to lower intelligence, morality and honesty, because the producer is not required to gain any knowledge of the fine art of manufacturing milk into its varied products, and having no incentive to thought, he gradually sinks into mental lethargy, while the method of selling milk, not according to value but according to volume, tends to lower the standard of right and wrong.

If A sells milk for the regular price, which is worth 50 per cent. more than that which B sells to the same company or individual, B knows that he is committing robbery, and legal robery demoralizes the robber quite as fast as illegal robbery. A knows that he is being legally cheated, with no recourse but to cheat B and C, in order to get even. So A purchases cows which produce milk which stands dangerously close in butter fats to the legal standard, or he or his boys secretly increase the volume of the milk without adding to its value, and justify their consciences, because they are being cheated and there is no redress. All these practices are tending, not only to lower the standard of the cows, but the standard of right and wrong in the minds of the young men. The lad brought up to "get even" by so-called justifiable means, finds it but one short step, like the horse-jockey, to justify any means which places him ahead.

To start right is half way to success; so in starting the dairy, provision should be made for testing both the quality and volume of the milk. The Babcock test and the spring-balance are indispensable implements in the dairy. A careful inspection of the pedigree and

performance of the ancestor in the female line will usually reveal the qualities of the male which is or is to be at the head of the herd or herds of a small syndicate of neighboring farmers.

Having good inherited qualities, the next step is to see to the rearing of the calf. The calf should be well sustained and should make rapid growth, but this should not tend to fat, but the development of those qualities which are to make the value of the cow that is to be.

Warm skim milk in moderate quantities after the calf is about two weeks old, bright clover hay and unground oats, should form the foundation of the calf's ration. In cold weather some oil-meal, old process, or *whole* corn, or both, should be added in order to furnish sufficient heat producers.

Darwin says that "of all the factors which produce variation in animals, food is the most potent." Food is also the greatest factor in producing improvement; and, if we are aiming to improve animals, of course we are ever trying to produce variation, for if no variation occurs then there can be no advancement. Starting from these fundamental principles, we may now begin to treat of the details of the feeding and care of animals, in order to produce variation for the better, or variation which shall result in fitting the animals more perfectly for some specific use or uses.

I will take the improvement of dairy cattle for illustrating my subject.

Start with the parents. If at or just before the time of conception, they are fed and cared for as we usually treat the best of our beef-breeds, then we have taken one step towards variation for the worse, because a new quality, beef, is being introduced into the blood of the embryo, and we cannot hope to get as good a dairy calf as we would had the sire and dam at the time of copulation been in a condition in which all dairy cattle should be kept. From the moment the calf is born, it should be watched and trained for the dairy as carefully and scientifically as is the little foal that is dropped in the trotting stable trained for the track. It has been discovered that in order to get the best results, trotting colts should be fed and developed towards the uses to which they are to be put when mature. They are not only fed with a view to the track, but they are also exercised with a view to speed. Should the trotting colt be fed like the draft colt, then we might expect marked variation to appear before maturity, and this marked variation for the worse; and if a trotter were desired, this

would be a very foolish and very unscientific method of treating a trotting colt. I use the trotting colt as an illustration, because of its scientific treatment and breeding, which are showing such marked results in colts which have been properly bred, fed and exercised.

If the dairyman were to use a tithe of the skill in rearing the dairy calf that the horseman does in rearing the trotting colts, we long since would have doubled the average product per cow of our dairies. Taking the dairy calf at birth, we find that it is unable to digest and assimilate coarse or innutritious food. Its delicate digestive apparatus can only take care of those forms of food which are easily broken down and assimilated, such as new milk; but, if the calf is fed with new and rich milk, it inclines to put on fat, and this is just what the dairyman does not want. He should teach his animal to put fat in the pail and not on the ribs; and so the utmost care must be taken in balancing the quality and quantity of the food, that it may produce vigorous, healthy growth, and extend to some extent the abdomen without inducing the animal to store up tallow. Great care should be taken not to have the food so concentrated as to dwarf the viscera and contract the stomach, neither should the food be so innutritious as to distend the stomach to such an extent as to injure the power of digestion and assimilation. We find calves *can* be reared on whey or watered buttermilk, but the results are not satisfactory, because the calf must take into its stomach so great a bulk that it cannot take care of it, and hence bloating, colic and indigestion are sure to follow. The dairy calves should never be fed *largely* on concentrated food, such as corn-meal, cotton-seed meal, &c. If they lay on some flesh and even some fat while on pasture, no evil results follow; but flesh and fat laid on by the feeding of concentrated and heat-producing foods are sure to affect the usefulness of the future cow.

The calf, like the trotting colt, should begin its life-work very young. At first thought, it would appear that the calf should be matured before it was allowed to produce young, because it is contrary to the law which produces greatest vigor and reproduction to copulate immature animals; but in practice it is found that the young heifer must be set at her life-work at a very early age, and, as she does not give milk, or it is not practical to have her do so before she drops a calf, it is the practice, and a very wise one, to have her drop her first calf at not more than two years of age. While this calf is *in uterus* she is of necessity, if well fed, somewhat fleshy, but this flesh should

rapidly disappear, if she has the dairy instinct as soon as she begins to produce milk, and this first year of the dairy calf-cow is the most critical one of all her life. Immature, because, not more than half-grown, she has had to give life and sustenance to her calf, she is now called on to give milk for her owner, and within a few months she will again have to furnish life and sustenance for her second calf; so here is a constant three-fold demand upon her energies, and unless the utmost skill and pains are taken, the usefulness of the coming cow can be ruined by careless, ignorant methods. This young heifer should not only receive an abundance of food, but that which is succulent and easily digested. The greatest care should be taken to develop the mammary glands; that is, her food should be so regulated that it will not only sustain her and produce material for the growth of herself and the embryo calf, but leave something for the production of a surplus in the form of milk and butter. If scarcely more food is given than is required for the life and growth of the animal, then, of necessity, little surplus product will be secured, and what is produced is often secured at the expense of the young cow and her prospective calf. I wish I knew how to emphasize the need of a more scientific and practical treatment of the two-year-old heifers. If all of them should be fed right for one or two generations, the average product per cow of our dairies would be largely increased.

Some hints as to the best methods of feeding dairy cattle in general, as well as the two-year-olds, will be given later.

If the two-year-old heifer is well bred she should not be discarded lightly, for it often occurs that she does not respond the first year, and gives no promise of what she may do in after life. In almost any case she will pay for her keeping until she is three years old, because she will then have grown nearly one-half more in weight and will have produced another calf. It is not wise to discard the heifers of good cows nntil they have been tested most carefully for two seasons. And here I would like to emphasize the fact that all animals kept for dairy purposes should have good form—not necessarily the beef form —but in all cases the gothic, steep-rumped, slow-feeding animals should be avoided. The wise dairyman, if he reflects for a moment, will see that as the country becomes more thickly populated the prices of meats will advance, while those of other food products, especially horticulture, will diminish. Cabbage, cauliflower, cucumbers, and all like garden products can be purchased in Holland, France or Eng-

land, in their seasons, for a considerable less than they can in the United States, while at the same time beef, pork and mutton are at least 20 per cent. higher in those countries than in America. The time is fast approaching when beef—I mean beef at the barn door—will be worth far more than it has been during the last ten years, while garden products will be worth less. So the wise dairyman will continue to breed animals, not only of the milk form, *but of good form* and medium size, because the best results are seldom secured by selecting those which are unusually large or unusually small.

The cow in her three-year-old form will need nearly as much skill and care in management as the two-year-old, in order that she may be induced to give a large amount of rich milk to within six weeks of the time she is due to produce another calf. The habit of persistent milking is worth more than the habit of giving large amounts for short periods. It is the old story of the "hare and the tortoise." If this well-bred heifer does not respond after two years' careful and intelligent testing, then she would better go to the shambles and her place be filled by an animal that will respond to feed and care.

To make the subject of conducting small home dairies more intelligible, let us imagine that the dairy is composed of 12 cows; suppose we add to these 4 superior two-year-old heifers, the products of the best cows; we now have 16 animals all told, and if this plan has been going on for some time there will also be 4 yearling heifers and 4 little calves in the box stalls. This implies that each year 4 heifer-calves are raised, which leaves 4 to be sold. It will also be found in practice that about two of these four will be discarded for lack of the highest qualities, and two of the mature cows may also be discarded for the same reason; this will bring the dairy back to 12 cows, and 4 heifers, more or less, will be added the following spring. By this method the dairy will be renewed on the average every six years; and if all the selections and additions were made on mathematical principles, no cow would remain in the dairy after she was eight years old. But in practice it will be found that a few of these cows will prove to be so superior that they will be kept somewhat longer; but in any case the dairy is constantly being renewed from a source which is always higher—from animals which are always becoming better than those already in the dairy. It will be seen that by this method advancement is *continuous and certain.*

The man who owns the small dairy should, for many good reasons,

manufacture butter on the farm. In the end he will not only be a more intelligent man, but his family will have advanced in intelligence far more than it would have done had he sold the milk or delivered it for some one else to manufacture.

Let us tabulate the small dairy so that we may make a careful study of it: 12 cows, 4 heifers, 4 yearlings, 4 small calves.

These would be the animals necessary to be kept, in order that there might always be 12 cows in full milking and 4 heifers being tested during the year. Just how much it would cost to keep these animals it is impossible to tell, but it is not difficult to estimate what such a dairy, if well managed, would produce, because we have the facts and figures of many well-kept farm dairies, and therefore it is not difficult to draw intelligent conclusions.

12 cows giving 250 pounds of butter, at 35 cents per pound	$1,050
4 heifers giving 200 pounds of butter, at 35 cents per pound	280
80,000 pounds of skim milk (500 pounds per cow), at one-quarter cent per pound	200
2 discarded fatted heifers	60
2 discarded fatted cows	80
12 calves kept until they bring $5 each	60
	$1,730

The slow-going dairyman will immediately object and say that the yield per cow is too high, but his argument falls to the ground when it can be proven that hundreds of dairymen, at the present time, get an average of 300 pounds per cow a year. The slothful man who wants to get rid of the trouble and annoyance of selling his butter and is willing to allow the middleman to cut the value of his product in two, in order that he may be relieved of the laborious task of thinking, exclaims that 35 cents per pound is too high for butter. But is it too high, when a graduate of Cornell University, when one year from college, sells all the butter he can make at 70 cents per pound? If a man wants to get on without any trouble or thought or is born tired, then he would better buy his cows of the cow-huckster and sell his milk to the milk-huckster, and then draw what little money they leave to him of the money-huckster.

No great and lasting success can come to the home butter dairy unless the cows be bred on the farm, unless there is kept constantly at the head of the herd a superior male. These two factors, combined with intelligent care and feeding, will most certainly bring

greater returns than can be secured by any other method of dairying. I cannot see any reason why the butter cannot be sold directly to the consumer. I cannot see why $100 gross income may not be secured from each cow, and neither can I see any reason why dairying carried on in this way should not lift the farmer and his family to a higher plane of intelligence, because it will require thought and study and care in every operation from the feeding of the calf to the final marketing of the butter, and so I must strongly advise this method of dairying, because of the valuable lessons it teaches the children of the household as well as the parents.

The feeding of the small dairy can be done with far more economy than the feeding of the large one, because it is easier to provide a variety of food, and because the owner may see to the feeding without any intervention of a hired man, and since the interested workman is worth far more than the one who is not. These small dairies fed and managed by their owners should produce a very much higher per cent. of income than the large ones.

Where the dairy is small, one may easily, without any great inconvenience, soil a part of the summer, from the last of July to the last of October. There is great economy in stocking the pastures to their full capacity in June and July, and thus supplementing them with other food during the heated, dry and frosty months.

No dairy should be run without some clover, corn or other suitable green food being fed to the animals, either in the field or in the barn, in connection with a little grain, in order to reach the highest results. Wherever the pastures are poor, grain-feeding will certainly pay, and it is likely that even where they are good, in the long run profit may be secured by supplementing grass with grain feed. A good flow of milk may be secured during a few months of the summer, but through the fall and winter the dairyman is likely to lose all that he has gained during the properous part of the year, so roots and ensilage should be provided. By ensilage, I mean more than is generally understood by that term. I mean succulent corn provided with an abundance of ears ready to be fed either from the field or the silo, from the middle or last of August until the following May. Then too, cattle foods should be fed with judgment. In a cold climate and with stables that have not been well fortified against the winter blasts, the rations should be largely composed of carbohydrates, while in warm climates and in warm stables the ration need not be wider than 1:4.5.

While the animal may thrive well on a badly-balanced ration, provided it is warm and has an abundance of good food, yet it will do better if its food is properly mixed. I here want to call attention to what is known as aroma. This is too often lost sight of. Grass or other food, if exposed to too great sun or too much rain, loses something, I might say very much, because the appetizing volatile oils play a prominent part in digestion. If abundant, the animal is inclined not only to eat more, but to digest better than it would if the foods have been badly secured, and are lacking in those flavors which are so valuable. Now, if aroma plays such a prominent part in the feed of the dairy, of how much greater consequence is it when we come to the butter, that highest of human foods? We may not always consult our own tastes; we are compelled to make the butter to suit the tastes of those that are to buy it, if the best results are to be secured. It does seem strange that dairymen will go on making butter to suit themselves, when they should make it to suit the customers, and just here the dairyman is likely to make the mistake which will prevent him from securing the highest prices. It is not a difficult matter to learn to make butter which will sell for high prices in the city markets, provided the butter has proper handling and delivery. And he or she who is too lazy to learn to make a good product, should not complain if they get meager rewards. But in this dairy business it must not be forgotten that the food which the animal eats can no more be produced without in turn receiving food, than can the animals produce food for man unless they have first partaken of food themselves; and so, after all this care in learning how to make butter and how to feed cattle and how to raise calves, at the very last end, I might say the first end, the dairyman may utterly fail, because he will persist in believing that he can get good pasture grass or good hay from land which has been largely robbed of its fertility; land which contains but a little poor food for the grass and forage plants; so we must start back and see what we can do in the field, in order to produce food of high aroma, that it may finally be found preserved in the butter and other products.

I have left the fertility which is produced in the dairy to the very last end, so that by no possible means could the manure value become mixed with the milk value. I may say that the manurial product of the cow is of no mean value, and without it we are likely to fail utterly; so I will append a statement of the manure produced by the animals on the

University farm, so that some conception may be had of the amount and value of manure produced by different animals. In order to save space I shall only give general averages, which we have found after many experiments. So far as we are able to discover, farm manures, with a moderate amount of bedding mixed with them and sheltered from the rain and kept free from fire-fanging, give, on analysis, $3 per ton, the nitrogen, potash and phosphoric acid being computed according to the price of the same elements when found in commercial fertilizers.

	Average total Manure per day.	Average Manure per day per 1,000 lbs. live weight.
Calves	16 pounds.	75 pounds.
Sheep	2.36 "	15.76 "
Hens	.3 "	8 "
Roosters	.16 "	3.93 "
Pigs	3.94 "	28.78 "
Cows	4.79 "	4.21 "
Horses	12.4 "	9.76 "

Gentlemen, I thank you for your attention. You see I am of true Jersey blood, and know how to talk a good while about a little matter. [Laughter and applause.]

Mr. Ege—I move a vote of thanks to the Professor for his able and entertaining address.

The motion was agreed to.

Mr. Ege—With reference to feeding two-year-old heifers. I think I understood you to recommend the feeding of linseed meal. Was I right? I have about a dozen of these heifers, and am interested.

Prof. Roberts—Linseed meal is a very highly-constituted nitrogenous food. About one-eighth of the grain ration can be of linseed meal, or about one-fourth of cotton-seed meal.

Emmor Roberts—How about ground wheat? Some of us find ourselves with large quantities of damaged wheat on hand. How will that answer to mix with the cotton-seed meal.

Prof. Roberts—It will do very well. Lighten it up with roots. Don't feed all concentrated food. Why not feed that to the chickens?

Emmor Roberts—Suppose you have not chickens enough, or suppose you have wheat enough for the chickens of a whole county? That is about the fix of some of us.

Mr. Ege—We have a little secret down here in New Jersey which we don't like to give away, but as the Professor is a Jerseyman we

will risk it. He tells us he has been five years trying to develop a stomach on a pig. [Laughter.] Has the Professor ever tried the use of skimmed milk, about five times a day, or as long as the pig will take it in? [Laughter.] It will develop the stomach on anything, whether it is on two legs or on four. [Laughter.]

Prof. Roberts—There is one point I would like to touch on if you will allow me. I want to see if the good people of the United States cannot be induced to sell milk according to its value. There are young men here who have listened to me with a great deal of attention, and I want to say to them that there is an unlimited market to-day, at from 20 to 50 per cent. more money than you are getting, in selling fortified milk. Take half your milk and run it through the centrifugal creamer, and then say to your customers, I warrant this milk to contain 12 per cent. of butter fats. You will be surprised to see what a demand there will be for it—and then, do your own selling. Don't let the other fellow get the money. I venture to assert that there is a sale for every quart of milk you can produce within a reasonable distance of New York City, at an advanced price, if you will leave the water at home. The city people want milk with 8 to 12 per cent. of butter fats.

MAINTAINING THE FERTILITY OF DAIRY FARMS—METHODS OF PRACTICE.

The Chair—We will call on a gentleman to follow Prof. Roberts, and who will talk to you about "Maintaining the Fertility of Dairy Farms," &c. Prof. Voorhees needs no introduction, and he will now entertain you. [Applause.]

ADDRESS BY E. B. VOORHEES, PROFESSOR OF AGRICULTURE, NEW BRUNSWICK, N. J.

Farming, in its strict sense, is the conversion of certain elements in the soil and atmosphere into salable products.

Successful farming depends upon the ability of the farmer to convert these elements into the most valuable or highest-priced products at least expense.

The results secured in the various lines of practice are but the expressions of different applications of the principles involved in the work. Farmers recognize this and are beginning to recognize more clearly than ever before that, other things being equal, their ability to command success is measured by their knowledge of principles, and consequent power to intelligently direct and control natural agencies.

The farmer who always sells big crops of excellent quality, and who under it all maintains and even increases the fertility of his soil, has this knowledge acquired either through experience or study. If through experience, he can apply it best in the lines of his experience; if through patient and careful study of principles and practice, it can be applied to all lines, whether the kind of farming be direct raising of grain or the indirect raising of animal products.

Dairy-farming may be termed indirect, since there is a double conversion of the elements, first into grain, hay, &c., and then into milk, cream, butter or animal product. Hence the business of dairy-

farming requires, for its best success, a broader knowledge of principles than grain-farming. The maintenance of fertility and condition of soil are in the one case dependent upon a radically different class of conditions than in the other.

Dairy-farming, especially milk-selling, is regarded as exhaustive of fertility; that this is true, is admitted in the sense that all farming is really a process of soil exhaustion, but that it is more exhaustive than grain-farming or market-gardening or fruit-growing is entirely a question of methods practiced. Exhaustion of fertility is in any case a relative matter, and is always a consequence of successful practice in any line, thus rendering the question of maintenance of soil fertility a very important consideration; it is a primary condition of success, it is the source, directly or indirectly, of individual and national wealth. A discussion of the maintenance of the fertility of dairy farms should include at least four points—

1. What crops to grow.
2. What feeds to buy.
3. The use of the manures made.
4. The kinds of manures bought.

1. WHAT CROPS TO GROW.

The crops that can be grown successfully do, of course, have an influence in deciding what crops to grow, still the main effort in any case must be directed towards raising those that are the most useful for the purpose—that is, those that will furnish the most feed at the least expense. In the matter of food values much has been learned; the ton basis either in regard to price or bulk is no longer regarded as a safe guide as to the value of a product. Comparisons of values are now based upon the possession of specific qualities, by the feed or fodder, first, its dry matter, and second, the kind and quality of the nutrients contained in the dry matter. These nutrients, viz., albuminoids, fats and carbohydrates, though present in all feeds, exist in different proportions and have different rates of digestibility; those feeds having the highest content of the more valuable albuminoids and fats, combined with a high rate of digestibility, are the most valuable for dairy purposes, without regard to cost of production or price per ton.

Thus a feed with a low content of water and a high content of

digestible albuminoids would represent maximum value, while one low in dry matter and high in the relatively indigestible woody fiber would represent the minimum of feeding value.

With these points clearly in mind we ask, how does the character of the crop grown, in reference to food value, have any bearing upon the question of condition or fertility of soil? The capacities which crops possess of absorbing the mineral constituents of the soil, while varying somewhat with the character of growth of the crop, do not have an important bearing upon this point. It is the power which a certain class of plants possesses of acquiring the expensive element nitrogen from the atmosphere rather than from soil sources, that is the important consideration. Important not because of the gathering of nitrogen alone, but because the plants so gathering it are richer in the more valuable nutrients than those which do not possess the power. This point is of vast significance and is not yet fully appreciated, even by those well acquainted with its bearings, because too many are inclined to question the processes rather than to accept the fact and act upon it. The study of this question has occupied the minds and lives of the most accomplished scientists of the world, and though it has been the field of innumerable controversies, the final triumph of their work, having a practical dollars-and-cents application on every farm, is a tribute to the value of abstract scientific research in the interest of agriculture. Great honor should be given to Boussingault, Hellriegel, Berthelot, Ville Willforth, Lawes, Gilbert and others, who have pursued the inquiries so long and with such zeal and skill in foreign lands, but it is a glory to our whole people and an honor to American scientists that among the first results to be accepted as positive were those secured by Prof. W. O. Atwater of our own country. Disregarding the *how* plants derive their nitrogen from the atmosphere, but admitting the fact, what does it mean to us? It means first the abandonment of empiricism and the adoption of science as the guide of practice, and the consequent classification of plants into nitrogen-consumers and nitrogen-gatherers. The first class is represented by the cereals and grasses, the second by the legumes; thus it becomes evident at once that the crops of the first class, suitable for dairy purposes, as corn, oats, wheat, timothy, are more exhaustive of the soil than those of the second class, viz., the various clovers, peas, beans, &c. The legumes not only do not draw all their nitrogen from the soil, but rather add to the fertility in this respect.

They store up in their roots as well as in their surface growth nitrogenous fertilizing material useful for the growth of cereals, which obtain it only from the soil. It is at once apparent that by a judicious combination of these two classes of crops grown for feed, it is possible to sell considerable fertility in the form of milk, while at the same time to maintain and even increase the fertility of the soil in reference to nitrogen.

In the second place, the classification of plants, in reference to their use of nitrogen, has stimulated an inquiry for and a study of the habits of growth, composition, and adaptability of the various less well-known legumes to the purposes of different lines of farming. The most important result of this study thus far is the introduction of the crimson or scarlet clover (*Trifolium incarnatum*). Its habits of growth are such as to make it widely useful, permitting a doubling of the acreage of leguminous crops without interfering with present well-established and useful rotations. It follows from the foregoing that "what crops to grow" is answered by the word clover; yet under the conditions that exist, certain cereal crops should be included, and the question is, which of the cereals? A comparison of crops usually grown—that is, corn, oats, rye and timothy, based on the average yields, and under similar conditions of growth in reference to fertility—shows that corn is far superior to the others in yield of digestible dry matter per acre. So far superior that, even adding the extra cost of production, it still leads in showing the lowest cost per pound of digestible dry matter.

The feeding value of these two crops has been amply demonstrated in practice. This reason, in connection with the others given, proves their right to a leading place in the rotation of the dairy farmer.

The following diagram shows the composition of the leguminous and cereal crops in reference to plant-food elements:

Fertilizer Constituents of Crops.

	LEGUMINOUS.		CEREAL.	
	Clover.	Peas.	Timothy.	Corn.
Ash	6.8	2.5	4.4	1.4
Nitrogen	2.0	3.3	1.0	1.7
Phosphoric Acid	0.4	0.9	0.4	0.6
Potash	1.7	1.0	1.3	1.4
Nitrogen gathered per ton	40 lbs.	66 lbs.	....	....
Nitrogen consumed per ton	....	....	20 lbs.	34 lbs.

A study of these analyses shows that while the leguminous crops do contain practically the same amounts of phosphoric acid and potash as the cereals and grasses, they contain double the amount of nitrogen. If then we assume that the nitrogen in a clover crop as harvested, and not including roots and stubble, is entirely drawn from the atmosphere, its influence in a rotation is evident, whether the crop is used upon the farm or soil. If used upon the farm, one ton will furnish to the manure double the amount of nitrogen furnished by a ton of timothy; if sold, the nitrogen removed in the clover will not represent any actual loss of soil fertility so far as this element is concerned, while the timothy will represent a loss of twenty pounds. The relative feeding value of these crops will be discussed under section 2.

2. WHAT FEEDS TO BUY.

The analysis of any product, either natural or artificial, that is used as a feed, shows it to contain, in addition to the groups of nutrients already mentioned, mineral or ash constituents. The amount of ash as well as the essential fertilizing constituents, phosphoric acid and potash, contained in it varies with the kind of product. Thus wheat straw and cotton-seed meal, respectively, would represent the minimum and maximum values in this respect.

Nitrogen, the other valuable fertilizing constituent of feeds, has already been referred to as the basis of value of the albuminoids. The other nutrients, viz., fats and carbohydrates, contain carbon, hydrogen and oxygen only and are therefore of no direct fertilizing value.

If the food-supply of the dairy is derived entirely from the farm and the products sold in the form of milk, there is an exhaustion of the mineral constituents in proportion to the amount sold, while the exhaustion of nitrogen is in proportion to the relation which exists between the milk sold and the leguminous crops raised. In this connection and bearing directly upon the question of fertility arises the question, What rations are most suitable or what quantities and proportions of the various nutrients are best adapted to the purposes of the dairy? It has been demonstrated time and again that the best daily ration for a dairy cow of 1,000 pounds live weight and in full flow of milk should contain approximately $2\frac{1}{2}$ pounds of digestible protein, $\frac{4}{10}$ pounds of fat and $12\frac{1}{2}$ of carbohydrates, and having a

nutritive ratio of 1 : 5.4, the nutritive ratio meaning the relation of the nitrogenous to the non-nitrogenous nutrients contained in it.

A study of the composition of corn and clover, the farm crops regarded as of the greatest importance in the dairy, shows that clover is well adapted in itself and would serve as an economical dairy ration, while corn, either alone or corn and clover together, are too poor in nitrogenous matter or albuminoids, and that even a ration composed of the corn and clover would still possess too wide a nutritive ratio for the best results. Hence the farmer who raises corn and clover, the best feeds for his purpose, is still in need of nitrogen, the primary source of the lean meat of the animal body and of the casein in the milk.

The following diagram shows the relative composition of leguminous and cereal crops in reference to food compounds, as well as their relative ratios as compared with the standard for dairy cows:

Food Constituents of Crops.

	LEGUMINOUS.		CEREAL.	
	Clover.	Peas.	Timothy.	Corn.
Fat	2.7	1.4	2.2	5.4
Fiber	19.3	4.0	28.8	1.4
Starch	39.6	55.8	45.8	69.5
Albuminoids	12 4	20.8	6.2	10.6
Nutritive ratio	1 to 5.8	1 to 3	1 to 14	1 to 11.2

Standard ration for dairy cows, 1 to 5.4.

Successful dairy practice therefore demands the buying of feeds. From the standpoints of economical feeding, evidence is positive and conclusive that rations made from farm products alone are as a whole too rich in carbohydrates, and therefore the feeds bought should be rich in nitrogen, the basis of albuminoids. From the standpoint of fertility, it is evident that the richer they are in the mineral constituents the better. This point has been and is now too little appreciated, and its importance cannot be too strongly emphasized.

In this State, at the present time, the composition of a feed bears no direct relation to its selling price; the latter is governed entirely by market conditions. It was shown in Bulletin 87 of the New Jersey Experiment Station, in which is reported an investigation of the composition and cost of feeds, that, on the average, a pound of albuminoids could be procured for less money than a pound of car-

bohydrates. The value of this condition of the market is only appreciated when it is remembered that 100 pounds of albuminoids contain 16 pounds of nitrogen, worth, at a fair valuation, $2.50, while the constituents of the carbohydrates have no commercial fertilizing value whatsoever. And in addition to this it was shown that those feeds which were richest in the albuminoids were, as a rule, the richest in mineral constituents, and they were furnished to the buyer entirely free of charge. The farmers of New Jersey pay directly to fertilizer manufacturers and dealers over $1,000,000 annually for just the same elements, though often in a less available form, that in the feeds are furnished them at so low a cost, and among the number so purchasing are a host of our best dairymen. If they have bought the right feeds and have fed them to the best advantage, there can be no criticism of their work; if they have not, it is strongly urged that they study these facts.

That farmers in other countries appreciate the importance of food and fertilizer values is abundently evident when we study our export lists. In 1890 we exported, in round numbers, 360,000 tons of oil-meal. The market conditions made it possible for the producers to receive for it $8,000,000. At these figures, based entirely upon feeding value, the consumers obtained feed at a low price.

There was contained in that amount of oil-meal, however, nitrogen, phosphoric acid and potash worth $8,000,000, based on a valuation for these elements much lower than consumers are, on the whole, obliged to pay for them in commercial fertilizers. If farmers appreciated this excellent feed as they should, not a pound would be exported. Take, as a further illustration, the case of wheat-bran and middlings, excellent feeds from the standpoint of both food and fertilizer value. There were exported in 1891, 55,000,000 bushels of wheat and 11,000,000 barrels of flour. We received for the wheat $51,000,000 and for the flour, $55,000,000. Assuming five bushels of wheat per barrel of flour, which is correct, the flour represented as much wheat as was exported directly, though we received for the flour $4,000,000 more than for the wheat, besides retaining bran and middlings, articles not used for human consumption, but entirely as stock feed, worth at the low valuation of $15 per ton, $10,000,000, and which contained fertilizing constituents worth $8,000,000. This latter is a clear loss to us, and which, if added to that in the linseed meal, another product used chiefly as animal food, makes a total loss

of $16,000,000 worth of fertilizing constituents annually, in these two exports alone, an amount sufficient to furnish fertilizers to New Jersey farmers for a decade, or to build stone roads over the whole State.

These are stupendous figures and absolutely correct as to fact, and it means, if it means anything, that we, as an agricultural people, are wickedly wasteful of our resources. But perhaps you say we are getting something in return. We are. We import annually over $10,000,000 worth of sugar, a product used for human consumption alone, and composed entirely of carbon, hydrogen and oxygen; it therefore represents no loss of fertilizing value to our neighbors and no gain to us. It could all be raised in our own country from the use of the fertilizing constituents now annually given away. In view of these facts alone, though I could bring others bearing upon the same point, it would seem to be a wise policy to retain the bounty on sugar, and to place an export tax on linseed meal and whole wheat. This, however, is a digression from my main point. I wish to call attention to the other feeds that may be added to the list which aid the farmer in economical feeding, while at the same time adding to his stock of essential plant-food. These are chiefly cotton-seed meal, dried brewers' grains, the gluten feeds, and malt sprouts. By using these in connection with his clover and corn, a dairy farmer may be increasing his fertility all along the line without buying a pound of fertilizer. This, however, depends upon the third point, viz.:

3. THE USE OF MANURES.

By the use of manure I mean the management of it from the time it is made until it is used by the crop. The manure from dairy cows should contain all the fertilizing ingredients contained in the feed less the amount sold in the milk. Dairy animals utilize about twenty-five per cent. of the nitrogen and ten per cent. of the mineral constituents present in the feed. This may perhaps be expressed more clearly from another standpoint. A ton of milk contains on the average twelve pounds of nitrogen, four and one-half pounds of phosphoric acid and three and one-half pounds of potash. This is worth, at fertilizer values, about $2.40 per ton; it is an equivalent of one-quarter of a cent for every quart of milk. Deducting these amounts, it is then a question whether the remaining elements are returned to

the soil in the manure, because of the usual methods of handling this product. Losses may and do occur, first through fermentation and second through leaching. By fermentation the nitrogen is converted into the volatile carbonate of ammonia, which escapes into the air and is lost; by the admission of considerable quantities of water the soluble constituents are washed out. Unless these two sources of loss are prevented, the constituents remaining in the manure bear no relation to those contained in the feeds. Experiments at our own and other experiment stations show that by the careless handling of manure from thirty to forty-five per cent. of the constituents may be lost, and not only that, for the residue represents the more insoluble, and therefore poorer parts of the manure. The volatile ammonia may be retained by a liberal use of land plaster, kainit or superphosphate, which at the same time add to the value of the manure in respect to mineral elements, provided it is kept under cover until applied to the soil.

It has been shown also that any handling of the manure, for purpose of improvement, is, under average conditions, so much added to the cost of the elements contained in it. In other words, the greatest economy in the cost of the plant-food is attained when it is applied to the soil as soon as possible after it is made. The plant-food which is now lost through present methods of handling and which could be saved by other methods, is, at a low estimate, one-fifth of the annual total production, a big price to pay for the privilege of doing as our fathers did.

The next question is, how shall the manure be used in order to attain the best or most economical results in crop production? Yard manure is essentially a nitrogeneous product, and while its usefulness has been abundantly demonstrated, the character and the proportions of the plant-food elements contained in it render its exclusive use a wasteful process. That is, in order to supply a sufficient amount of available phosphoric acid for maximum crops, nitrogen is liable to be wasted, because it is so much in excess of the needs of the crop, while potash would be likely to be accumulated in undue proportions. To utilize the elements in yard manures to the best advantage, they must be used in connection with other fertilizing materials. Hence their best use depends upon—.

4. THE KINDS OF MANURES BOUGHT.

It follows, from what has been already shown, that these should be chiefly phosphatic, though, for the successful growth of the legumes, potash should be included. These may be added as preservatives of the manure, as already indicated, or supplied directly to the crops as required. By this means the advantages to be derived from the relatively bulky manure, and the concentration and solubility of the fertilizers, are both secured.

5. METHODS OF PRACTICE.

While the methods of dairy practice vary in different parts of the State, both in respect to crops grown and rotations pursued, yet the following method, which permits of the use of leguminous crops, and of two money crops per year besides the milk, is adapted to a wide section of the State.

The assumption is a one-hundred-acre farm; the rotation, corn, potatoes, wheat, clover and pasture. On a fair basis of fertility the food crops in this rotation would be equivalent to 14 tons of corn, and 15 tons of stalks, or its equivalent in ensilage, for the corn crop; 20 tons of hay, and an equivalent of 20 tons for the pasture. Crimson clover may be sown in the corn and turned under for the potato crop. The potatoes, 200 bushels per acre and wheat 15 bushels per acre, sold, and the wheat straw used for bedding and absorbents. On the basis of these yields, and assuming average composition of product, there would be furnished annually 2,523 pounds of digestible fat, 9,422 pounds of albuminoids, and 69,930 pounds of carbohydrates, or sufficient carbohydrates for 15 cows for one year, and sufficient albuminoids for 10 cows per year. By buying three tons of linseed meal, three tons of cotton seed, six tons each of wheat bran and middlings, and five tons of malt sprouts, these digestible nutrients would be increased to 4,297 pounds of fat, 18,145 of albuminoids, and 90,222 of carbohydrates, or sufficient to furnish a balanced ration for twenty cows in full milk for one year. By a judicious mixture of these feeds with the crops grown, excellent and palatable rations could be prepared.

Assuming an average yield of milk of nine quarts per cow per day, which can easily be secured from good cows and good feed, and

all of which is sold, and we have the following statement as to the fertility of the farm.

There have been sold of fertilizing elements as follows:

	Nitrogen.	Phosphoric Acid.	Potash.
In the potatoes	396 pounds	144 pounds	540 pounds
In the wheat	315 "	180 "	99 "
In the milk	876 "	365 "	219 "
A total of	1,587 "	689 "	858 "
Feeds bought contained	1,803 "	997 "	686 "
	216 "	308 "	172

The balance shows a gain of 216 of nitrogen, 308 of phosphoric acid and a loss of 172 of potash, or a net gain in fertility worth $44.86, not including the increase in nitrogen by the use of the clovers. Thus it is shown that by a rotation, not the best, that dairy-farming can be conducted on a reasonably large scale, milk, grain and potatoes sold, and fertility increased without the outlay of one cent for fertilizers.

That this method of farming would be fairly profitable, of course, depends largely upon the man, still the total sales would amount to not less than $3,500, assuming the low price of 2½ cents per quart for the milk, 40 cents for the potatoes and 90 cents for the wheat. The feeds would cost not more than $500, leaving $3,000 to pay for all expenses of labor, wear and tear, interest, taxes, &c.

Mr. Ward—I would move a vote of thanks to the Professor for his valuable paper.

The motion was agreed to.

Prof. Roberts—I want to say a word about this valuable paper. There is one point among many in the paper that strikes me as being of exceeding value. I refer to this great loss of plant-food which is crossing the ocean and getting away from us. There is a lesson in it for the American farmer. Everything should be worked up before it goes out of our hands. Think of it—$16,000,000 worth of plant-food that might remain in this country, besides setting the mills going and giving employment to thousands of men in running them, and to other thousands in mining coal for their use.

Speaking of plant-food or manures—nine-tenths of the farmers in New York pitch the farm manures out under the eaves; baptize them, literally, and wash all the spirit out of them. [Laughter.]

Such treatment wastes from twenty to twenty-five per cent. of their manurial value, and leaves an almost worthless balance. Do you know that thirty-two inches of rainfall in New Jersey means 3,200 tons of rain-water on every acre? The average barn-yard of New Jersey contains a quarter of an acre, upon which falls annually about 800 tons of rain-water. My father used to try to irrigate his farm at the end of a four-tined dung fork. [Laughter.] I have pitched manure day after day when the water just ran out of the bottom of the wagon. We thought we were manuring the farm. Why, such stuff would not fertilize white beans! [Laughter.] We must do better than this. The best farmers now never allow an animal to run out, and every forkful of manure is saved. Take care of all farm manure. You should be ashamed of such farming. Think of it—worth $3 a ton; worth as much as hay was when I was a boy!

Raise a plant to feed an animal, to make fertility to feed another plant to feed another animal, to make fertility, &c. These are the three golden links in agriculture.

A Member—I would like to ask the Professor if there is leakage of fertility in manure by taking it out and composting it, for use the next fall. We compost it and cover it about six inches thick with soil, and then work it up finely before spreading. Do you think there is any leakage in fertilizing qualities in doing this?

Prof. Voorhees—Probably very little, if properly covered. If it was properly covered, the fermentation would not go on to any great extent, and there would be little loss.

A Member—I follow this practice, and when I opened a heap last fall the ammonia was so strong we could hardly stand it.

Prof. Voorhees—If you put plaster on the compost for covering, that will absorb the ammonia, and there will be but little lost in the air.

A Member—How much loss would there be in applying to the soil as fast as made?

Prof. Voorhess—That is the best way. Of course there is more or less loss in any method. Probably less loss occurs when you apply the manure directly. There is less loss of ammonia in spreading the manure at once.

Mr. Pancoast—If a barn-yard is in the form of a basin, will the loss be so great? On a farm where there is a large quantity of wheat straw and corn-stalks, and the manure is hauled out early in the spring,

say in May, will there be so much loss, when the farm-yard is in the form of a basin?

Prof. Voorhees—I would be guided in my judgment by the kind of drainage, and the appearance of the drainage from the yard. I imagine there would be considerable loss. No matter how much dish the yard has the water must get away if it falls on it in any quantity, and if it passes through it carries the soluble constituents with it, without a doubt. The quantity of manurial value depends on the appearance of the drainage from the yard, but you would lose considerable of value.

Mr. Pancoast—Some of our farmers have a system of hauling this water out on the land; some have abandoned it, as they think it don't pay.

Prof. Voorhees—I would not save it that way. The more water to haul, the more labor, and the more expense. Save it some other way, and keep it from getting wet. I don't believe in sprinkling water on it.

Mr. Pancoast—How would you advise in regard to wheat straw and corn-stalks?

Prof. Voorhees—Feed it to the cow, and as soon as dropped carry it out and spread it, or keep it in a covered yard. Where you have a covered yard that is the best way. As soon as you can get it out, take it out on the field. Don't use your straw and stalks in the barn-yard, but pass them through the cow first, for they make better manure.

Prof. Roberts—How much stock does the gentleman keep?

Mr. Pancoast—On 100 acres, about 15 cows and 6 or 8 horses.

A Member—Has the hot sun the same influence as the rain; will it cause the manure to lose its fertilizing qualities?

Prof. Voorhees—It will not absorb the fertilizing qualities of the manure, but it makes the nitrogen less valuable; it burns it, and it will not decay so rapidly.

A Member—How would you prevent it from burning?

Prof. Voorhees—That you cannot prevent; if the manure is spread, you must take your chances. The best method is, if in the summer-time, to plow it in.

A Member—You cannot find time to spread it in the summer-time.

Prof. Voorhees—Then keep it in the yard under cover. If you

have no place there, you must, of course, make the best of your conditions.

A Member—If you keep the rain off it will burn.

Prof. Voorhees—But it will not lose so much.

A Member—I put a roof over my horse manure, but I found it would burn, so I made the roof to keep the sun off, but not the rain.

Prof. Voorhees—Was there any leakage from the yard?

A Member—No, sir.

Prof. Voorhees—To prevent fermentation, keep the manure moist. If there is enough water put on to pass through the manure, you lose; if you absorb it all you increase your manure. It is a question of the water passing through the manure and carrying fertility with it.

Prof. Roberts—Do you keep stock on this manure?

A Member—I do not.

Prof. Roberts—Our cows are kept on the manure and we have no difficulty; there is enough urine to prevent heating. We simply allow the cattle to run over it in passing through during the summer.

A Member—I keep my horses separate from my cows. My cattle are not allowed to go out. The horse manure is thrown out of the window.

Prof. Roberts—The cow and horse manure should be thrown out and mixed together.

Mr. Lanning—I would like to ask the Professor a question about feeding stock. I feed dry cut corn fodder twice a day and hay once a day, and ground corn on the cob, equal bulks of each. I would like to ask what I can buy which will be most profitable to mix with that feed; what is the practice on the farm? What must I mix with, say, one ton of corn-cob meal and one ton of bran?

Prof. Voorhees—Do you feed hay?

Mr. Lanning—The hay once a day and the cut product twice a day.

Prof. Voorhees—You would need to buy linseed meal for a part of it. You feed equal parts of corn and bran—about how much by weight—can you tell?

Mr. Lanning—We feed about four quarts of the mixture, three times a day.

Prof. Voorhees—I would add two parts of cotton seed or one and a half of linseed. This would, I think, about balance the ration. I would use the same proportional weights of bran and corn-cob meal.

That would give you a more nearly-balanced ration, and would give you increased fertilizer value.

Mr. Lanning—Are there any nutritious qualities in the cob?

Prof. Voorhees—Not a great deal. The results show that the cob, finely ground with the corn, will give the same results as the same quantity of corn meal. We have not found out why, for we have made no experiments. The cob is not as good as the corn, but it seems to give as good results with the corn as the corn without the cob.

Prof. Roberts—Have you ever seen any ground fine?

Prof. Voorhees—Not as fine as I would like to have it.

Emmor Roberts—I do not think any farmer accustomed to feeding cob-meal would ever willingly abandon it for whole corn. The farmer who has been accustomed to doing this for twenty-five or thirty years will not abandon it, if the chance were offered, of using an even quantity of cob-meal or of whole meal. The result with the cob-meal is better in every case, as the cattle do better and keep in better condition. I do not pretend to say the cob has any virtue, but the mechanical effect seems better. I have fed cattle this way all my life and find they do a great deal better with it than without it. You may take wheat-bran and mix it with corn-meal and it will answer the same purpose, but it costs you a great deal more money.

Mr. Evans—I can fully indorse that. Do I understand that $1\frac{1}{2}$ parts of linseed meal are equal to 2 parts of cotton-seed meal?

Prof. Voorhees—No, sir; I don't mean that. I should not use any more than that.

Mr. Evans—Can you use as much linseed as cotton-seed meal?

Prof. Voorhees—I seldom recommend more than $1\frac{1}{2}$ pounds of linseed, though it is more digestible than the cotton-seed meal.

Mr. Evans—I have fed considerable cotton seed, but have not much experience with the linseed-meal.

Prof. Voorhees—The cotton seed is richer in the albuminoids than the other.

A Member—Will it pay to buy at the present prices? If a farmer has plenty of corn, costing about $16 per ton, will it pay to buy cotton seed at about $30 per ton?

Prof. Voorhees—Every time. In the first place, when he buys a ton of cotton-seed meal, looking at it entirely from the standpoint of fertilizer values, he has $30 worth of fertilizer. Now, if he can get

any food out of it he has the food as clear profit on the cost of his fertilizers, besides its value in balancing up the other feed.

A Member—A few years ago Dr. Cook showed us an experiment on the farm, by which they got a comparative result between the use of a certain quantity of cotton-seed meal and an equal quantity of corn-cob meal, showing the result entirely in favor of the cotton seed.

Prof. Voorhees—That is the evidence we have. There is no positive evidence as to what constitutes the value of the cob, but it seems to be the better influence on the digestive system of the animal. If you have the cob ground too coarse you have a bad effect. If you use bran and other feeds having a good mechanical effect, as Mr. Roberts says, the value of the cob is about the same as so much ground wood.

Prof. Roberts—What would be the effect with chopped hay? Would it not do equally as well as to grind the stalks?

Prof. Voorhees—You can get the same mechanical effect as from the cob. It hinges on the cost of grinding.

Mr. Lanning—That is the point. If the cob will do the same work that the cut hay or stalks will do, we do not need to shell the corn or to husk it, but we can grind it all at the same time. I have fed it for three or four years, and speak from practical experience. After feeding corn-cob meal I have turned to feeding the pure corn-meal, always mixed with bran, and the cob-meal with equal bulk of bran, and with pure corn-meal mixed with two parts of bran and one of corn-meal. I have found no difference in the product of the cow, and I think it economy to feed corn-cob meal. I have never used either linseed or cotton-seed meal, to speak of.

Prof. Voorhees—I think either of these I mentioned will balance that ration. I have here a number of balanced rations. Take cut or crushed corn-fodder, three pounds per day, and seven pounds of middlings, and three pounds of cotton-seed meal. That will make a balanced ration. The value of the fertilizing material in it will very materially reduce the cost of the food to you if you take care of the manure. Calculating that on the basis of the fertilizing value in it, at the rates you pay for these same elements, you will find this ration will contain a fertilizer value of 11.1 cents; the total cost of the ration would be 16.8 cents, leaving a net cost of the ration, independent of the fertilizing value, of 5.7 cents. I do not take into consideration

that twenty-five per cent. of the nitrogen is taken out, for you sell that in your milk. When you buy your feed you have that amount in it. I would strongly recommend when you buy your feeds you get them rich in these constituents.

If I were a farmer I would sell a great deal of my corn if I did not have a large dairy; if I had ten cows instead of twenty, I would sell all my corn, because I get a higher price for my constituents than I must pay for them.

Emmor Roberts—The market price of corn is about the same as hay. A pound of hay is worth one cent, and a pound of corn something less. Is not a pound of shelled corn worth more for feeding an animal than a pound of ordinary hay? Is there not more value in it? I refer to the market value.

Prof. Voorhees—I would sell it all at that rate.

Mr. Roberts—We do, except for our horses.

Prof. Voorhees—I would sell that, too.

Mr. Roberts—It is vastly cheaper to feed our corn—we are feeding wheat, too, I am sorry to say—it makes a rich ration, and the cattle do surprisingly well on it.

Prof. Voorhees—You should use cotton seed with it; corn is highly carbonaceous.

A Member—How about brewers' grains?

Prof. Voorhees—If fresh they are good; if not, they are harmful. At the college we formerly fed them altogether, in connection with corn and cotton-seed meal. Twenty pounds a day of the grains forms an excellent basis for a ration.

A Member—Is there anything about these grains detrimental to the health?

Prof. Voorhees—I think not, if properly used. If you use a reasonable quantity, when sweet and with other foods, they are no more detrimental than anything else, either to the animal or to the people who use the milk, though if they are sour or used almost exclusively, they are not so good.

A Member—Not as rich?

Prof. Voorhees—Not so good. I want to call your attention to the present low prices of buckwheat bran—but $10 to $12 per ton. It is one of the best milk-feeds and one of the cheapest. I don't know how it is in this section of the State, but in the northern part of the State the farmers do not find it difficult to get it. Where the buck-

wheat is not raised the bran is not found in such quantities, but where you can get it for $12 a ton it is one of the cheapest feeds on the market.

A Member—Would you recommend us to sell our corn and buy cotton-seed meal?

Prof. Voorhees—There are conditions under which I advise it.

A Member—Take corn at 45 cents per bushel, which means $16 per ton for cob-meal. Would you advise selling, and buying wheat middlings at $20 per ton, and bran at $18 or $20 per ton? If you have stock enough to use up the carbohydrates economically would you recommend this? I hardly think I should sell if I have animals enough to use my feed economically. It certainly would not pay to sell corn at 45 cents, and buy back the carbohydrates at a higher price.

Prof. Voorhees—There are conditions under which I would sell the corn; that is, when you have not animals enough to use it up in a properly balanced ration. I should sell to that point where you can use economically, and properly balanced.

Mr. Lanning—How many pounds of ground corn can a dairy cow in full milk consume each day to advantage?

Prof. Voorhees—One of the very best rations used by certain breeders is a third each of corn, oats and bran. That is, six pounds each, 18 pounds all told. This gives the best results.

Mr. Lanning—Understand, we don't want to kill our stock. We want good results, but at the same time do not want to feed any more corn than they can use at a profit every day.

Prof. Voorhees—Take one-third each of that mixture—if she can use that, all right; if not, reduce the ration. I give you relative amounts, as the rations are made up.

Mr. Nicholson—Have you ever analyzed what is called hominy meal, from kiln-dried corn, and what is its value, compared with ordinary corn, not kiln-dried?

Prof. Voorhees—I can give you the composition. Hominy meal is about three times as rich in fats as corn-meal, and also richer in albuminoids. It is very excellent, because it contains a large quantity of very digestible food. Its relative value I cannot give you from memory, but I think corn-meal will have about 4 per cent. of fats, whereas hominy has over 9½; corn-meal has about 9½ of crude protein and hominy has 11½. The other constituents are proportionately reduced, of course.

Prof. Roberts—I noticed in coming through the State that the method apparently practiced consists in husking the corn and leaving the stalks in the field in the sun. Is that the common practice in New Jersey?

Prof. Voorhees—That is true through the southern section, I think.

Prof. Roberts—Would it not be better to cut them up when green?

Prof. Voorhees—Undoubtedly, and we are trying to induce them to do this. A very large number of farmers raise the big varieties, the stalks are very heavy to handle, and it is sometimes husked standing and then left in the field until needed for feeding. We have been making some experiments in that line. We want to get smaller varieties of stalks grown and then use the whole product.

Prof. Roberts—Are they of much value when husked ripe and then shocked?

Prof. Voorhees—The value is much reduced in that way.

A Member—We cut it and shock it before it is husked.

Mr. Roberts—I think nine-tenths of the corn in the southern portions of the State is cut as it begins to harden; it is a very rare sight to see it husked standing.

A Member—I am interested in this manure question—this saving the manure. I don't quite understand the best way. We throw our stable manure out, and I would like to know the best way to take care of it.

Prof. Voorhees—Mix your horse manure with the cow manure.

A Member—We try to haul it out sometimes, but we don't have time always to do this, and we don't always know just where to put it.

Prof. Roberts—Put it on the field. [Laughter.]

A Member—You can't see where to put it; we might get it on twice in the same place, on account of the snow.

Prof. Roberts—It won't hurt the field if you do. [Laughter.]

Mr. Roberts—I don't think there is any better way than to spread it on your sod-fields, or on any field. That is the best and cheapest way to save manure.

A Member—You can't always do that. Sometimes the fields are soft and will cut up badly.

Mr. Roberts—That is true. It has been asked here whether there is any loss in spreading in midsummer, and I think the loss is very little and the saving very great.

Prof. Voorhees—That is the ground I take. I said we could not be certain we did not lose by any method. I also said the probabilities were there would be some lose, but the question is, which is the best way?

Prof. Roberts—I don't know where to put my manure the last of May; I have no place; I don't want it on my corn, nor on my meadows, and I have no place to throw it; neither do I want to use it in June, nor I don't want to use it in July, nor in August—it is too hot. I don't like to work in August. [Laughter.] In September, when it comes cold, we can learn a lesson if we look at Nature. Nature built this soil without any Farmers' Institutes or fertilizer agent, and raised a crop every year and fed an immense number of animals of different species. The feathered tribes were in immense numbers—the pigeons were so numerous that they could be netted by the wagon-load. Every year Nature raised her crops, fed all animal life, and increased the fertility of the soil. She spread the refuse thinly on the surface in the fall, where plants were growing.

Mr. Roberts—Farmers living contiguous to the cities have to use all the economy they know how, for the business is a close one. It is the custom with them in sending their loaded wagons to the city to have the team bring back a load of manure. Now, the question is, what to do with it. The idea is to get it home. Sometimes we throw it in the barn-yard, and then there is no loss if covered, but as a rule we always have a pasture yawning for manure. We always find a place for it somewhere.

Prof. Roberts—I don't want it on my pasture at this time of year. The cows are there eating, and they do not want their food soiled. Our method is to put out manure about this time of the year on the corn-ground. The balance, if any, is hauled out into the rotting-pit. If it is not damp enough we put water upon it.

Mr. Borton—I have a case in mind where, a few years ago, a prejudiced person hauled out some manure some time before it could be plowed. He did not believe in leaving the manure exposed. It was when oats formed an important crop. In this instance he found the ground was too hard to plow. He had hauled out a considerable quantity before he found he could not plow the ground. When he was able to plow he did so, believing all the time that the manure was valueless; the rest of the field he plowed as fast as the manure was spread. When he came to harvest the crop he found the best

wheat on the piece of ground where the manure had lain exposed before plowing, and where he had supposed the manure would be of no value.

The Chair—I would like to say a word to Prof. Roberts, both in regard to manure and in regard to harvesting corn.

The method of cutting up corn before husking has been talked over. I do not think there is one-tenth of the South Jersey crop harvested in this way, but the stalks are cut and shocked before husking.

In regard to the handling of our manures. The question of labor in handling manure is a most important one. We cannot afford to pick up manure and throw it down two or three times. Once handling is all we can afford. Some years ago I found we could not afford to handle it so often, and so hauled it out on the fields. Some years ago I had a quantity of manure which had to be moved. The ground was frozen, and I was somewhat skeptical, but I had to move it. At the time of breaking up of the ground there was considerable colored matter which ran off the field and out into the road, and my neighbors criticised me for allowing my manure to run to waste. They said I would soon see the error of that way of spreading manure. Potatoes were planted on the ground, and in the fall following wheat was sown. The next summer, on the ground where I supposed I had lost the salts and essence of my manure, I found the biggest crop of wheat I had in the field. We could hardly get the machine through it, it was so heavy. The criticisms then came the other way, and those same people asked how I could account for it. I made a further examination through the field to see if I could trace the path of the colored matter that ran off, but I have never been able to see any trace of its path through the field.

We have been forced to the belief that the economy lies in handling the manure once and not disturbing it afterwards. Get it there—no matter how, so you get it there.

SANITARY CONTROL OF THE MILK-SUPPLY.

BY GEORGE W. M'GUIRE, STATE DAIRY COMMISSIONER.

SANITARY CONTROL OF THE MILK-SUPPLY.

ADDRESS BY GEORGE W. M'GUIRE, STATE DAIRY COMMISSIONER.

When the first Milk law of this State was enacted, in 1880, it was intended to prevent the sale of any but pure milk and to protect the dairy interests of the State; hence it became both a sanitary and a commercial measure. From a sanitary standpoint it has undoubtedly served to protect the public health, and while we have no means of estimating its improved condition, we do know that physicians have relied on the Inspector to watch the milk supplied to their patients and that they have acknowledged the benefits of such surveillance. From a commercial standpoint there can be no doubt that the dealer in pure milk has been protected against the wholesale system of adulteration indulged in prior to the enactment of the law, and now when adulterated milk comes in competition with pure milk, the remedy is easy, and the honest dealer has the aid of the law and its officers to drive the spurious article from the market. That law for ten years was enforced by Dr. William K. Newton, who succeeded in ridding the State of a band of adulterators who infested it prior to that time. This he accomplished almost single-handed, besides inaugurating systems by which the work has been made much easier. In 1886 the Legislature passed a law merging the office of State Milk Inspector into that of State Dairy Commissioner. Under that law the Commissioner was given additional help and I was appointed an assistant, and after an experience of over six years I do not hesitate to say that the milk-supply of New Jersey is purer than I have ever known it to be. While we endeavor to prevent the adulteration of this most important article of food by a rigid system of inspection, men will take their chances to increase their profits, even at the risk of detection and punishment.

The principal methods used for the adulteration of milk are the removal of cream or the addition of skim milk and the addition of

water. Some dealers have become so adept in the former method that, knowing the quality of milk they receive from day to day, they are able to take enough cream from it or add sufficient skim milk to it as to greatly enhance their profits without danger of having their milk fall below the State standard. A competent Inspector is soon able by experience to distinguish such milk from pure milk by its appearance, and the man who continues in this practice is liable, sooner or later, to be detected.

While the dilution of milk is considered by many people to be merely a commercial fraud, the best authorities deem it the worst form of adulteration yet resorted to, for it not only debases this all-important article of food, which is so nourishing to children and invalids, but when impure water or water from infected wells is used, often causes most serious consequences.

The entire suppression of these frauds cannot be accomplished alone by legislative enactment, and we, as officers appointed to enforce the law, invoke the sympathetic assistance of all public authorities and private citizens who feel an interest in the public good. But something further is necessary for the proper inspection of the milk-supply, especially of our large cities, and with this idea in view we have from time to time extended our inspections to the sources of supply. The cows, their stables, the milkers themselves, and the vessels used in carrying the milk, should all be inspected; especially should this be done in localities contiguous to large cities, where cows are kept as mere milk-making machines, without regard to the quality of the product. Last year we did some work of this character in Hudson, Essex and Passaic counties, and it must be said that many stables were found to be conducted on good sanitary principles. The stables were clean, the cows looked well cared for and the milk vessels were clean and bright. The principal food used, however, was brewers' grains, which, when used exclusively, produces a poor quality of milk. On the other hand, we discovered some stables that reeked in filth; the floors were almost impassable, devoid of any drainage whatever, the cows covered with filth, and the entire surroundings foul and dirty. The following report, made by one of the Inpectors, will give an idea of one of these stables as it then existed:

"Swill-stable; 11 cows, 2 bulls, 30 hogs, all under one roof. Cows standing in filth of all sorts; gangway choked up with partially-

rotted garbage and swill. The location of this place in the swamp makes it impossible to secure any drainage. The barn is taken up by a boiling-vat, the refuse from which runs out, forming large pools of greasy slop wherever there is a little depression in the ground."

This man was compelled to abandon his old stable. He built a new one for his cows and is now conducting his business with some degree of decency. During the present year our Inspectors have visited 155 stables, containing 2,693 cows. The most of these inspections took place after our busy season of work at the summer resorts within the State, and I was gratified to find that there was a marked improvement over last year in the sanitary surroundings of many stables and in the handling of the milk produced in them, due to our former crusade against them, together with the help we received from the United States authorities and the action of the Hudson County Board of Health, in revoking and refusing permits to parties bringing hotel swill during the cholera agitation of last summer.

Notwithstanding the improved condition of these stables, there remains much to be done to insure wholesome milk from these districts. Several reports have of late come to me from my Inspectors, showing that many of the men engaged in this business, especially in Hudson county, appear to have no conception of cleanliness. The cows are filthy, the people dirty and the ventilation of some of the barns is very bad, and there is absolutely no drainage whatever. The cows are fastened in their stall for months at a time, until they are no longer able to supply milk to their owners, then they are fattened and sold to the butcher. Where milk is produced, strained and cared for under such conditions, there can be no doubt that it is unwholesome. It must be admitted that milk coming from our country districts, where the cows are allowed to feed on proper pasturage, have an abundance of pure air and water, and are well housed in the evening in clean, airy stables, is the best, and although the chemist has not been able to tell the difference between town and country milk, there is a vast difference in the quality, and in the effect upon the consumer. We also know that it is possible to conduct a milk dairy in a city, and produce milk of good quality. In Germany, large stables holding from one to two hundred cows, are conducted on proper plans; the cows are kept clean; the stables are airy and neat. and the feed is proper; and although the animals are confined in the house for months

at a time, a good quality of milk is produced. In some parts of Hudson county, the reverse of the German method prevails, and although the milk produced is up to our legal standard of purity, to my mind it is unwholesome as an article of food.

There are over 1,000 stables in Hudson county, over 1,300 in Essex county, containing about 9,000 cows, and the principal food given them is brewers' grains. While it is true that some of the owners properly mix meal with brewers' grains, thereby producing nutritious milk, many of them feed the cows on brewers' grains exclusively. The habit of feeding milch cows on brewers' grains exclusively is generally condemned by competent authorities as an unwholesome diet. Dr. Munsel, in his report to the New York State Board of Health, says: "The result of the analyses of the milk produced by the cows fed on brewers' grains shows that if mixed with other feed, such as chopped hay, Indian meal and bran, in not too large a proportion, the milk produced is of good quality; but if the cows are fed on these grains exclusively, or to a great extent, the milk produced is of extremely poor quality, sometimes containing only two-thirds as much fat as ordinary milk. The decrease in the quality of milk of cows of the same dairy is gradual, but after six months or a year the change is apparent and seems to increase with the time, but as the cows lose flesh on this food, it is customary for the dairyman to sell his cows to the butcher and purchase new cows."

Prof. Albert R. Leeds, of our own State, who has given this subject much study, in an address delivered recently before the New Jersey State Sanitary Association, said: "It is not my intention altogether to condemn brewers' grains as a food for cattle when used with other food and fed in a proper manner. The effect of brewing is to extract from the malted grain its saccharine matters, leaving, however, albuminous substances of a highly nutritive character. The objection is based on the way in which brewers' grains are handled and fed. As they leave the brew vat they contain nearly four-fifths water. The solid portions are sweet and fresh and cattle apparently find them very palatable. Not only are these grains wet when they leave the brewery, but even more water is added in the stable, and so in hot weather they become acid in the course of a few hours. The practice of feeding them exclusively is unnatural and does great harm both to the cattle and milk. producing in the latter an actively poisonous and dangerous principle."

It would be needless for me to add anything to what these gentlemen have said, as all persons who have made a careful study of the influence of the food of cows on the milk production, either from a scientific or a practical standpoint, have arrived at the same conclusions.

An experienced Inspector can readily detect milk which is the product of such food by its general appearance, taste and odor, and chemistry shows it to be deprived of a large percentage of its most nutritious constituent, viz., fat.

We know that milk is easily affected by dirty surroundings, and that it absorbs odors, and under the conditions we have described, it is a hot-bed for disease germs, having the greatest facilities for carrying or propagating death-carrying microbes. The question then naturally arises—why has this condition of affairs been allowed to exist so long when the facts have been so well known, and why is not some action immediately taken to remedy the evil? My answer to such a question is, that under the general health laws of the State, and by a special law, chapter 74, Laws of 1882, the Local Boards of Health and municipal corporations are vested with large and arbitrary powers. They can pass ordinances regulating the production and sale of milk; have power to inspect the cattle and to license dealers in milk and compel the proper observance of well-defined sanitary rules in the handling of milk; can prevent the herding of cows in closely-confined places; and, in fact, can close every foul cow-stable in the State. All that is needed is for Local Boards of Health to be alive to the necessity of protecting the consumer against the danger of such infectious milk by intelligent and vigorous action. The powers of the Dairy Commissioner in the matter are limited to the prevention of the sale of adulterated milk, or where it is the production of diseased cows. The only section of the law bearing on the subject is the following:

"2. *And be it enacted,* That every person who shall sell or who shall offer for sale, or who shall transport or carry for the purposes of sale, or who shall have in possession with intent to sell or offer for sale, any impure, adulterated or unwholesome milk; and every person who shall adulterate milk, or who shall keep cows for the production of milk in a crowded or unhealthy condition, or feed the same on food that produces impure, diseased or unwholesome milk, or shall feed cows on distillery waste, usually called swill, or upon any substance

in a state of putrefaction or rottenness, or upon any substance of an unwholesome nature, shall be liable to the penalties hereinafter provided for in this act."

This section has a wide range, and in general terms prescribes violations of law which are to be punished by the infliction of penalties. There should be more specific regulations regarding the condition of the stables, the inspection thereof, enforcing the cleaning of the same, and requiring proper exercise for all cows kept for the production of milk. Much can be accomplished by a rigid system of inspection, and I would favor the license system, the license to be granted only after a careful inspection, with power to revoke in case the regulations are violated. If such a system could be obtained, most of the people who now maintain these offensive dairies would either be compelled to go out of the business or carry on the business under vastly different conditions; in fact, the location of many stables, situated as they are on the marshes, with inadequate floor space, no room for exercise, and contaminated drinking-water, would preclude the possibility of their continuance in the business.

(For discussion on the above subject, see Minutes.)

INSECTS OF THE YEAR.

BY PROF. JOHN B. SMITH, STATE ENTOMOLOGIST.

INSECTS OF THE YEAR.

The Chair—I am pleased to say that our efficient State Entomologist, Dr. John B. Smith, is with us, and has kindly consented to speak to us on our insect pests. It gives me pleasure to introduce Dr. Smith.

ADDRESS BY PROF. JOHN B. SMITH, STATE ENTOMOLOGIST.

Mr. President and Gentlemen—There has been no very marked invasion of insects during the present year, nor have any of the known pests assumed any seriously destructive dimensions. Yet the annual tax levied by the insects has not been less than usual, and some species have exacted more than their share. As a large part of my talk will be based on pictures, shown on the screen, you will need little in the way of introduction, and I will proceed at once to the first of the pests which has attracted special attention during the year. This is the

ANGOUMOIS GRAIN-MOTH.

This insect has been becoming more and more troublesome for the three years last past, and has done considerable injury to grain and corn in the Delaware river counties. The life history has been given

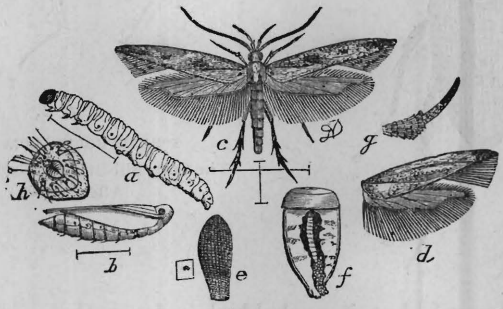


Fig. 1.

GELECHIA CEREALELLA.

a, larva; *b*, pupa; *c*, moth; *d*, wings of a variety; *e*, egg; *f*, larva in corn-kernel; *g*, palpus of moth. All save *f* are enlarged. (From report U. S. Dep't Agr.)

in the report of the Station for 1891, page 406, and I need not go into details here. It becomes most injurious in the mow and in the crib, and the farmers want some means of fighting it there. By all odds the best way, however, to control the insect is to thresh the grain as soon after it is cut as possible, and to bulk it, covering the top of the bin with sacking. Where grain is mowed, it is almost impossible to keep it clear of the insects unless the mow is open to the cold in every direction, and this would only mitigate, not prevent, damage.

Corn-cribs can generally be kept free from the insects by having them as open as possible and setting them clear of shelter, so the air can get all around and through them as freely as possible.

In sheltered localities the insects will breed freely all winter. In stacked grain the insects also propagate freely so long as the weather remains mild.

Another corn insect that has been troublesome in parts of Burlington and Monmouth counties, is the

CORN BILL-BUG.

This insect is treated in the report for 1891, page 394, and I have little to add to what is there said. The life history of the insect is

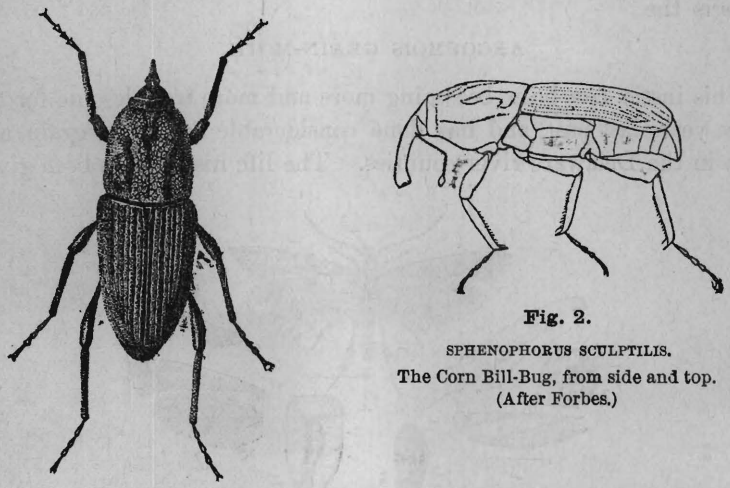


Fig. 2.

SPHENOPHORUS SCULPTILIS.

The Corn Bill-Bug, from side and top.
(After Forbes.)

not entirely known, but it probably breeds in the root of timothy-grass, for it is always worst in corn that has been planted on such sod. It usually works for only a short time, and by delaying replant-

ing a few days the second planting usually remains undisturbed. Experience has shown that fall plowing gives at least some relief and sometimes entire exemption, and this practice is earnestly advised. It is of no use to try and poison the insect, for it is practically impossible to reach it, feeding as it does on the stalks of the plant just at or even below the surface.

Another species, primarily a corn insect in this part of the country, has been unpleasantly conspicuous on early tomatoes. I refer to

THE CORN-WORM.

On sweet corn, and later in the season on field corn, there may be found in many localities an unpleasantly large number of ears, of

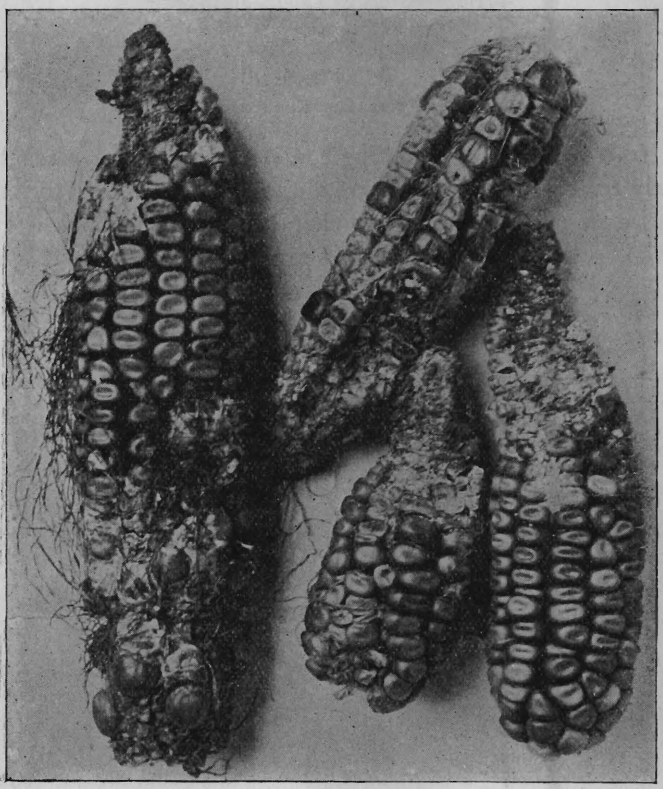


Fig. 3.

Ears of corn eaten by corn-worm. (From a photograph.)

which Figure 3 is a faithful picture. The insect causing this injury is described in the report of the Station for 1890, page 576, and in some parts of South Jersey it is a serious pest. Early in the season it makes its appearance on the tomato vines, boring into the

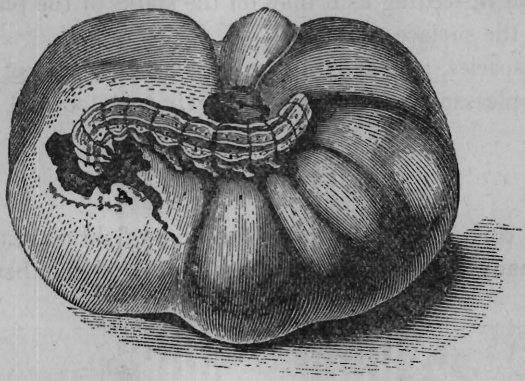


Fig. 4.

Corn-worm attacking tomato.

young fruit which is just getting ready to color up for market. As the early fruit is what growers are aiming for, because it brings the best price in market, the serious character of the damage is readily perceived. Among growers in some parts of Salem county it is known

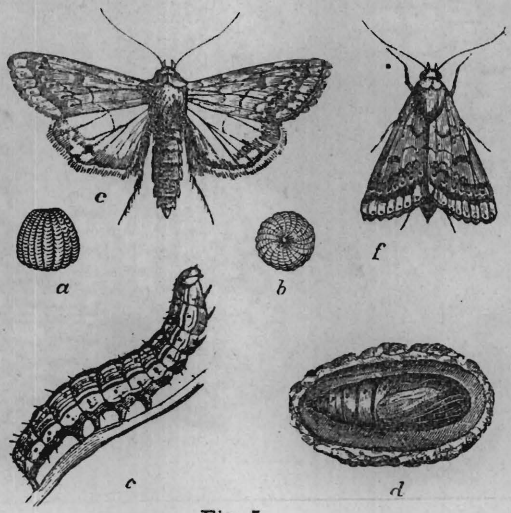


Fig. 5.

Heliothis armiger: *a*, egg, from side; *b*, same, from top—both enlarged; *c*, larva—corn-worm; *d*, pupa; *e*, moth, with wings expanded; *f*, same, wings folded.

as the "Heart-worm," and a very large percentage of the early crop was destroyed in 1892.

The life cycle of this insect is interesting and gives us little chance to use insecticides to advantage. The moth makes its appearance in spring, and lays its eggs on peas, or, if it can find them, tomatoes; later, a second brood attacks sweet corn, and a third attacks the field corn. In the more northern parts of the State there are only two broods, and tomatoes suffer little or not at all. After corn is in proper condition, no other crops are attacked in our State, and the last brood always matures in corn.

The remedy is to fall-plow infested corn-fields. The larva goes underground to pupate in an earthen cell, and if this cell is broken by plowing, so the earth comes into direct contact with the pupa, the freezing and thawing of the ground in a normal winter will destroy by far the largest percentage of them.

A considerable part of the season of 1892 was devoted to a study of the insects infesting the cucurbs, such as squash, citron and other melons, cucumbers and the like.

One of the chief among the pests was

THE SQASH-BORER.

This insect has been long known as the most seriously injurious to squashes, and has made the growing of Hubbard and Marrowfat squashes a simple impossibility in some sections of the State. The figure shows the moth in all its stages after the egg, and it illustrates a characteristic and easily-recognizable species. What is not shown is, that the tuftings of the prominent hind legs are of a contrasting orange color, while the rest of the insect is black or nearly so.

The eggs are laid on all parts of the plant, as illustrated by the figure, but the favorite location is, by all odds, the base, just at or even a little below the surface of the ground.

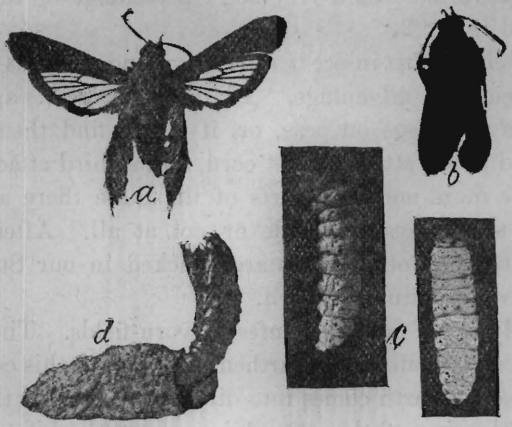


Fig. 6.

THE SQUASH-BORER.

a, *b*, squash-borer moths, wings expanded and at rest; *c*, larva, from above and from side: *d*, cocoon, showing pupa emerging. (From a photograph.)

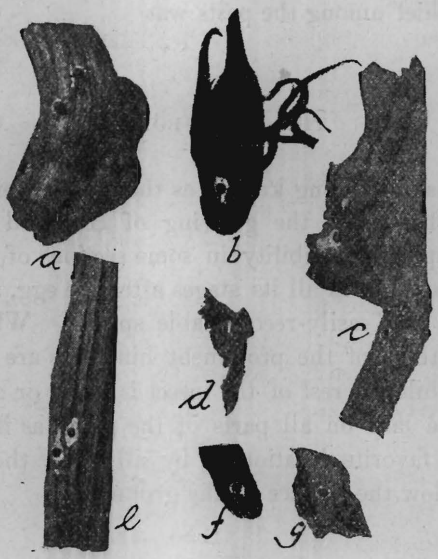


Fig. 7.

EGGS OF SQUASH-BORER.

Eggs of squash-borer on all parts of the vine: stem (*a*), bud (*b*), leaf (*c*), tip (*d*) and root-bark (*e*, *f*, *g*). (From a photograph.)

Here the larvæ, when they hatch, at once bore into the stem and there they remain until full fed, usually cutting off the plant completely, and always so weakening it that it is unable to mature fruit.

The usual remedy adopted, and the only one that has been successful hitherto, is to wait until the borers are in the vine, and then cut them out with a knife. Observation has shown that the moths rest during the night on the upper side of the leaf, fully exposed to view, and that they go to roost as soon as the sun gets low, say after 5 P. M.; also, that they do not resume flight until the sun is well up. The suggestion is that in early evening or in early morning, the grower should walk through the fields, between the squash rows and kill all the moths observed. A very little practice will enable one to see the insect at once, and as the moths are torpid and simply drop if disturbed, there is no difficulty in capturing them. Fields for squashes should be evenly fertilized or manured, and as soon as the vines begin to run they should be covered at the joints, to give them a chance to root. In good, well-cultivated ground, many varieties of squash-vines will send long suckers from every joint, sufficient to support the plant, even if entirely cut off at the base. The annual report of the Station for 1892 will contain a detailed life history of the species.



Fig. 8.
Squash-borers in the stem. (From a photograph.)

Another melon insect, which is becoming annually more abundant, is

THE BOREAL LADY-BIRD.

All stages after the eggs are shown in the figure, and the insect is quite readily observed in all its stages. As a larva it is a yellow slug

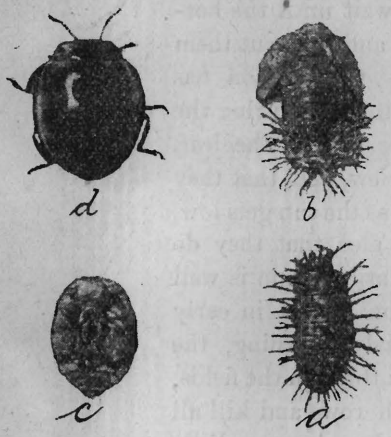


Fig. 9.

The boreal lady-bird: *a*, larva; *b*, *c*, pupa, from above and below; *d*, the adult beetle. (From a photograph.)

with black, branching spines, which feeds on either the upper or under side of the leaf, preferring the latter. The beetle is also yellow, hemispherical, and with black spots arranged, as shown in the figure.

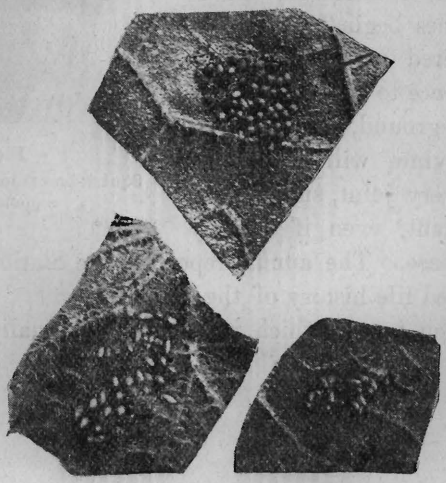


Fig. 10.

Eggs of the boreal lady-bird. (From a photograph.)

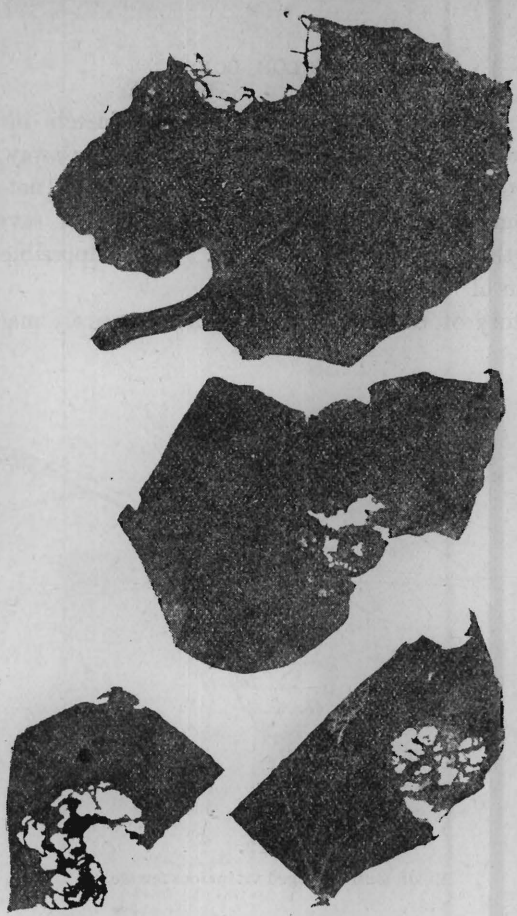


Fig. 11.

Injury done by the adult boreal lady-bird. (From a photograph.)

The feeding habits of this beetle are rather peculiar and interesting. Unlike any other species known to me, it marks out its work in the form of a segment of a circle, within which it does its feeding. When this circle is eaten out it makes a new one somewhere else, and the performance is repeated.

As this insect feeds fully exposed on the leaves in all its stages, it is easily reached and destroyed by any of the stomach poisons, such as the arsenites.

The last of the melon insects to which I will call attention this evening is

THE MELON LOUSE.

This is perhaps the most destructive of the insects infesting the citron and other melons, in some seasons sweeping away the entire crop in large districts, while in another year it may not be in the least troublesome. The season of 1891 was one of severe injury, while in 1892 there was no damage done. It is impossible to predict what the season of 1893 may bring forth.

The life history of this species has not been entirely made out, but

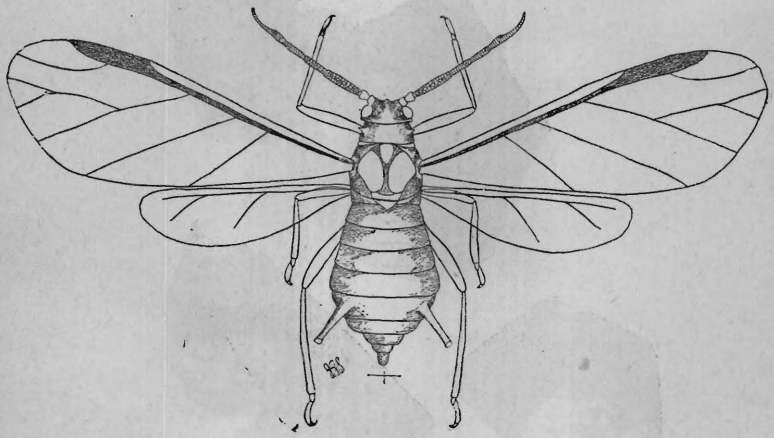


Fig. 12.

Melon louse: Winged viviparous female.

enough is known to make it safe to say that it has an alternate food plant, on which it lives through the winter.

For remedies, any contact poison, such as the kerosene emulsion or whale-oil soap, will answer. It should be applied thoroughly, with an underspray nozzle, just as soon as the lice are first noticed in the field. If the work is thoroughly done then, exemption later may be complete.

Another crop of importance in the southern portion of the State is the sweet potato, and it is likewise subject to attacks by insects.

The best known among these are

THE TORTOISE BEETLES.

These insects are more commonly known as "Golden-bugs," and some of them resemble in life, drops of molten gold. Handsome as is the beetle, the larva is as repellant a slug as is commonly seen, usually bearing a fork, loaded with its own excrement, as a shield. There are

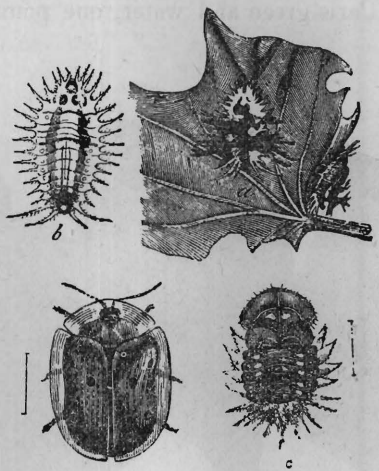


Fig. 13.

Coptocycla aurichalcea: a, larvæ, on leaf; *b*, larva; *c*, pupa; *d*, beetle. *b*, *c*, *d*, enlarged. (After Riley.)

several distinct species engaged in the work, but all of them have essentially the same life history, which is given at some length in the report of the Station for 1890.

For these insects spraying with the arsenites, with an underspray nozzle, is a complete remedy.

In parts of Salem county a much more serious pest has been

THE SWEET-POTATO FLEA-BEETLE.

This species is a comparatively new pest, and has not as yet spread very far. Its injury is done in the adult or beetle stage only, and the early history is yet unknown. The damage is done by eating chan-

nels in the tissue of the leaf on the upper side, first along the main veins, then in every direction, never crossing a larger vein, however. This interrupts the supply of nourishment for the leaf, and it browns up and dies. The attack is made just after the plants have been set out, and when they are least able to withstand such a drain on their vital power. The figure shows you the characteristic channels eaten by the insects.

The remedy is obvious. Dipping the plants, before setting out, into a mixture of Paris green and water, one pound to 150 gallons,

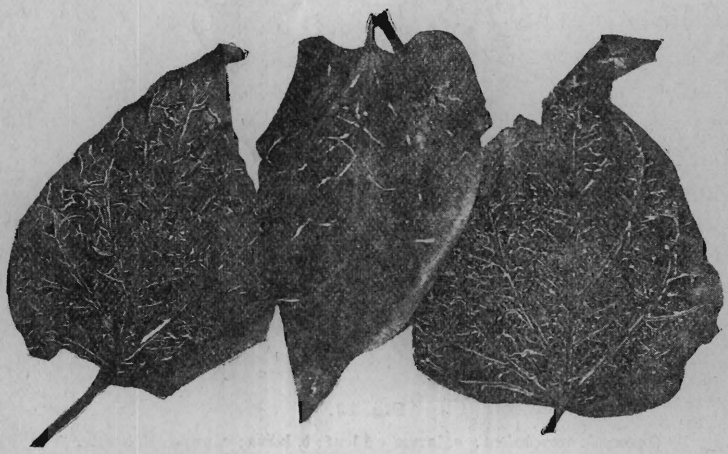


Fig. 14.

Work of the sweet-potato flea-beetle. (From a photograph.)

with one pound of lime added, will kill all the beetles that undertake to feed on them. Should the weather remain dry for a week after the plants have been set out, no further application will be needed. Should it rain, it would be necessary to renew the application, which can be easily done by means of a knapsack-pump.

THE SWEET-POTATO CUT-WORM.

The cut-worms are sometimes, and have been during the season of 1892, troublesome to sweet-potato growers in this State. The species

that is most injurious is that known as the "Reaping Rustic," which is quite an indiscriminate feeder, and often destructive to onions among other crops. The eggs for these cut-worms are laid in the fall, in grassy or weedy spots in the field, and the larvæ become nearly half grown before winter sets in. When the warm weather comes and vegetation starts, these insects become active and begin feeding once more. When the sweet potatoes are set out in fields infested by them, they must feed upon these, as there is nothing else to eat.



Fig. 15.

Sweet-potato cut-worm, *Agrotis messoria:* *a*, moth; *b*, *c*, larva from side and top. (From a photograph.)

Fields can be kept free of these insects by keeping them clean in late summer and fall. The larvæ can be destroyed in fields infested by them, by putting out traps, consisting of little piles of poisoned grass or clover, or other vegetation, after the field is plowed and before the plants are set out. The worms will eat of the only food that is on the ground, and will die in the course of from thirty-six to forty-eight hours.

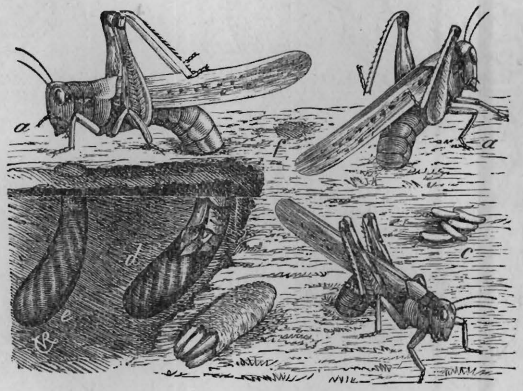


Fig. 16.

Oviposition of grasshoppers; *a*, female in different positions, ovipositing; *b*, egg-pod extracted from ground and broken open at end; *c*, a few loose eggs; *d*, *e*, show the earth partially removed, to illustrate an egg-mass already placed and one being placed; *f*, shows where such a mass has been covered up. (After Riley.)

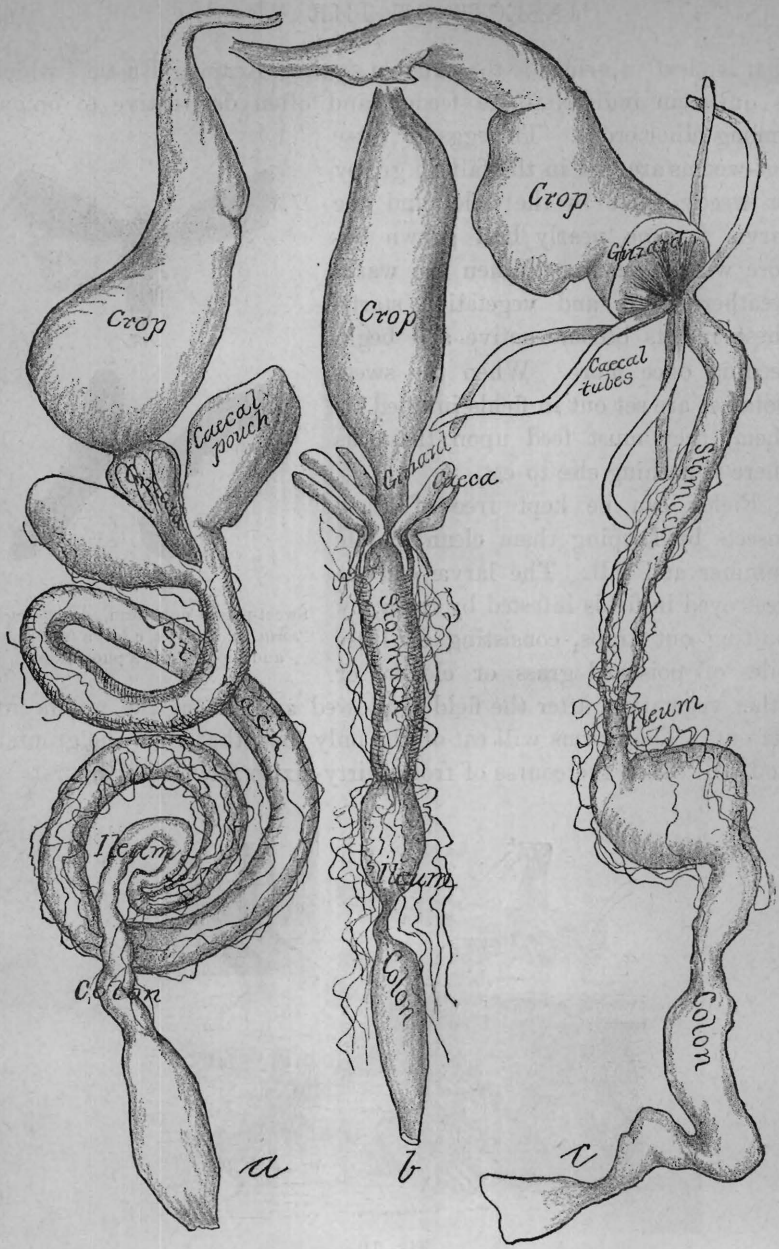


Fig. 17.

Alimentary canal of *a*, katydid (*Scudderia furculata*); *b*, grasshopper (*Acridium obscurum*); *c*, cockroach (*Blatta orientalis*), much enlarged. All the parts of the tract are named, except the irregular threads surrounding the stomach, which are the Malpighian vessels. They are much more numerous than shown in the figure, and form, in nature, a complete network around the organ.

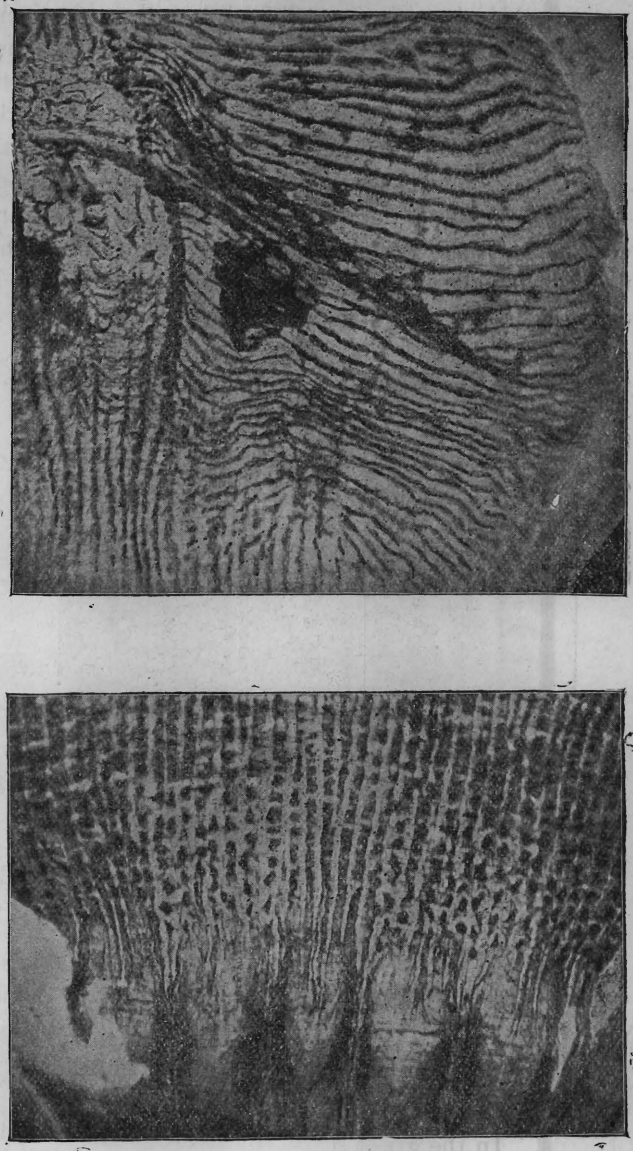


Fig. 18.

Part of inner surface of the crop of a grasshopper, *Acridium obscurum*. The upper figure illustrates the transverse ridgings, and shows the change to the longitudinal type; the lower figure shows the breaking up of these ridges into conical processes and gizzard plates. (From a micro-photograph.)

Cranberry-growers have complained of an unusual abundance of grasshoppers on their bogs during 1892, and of the great increase of injury caused by them. The character of the season was such, that *Orthoptera* of all descriptions were unusually abundant and troublesome. I am convinced, however, that the true short-horned grasshoppers are not guilty of the injury to cranberries of which they are accused. I base my conclusions not only upon observation, but upon a study of the anatomy of the insects and more especially upon the digestive system of these forms as compared with those of the katydids, which I believe to be the real culprits. The figure is so lettered that you can readily see the differences in the structure of the stomach

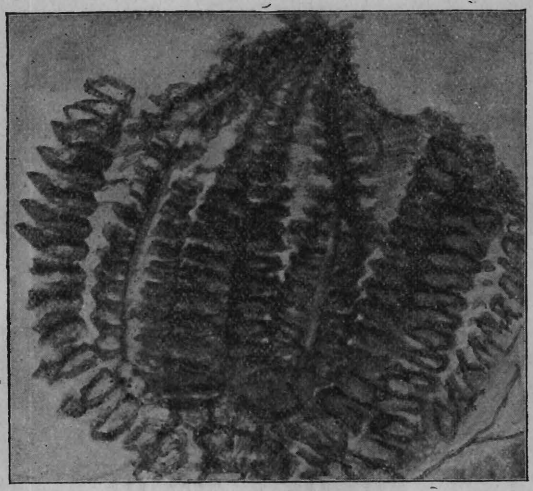


Fig. 19.
Part of the gizzard of a katydid, *Scudderia furculata.* (From a micro-photograph.)

and its appendages, and it will bring into view at once the fact that the katydids have a vastly greater capacity for food than the grasshoppers. The figure of the roach is introduced simply for comparison. But it is not only the actual capacity of the digestive system, but the structure of the gizzard, that makes me so positive that the katydids are the culprits. In the grasshoppers the crop is a wrinkled and folded organ, internally, and it is particularly well adapted to grinding up softer vegetable tissues. There is no distinct gizzard.

In the katydids, on the other hand, we find a very much more com-

plicated structure of the gizzard, and a comparatively more simple crop. Indeed, the crop is a mere membraneous bag, while the gizzard is furnished with stout, horny teeth, well adapted for grinding up the seeds upon which it preferably feeds.

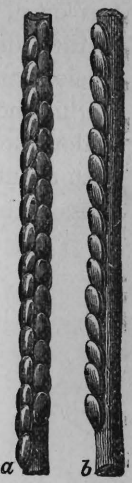


Fig. 20.
Eggs of katydid, *Microcentrum retinervis.*

The question as to the real culprit eating the cranberries becomes important when we proceed to the question of remedies. Grasshoppers, as shown in Figure 16, lay their eggs in the ground and prefer firm, sandy knolls for that purpose. By keeping the bogs free of such knolls, and keeping it quite wet in the early part of the season, the development of the grasshoppers may be prevented. The katydids, on the contrary, have a different habit. The eggs are laid on or in twigs, or in the tissues of leaves, and by keeping the bog free from shrubbery, they can be prevented from breeding on it. In addition, it is a highly important matter to have a wide, marginal ditch, which should be kept constantly clean to prevent the wingless insects from getting on the bogs from the edges; and all dams should be kept free from shrubbery of all kinds. The application of insecticides is not advised. In Bulletin No. 90 of the Station, these matters are more fully treated.

One of the insects that may, in the near future, become a serious pest in New Jersey, is

THE PEAR-MIDGE.

This insect I have treated in the Station Report for 1891, page 397, and have spoken of at some length before the Horticultural Society. It was introduced into this country in Connecticut some time early in the last decade, and has gradually spread, until at present it has extended up the Hudson river valley to Albany, and has reached New Brunswick in its journey across the State of New Jersey. In 1884 the insect could have been controlled without much difficulty, and could probably have been completely exterminated. The warnings given at that time by Dr. Riley and myself were disregarded, and now the insect is beyond all chance of control. It forms another undesirable immigrant to whom we have given free admittance, and will probably form one of the most troublesome pests with which the farmer has to deal. The eggs are laid by the insect in the bud before

it is open, or into the flower, the long ovipositor enabling the fly to lay them deep into the ovary of the forming fruit, and there the larva develops, never coming to the surface until it becomes fully grown. A fruit once attacked is doomed. There is simply nothing that can be done to save it. It becomes knobby, gnarled, and stops growing when about the size of a walnut or less, finally cracks open and gives egress to the larvæ contained in it. These drop to the ground, burrow

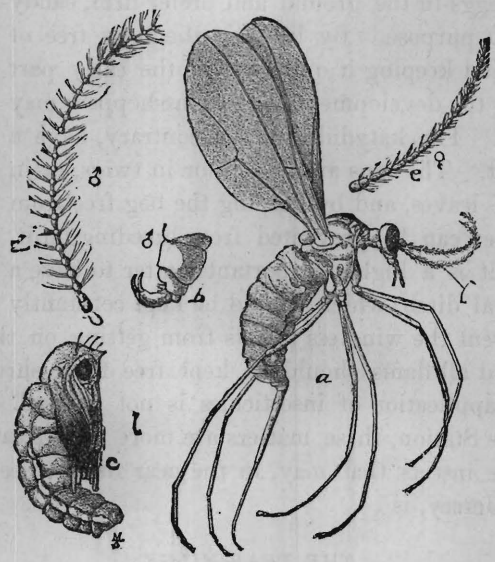


Fig. 21.

DIPLOSIS PYRIVORA.

The Pear-midge: *a*, the mature fly, female; *b*, tip of abdomen of male; *c*, the pupa; *d*, the male, and *e*, the female antenna. (After Riley.)

into it about an inch, and there lie unchanged for a long time, emerging as imagos in early spring, when the pear blossoms are forming. The Lawrence is very much the favorite and the Bartlett comes next. We can probably check its spread somewhat by sacrificing the Lawrence fruit early in the season; but when there are none of that variety available, the other will suffer. No definite suggestions as to remedies can be made at present, but I hope to be able to say something more satisfactory next year.

The insects infesting blackberries have been made the subject of Special Bulletin N of the Experiment Station, and all those interested have probably seen this. I deem it desirable, however, to call special attention once more to the

RED-NECKED CANE-BORER.

This insect has increased steadily in the course of the few years last past, and unless some systematic efforts to check its ravages are made, the cultivation of certain varieties of blackberries, notably the Wilson, will become impossible.



Fig. 22.
GALL.

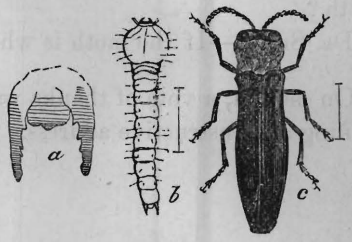


Fig. 23.
AGRILUS RUFICOLLIS, Fabr.
Gall, natural size; larva and beetle, enlarged. (After Riley.)

I have pointed out, not once, but time and again, that it will be easy to practically eradicate this insect by cutting out all the galls in the fields and burning the cut canes. Were this done thoroughly, two or three years in succession, there would be no need of further complaints of injury from this insect.

I have not tried to present to you much that is new, but have tried to give you the latest developments concerning those well-known pests which are always with us. They are the troubles we must constantly learn to deal with, and we cannot learn our lesson too thoroughly. What is needed is persistent, and, above all, united effort. Thorough, organized, systematic work will show, and the return due to increased crops of higher

quality will pay over and over again the outlay of time and money; while in acting in concert, farmers will learn a lesson which will be valuable indeed in other directions. The annual tax levied by insects in the United States has been estimated at $200,000,000, and New Jersey farmers pay their full share of this. It is one of the few taxes, however, that lies within your own power to remove.

Mr. Pancoast—Can the grain-moth propagate inside the rick and continue to cut and destroy the grain?

Dr. Smith—It can work its way through between the straw, and does do so.

Mr. Pancoast—Is this cold weather likely to eradicate the grain-moth?

Dr. Smith—If the moth is where the cold can strike it, yes.

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

CONTAGIOUS DISEASES OF ANIMALS.

BY EZRA M. HUNT, M.D., SECRETARY OF THE STATE BOARD OF HEALTH.

CONTAGIOUS DISEASES OF ANIMALS.

The work of this Board in its oversight of the contagious diseases of animals, has been much the same as that of two or three years past. Your Board is aware that while the State law is general in its terms, it was passed with special reference to foreign cattle diseases, which have not as yet become acclimated or indigenous here. Fortunately, rinderpest, the great cattle scourge of Asia and parts of Europe, has never appeared in this country; and foot and mouth disease, which cause such losses to English farmers, has never invaded our dairies. It was because that about 1846 contagious pleuro-pneumonia was imported here from Europe, and because of the serious Massachusetts outbreak in 1858, that most of our laws as to contagious diseases of animals were passed. New Jersey was not seriously affected until much later. Recurring outbreaks about 1879 led to special action of our Legislature. One year later, the general oversight of contagious diseases was committed to this Board. By your kind co-operation and approval it has ever since been able to hold in check pleuro-pneumonia, so that it has never prevailed to any alarming extent. It was able now and then, for a brief period, to apparently rid the State of the disease, but ever and anon the introduction of diseased stock from other States would infect localities. It became apparent to this and other States, as well as to the General Government, that there must be some addition to State power, hence national legislation was had, and has from time to time extended its powers, so that, so far as contagious pleuro-pneumonia is concerned, it practically has charge of all cases occurring. Because of the reserved rights of the States, it could not have full powers of quarantine, or kill diseased or exposed cattle without the consent of the owners.

In 1888, an arrangement was made between this Board and the General Government, under the guidance of the Governor and the Attorney-General, by which all expenses of inspection and slaughter

were borne by the "United States Bureau of Animal Industry." We have been able efficiently to co-operate with it, and to preserve the rights of our citizens, while aiding in the effort to stamp out the disease. At first the Bureau found but very little contagious pleuro-pneumonia in the State, but our experience as to its introduction from the stock-yards of larger cities, was soon repeated. It was not until within a few months that for the second time we are able to make proclamation that the State is rid of the disease, and in the last case with the addition that there is not now a single known case in the United States.

With the broad provisions of the national law, and with the fact that the introduction of any foreign animal disease is wholly a question of importation and quarantine, and after that of interstate traffic, we think that ere long the whole matter of dealing with imported contagious diseases should be given in charge of the United States Government.

Among our native contagious diseases, the disease of horses known as glanders, or farcy, is the one that chiefly calls for the attention of this Board. It is not only a disease transmitted from animal to animal, but also occasionally acquired by man, so that it deserves the special notice of all Boards of Health. As early as 1864 this State legislated on the subject, giving full powers of destruction of animals affected therewith, when a proper certificate had been given and the proper authorities had been called upon to act. (See "An act to prevent the spread of glanders in horses," approved March 31st, 1864, Rev. Statutes, Vol. 1.)

An important addition to this law is that of chapter 49, Laws of 1884. Under this law, the State Board of Health and the Local Boards co-operate to prevent the spread of the disease. Its worst centers are car and large livery stables. It is often brought to us from neighboring cities. As horses with the chronic forms of the disease continue to be worked, and as discharges from the nostrils get upon hay, mangers, harness, &c., these are often rubbed against the thin or abraded surfaces of other horses, and so the disease is caught. It is seldom, if ever, caught directly from the breath. There is no treatment of the disease. Our business and that of Local Health Boards is, when full diagnosis is made, to see that the animal is killed and thorough disinfection secured.

During the past year it has been unusually scattered about through

the State, cases being looked after by us in Hudson, Essex, Somerset, Morris, Mercer, Camden, Cape May and Atlantic counties. Others are promptly disposed of by owners, by local veterinarians and by Local Boards of Health. We have been able to be of much service, but as the time and expenditure needed in sending long distances are great, we urge upon all Local Boards to dispose of cases when they can. Newark City Board of Health, especially, has done much in this direction during the past year. Circular 50 of the State Board of Health, which is at command of all farmers and owners, gives the laws and the facts as to this and all other diseases. It was rewritten and re-arranged the last year, and is of much service as a guide to farmers in dealing with various contagious diseases.

TUBERCULOSIS.

The next disease which has commanded much of our attention is tuberculosis. As it is closely related to the milk-supply, it has also received the careful attention of George W. McGuire, the Dairy Commissioner. When necessary we have furnished him veterinary aid, and have highly approved his efforts, especially in Hudson county, to restrict or prevent milk-supply from dairies in which the disease is found. Our facts still enable us to say that it occurs chiefly in city stables, in places where cattle should not be kept at all. We have found it rare in Paterson, Camden and Trenton, and comparatively rare in Newark. But so serious is it in some Hudson county stables as that they should cease to supply milk for ordinary sale. We have treated so fully of this disease in former reports, and especially in the last, that there is no need of extensive notice here. There are differences of view as to the degree to which the meat or milk of affected animals can communicate the disease to human beings; but there are enough facts and well-grounded suspicions to make it clear that the milk of tuberculous animals should not be used, and that there should be closer oversight of the slaughter of animals for food. There should be stringent laws as to both meat and milk-supply.

There is coming to be much sensitiveness as to the use of milk, unless it has been boiled, or unless its purity can be certified.

Producers are finding it to their interests to guard cattle and their products from every possibility of disease or contamination. As a

specimen of how thorcughly this is carried out we quote as follows from the recent work of Dr. Woodhead, on "Bacteria and their Products:"

"This question of tubercle in milk has now assumed such importance that much attention has been given to it abroad, and in Denmark a most complete system of inspection has been instituted in connection with one of the largest milk-supply associations in the world; and private enterprise, guided by Prof. Panum and Mr. Busck, of Copenhagen, has indicated a way in which the State might tread with very great advantage. In connection with this association, six special veterinary surgeons, in addition to local practitioners, are constantly employed in keeping watch over the cattle that supply the milk to it. One of these veterinary surgeons alone, specially retained, examines 800 cattle fortnightly, and makes most careful notes (notes that I had an opportunity of examining) of the condition of every animal. Bang, to whose energy and observations the opening up of the tuberculosis question is very greatly due, contends that a diagnosis of tubercular disease of the udder can generally be made without difficulty during life and in the very early stages of the disease. With this conclusion it is somewhat difficult to agree, but much more may be done in the way of careful and systematic examination than is done at present, and in Denmark they have certainly systematized the examination of cattle to a far greater extent than we have succeeded in doing. As it may be of interest to mention the points on which the veterinary surgeon should depend in making his diagnosis, they may, so far as I was able to follow the routine of a number of inspectors, all of whom, however, differed slightly in their methods, be briefly summed up in the following:

"(*a*) First of all the sub-maxillary glands are examined; these are easily felt, and any change is readily made out.

"(*b*) The glands at the root of the neck and those in front of the haunch bones are always carefully examined. The glands in the flank should be equal in size, about the size of the middle finger, and not hard. Mere enlargement, even when considerable, is, however, not looked upon as of great importance if it is perfectly equal on the two sides.

"(*c*) The animal is made to cough by means of pressure on the trachea, and the lungs are carefully examined during and after the coughing.

"The condition of the skin over the flanks is carefully observed; it should, in a healthy animal, be 'loose,' like that of a dog, soft and pliable; any adhesion, hardness or harshness should be carefully noted.

"(*d*) The udder is carefully examined for inequality of size and for

any induration. It is a somewhat curious fact that tuberculous disease usually affects the hind-quarters of the udder, which become hard and knotty, but not painful; whilst in acute inflammation of the udder, the anterior quarters are quite as much affected as the posterior; the pain is usually very acute, and the process is accompanied by much more marked febrile symptoms.

"(*e*) Then the glands above the udder, high up between the quarters, are most carefully examined. In cases of tubercular disease of the udder these glands are invariably affected, are unequal in size, and the larger one, corresponding to the affected quarter, is usually considerably indurated.

"(*f*) Careful auscultation is carried out at least once a month. The fore-foot of the side that is being examined being always well advanced. The normal expiration sound lasts half as long as the normal inspiration, and if this rhythm is deviated from in any way, a further and thorough examination of the lungs should always be made.

"(*g*) The examination is continued still further if the slightest suspicion of tubercular disease is aroused by the above investigation, and an examination per rectum is made, with the object of determining whether there is any tubercle of the peritoneum or not. As the onset of the disease in the udder is so rapid, and as, as yet, it is held by most observers that the bacilli may make their appearance in the milk, even where the udder is not directly affected, it follows that if there is the slightest suspicion of the existence of tubercular disease in a cow, the milk from that animal should not be put into the milk-supply, and as a matter of fact, on the Danish farms above referred to, it is not sent to town, but it is either thrown out, or after being most thoroughly disinfected by prolonged boiling, is given to the pigs.

"(*h*) The farmer keeps a record of the quantity of milk given by each cow, and a note of what is done with it; and any milk that is put out of the supply by the veterinary surgeon or by the farmer himself, on account of *suspected* disease, is paid for by the company, or the difference between the full value and the value as pig-food.

"Any other inflammatory condition of the udder is carefully noted, and even then the milk is withdrawn from the regular supply.

"(*i*) A small quantity of milk is always drawn off by the veterinary surgeon, who carefully notes its color. If it is too thin and watery-looking he immediately condemns it; whilst if it loses the peculiar blue tinge that freshly-drawn milk from a healthy cow almost invariably has, and takes on even a slight yellow tinge instead, the milk from the infected quarter is not used for any purpose, although the milk from the other quarters may be used, after being thoroughly boiled, for the feeding of pigs.

"The authorities of the association insist rigidly on the fortnightly inspection, because it has been observed that very great swelling may

appear as a sign of udder tuberculosis in from ten to fourteen days, as in this position the onset of the tuberculous disease is usually much more rapid than in the lungs, in which the process in a very large majority of cases appears to be far more chronic in character. In all cases, the condition of the glands must be systematically and carefully observed."

Questions as to how far the muscles of animals can be affected are not yet so fully decided as that all meat can be condemned because of tubercle in some internal organ. Muscle is resistful of any such deposit in any case, although it has been found. In cattle, as in human beings, there is great variety in lesions and in constitutional effect. A rapid miliary tuberculosis is very different from fibroid phthisis both in local and constitutional effects. In one the whole system seems involved; in the other, nutrition and general health are not much interfered with for a long time. Could we draw the precise limits as to cattle used for food, it would not always depend upon the finding of a bacillus tuberculosis somewhere. As it is, we must depend upon meat inspection and the future results of science and experience. An English parliamentary commission, which has been sitting for two years, will, ere long, report upon the whole subject.

Various facts have recently shown that milk may undergo rapid changes, not only because of the animal from which it is procured, or of the way in which it is handled, but of the surroundings amid which it is kept. An important paper on "Meat Infections" and "Food-Poisoning" in this way, inclusive of milk, was read by Dr. Edward Ballard, at the last meeting of the "International Hygienic Congress," at London, as also another on the "Regulation of the Milk-Supply," in reference to diseases transmissible by milk, by Dr. Osterlag, of Berlin. The subject is being carefully investigated, and as soon as there are settled facts, new laws and regulations will no doubt be enacted. In Hudson county this year, in the examination of stables, many cases of chronic tuberculosis were found.

TEXAS FEVER.

Some cases of Texas cattle fever have occurred in the southern portion of the State, principally from cattle purchased from a drove. The usual precautions of isolation, and of exclusion from land on which the cattle had pastured, were taken, and further spread pre-

vented. While the disease is easily controlled if such precautions are used, if not, it may easily extend to many localities.

LUMP-JAW.

The disease known as actinomycosis, or lump-jaw, has been found in a few cattle exposed for sale. While in the usual sense it is not contagious, all such cases should receive attention. (See notes as to it in Circular 50 of this Board.)

HOG CHOLERA, OR SWINE PLAGUE.

This has appeared in a very few localities. There has, however, been but little of it in the State at large. Until science and practice teach us better how to prevent it, we shall, no doubt, have outbreaks in the State. (Full directions as to it are given in the circular above referred to.)

LAWS AS TO COMPENSATION FOR LOSSES IN CONTAGIOUS DISEASES.

Thus far this State has for the most part held to the view that only losses from diseases that are imported call for conpensation. This is based upon the idea that it is the duty of the government to prevent such importations; that because of the stringent measures necessary, the owner suffers peculiar inconveniences; that often it is necessary to destroy well but exposed stock, and that there is hope for a complete expulsion from the country.

It is the same difference that we make when we pay for the destruction of the Canada thistle and do not pay for common daisy and buzzard weed being destroyed, though all do more or less harm.

As to common contagious diseases, most take the ground that they are to be regarded as other common misfortunes, and that the owner has no claim for any public remuneration, even though the law compels him to kill. It may compel him to kill the mad dog, even though it be the most valuable bird dog in the State, or the horse, or the cow, that by reason of disease has become a public danger. Common law says that he is maintaining a nuisance, which it is his duty to abate, without being paid for so doing.

Expediency or some widespread invasion of disease, or the law of sympathy amid very special losses, may lead a government or a State to become a contributor, but this is not to be expected in the usual routine of either human or animal diseases. If a general plan of compensation were adopted, it would be a very heavy burden to the taxpayers, since there are so many animal diseases, and since State oversight and employment of veterinarians for them all, as well as payment for losses, would require large appropriations. The matter is safely left with the State Board of Agriculture, and with State and Local Boards, which now, under general laws, have some relation to and care over all diseased animals.

We give herewith reports of their work for the year from various veterinarians who have assisted us. Many cases, especially of glanders, that occur in the State, are disposed of without notice to us, either by the owner, the Local Board of Health, or the veterinarian in charge, and disinfection carried out according to Circular 50.

During the year the New York *Independent* has published a valuable article on dairy hygiene, by Dr. George G. Groff, Lewisburg, Pennsylvania, which we here append.

DAIRY HYGIENE.

"Although dairy products in many places are celebrated for their purity, there still remains much butter, milk and cheese of inferior quality produced throughout the country. It has been thought that a knowledge of the causes which lead to these inferior results might be the means of correcting the same, and, finally, of the production of dairy products of a higher and more uniform quality. Among the causes which lead to bad milk and also to bad butter and cheese from such milk are, unhealthy animals, improper feeding and care of animals, improper care and treatment of milk, and faulty methods of preservation of milk, butter and cheese.

"In the care, the feed and the housing of cows is where the foundation of really fine dairy products must always be laid. If the proper conditions exist here, they will be very apt to be followed up by the like proper and necessary conditions all the way through; but unless there is such a foundation, no future exercise of skill or careful manipulation can effect the finest products. If these are all right, and every dairyman knows what that means without a categorical statement, the next thing that demands attention is the care of the milk from the time it is drawn and up through all the processes of manufacture. All elements of uncleanliness must be carefully excluded from

the milk and from all utensils of the dairy, not only because they are objectionable in themselves, but because they promote fermentation and decay. Every point about the dairy should be so constantly clean and well cared for that the owner would at all times take pride in showing a customer around, and with the full confidence that an inspection would add to the good opinion formerly entertained.

"Not only are these products often of inferior quality, but at times they become actually dangerous as articles of human food. All have heard of cases of cheese poisoning, ice-cream poisoning, and of 'milk sickness.' The former two of these, beyond any doubt, are the result of poisons developed in the milk and cheese. We cannot state positively that the 'milk sickness' is so caused. It has recently been asserted, however, that cholera infantum is caused by partly decomposed milk, in which a specified poison, 'tyrotoxicon,' has been developed; and when we remember the very large number of children who die from this disease, the importance of purity in the milk-supplies is recognized. Nearly one-third of all the children born in the United States die under five years of age. In our large cities, fully half of the deaths during the hot months are of infants. This is at the very time when milk is the most difficult to keep sweet and wholesome. The summer bowel troubles of children are undoubtedly, partially at least, due to their food, of which milk is a very important part.

"The reason given for exercising this extreme cleanliness is, that it is now known that all the changes of decomposition in the milk from healthful animals, are due to the introduction into the milk, after it is drawn from the cow, of low forms of life. These germs cause souring, make the milk ropy, blue, &c. Milk drawn absolutely clean, into chemically clean vessels, and then sealed, will remain sweet indefinitely.

"*Diseases of the Cow Possibly Affecting Milk.*

"*First.* Tuberculosis (consumption of the lungs), pleuro-pneumonia and 'contagious pneumonia.' The first of these diseases is often prevalent among cattle which are confined in stables without an opportunity of exercising in the open air.

"Especially if the stables are damp, dark and unventilated, are the cows liable to contract consumption. With care they may live several years with this disease, but the milk should never be used for human food, as the risk of contracting the disease is too great. When the disease has appeared on the udder, it has certainly been transferred *in the milk* to human beings. If the udder is affected with tubercle, the tubercle bacilli will be found in the milk. No difference can be detected between the bacillus of human and bovine tuberculosis. The disease produced in the lower animals by inoculation with germs taken from the tuberculous mammary gland of the cow is precisely the same as that produced in the same animals by inoculation with germs taken

from the expectoration of human beings suffering from consumption of the lungs.

"In pleuro-pneumonia and 'contagious pleuro-pneumonia' the milk should not be used, nor in bacillar anthrax (malignant pustule, carbuncle, bloody murrain). In this last disease, the germ is in the flesh, and even cooking will not certainly kill it. According to Professessor Law, of Cornell University, 15,000 of the inhabitants of St. Domingo died of eating such flesh, in six weeks' time. And among the Tartars of Asia there are annually many deaths from the eating of the flesh of animals dead of bloody murrain.

"*Second.* Cows suffering from milk fever, from any eruption of the udder, from any wasting disease, from cancer in any part of the body, from 'lump-jaw' (actinomycosis), from foot and mouth disease, from 'milk sickness' (trembles), or from any other disease, the cause of which is unknown to the owner, should not be used to produce milk for human food. 'Ropy' and 'bloody' milk is not fit for human food. For six days after calving or aborting (some say twelve days for best products), or longer, if the cow is feverish, the milk should be rejected. *It should be the rule in every dairy, that no milk from any cow sick of any disease should be used for human food.* According to Professor Law, milk from cows with foot and mouth disease, may produce in human infants 'a most dangerous intestinal irritation and diarrhœa.' In 'milk sickness' (trembles), the meat, milk, butter and cheese all transmit the disease to human beings. The cause of this disease is yet unknown. It prevails most in newly-settled regions, and generally disappears as the county becomes well cultivated. It is generally supposed to be caused by some wild plant which the cows eat, but this has never been proven, and it may be possible that this disease is due to a poison, which, like tyrotoxicon, has developed in the milk. There is a good deal of mystery and but little light on the subject of 'milk sickness.'

"*Care of the Cow.*

"That dairy products may be of the best and most uniform quality, it is necessary—

"*First.* That the cow be fed regularly.

"*Second.* That she have a variety of food, and, if possible, some green food regularly during the winter months. Such articles as turnips, carrots, parsnips, potatoes, &c., as also cabbage, may be fed *in moderate quantities* without injury to the milk or butter, if care is exercised as to the time of feeding, and later in aërating the milk. Generally during the time of milking or just after milking, is the best time to feed roots. The articles, to be sure, *must be judiciously fed,* or the product will be affected. So much trouble has arisen from

the feeding of roots, cabbage, brewers' grains, and even ensilage, that many butter factories refuse to accept milk from cows so fed.

"*Third.* Her food should be of good quality, pure and clean. The trough from which she feeds must be kept clean.

"*Fourth.* She needs an abundance of pure water. Beware of house-drains, duck-ponds, hog-wallows, &c., from which cows will drink, to the injury of their milk. Brewers' and distillers' slops and fermenting and sour kitchen garbage, cannot produce good or healthful milk. Brewers' 'grains,' if fresh, not sour, are a wholesome food, if not fed in excess.

"*Fifth.* She should have a comfortable bed.

"*Sixth.* She should be so fastened in the stable as to be able to move her head freely, that she may rest her body in a comfortable and easy position. Immovable stanchions should not be used. She should be combed and brushed daily.

"*Seventh.* She needs exercise in the open air to maintain good health. However, when the weather is cold and stormy, it is not necessary to turn her out, but on warm, pleasant days she should always spend several hours in the open air and sunshine. There is a growing tendency among dairymen to keep cows in the stable from one year's end to the other. This we know is at the expense of the animals' health. It is here held that though they may not be so much milk as from cows kept constantly in stables, yet, from cows leading *natural* lives, the milk will have a greater vitality, and hence a greater food value, and will be less liable to produce disease in human beings.

"*Eighth.* In going to and from the pasture she should be driven quietly. Cows made to run and worried by dogs have the milk injuriously affected.

"*Ninth.* At calving-time, she needs proper attention.

"*Tenth.* In summer-time it may be well to stable her in a cool and dark stable during the day, allowing her to spend the night in the pasture, thus protecting her from the great annoyance of flies. In a word, she needs to be comfortable and healthful to give milk of a good quality. The time has certainly come when some attention should be paid to the quality of this important food.

"*The Stable.*

"*First.* This should be warm, dry, well ventilated, well lighted, but without drafts of cold air. Dryness, sunlight and fresh air are as necessary in a stable to maintain vigor of cattle, as in a human habitation. Shutters with movable slats which will darken the stable while still permitting the circulation of air are very desirable for summer use.

"*Second.* The stable should be kept scrupulously clean, if first-class

dairy products are desired, and abundance of straw or sawdust or dried peat, and even of dry earth may be necessary to absorb all of the liquid excreta, the effort being to absorb this at once.

"*Third.* As disinfectants and purifiers of air in stables, a frequent use of whitewash on the walls and woodwork, and of ground plaster, sprinkled over the floors, is necessary. By the frequent use of whitewash and plaster we may keep the air of a stable sweet and pure. The mangers should be kept thoroughly clean. They should be frequently washed out with strong salt and water, otherwise mould will grow in them, especially in the corners.

"*Milking.*

"*First.* The cows should be handled quietly, so as not to be made nervous. If excited and irritated, the milk is affected injuriously.

"*Second.* The udder, if soiled, should be carefully cleansed before milking. If necessary, it should be washed in warm water and carefully dried. If not soiled, it should always be brushed clean with a soft brush. For washing the udder, nothing is nicer than a large, coarse carriage sponge. The sponge is recommended, because it is easier handled than a cloth; but the dairyman must remember that it will be liable to become very foul on the interior, and hence it will need to be scalded every day, along with the other dairy utensils. A filthy sponge used to wash the udder would do much more harm than good. As a disinfectant, strong cider vinegar may be added to the water in which the cows' udders are washed. This should be removed by water later.

"*Third.* A bucket of warm water, with towels, should always be taken to the stables by the milkers. The milkers' hands should be carefully washed before milking, and, if they become soiled, after milking each cow.

"*Fourth.* The patented device of the Thatcher Manufacturing Company, of Potsdam, N. Y., is recommended to those desiring clean milk.

"*Fifth.* No milker suffering from any contagious disease, and, if possible, no one constantly about a person suffering from a contagious disease, should be admitted to the stables. When scarlet fever, diphtheria, typhoid fever or dysentery prevails in any family which manages a dairy, extraordinary care should be taken, because it is now well known that the germs of these diseases are readily absorbed by milk, and may be transmitted to those who use the same. On this point too much care cannot be taken. As an apt illustration of the need of care in this respect, may be mentioned the experience of a milkman of Pennsylvania, during the winter of 1891 and 1892. He had under his roof eight cases of typhoid fever. He supplied some sixty families with milk. In these families there developed among

those who used the milk some forty-five cases of fever, with eight deaths. A careful study of the epidemic shows that it was confined to those who used the milk from this one dairy!

"*The Milk-House* (*Spring-House, Dairy, Buttery, Creamery, &c.*)

"*First.* The milk-house should be entirely separate from the dwelling-house. No family should live in or over a milk-house, spring-house, creamery or buttery. A really good article of butter or cheese cannot be produced in the cellar, kitchen or other room of a dwelling-house, unless specially separated from the dwelling apartments, and specially fitted with shelves on which the milk vessels may be placed. This is necessary, because milk so readily absorbs the odors of cooking, &c., about our homes.

"*Second.* The milk-house should be kept scrupulously clean, inside and out. Soap and whitewash must be daily used, and the air maintained perfectly pure.

"*Third.* It should be abundantly supplied with pure water and ice. There should also be convenient means of heating water, as boiling-hot water is needed in large quantities.

"*Fourth.* The milk-house should not do service as a wash-house or laundry. No barn-yard, pig-pens, or privies, or other outbuildings containing any filth whatever should be located near the milk-house. The milk-house should be on some elevation sufficient to secure complete and quick drainage. No milk-house has ever been kept too clean. Spring-houses located on low and swampy grounds, liable to overflow in case of high water, will need special care. After every such overflow the walls will need to be scrubbed and whitewashed, and the whole premises most thoroughly cleansed and renovated.

Milk Vessels and Their Care.

"*First.* Wooden vessels are not to be used at all, because so difficult to keep clean. Tin is the best material for buckets, pans, &c., because it is so readily cleansed; but when the milk is to stand a long time, stoneware or glass vessels are preferable, and should be employed for family use. Tin vessels should have as few seams as possible to hold dirt.

"*Second.* All milk vessels must be kept scrupulously clean. They should be scalded with boiling water every time after they are washed, after which they should be dried, and then, if possible, be exposed to the sun's rays. After washing, milk vessels should be inverted and exposed to air and sun. They should not be rinsed in cold water when used, as this water may be impure. The water used in cleansing milk vessels must be *scalding* hot.

"*Third.* Vessels for containing milk ought to be as free from crevices as possible, and from places difficult to clean. The milk cans used for shipping milk to cities should have as large a mouth as possible. This facilitates the cleansing of the same. To facilitate cleansing, the mouth of the can should be the same in diameter as that of the body of the can. The serious difficulty of keeping clean the milk cans used in shiping milk to our large cities might be largely overcome if the city dealers would cleanse them before returning them to the farmers. In hot weather, these cans often come to the farmer, after an absence of a week or more, with all the seams cased with foul and putrid milk, and in such a condition that it is almost impossible to make them pure and wholesome. If, however, the city dealers would scald the cans out on emptying the milk, this whole difficulty would be overcome. Do not rinse vessels in cold well-water, as there are often impurities in it. Soap is undesirable about dairy utensils, because if a trace of it remains on the vessel it may injure the taste of the milk. Soda and lye may be used, and are preferred to soap, but each must be thoroughly rinsed off.

"*Care of Milk.*

"*First.* At once, after the milk is removed from the cow, it should be strained through double strainers, then cooled, removing the animal heat as soon as possible. Many creameries require in their contracts that the milk which they purchase be cooled to 58° inside of forty-five minutes, and that it be delivered at the creamery at a temperature not above 60°. This cooling should be done in pure air, by immersing the can in cold spring or ice-water, and then stirring the milk, or by running the milk in a thin film over some metallic surface, as in the patented coolers, which should be kept cold by ice or cold, running water. Milk may also be aërated by passing air into it from a specially-constructed bellows. Some of the most careful students in dairying hold that very much may be accomplished in purifying milk and removing bad odors and tastes through aëration of the same. A perfectly clean room and time are the elements needed in this work. The attention of dairymen, who are having trouble with their milk, is called to this mode of treatment. Aërated milk will keep twenty-four hours longer than milk not so treated.

"*Second.* It should be kept in a cold place, but should never be allowed to freeze. In transportation it should be kept cold, and the introduction of refrigerator cars would add greatly to the value of milk.

"*Third.* It should be kept free from every odor.

"*Fourth.* No chemicals should ever be used in preserving milk. These are injurious to the human system, and especially to babies. In very hot weather a tablespoonful of baking-soda may be dissolved

and added to a forty-quart can of milk; but no other chemical, and no large quantity of soda ought to be used. The keeping power of milk will depend upon the rapidity of the extraction of the animal heat, the removal of tastes and odors by aëration, the lowness of the temperature at which it is kept, the cleanliness of the vessels, and the complete removal of any kind of contaminating air. Not only does milk have the power to absorb the germs of disease, but experience shows that it is an excellent medium for germs to develop and multiply. Not only is this true of raw or uncooked milk, but it is also true of boiled and sterilized milk, if it is again exposed to contamination, and germs of air enter the milk. 'Bitter' milk, 'blue' milk, also red, yellow, green and violet milk, are caused by special low forms of life. So also is caused ropy or slimy milk. All these are prevented by absolute cleanliness.

"*Milk for Infants.*

"*First.* It was formerly considered best to supply babies with milk from a single cow; but at the present time it is believed that the milk used as baby-food should be the mixed product of several healthy cows.

"*Second.* Extraordinary care should be used to keep such milk clean.

"*Third.* All the animal heat should be removed quickly; the vessel should be sealed and placed on ice.

"*Fourth.* The cows which supply milk to babies should not spend their lives in stables, but ought to be in the open air every warm, pleasant day.

"*Fifth.* Where it is difficult to secure milk for babies, it may be well to consider the preparation of the same by sterilizing or condensing it, processes which cannot be discussed in this circular. Owing to the recognized difficulty of procuring perfectly pure, good, wholesome milk for babies, many artificial 'Infants' Foods' are on the market. Unless precautions similar to those suggested in this article are more generally adopted, dairymen will find that these preparations will more and more supplant fresh milk as food for invalids and infants.

"*The Care of Butter.*

"After good butter has been produced, it should be firmly worked to remove all the buttermilk, then salted with the best English dairy salt, from one-half to three-fourths ounce to the pound, depending upon the time it is to be kept, and then packed in a perfectly clean vessel, from which it can absorb no odor or taste (as glass, stoneware, or steamed wood packages). It should then be kept in as cold a place

as possible; best in 'cold storage,' when that is possible. All contrivances to keep butter from the air will prolong its keeping qualities. The more buttermilk or other impurities in butter, the less time it will keep wholesome. Hence the need of cleanliness in every department of butter-making. It should be salted to taste, never excessively, and then sold and consumed as soon as practical after manufacture. Too much exposure of milk to the light will reduce the color in butter.

"CONCLUSION.

"Pure milk is a perfect food. When impure it becomes a dangerous poison. It is very easily contaminated. It rapidly decomposes. Constant diligence is needed to keep it of a high quality. It is at the present time produced with entirely too much carelessness. A student of the subject writes: 'My own opinion is that the safest thing for city consumers is to refrain as far as possible from the use of raw or unboiled milk. This may be considered extreme, but I regard milk as a fertile source of disease.' In place of these extreme measures, careful people should at least purchase only of dealers who have their dairies under veterinary and sanitary inspection."

REPORT OF J. GERTH, JR., D.V.S.

NEWARK, N. J., December 20th, 1892.

Dr. E. M. Hunt, Secretary State Board of Health, Trenton, N. J.:

DEAR SIR—The year of 1892 was not marked by any decrease in the number of outbreaks of glanders, or farcy, among the horses of New Jersey. In my last report, I attributed the spread of this fatal disease to the indifference of veterinarians in reporting outbreaks to the proper authorities promptly, so that thorough and effective measures for its eradication could have been enforced without any unnecessary delay. I may add that I also believe it to be absolutely necessary to trace all outbreaks of glanders and farcy to the fountain-head, if we ever hope to succeed in wiping this equine scourge out of existence. Thorough investigation of the origin of all outbreaks and prompt "nipping in the bud," whenever it appears, are the two most important factors in eradication, both from a practical and economical standpoint.

At the beginning of this year, stables were in quarantine at Newark, Elizabeth and Bernardsville.

At Newark, the stables of the Hill Brewing Company, that of Royal Wilson, at 48 Nesbit street, and that of Mr. Ehrlich, on Rose street, and Williams, South Eighth street.

The efficient work of the agents of the Board of Health in checking and controlling glanders at the stables of the Hill Brewing Company, prevented a loss which might have been much greater than that already sustained at the time of its existence being reported.

The stables of Royal Wilson were thoroughly cleansed, but not disinfected, because the owners of the premises had decided to tear down the building.

At Ehrlich's, on Rose street, the horse was killed and the premises disinfected.

At Williams', on South Eighth street, one horse was killed and the stable, with one exposed horse, quarantined. The owner vacated and disappeared with the horse in quarantine. Their whereabouts could not be ascertained.

At Elizabeth, McGrath's diseased horses were destroyed and premises disinfected.

At Clarksburg P. O. (near Hightstown), the same was ordered done. Mr. Aaron Eldridge was the owner.

Later we had some more trouble in Newark, a glandered horse having been taken from McGuinness' livery and boarding stables, to that of Cody, on East Kinney street. This case was investigated by the Local Board of Health.

In the month of August, four horses owned by Mr. Burke, near Roselle, were destroyed, and the premises disinfected, also two owned by Mr. Geo. W. Barber, of Clinton Place, Irvington, N. J., and one owned by Mr. McKenna, at Kearny, N. J.

In the month of October there was a prevalance of glanders among horses at Hoboken, N. J. The Local Board of Health requested assistance of the State Board, which request was cheerfully complied with. Dr. D. J. Dixon, who stated that he had seen sixteen cases of glanders at Hoboken, within a period of six weeks, kindly assisted in stamping out the outbreak. Three stables were quarantined and one public watering trough removed by order of the Board.

In December, there was one case of glanders at the stables of S. Schener & Sons, Newark, N. J. The horse was destroyed at once and the premises most thoroughly disinfected. Although nine other horses were exposed, not one contracted the disease. This outbreak

speaks volumes in favor of prompt action. In connection with this case, I wish once more to call the attention of the Board of Health to the fact that the diseased animal intermingled daily with the horses of the public market at Newark and must have been exposed to a glandered animal there. I am of the opinion that all horses should be regularly examined at the public market on market days, and that, by so doing, numerous outbreaks of glanders can be prevented.

I also refer to the case of farcy at Hoboken, owned by Mr. Davis, on Willow street, corner of Sixth street. This case was examined by Dr. Dixon and myself. The owner was not present and reported to be out of town. A young lad was in charge (a son of the owner, I believe), and not wishing to destroy the horse in the owner's absence, I notified the young man that the horse must be considered in quarantine, until I could return in a few days. Upon returning, I learned that the horse had been removed to New York for treatment. Such proceedings on part of horse-owners occur too frequently, and often cause a spreading of the disease. I think such acts must be prosecuted.

Tuberculosis.—The only outbreak investigated by myself was at Newton, N. J.

The spread of this disease is thought to be on the increase. It is reported that the United States Bureau of Animal Industry has decided to take measures for the eradication of tuberculosis this coming year. I hope the report is true, especially as it is now generally believed that the consumption of the meat or milk of animals so diseased endangers the health of man.

REPORT OF CHARLES LEHLBACH, M.D., MEDICAL OFFICER OF HEALTH.

NEWARK, N. J., January 17th, 1893.

E. M. Hunt, M.D., Secretary State Board of Health:

DEAR DOCTOR—Inclosed you will find Dr. Runge's report as per your request. Many of the cases were reported by veterinarians and with promptness. These cases were where the diagnosis was positive, animals immediately killed, and the stable disinfected. This was done

under the constant supervision of an experienced inspector of this department and at the expense of the owner, the department furnishing the necessary disinfectants at cost price.

The disinfection consisted in destroying by fire all loose woodwork, &c., &c., whitewashing the stalls with hot solution of milk of lime and carbolic acid, and washing bits, &c., with carbolic acid solution. Fumigation was resorted to in some stables.

We found a commendable disposition of owners to comply with the law, and in all cases they aided us in thorough disinfection, examination of the stock, &c., &c.

NEWARK, N. J.

Dr. Charles Lehlbach, Health Officer:

DEAR SIR—The following cases of glanders have been found in this city during the year 1892:

February	5th.	Geo. Blum, Duryea street and Sussex avenue.
April	18th.	Gus. Kahn, 245 Warren street.
"	18th.	Michael Adubato, 78 Lock street.
May	16th.	John McCue, 57 Littleton avenue.
"	23d.	G. W. Ward, 209 Clinton avenue.
July	29th.	Edward Hogan, 75 Bruen street.
August	16th.	J. Oelschlaeger, Camden and Cabinet streets.
"	27th.	E. D. Dennis, 135 Plane street.
September	6th.	Rufus File, Ridge street.
"	22d.	Rufus File, Ridge street.
October	7th.	Geo. W. Vernett, 107 Plane street.
"	7th.	Unknown horse found turned into the meadows.
"	12th.	Unknown horse found turned into the meadows.
"	9th.	Geo. W. Vernett, 107 Plane street.
"	26th.	S. Schener & Son, 22 Greene street.
"	28th.	Unknown horse found turned into the meadows.
December	20th.	G. W. Vernet, 107 Plane street.

Total number, 17.

All stables have been thoroughly cleaned, disinfected and fumigated.

Respectfully yours,

WERNER RUNGE,
Inspector.

REPORT OF T. B. ROGERS, D.V.S.

WOODBURY, N. J., December 20th, 1892.

To Dr. E. M. Hunt, M.D., State Board of Health, Trenton, N. J.:

MY DEAR SIR—There has been but little disease among the domestic animals in South Jersey during the past year. Outbreaks of Texas fever have engaged your attention at Somerdale, Camden county; Folsom, Atlantic county, and in the city of Camden, N. J. These outbreaks were traced to the Philadelphia drove-yards, and in each case were successfully stamped out.

At this writing there is an enzootic of rabies in Gloucester county, and a boy from this city has been sent to the Pasteur Institute for treatment. Some years ago I recommended a large increase of taxation on uncastrated male dogs, and as years go by I see no reason to change my opinion on this subject.

Tuberculosis of cattle is now engaging the attention of both medical men and veterinarians, and many assertions with regard to its prevalence in our herds must be taken "cum grano salis." It is extremely difficult to make a diagnosis of this disease unless a very large amount of lung is involved, and if the lesions are in other tissues, hidden from sight and touch, the diagnosis cannot be made without the injection of "tuberculin" or its analogues.

Whether the consumption of tuberculous milk is as dangerous as has been stated is a very open question; my own opinion is that it is not. If all the cattle claimed by tubercular alarmists are infected, and the milk from these animals is constantly conveying the bacilli to human beings, how is it that the death-rate from tuberculosis is no greater? There is a difference between bovine and human tuberculosis that should receive more attention. When a man has a tubercular cavity as big as a walnut he is in bad shape, loses flesh, has hectic, night sweats, &c., while I have seen cattle loaded down from stem to stern with tuberculous deposits, with good appetite, sleek and fat and giving milk. Tuberculosis of man is eminently destructive; in cattle it is very conservative, breaking down very late. Whether the tubercle bacilli so constantly found have relation to the retrograde products of tuberculosis, finding in them a proper pabulum for their support, or whether they, and they only, give rise to the disease, is another question, not as clearly answered as it might be.

REPORT OF G. F. HARKER, V.M.D.

Dr. E. M. Hunt, Secretary:

DEAR SIR—I would submit the following report of cases examined by me for the State Board of Health:

May 17th, I visited the herd of Mr. Crossley, at Ewing Station, where one cow had been killed and two others condemned as being affected with tuberculosis, but could find no evidence of the disease in these two or any animals in the herd. In view of the fact that the cow killed had the disease in a very bad form, and of long standing, I recommended the herd be watched and further examinations made.

September 19th, I visited Mr. Thomas Forsyth's place, at Hamilton Square, and found a case of chronic glanders. The stable was quarantined, and this and three other horses developed the disease. This outbreak can undoubtedly be traced to Asbury Park, where these horses had been used for hacking during the summer, and where the animal first affected was traded for.

REPORT OF WM. H. LOWE, D.V.S.

PATERSON, N. J., January 3d, 1893.

Dr. E. M. Hunt, Secretary State Board of Health, Trenton, N. J.:

DEAR SIR—I have the honor to submit herewith a brief report of the work done by me in behalf of your Board for the year ending December 31st, 1892.

The outbreak of glanders at Passaic and Lodi, an account of which was given in my last annual report, has been completely exterminated, no new case having occurred for more than eight months. The summary eradication of the disease was largely due to the earnest and intelligent efforts of Mr. O. Vanderhoven, Vice President of the Society for the Prevention of Cruelty to Animals, who visited the infected localities when the outbreak first occurred, and was untiring in his efforts until he saw the last case destroyed.

It is my experience that glanders is often spread by veterinarians attempting to cure infected animals, instead of reporting the cases at

once to the proper authorities, but this cannot be truthfully said of Dr. Hasbrouck, of Passaic, who rendered valuable services in inspecting, keeping oversight over suspicious cases and in disinfecting infected premises.

The outbreak in question was traced to the hovels of Polish Hebrew peddlers, junk dealers and others of the peddler class. Some eight or nine horses were killed last spring, but the killing of these animals did not eradicate the distemper, which was traced to Lodi, in the outskirts of which were stables owned by the same sort of people and some colored owners of old worn-out horses. Some very bad cases were disposed of in that village. A thorough inspection of all the hovels for miles around was made and a number of cases were found, some occupying stalls side by side with others in advanced stages of the disease. The owners, when thoroughly satisfied, and being informed of the penalty attached to the possession of glandered horses, pretty generally yielded at once. From this time our efforts were thorough, and the carcass of a horse dead or killed with glanders was not allowed to be taken along the highway to the bone-yard, but was buried in the nearest field, to which he was led to slaughter. The sheds, hovels and stables were most carefully and thoroughly cleansed and disinfected, and afterwards whitewashed with lime, and lime thrown about in every part, the earth in some cases being removed and the wooden mangers and feed troughs torn out and burned. In one case a wretched hovel stable in which three horses had died was ordered burned as it stood. The class of people purchasing old horses were placed under constant surveillance. In this way the disease, which had so firm a foothold in Passaic and Lodi, was wiped out. For the past eight months there has not been a case of it in all the country round about. Had it not been for the heroic work done, especially in Lodi, there is no saying when the distemper would have stopped. It is doubtful if the glanders, so extensively spread, was ever more successfully eradicated. Had the power of the State not been behind us in this matter, we would have been powerless to destroy the horses until the disorder had reached a dangerous condition, which would have kept the disease and spread it over a large area.

NEW JERSEY

STATE AGRICULTURAL SOCIETY.

THIRTY-FIFTH ANNUAL REPORT,

For the Year Ending December, 1892.

OFFICERS FOR THE YEAR 1893.

PRESIDENT.

E. B. GADDIS.. .....Newark .....Essex county.

VICE PRESIDENTS.

HON. N. S. RUE..... .... Cream Ridge.....Monmouthc ounty.
GEN. JOHN S. IRICK.....Vincentown .....Burlington county.
HON. GEO. A. HALSEY.....Newark ....Essex county.
HON. WILLIAM J. SEWELL..... Camden..... ..... Camden county.
H. H. ISHAM.. .....Elizabeth.....Union county.

TREASURER.

WM. A. CLARK .. ..Elizabeth.....Union county.

RECORDING SECRETARY.

THOMAS W. DAWSON.....Newark.....Essex county.

CORRESPONDING SECRETARY.

P. T. QUINN ....Newark.....Essex county.

GENERAL SUPERINTENDENT.

WM. L. TOMPKINS. ....Newark.....Essex county.

MEMBERS OF THE EXECUTIVE COMMITTEE.

W. L. TOMPKINS, G. B. JENKINSON, JOS COLYER,
CHAS. F. KILBURN, H. P. JONES.

BOARD OF DIRECTORS.

1. HON. N. S. RUE . .....Cream Ridge.....Monmouth county.
2. GEN. JOHN S. IRICK.. ....Vincentown ....Burlington county.
3. HON. AMOS CLARK ....Elizabeth.....Union county.
4. P. T. QUINN. ....Newark..... .....Essex county.
5. COL. W. A. MORRELL .....Elizabeth.....Union county.
6. JOSEPH COLYER.....Newark .....Essex county.
7. HON. GEO. A. HALSEY.....Newark..... .....Essex county.
8. HON. H. C. KELSEY..... .....Trenton.....Mercer county.

9.	Hon. T. H. Dudley	Camden	Camden county.
10.	Thos. T. Kinney	Newark	Essex county.
11.	E. B. Gaddis	Newark	Essex county.
12.	Charles Ayers	Metuchen	Middlesex county.
13.	Wm. L. Tompkins	Newark	Essex county.
14.	Henry P. Jones	Newark	Essex county.
15.	Hon. Wm. J. Sewell	Camden	Camden county.
16.	Geo. B. Jenkinson	Newark	Essex county.
17.	Chas. F. Kilburn	Newark	Essex county.
18.	Franklin Murphy	Newark	Essex county.
19.	H. Heywood Isham.	Elizabeth	Union county.
20.	Chas. B. Thurston	Jersey City	Hudson county.
21.	James Smith, Jr.	Newark	Essex county.
22.	P. Sanford Ross	Newark	Essex county.
23.	John F. Dryden	Newark	Essex county.
24.	Thos. W. Dawson	Newark	Essex county.
25.	Hon. Wm. J. Keys	South Branch.	Somerset county.
26.	Dennis Long	Union	Union county.
27.	A. V. Sargeant	Raritan	Somerset county.
28.	Wm. T. Hunt	Newark	Essex county.
29.	Silas C. Halsey	Newark	Essex county.
30.	Hon. G. Krueger	Newark	Essex county.

TREASURER'S FINANCIAL STATEMENT,

For the Year Ending December 31st, 1892.

GENERAL ACCOUNT.

RECEIPTS.

Balance January 1st, 1892		$4,789 90
From State premiums, balance 1891	$255 00	
From returned premiums, 1891	5 00	
From track rent	240 00	
From stall rent	242 00	
From Driving Association, rent	300 00	
From track tickets	55 00	
From sale old shafting	60 00	
From sale hay	3 00	
From speed entries, 1891	40 00	
		1,200 00
		$5,989 90

FAIR ACCOUNT, 1892.

From gate admissions	$8,085 60	
From grand stand admissions	1,034 00	
From railroad admissions	4,283 80	
From in field	105 00	
From special privileges	2,100 00	
From stand rents	4,348 00	
From speed entries	2,290 00	
From Society entries	791 50	
From parcel-room	25 50	
From telephone	14 65	
From telegraph	6 79	
From programme	200 00	
From premium account	2,815 00	
		26,099 84
		$32,089 74

DISBURSEMENTS.

For ground account	$780 56	
For general account	2,514 14	
For repairs and improvements	3,584 08	
For fair account	8,829 32	
For premiums	16,073 00	
For fair, 1891	243 06	
		$32,024 16
Balance		65 58
		$32,089 74

AMOS CLARK,
Treasurer.

CORRECT—Attest:
GEO. B. JENKINSON,
E. B. GADDIS.

GROUND ACCOUNT.

Paid salary Overseer	$500 00
Paid help on grounds	89 63
Paid help haying	74 12
Paid horse-keep	75 42
Paid horseshoeing	9 75
Paid wagon and tool repairs	31 64
	$780 56

GENERAL ACCOUNT.

Paid township tax	$312 00
Paid State tax	90 00
Paid office rent	200 00
Paid interest	60 00
Paid salaries	1,200 00
Paid National Trotting Association	50 00
Paid expense annual meeting	250 75
Paid expense quarterly meetings	58 48
Paid Treasurer's office expenses	19 51
Paid Recording Secretary's office expenses	34 51
Paid Corresponding Secretary's office expenses	42 10
Paid sundry expenses	196 80
Paid account fair, 1891	243 06
	$2,757 20

REPAIRS AND IMPROVEMENTS.

Paid chairs grand stand	$170 63
Paid painting	718 11
Paid new tank—balance	73 59
Paid new sheds	1,171 41
Paid crushed stone	48 04

Paid furniture	$16 75
Paid whitewashing	63 95
Paid general repairs	1,168 47
Paid new tables	153 13
	$3,584 08

PREMIUM ACCOUNT.

Paid State premiums, 1891	$845 00
Paid Society premiums, 1891	4 00
Paid State premiums, 1892	2,815 00
Paid speed premiums, 1892	4,580 00
Paid premiums, Department A	1,148 00
Paid premiums, Department B	4,656 00
Paid premiums, Department C	1,035 00
Paid premiums, Department D	316 00
Paid premiums, Department E	117 00
Paid premiums, Department F	198 00
Paid premiums, Department K	290 00
Paid premiums, Department M	69 00
	$16,073 00

FAIR ACCOUNT.

Paid advertising	$762 00
Paid signs and posters	525 80
Paid bill-posting	425 93
Paid tickets	201 96
Paid special attractions	1,609 28
Paid entertainment	822 99
Paid police and watchmen	674 00
Paid music	180 00
Paid collecting stand rents	317 50
Paid speed department	641 87
Paid judges' expenses	199 49
Paid superintendents and help	412 01
Paid general help	316 25
Paid entry department	610 25
Paid Treasurer's expenses and help—gatemen and ticket-sellers	381 26
Paid Corresponding Secretary's expenses and supplies	65 00
Paid Recording Secretary's expenses and supplies	131 75
Paid telephone	40 00
Paid telegraph	8 13
Paid erecting tents	75 00
Paid hay and straw	237 65
Paid sundry expenses	88 86
Paid sundry supplies	91 94
Paid coat and parcel-room	10 40
	$8,829 32

CORRESPONDING SECRETARY'S REPORT.

To the Stockholders of the State Agricultural Society:

GENTLEMEN—It affords me pleasure to give you at this time, the annual meeting of stockholders of this Society, a brief outline of what has been accomplished by your Board of Managers and officers during the year just closed, 1892. From an agricultural standpoint, the year has been a prosperous one to the farmers of our State. The spring months were most favorable for planting, and the area put under culture was larger than the two preceding seasons. The climate was favorable for the growth of winter and spring plantings of cereals and all of the cultivated crops. Owing to our location, these crops are more varied than they are in any other State in the Union. The nearness to large markets enables our farmers to raise, besides the staples, fruits and vegetables having a much higher market value than the ordinary field crops. Among these can be included peaches, pears, grapes, raspberries and strawberries.

There are also wide districts in our State especially adapted to the growth of Irish and sweet potatotes, cabbages, onions, turnips and a variety of other vegetables, the money value of which per acre is from three to five times larger than the ordinary staples when grown in the vicinity of manufacturing towns and large cities. This branch of farm-gardening is steadily widening in our State and wherever it is carried on with intelligence and sufficient capital the returns are satisfactory.

In the eleventh United States census the figures show that there were 534,440 acres in truck-farming, which gave a gross yield of $76,517,155. There was planted in wheat 37,170,798 acres, which gave a gross return of $368,442,611, which is a trifle less than $10 per acre, while the truck yield is $143 per acre. About the same relative difference, according to these figures, exists with oats and Indian corn when compared with truck-farming. There is another

branch of industry which deserves the attention of our farmers—and one that has taken root in our State during the last few years—that is, the cultivation of the peach. There is, as every one knows, a large and growing demand for this fruit, and when the best varieties are planted on good and suitable land, after the third year, usually pays a handsome profit. Occasionally, as two years ago, the markets become overstocked, but this is of rare occurrence. Last year, peach-growers in Morris, Hunterdon, Warren and several southern counties reaped a profitable harvest on their peach crop, and growers were well satisfied with their returns. In fact, this may be said of nearly all of the truck farm products the past year. As before stated, the season was favorable, the yield was above the average and prices ranged higher for the various crops than they have for several years past. This point can be made more clear by giving the wholesale prices of a few products at this date. Prime Irish potatoes are selling now at from $2.75 to $3 per barrel; yellow Jersey sweets, at from $3.50 to $3.75 per barrel; cabbages, $7 to $8 per hundred; Russia turnips, 75 cents to $1 per barrel, and other vegetables equally high. These figures are from twenty to fifty per cent. higher than the same products were selling for a year ago. The same is true of the spring and summer truck grown in New Jersey.

In our annual reports, from year to year, we have endeavored to direct the attention of our farmers to the State premium crops, the substance of which has been published in the annual reports of the State Board of Agriculture. The same class of facts stands out glaringly this year in the marvelous difference in yield between those State premium crops and the average yield of the State for the same products. The ground where these crops are grown is accurately measured and the crops measured or weighed, and they are accompanied by a carefully-drawn affidavit. The yield is, in nearly all cases, double and often three and four times more than the average of the yield of the State, showing beyond question what our soil is capable of producing under intelligent direction and the best system of cultivation. For instance, the average yield of potatoes in this State does not exceed 75 bushels per acre, while we have statements, now in hand, verified, of a yield of 400 bushels. The same is true of corn; the average yield is 34 bushels and the premium crops show 80 to 90 bashels; wheat, average yield, 14 bushels, and the State premium crop is 35 to 40 bushels. About the same relative differ-

ence exists in more than a dozen different crop products which have been sent in to this Society for competition for State premiums offered in our schedule for 1892. The competitors for these crops are more numerous this year than in any previous year, showing that more interest is taken in them by farmers in different sections of the State than heretofore, and their publication has done a great deal to stimulate rivalry, the main purpose for which they originally were intended. There were a number of competitors thrown out this year because they failed to comply with the conditions coupled with these premiums. These crop conditions are, that the Recording Secretary of this Society should be notified of the entries on or before the 1st of December, and that the verified reports be filed with the same officer by the 1st of January, 1893.

The dairy interest of the State assumes larger and more important proportions each succeeding year—many changes in methods for the better by our wide-awake breeders and dairymen. More attention has been given to the several branches of this important industry by those engaged in this calling. Foremost among these is the proper and judicious selection of the best animals for the production of milk. The careful tests made at the experimental station, at New Brunswick, have aided dairymen very materially in settling this question. The dairymen are now alive to the necessity of combined action as the only sure way of regulating supply and demand. In Burlington county, the dairymen have, by concerted action, been able to control the price of milk in the Philadelphia market by taking proper care of the surplus supply. They have arranged to make butter from this surplus, and at paying prices, and by this way the market is not overstocked with milk.

The farmers of our more northern counties would be wise to turn their attention to this matter, especially in the dairy districts.

Sheep husbandry is not carried on to any great extent in our State. Why it is not is a question that comes under the consideration of this and other agricultural bodies. In consulting those who have had experience in this branch of industry in the northern part of the State, they assure me that they realize a very handsome profit from their investment, especially in raising of spring lambs for market. The nearness to the markets of New York, Philadelphia, Newark and Trenton gives special advantages for disposing of the stock at paying prices.

There is another industry that I desire to call your attention to and which is not in any way experimental. It is that our farmers should raise more poultry on a basis of profit. There is always in the season a good demand both for Jersey-grown eggs and poultry, and both usually bring the top market prices.

During the holiday trade just closed Jersey poultry sold readily at from one to two cents a pound more than Western stock of the same kind, and, at the same time, the expense of sending it to market is much less. There does not seem to be a question that when this branch of industry is properly and intelligently carried on it can be done with a liberal profit.

In the early part of last year that dreaded disease, pleuro-pneumonia, was reported to exist in Hudson and Essex counties. The National Bureau of Animal Industry took prompt measures, and it is now stated that they promptly stamped it out. The hog cholera has been prevalent in some sections of our State during the year. The loss from this disease is represented to be very large. I would suggest that this Society, in conjunction with other societies of the State, urge the present Legislature to make inquiry into the matter, and pass such a law as might aid in stamping it out from the sections where it has existed. These are only a few of the matters I desire to call your attenton to before giving you an outline of what your officers have done during the year just closed.

Soon after the annual meeting held here a year ago, the Executive Committee met in their office in Newark to lay out plans for the year's work. The Executive Committee was divided into sub-committees, and to each of those were allotted special duties, with power to carry them out and report from time to time to the main body. That these committees worked in accord and harmony goes without saying. A member of the Executive Committee, when he performs his duties, has no sinecure, but expends time, patience and good judgment. It is but just to say, in this connection, that no body of men could have worked more earnestly or faithfully for the success of the exhibition than did the Executive Committee of this Society for the year 1892. The committee left nothing undone which, in their judgment, would add to the interest and broaden the usefulness of the annual exhibition. That their labors were successful would be admitted by any impartial and intelligent person or persons who took pains to visit and examine the different departments of our last

annual fair. While the number of entries was not quite as large as they were in 1891, the standard and quality equaled any exhibition held in this country. The arrangement and classification are so disposed that they can be examined by visitors with the minimum of time. The Horse Department, both speed, useful and fancy stock, was under our associate Director, Wm. L. Tompkins, who gave, by his skill and management of the department, satisfaction to the Society as well as to the exhibitors. The summary of his department is as follows:

In the speed department there were 97 entries in all classes.

Records were lowered in every class except 2:19 trotting and 2:19 pacing. These last two classes were contested on rainy days with a heavy track.

NOTE.—Several horses entered in show classes trotted better than 2:30, which performance entitled them to register as "standard," in case they were not standard bred.

Average time of trotting and pacing (double teams not included), 2:27 *exact.*

TABLE SHOWING THE NUMBER OF HORSES ENTERED IN THE VARIOUS CLASSES.

STALLIONS.		
Standard-bred stallions	28	
Percheron and draught stallions	4	
Non-standard stallions	10	
		42
BROOD MARES.		
Standard bred	27	
Non-standard mares and fillies	14	
		41
DRIVING AND WORK-HORSES.		
Gentlemen's driving and carriage horses	72	
Draught and work-horses	14	
		86
Total all classes		169

I have compiled the following tables of neat cattle, sheep and swine, which went to make up the exhibition of 1892, of which it was said, without reserve, by the competent judges selected by the Society to place the awards, that they equaled, if not surpassed, any previous exhibit shown at Waverly:

CATTLE.

BREED.	Herds.	Bulls.	Cows.	Total.
Ayrshires	2	12	22	34
Angus Aberdeen	*None.	4	6	10
Brown Swiss	"	4	6	10
Dutch Belted	"	4	12	16
Devons	"	8	15	23
Guernseys	3	19	39	58
Herefords	None.	7	15	22
Holsteins	2	15	21	36
Jerseys	2	17	33	50
Red Polled	None.	16	32	48
Short Horns		8	15	23
Grades	3	†None.	39	39
Total	12	114	255	369

Making a total of 369 head of neat cattle.

*No herd prize offered;
†The breeding from grade bulls has always been discouraged by the Society.

The following is the list of sheep and swine of the various breeds and the number of each exhibited, under the charge of our efficient member, Mr. Dennis Long, who has made his department a success:

SHEEP.

BREED.	Rams.	Ewes.	Total.
Cotswolds	14	16	30
Dorset Horned	10	14	24
Hampshires	9	12	21
Leicesters	10	16	26
Lincolns	8	12	20
Merinos	20	30	50
Oxfords	13	12	25
Southdowns	26	48	74
Shropshires	10	18	28
Total	120	178	298

SWINE.

BREED.	Boars.	Sows.	Total.
Berkshires	8	15	23
Cheshires	11	11	22
Essex	7	5	12
Large White	8	10	18
Jersey Red	8	7	15
Poland Chinas	10	15	25
Yorkshires	9	13	22
Victorias	4	4	8
Total	65	80	145

This makes 31 head more than were shown the previous year, and an exhibit not surpassed for animals of the best type of their several breeds.

The following table shows the entries from 1874 to 1892, inclusive, and also shows the steady growth in the Society's entries:

TABLE OF ENTRIES FROM 1874 TO 1892.

SHOWING THE STEADY PROGRESS AND GROWTH MADE IN ALL DEPARTMENTS OF EXHIBITS.

DEPARTMENT.	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	EXHIBITS.
Special State	59	70	106	106	148	124	170	146	149	106	155	140	129	126	132	116	136	110	95	Horses, cattle, sheep, swine.
Speed	52	98	105	99	98	149	.....	103	126	107	66	107	104	175	134	152	147	200	85	Speed.
Department A	107	72	68	73	76	78	109	62	75	46	.....	74	78	88	89	90	106	76	82	Horses.
Department B	392	431	633	715	818	757	950	963	837	845	984	972	1187	1160	1321	1647	1843	2585	2319	Cattle, sheep, swine, poultry.
Department C	817	961	1005	1456	1140	1768	1697	1492	1467	1913	1998	2027	1832	1595	2061	1431	1677	2578	2413	Farm products.
Department D	548	701	705	1416	946	702	1122	1091	1021	1182	1269	1113	1258	1296	1318	1634	1619	1711	1355	Ladies' needlework, &c.
Department E	164	182	233	256	291	415	540	793	521	477	639	720	818	715	1012	856	904	711	922	Canned goods, honey, &c.
Department F	32	154	139	207	192	263	275	232	207	338	219	321	324	176	219	158	105	90	135	Farm machines, tools, &c.
Department G	69	72	16	40	47	28	49	50	50	57	83	94	64	88	103	95	96	103	87	Carriages, wagons, &c.
Department H	29	52	36	37	.....	211	204	86	64	52	57	34	39	35	46	77	73	58	32	Household furniture, woolen goods.
Department I								121	83	85	112	102	110	127	165	111	123	118	62	Manufactured goods.
Department K	97	114	115	136	214	142	177	183	255	300	219	355	380	412	416	435	460	594	500	Fine arts, &c.
Department L	81	97	88	140	159	15	34	72	77	35	60	49	40	39	40	50	*	*	.....	Sanitary appliances.
Department M	.....	.....	.....	.....	.....	.....	.....	.....	35	16	24	37	39	31	45	52	28	50	52	Dairy goods.
Total	2447	3004	3249	4681	4129	4687	5491	5394	4967	5559	5885	6184	6296	6063	7140	6904	7317	8984	8139	

*Included in figures given for Department I.

The Poultry Department was an attractive feature of the exhibition. In quality it was fully up to the standard in excellence; crowds of people filled the building from the opening to the close of the fair. At the season of year in which we hold our exhibition, poultry are "moulting," and, of course, they do not make as good an appearance as they would later in the season, when they are full-feathered. The superintendent of the department, Mr. Marshall, deserves credit for the way he discharged his difficult task. The exhibitors were well pleased with their awards and the treatment they received. The only wish they expressed was that the Society would in the near future lengthen the present poultry building, so that birds could be shown to better advantage. This matter will come before the Executive Committee before the next annual fair. In justice to the superintendent of this department, I desire to mention here that fewer complaints have been received than for many years past, which speaks well for the person in charge.

The Fancy and Domestic Department, in charge of Mrs. Smith, presented its usual artistic appearance, making up one of the very attractive parts of the exhibition, as attested by the constantly crowded condition of the building with visitors, all of whom were well pleased with the choice collection of domestic handiwork, taste and skill of American women and American girls.

The Art Department, under the supervision of Mr. S. C. Halsey, showed great improvement in numbers and quality of works of art over previous exhibitions. It was a surprise to the officers that so much interest was shown in this department. There is no question now but that this new feature of our exhibition will grow rapidly from year to year. All that is needed to make it a great success is to continue in the same line as last year, with the same skillful management. There are now hundreds of exhibitors where five years ago they could be counted by tens.

Last year it was my intention to speak of the Carriage and Wagon Department, but just now it seems timely to say that better accommodations are sadly needed. The large and growing exhibits and the increased interest manifested by visitors warrants the Society in providing better accommodations for this branch of our annual fair. It would be a wise move on the part of the Society to devote the old main building for the exhibition of carriages. The present structure is inadequate for the purpose, and not large enough or not properly constructed to protect so much and so valuable property. This

needed change should be carried out before the annual exhibition of next September.

In the Agricultural and Horticultural Department, known as Department C, the last fair excelled all previous ones in the quality and character of the products. In the quantity and excellence of the fruit display it far excelled any similar show on the Atlantic board. To experts it was a wonder and surprise in all its parts, in quantity, quality and the high standard of excellence of apples, pears, peaches and grapes, grown and exhibited, not by nurserymen, but, on the contrary, by those who grew them for pleasure or profit. To give an idea of the competition in this department, there were ninety-one plates of one variety of choice pears in competition for the two premiums offered, the first $1, and the second half that sum.

The display of native grapes far surpassed any previous exhibition held at Waverly, and there were few, if any, held in any part of the country that equaled it in varieties, size of bunches or appearance. The show of vegetables, grain and plants made this department one of the most attractive on the grounds—a credit to the State and Society.

On the opening day of the fair every indication had a favorable aspect. All the departments were well filled with choice products carefully classified. The weather was bright and clear, the comments of our local and metropolitan press were enthusiastic in praising the management of the State Fair and its large exhibits; but, unfortunately, on Thursday morning there was a downpour, which continued over Friday. The loss sustained by those two wet days could not be less than $15,000, with no falling off in the running expenses. This, of course, was a hard and sad experience for the Society, and especially for the stockholders.

Before closing this brief summary of the doings of this Society for the last year, I would leave my task incomplete if I did not add that, for the last three years, while Mr. H. H. Isham has been President, he has been indefatigable in his efforts to promote the interests of the Society, always pleasant and cordial with his associates, attentive, faithful, conservative in directing its affairs. He has certainly made a model President. The Superintendent of the Grounds, Mr. E. B. Gaddis, deserves the thanks of the stockholders for the able and efficient way that he has discharged his multitude of duties.

P. T. QUINN,
Corresponding Secretary.

SPECIAL STATE PREMIUMS

FOR THE YEAR 1892.

List of awards in all departments as made by the judges at the Thirty-fourth Annual Exhibition of the New Jersey State Agricultural Society, held at Waverly Park, September 19th, 20th, 21st, 22d, 23d, 1892.

HORSES.

STALLIONS.

Standard-bred Stallions, with Two of Their Get.

	First Premium.	Second Premium.
Flemington Stock Farm, Flemington, N. J.		
"Wm. H. Vanderbilt"	$100 00	

Standard-bred Stallion, Four Years Old and Over.

Windsor Stock Farm, Farmingdale.		
"Alcantara, Jr.,"	60 00	
Benedict Bros., Elizabeth, N. J.		
"Beachwood"		$30 00

Standard-bred Stallion, Three Years.

Hollygrove Farm, Plainfield.		
"Edward King"	50 00	

BROOD MARES, ETC.

Standard-bred Brood Mare, with Two Colts.

Flemington Stock Farm, Flemington, N. J.		
"Kate Berry"	75 00	
M. E. Thayer, Westfield.		
"Mattie T. Patchen"		40 00

Standard-bred Fillies, Three Years.

	First Premium.	Second Premium.
Flemington Stock Farm, Flemington.		
Filly	$50 00	

Standard-bred Fillies, Two Years.

Flemington Stock Farm.		
"Iva"	40 00	
R. Y. Fairsevice, Kearny, N. J.		
"Caroline"		$20 00

CARRIAGE AND COACH STALLIONS.

Limited to Horses with Coach Style, Quality and Action.

R. Stuyvasant, Allamuchy.	
Stallion "Red Fox" and one of his get	$75 00
Brood Mare "Bellmont" and foal	60 00

PERCHERONS AND CLYDESDALES.

E. Tomson, Manager, Clinton.		
Percheron Stallion "Poulard"	75 00	
M. & N. Meyer, Newark.		
Percheron Stallion		$40 00
R. Stuyvasant, Allamuchy.		
Brood Mare "Kate," with foal	60 00	

WILLIAM JOHNSTON,
M. C. CLARK,
Judges.

SPECIAL STATE CATTLE.

JERSEYS.

J. O. Magee & Son, Elizabeth.		
Herd Bull "Majestic Rioter" and four cows	$100 00	
Hollygrove Farm, Plainfield.		
Herd Bull "Eurota Stoke Poges" and cows		$50 00
Hollygrove Farm, Plainfield.		
Bull "Eurota Stoke Poges"	50 00	
J. O. Magee & Son, Elizabeth.		
Bull "Majestic Rioter"		25 00
J. O. Magee & Son, Elizabeth.		
Cow "Montania"	50 00	
Hollygrove Farm, Plainfield.		
Cow "Sweet Briar's Eurota"		25 00

L. M. LUSSON,
I. W. NICHOLSON,
Judges.

AYRSHIRES.

	First Premium.	Second Premium.
Wm. Lindsley, Westfield.		
Bull and four cows	$100 00	
J. O. Magee & Son, Elizabeth.		
"Golden Boy" and four cows		$50 00
Wm. Lindsley, Westfield.		
Bull	50 00	
J. O. Magee & Son, Elizabeth.		
Bull "Golden Boy"		25 00
J. O. Magee & Son, Elizabeth.		
"Bell Drummond"	50 00	
Wm. Lindsley, Westfield.		
"Ayrshire Drummond"		25 00

J. F. BURKE,
J. F. CONVERSE,
B. C. QUIMBY,
Judges.

GUERNSEYS.

Geo. La Monte, Bound Brook.		
Bull "Sir Garris" and four cows	$100 00	
Wm. Lindsley, Westfield.		
Bull and four cows		$50 00
R. T. Ridgeway, Cream Ridge.		
Bull "Zack Taylor"	50 00	
Wm. Lindsay, Westfield.		
Bull "Bonnie Lad"		25 00
Cow "Darling of St. Andrews"	50 00	
Geo. La Monte, Bound Brook.		
Cow "Little Nell of Evergreens"		25 00

R. H. PAGE,
E. T. GILL,
Judges.

HOLSTEIN-FRIESIANS.

A. A. Cortleyou, Neshanic.		
Bull "Clothilde 3d," "Sir Netherland," and four cows,	$100 00	
D. T. Magee, Elizabeth.		
Bull "De Kolp 2d" and four cows		50 00
A. A. Cortleyou, Neshanic.		
Bull "Clothilde 3d," "Sir Netherland"	50 00	
D. B. Wade, Union.		
Bull "Shafto Pruyn"		25 00
J. O. Magee & Son, Elizabeth.		
Cow "Zyp 3d"	50 00	
D. T. Magee, Elizabeth.		
Cow "Miss Meadia"		25 00

H. LANGWORTHY,
C. D. B. FOREMAN,
Judges.

GRADES.

	First Premium.	Second Premium.
Wm. Lindsay, Westfield.		
Herd of grades	$100 00	
D. T. Magee, Elizabeth.		
Herd of grades		$50 00
J. E. Holcombe, Reaville.		
Grade cow	50 00	
Wm. Lindsay, Westfield.		
Grade cow		25 00

N. M. CUMBERSON,
LEWIS DAVENPORT,
J. B. BRIGGS,
Judges.

SWINE.

JERSEY REDS.

Wm. C. Addis, Delaware.		
Jersey Red Boar	$20 00	

LARGE WHITES.

Benj. Hulse, Allentown.		
Large White Boar	20 00	
Wm. C. Addis.		
Large White Boar		$10 00

SMALL WHITES.

Jeremiah McCam, Mt. Hermon.		
Small White Boar	20 00	
Wm. Lindsay, Westfield.		
Small White Boar		10 00

POLAND CHINAS.

Wm. C. Addis.		
Poland China Boar	20 00	
Poland China Boar		10 00

ESSEX.

Wm. Lindsay.		
Essex Boar	20 00	
Benj. Hulse.		
Essex Boar		10 00

CHESHIRES.

	First Premium.	Second Premium.
Jas. A. Long, Irvington.		
Cheshire Boar	$20 00	
Cheshire Boar		$10 00

BERKSHIRES.

Wills A. Seward, Budd's Lake.		
Berkshire Boar	20 00	
Benj. Hulse.		
Berkshire Boar		10 00

SWEEPSTAKES.

Best Boar Among the Prize-Winners.

Benj. Hulse, Allentown.		
Large White Boar	20 00	
Wills A. Seward.		
Berkshire Boar		10 00

CALEB M. WALTER,
Judge.

SHEEP.

DORSET HORNED.

R. Stuyvesant, Allamuchy, N. J.		
Dorset Ram	$20 00	
J. McCain, Mt. Hermon.		
Dorset Ram		$10 00
R. Stuyvesant, Allamuchy.		
Pen Dorset Ewes	20 00	

MERINOS.

J. McCain.		
Merino Ram	20 00	
Ben Hulse, Allentown.		
Merino Ram		10 00
J. McCain, Mt. Hermon.		
Pen Merinos	20 00	

LEICESTERS.

R. Stuyvesant.		
Leicester Ram	20 00	
Ben Hulse.		
Leicester Ram		10 00

COTSWOLDS.

	First Premium.	Second Premium.
R. Stuyvesant.		
Cotswold Ram	$20 00	
Wm. C. Addis.		
Cotswold Ram		$10 00
R. Stuyvesant.		
Pen Cotswolds	20 00	

SOUTHDOWNS.

Benj. Hulse.		
Southdown Ram	20 00	
Wm. C. Addis.		
Pen Southdowns	20 00	
Benj. Hulse.		
Pen Southdowns		10 00

SHROPSHIRES.

R. Stuyvesant.		
Shropshire Ram	20 00	
Pen Shropshires	20 00	

OXFORD DOWNS.

Wm. C. Addis.		
Oxford Ram	20 00	

HAMPSHIRE DOWNS.

Benj. Hulse.		
Hampshire Ram	20 00	

JAMES WOOD, Mt. Kisco, N. Y.,
Judge.

POULTRY.

Haynes & Andrus, Annandale.		
Display of Poultry	$50 00	
Dr. J. C. Maple, Trenton.		
Display of Poultry		$25 00

JOHN E. DEIHL,
J. D. NEVIUS,
Judges.

STATE HOUSE, TRENTON, N. J., January 18th, 1893.

A meeting of the Special State Premium Committee was held this day in the State House, Trenton, N. J. The meeting was called to order at 10:45 o'clock A. M. There were present Governor Werts, I. W. Nicholson, H. I. Budd, H. P. Jones, P. T. Quinn, Thomas W. Dawson.

In conformity with the act of 1874, the Special State Premium Committee then proceeded to make diligent and careful examination of the statements and proofs for competition on farm crops, fruits and dairy products. Isaac W. Nicholson was chosen Chairman, and Thomas W. Dawson Secretary. After making careful examination, the following awards were made:

FARM PRODUCTS.

WHEAT (best 5 acres, straw considered).—First Premium to John H. Denise, Freehold.....$25 00

Statement.—Soil, clay loam. Wheat sown after potatoes. To the potato crop was applied 1,500 pounds home-mixed chemical fertilizer. Wheat sown about September 28th, and 300 pounds per acre of ground bone drilled in with the wheat. Variety, Poole, 1¼ bushels of seed per acre, and 2 inches deep in a finely-prepared surface 3 inches deep. Yield, $212\frac{4}{60}$ bushels, or $42\frac{33}{60}$ bushels per acre. Crop sold for 90 cents per bushel. Total sales, $181.47.

WHEAT.—Second Premium to David L. Ballenger, Moorestown..... 15 00

Soil, light clay loam. Wheat sown September 28th, after tomatoes and sugar corn, the ground having been manured broadcast before these two crops; nothing put on when the wheat was sown. Yield, 167½ bushels, or 33½ bushels per acre. Sold at mill for 75 cents per bushel, and received $124.87 for crop.

RYE (best 5 acres, straw considered).—First Premium to Livingston Du Bois, Manalapan..... 25 00

Soil, clay loam. This field had as a previous crop rye and potatoes. Was plowed in August and September, well harrowed. Rye drilled in on October 1st and 2d; harvested July 5th to 9th. Barn-yard manure spread on land after plowing, and wheel-harrowed in well. Yield on $19\frac{80}{100}$ acres, $568\frac{52}{60}$ bushels, or $28\frac{41}{60}$ bushels per acre. Straw sold, 50,490 pounds, and 6,000 pounds (estimated) kept for use. Yield per acre, 1 ton 840 pounds.

CORN (best 5-acre field, stalks considered).—First Premium to Roland Conrow, Cinnaminson..$25 00

Soil, sandy loam. Timothy sod plowed down in March, about 7 inches deep. Planted May 5th to 7th, in hills 4 feet by 4 feet 6 inches. Corn weighed at time of cribbing, and was well dried. Fertilizers, about 1,000 pounds of hen manure per acre, applied in hill at time of planting. Yield from 5 acres, 355 bushels, or 71 bushels per acre. Variety, cross between Yellow Dent and Gourd. Cultivation frequent and level.

TIMOTHY HAY (best 5 acres).—First Premium to Martin Dennis, Stillwater 25 00

Soil, gravelly. Laid down to grass after wheat. Land previous to wheat crop had been manured with barn-yard manure for corn, then seeded to timothy and clover at time of wheat-seeding. This the second cutting; pastured lightly with sheep after first year's mowing. Yield, 16 tons 1,600 pounds, or 3 tons 720 pounds per acre. Expenses—Harvesting 16⅘ tons, at $2 per ton, $33.60. Sales, $268.80, or $47.04 per acre, net.

TIMOTHY HAY.—Second Premium to John H. Denise, Freehold..... 15 00

Soil, clay loam. Timothy sod, second year's mowing. Fertilizers applied, 500 to 600 pounds per acre of home-made chemicals, high-grade, about April 1st. Yield, 16 tons 1,700 pounds, or 3 tons 740 pounds per acre. Statement of expenses—Fertilizer and applying, $55.50. Total receipts from sales, $252.75, or $39.45 net per acre.

ENSILAGE (best 1 acre).—First Premium to Martin Dennis, Stillwater.. 25 00

Soil gravelly. Sod plowed in July; cross-plowed in October; manured during winter with barn-yard manure at the rate of 15 loads to the acre. Sown in drills 4 feet apart. Cultivation level, by using the Broken Axle cultivator. Variety, Southern sweet corn. Fertilizers used, 370 pounds per acre of Thorburn's Complete Manure, sown in drill with Keystone drill. Yield on 5 acres, 60 tons 1,000 pounds, or 12 tons 200 pounds per acre. Expenses—Fertilizers, $93 75; plowing twice, $15; harrowing, $2.50; harvesting and cutting, $30; total cost, $141.25. Sixty tons 1,000 pounds estimated worth $363, or $6.60 per ton. Net total, $72.60 per acre.

WHITE POTATOES (best 1 acre).—First Premium to John and Joseph J. Quinn, Waverly, Clinton township 25 00

Soil, heavy clay; tile underdrain. One acre Early Rose potatoes. Planted April 18th, by Aspinwall planter, 15 inches in the row, 2½ feet between rows. Cultivated twice with Breed's weeder, twice with horse cultivator machine. Dug about the middle of

October, and marketed same time. Fertilizer used, stable manure spread broadcast, 25 two-horse loads to the acre. Yield, 385 bushels, or 116 large barrels, 20 small and 4 culls. Sold direct at the farm to dealers and consumers. Expenses—Manure, $25; spreading, $5; seed, $9; cutting, $2; cultivating, $34; carting, $15; total, $90. Sales, $302.32, gross receipts. Net returns, $212.32.

WHITE POTATOES.—Second Premium to Henry Campbell, Freehold..$15 00

Soil, clay loam. Plowed the land April 8th to 15th. Planted April 16th to 20th, in drills 2 feet 9 inches and 13 inches apart in the row, with the Aspinwall planter. Cultivated with horse cultivator three times, harrowed once. Fertilizers used, Stockbridge Potato Fertilizer, 600 pounds broadcast and 400 pounds in the drill, with 14 loads of stable manure broadcast in the fall. Yield, 160 barrels per acre, at $1.75 per barrel, $280. Expenses—Carting, $4; plowing, $2; cultivation, $8; fertilizer, $18; manure, $28; total expenses, $60. Net proceeds, $220.

SWEET POTATOES (best 1 acre).—First Premium to Aaron L. Collins, Fellowship 25 00

Soil, a good, free loam, not sandy. Plants set in rows, 3 feet apart and 20 inches in the row. Set May 16th. Cultivated three times with riding cultivator, hoed twice and plowed once. Fertilizer used, stalk manure from barn-yard, about 10 tons per acre. Yield on 2 acres, 1,296 baskets, $\frac{5}{8}$ size, or 648 baskets per acre. Dug October 5th to 25th. Sold in Philadelphia on commission. Expenses—Sprouts for 1 acre, $13.75; Manure, 10 loads, $25; total expenses, $38.75. Sales—1 acre, $147.10. Net proceeds, $108.35.

SWEET POTATOES.—Second Premium to Charles B. Jessup, Cinnaminson..... 15 00

Soil, sandy loam. Plants set as early as soil would permit. Plowed and hoed, then cultivated and hoed; vines turned and hoed, then plowed, this being the last working. Fertilizers used, Philadelphia manure, a small cart-load to the row. Yield, 480 baskets per acre. Crop all stored for January and February sales.

LATE CABBAGE (best 1 acre).—First Premium to William B. Lippincott, Hartford..... 25 00

Soil, heavy loam. Variety, Late Drumhead. Cultivated with common cultivator and hoed by hand. Fertilizers used—During the previous summer a heavy dressing of manure was spread over a sod; also about 700 pounds Grange fertilizer used in the rows. Yield, 4,159 heads. Expenses—Carting to city and harvesting, $13.75; balance of expense consists in cultivation and fertilizers. Total sales, $198.18.

NEW JERSEY STATE LIBRARY

LATE CABBAGE.—Second Premium to J. M. White, New Brunswick...$15 00

Soil, sandy loam, with clay subsoil. Ground has been occupied by peach orchard for 17 years, planted to corn 2 years and fertilized with potash and phosphoric acid. Soil was plowed late in the fall previous, again in the spring, kept clear of weeds with Cutaway and Acme harrows till late in July, then marked out 32 inches apart each way and set with a cross between Flat Dutch and Drumhead cabbage plants; cultivated each way twice with horse cultivator, plowed once and hoed once. Fertilizers used, 9 tons New York horse manure, 150 pounds nitrate soda and 1,500 pounds Peter Cooper's bone per acre, spread broadcast and worked in with the Acme harrow. Yield, 4,325 heads. Sold in the field. Expenses—Nine tons manure and carting and spreading, $16.65; nitrate soda, $3.75; bone meal, $18; plowing and cultivating, $11; total, $49.40. Total receipts, $210.06. Net proceeds, $160 66.

EARLY CABBAGE (best 1 acre).—First premium to William B. Lippincott, Hartford 25 00

Soil, heavy loam. Variety, Winningstadt. Land in sod four years; had a heavy coating of manure the previous summer. Plowed down in early spring, cut-harrowed twice and smooth-harrowed once. Plants set 3 by 2 feet, cultivated with common cultivator and hoed by hand. Fertilizer used, 700 pounds Grange fertilizer, used in the rows. Yield, 506 baskets and 275 heads. Expenses—Carting to city and gathering, $15.25; balance of expenses, cultivation and fertilizer. Total receipts, $165.80. Net proceeds, $150.55.

EARLY CABBAGE.—Second Premium to Charles B. Jessup, Cinnaminson 15 00

Soil, free loam, with clay subsoil. The crop was set out early in April, and cultivated with harrow only, and hoed twice. Fertilizer used, one-half ton Grange fertilizer, put in the rows when the ground was made up, and plants set same day. Yield—Four hundred and sixty-one baskets were cut, commencing about the middle of June; sold in Philadelphia. Expenses were growing plants, cultivating and marketing. Gross sales, $119.86.

TURNIPS (best 1 acre).—First Premium to Martin Dennis, Stillwater... 20 00

Soil, light clay loam. Sod plowed in July, and cross-plowed in October. Manured with barn-yard manure just before planting; manure plowed down, harrowed and rolled. Seed sown July 15th, in drills 2½ feet apart. Fertilizer sown in the drills at the rate of 250 pounds per acre. Sown with Planet, Jr., drill, hoed twice, cultivated four times with tooth cultivator; level culture. Fertilizers used, barn-yard manure, 15 loads, and Thorburn's

Complete Manure, 250 pounds. Yield, 1,021 bushels, or 30 tons 1,260 pounds per acre. Expenses—Plowing, $4.50; harrowing, $2,50; rolling, 25 cents; manure, $17.50; hoeing and cultivation, $6; pulling and carting, $15; total expenses, $45.75. Total receipts, 30 tons 1,260 pounds, at $7.50 per ton, $229.72, or net proceeds, $183.97.

TURNIPS (best 1 acre).—Second Premium to John and Joseph J. Quinn, Waverly Park.....$10 00

Soil, heavy clay. Ground, old strawberry-bed prepared and planted to rutabaga turnips, 2 feet between rows. Seed sown July 7th. Thinned to 3 inches in the row; harrowed and cultivated. Yield, 404 bushels, 10 loads of tops. Expenses—Plowing, $4; harrowing, $4; sowing, $1.50; seed, $1.25; thinning, $15; cultivating, $3; pulling, $20; carting, $10; commission, $15.08; total, $73.83. Gross receipts, $176.43; net, $102.60.

TOMATOES (best 1 acre).—First Premium to Isaac Collins, Jr., Moorestown..... 25 00

Soil, free loam. The land was spread with manure in the winter, plowed down in the spring. Rows were made 5 feet, and plants set 3½ feet apart in the row. The tomatoes were gang-plowed once, hoed once, and hoe-harrow used when needed. Fertilizer, 700 pounds of Grange fertilizer, used in the row. Yield, 1,460⅝ baskets, which sold in Philadelphia for $360.71 gross.

TOMATOES,—Second Premium to Wm. B. Lippincott, Hartford..... 15 00

Soil, heavy loam. Land plowed in early spring; cut-harrowed about May 1st. Plants set 4 by 5 feet about May 15th. Land in sod 4 years. Fertilizers—A heavy coat of manure was applied the previous summer, and manure applied in the rows. Expenses—Carting to city and harvesting, $19.50; balance of expense, manure and cultivation. Gross sales, $150.09.

ASPARAGUS (best 1 acre).—First Premium to John and Joseph J. Quinn, Waverly Park..... 25 00

Soil, light loam, underdrained. Asparagus, Conover's Colossal. Thoroughly cultivated in the spring, banked up once during the season, hoed twice. Commenced cutting May 4th, stopped June 29th, cutting 29 times. Fertilizers used, 50 loads of stable manure spread broadcast, 1 ton of asparagus manure, and 75 sacks of field salt. Yield, 191 dozen and 4 bunches (average weight, 4 pounds to the bunch), or 2,296 bunches; hand-cut and bunched, and sold by commission merchants at Newark. Expenses—Manure, $114.05; cultivating, $12; cutting and bunching, $80; carting, $8; commissions, $40.63; total, $254.68. Receipts—Gross sales, $406.20; net, $151.52.

ASPARAGUS.—Second Premium to J. M. White, New Brunswick.....$15 00

Soil, light sandy, with one spot of gravel and sand subsoil. Trash cleaned off in fall by mowing and burning. After cutting in June, 400 pounds of nitrate of soda were applied, and bed thoroughly cultivated and ridged to the rows. Fertilizers, 400 pounds nitrate soda, and stable manure, 12 tons; Kainit, 2 tons. Yield, 3,549 bunches, 1 pound each. Expenses—Fertilizers, $53; cutting, bunching and marketing, $50; total expenses, $103. Gross receipts, $340.35. Net proceeds, $237.35.

FRUIT PRODUCT.

PEACHES (best 1 acre).—First Premium to John and Joseph J. Quinn, Waverly Park..... 25 00

Soil, heavy clay. Varieties, Morris Rare Ripe and Crawford's Late; trees planted with raspberries between rows. Cultivated and hoed twice, pruned in the fall. Fertilizers, 10 two-horse loads to the acre, spread broadcast. Yield, 699 half-bushel baskets, or 349½ bushels. Expenses—Manure and spreading, $15; cultivating and pruning, $13; baskets, $28; picking, $30; carting, $10; commission, $48.41; total, $144.41. Total gross sales, $484.12. Net proceeds, $339.71.

PEARS (best 1 acre).—First Premium to Henry Campbell, Freehold... 25 00

Soil, clay loam. Variety, Keifer pear. Plowed three times and kept well harrowed and hoed till about the 20th of July. Fertilizer—1,000 pounds Stockbridge Tree Fertilizer were drilled May 20th, 1892, per acre after the first plowing. Yield, 345 barrels. Expenses—Freight, $168.70; commission, $120.70; barrels, $96.60; picking and packing, $38.50; total, $324.50. Gross sales, 345 barrels, at $3 50, $1,207.50. Net proceeds, $883.

PEARS.—Second Premium to John J. and Joseph J. Quinn, Waverly.. 15 00

Soil, heavy clay. Variety, Doyenne Bossouck and Bartlett, in grass. Yield, 839 bushels, viz., 813 half-bushel baskets hand-picked Bossoucks, 224 baskets windfalls; 430 baskets hand-picked, 211 baskets windfalls Bartlett. Expenses—Picking, $85; sorting, $80; ice, $20; baskets, $67.52; commission, $74.95; carting, $20; total expenses, $347.47. Total gross sales, $739.25. Net proceeds, $391.78.

APPLES (best 1 acre).—First Premium to Henry Campbell, Freehold . 25 00

Soil, clay loam. The orchard is in grass; was mowed twice and left on the ground for mulch. Fertilizers spread broadcast, 10 loads of horse manure per acre; in July used 400 pounds muriate of potash per acre. Yield, 400 barrels per acre—variety,

Fall Orange. Expenses—400 barrels at 28 cents, $112; freight, $64; commission, $88; cartage, $88; picking and packing, $60; total expenses, $412. Gross sales—400 barrels at $2.50 per barrel, $880. Net proceeds, $468.

APPLES.—Second Premium to Nathan H. Conrow, Cinnaminson $15 00

Soil, sandy loam, with clay subsoil. The orchard was plowed about May 20th, and then about June 20th a spading harrow was used to kill the weeds. The acre consists of 40 trees, originally 20 trees of Porters and 20 trees of Orange Pippin, 5 of which have been replaced by small trees, too small to be worthy of notice. The Orange Pippin trees were sprayed May 16th, again on the 24th. The Porter trees were sprayed May 18th, again on the 24th. Fertilizers used—15 tons to the acre of street dirt were applied broadcast during the winter 1890 and 1891. The fruit was carefully assorted into two grades and sent to Philadelphia commission merchants. Yield, 1,128 baskets. Expenses—Commission, $37.78; toll and ferriage, $12.69; total, $50.44. Gross sales, $377.75. Net proceeds, $327.31.

GRAPES (best 1 acre).—First Premium to John J. and Joseph J. Quinn, Waverly Park.. ..... 25 00

Soil, clay and gravel. Variety, Niagara and Concord, 100 vines of the first, 335 Concords. Plowed early in the spring, cultivated twice during the season, hoed twice. Vines are pruned in the winter and cut back according to the strength of each. Grown on the cradle system. No fertilizers used this year. Yield, 10,325 pounds. Sold 3,977 pounds in 5-pound baskets, and 6,348 pounds in cases containing 45 pounds each. Delivered to commission merchants by wagon to Newark. Expenses—Cultivating, $15; paper bags for bunching, $18.20; tying, $29; baskets, $29; packing, $25; carting, $6; commission, $39.98; total expense, $162.27. Gross receipts, $398.97; net, $236.70.

GRAPES.—Second Premium to Henry Jeroleman, Hilton..... 15 00

Soil, dark loam, with blue clay subsoil, all well underdrained with stone drain, 6 inches in diameter. Varieties, Seth Boyden, Brighton and Worden. Fertilized but once in 3 years with 10 one-horse loads well-rotted barn-yard manure. Vines set in rows 6 to 8 feet apart, and between the rows 8 feet apart. Kept free from weeds by hoe and horse cultivator. Yield, 236 baskets, containing 10,380 pounds. All marketed in half-bushel baskets. All the grapes were sold in the vineyard to the wine-makers of Newark, the Seth Boyden $80 per ton, the others about $60 per ton. Expenses—About $1.50 per ton, picking, and $1 per ton for delivery; total picking, $12.50; cost of cultivating, $10; total, $22.50. Gross receipts, $375.20; net, $352.70.

STRAWBERRIES (best 1 acre).—First Premium to Henry Jeroleman, Hilton $25 00

Soil, dark loam, with blue clay subsoil, all well underdrained. Strawberries set in rows 2½ feet apart and allowed to mat, leaving about 12 to 15 inches between the rows for picking. The strawberries are set with and among my acre of pear trees, which this season was an advantage, the trees shading the berries from the hot sun. Both the trees and berries were fertilized at the same time. Last fall were applied 40 loads of well-rotted barn-yard manure, covering up the plants; in the spring raked off to between the rows all the manure I could, to keep down weeds. Covered the paths with salt hay to keep the fruit clean. Varieties, American and Sharpless. Yield, 5,013 quarts, or 156 bushels and 21 quarts. Sold through commission merchants in New York and Newark. Expenses—Cost of manure, weeding and hoeing, $70.06; picking, 2 cents per quart; carting to New York, three-quarters cent per quart; commission, 2¼ cents, $250.65; total expenses, $320.65. Gross sales, $902.34. Net proceeds, $581.69.

STRAWBERRIES.—Second Premium to John and Joseph J. Quinn, Waverly Park 15 00

Soil, heavy loam. Variety, Charles Downing. Hoed twice in the spring, and a heavy mulch of manure spread in the fall, using 30 two-horse loads per acre. Yield, 160$\frac{21}{32}$ bushels, or 5,141 quarts. Sold in Newark by commission merchants there. Expenses—Manure, $30; spreading, $8; hoeing, $20; picking, $78; carting, $10; commission, $71.94; total, $217.94. Gross sales, $488.23. Net sales, $270.29.

BLACKBERRIES (best 1 acre).—First Premium to Nathan H. Conrow, Cinnaminson. 25 00

Soil, sandy loam. Cut out the dead wood in March, and trimmed back the live wood. In May they were plowed from with a one-horse plow. Hoed and again plowed in June, afterward cultivated with cultivator. Fertilizers used—10 tons street dirt per acre was applied broadcast during the winter. Yield, 1,450 quarts; 80 quarts used and sold at home, balance sold by commission men in Philadelphia. Expenses—Picking, 1½ cents per quart, $22.95; hauling, &c., $2; commission, $11.89; total expenses, $36.84. Gross sales, $118.90. Net proceeds, $82.06.

RASPBERRIES (best 1 acre).—First Premium to Henry Jeroleman, Hilton..... 25 00

Soil, dark loam, blue clay subsoil, all well underdrained. Set in rows 6 feet apart and 2 feet in the row. Cultivated between rows twice this season with one-horse harrow-tooth cultivator, and kept clean from grass and weeds. Variety, Cuthbert (or

Queen of the West). Fertilizers—Every third year apply 10 one-horse loads of composted manure on the rows around the plants in the spring; no manure or fertilizer used last or this season. Yield, 1,694 quarts, or 52 bushels and 30 quarts. Expenses—Cultivation, $2; commission, $37.20; wineing, $2.25; carting, $7; picking, $33.88; total expenses, $80.15. Gross sales, $372.68. Net, $290.28.

CURRANTS (best 1 acre).—First Premium to J. J. & J. J. Quinn, Waverly Park..... .....$25 00

Soil, gravel and clay. Variety, Cherry currant. Planted in rows 4 by 5 feet. Cut and trimmed in winter, cultivated twice during the season, and hoed twice. Fertilizer used, 10 two-horse loads of manure per acre. Yield, 3,328 quarts. Sold by commission merchants in Newark. Expenses—Cultivating, $16; pruning, $10; applying hellebore and cost of same, $8; picking, $33.28; carting, $5; commission, $31.78; total expenses, $104.06. Gross sales, $315.18. Net proceeds, $211.12.

CURRANTS.—Second Premium to Wm. R. Ward, Newark... ..... 15 00

Soil, sandy loam. Variety, Fay's. Planted between pear trees, and kept cultivated between rows. Fertilized with bone for pear trees, about one-half ton per acre; first three years after planting manured with well-rotted stable manure; used none this year. Only expense being to keep the patch cultivated and one hoeing between bushes; half labor charged to pear crop, also half of fertilizer. Yield, 1,484 quarts. Expenses—Picking 1,484 quarts, $14.84; commission, $6.40; cultivation, $5; bone, $5; total expenses, $41.24. Gross sales, $156.40. Net proceeds, $115.16.

Entries on acre of egg-plants and two entries on citrons were passed by committee, no premium being offered.

DAIRY PRODUCTS.

BEST INCOME FROM A DAIRY (10 cows).—First Premium to Wm. B. Lippincott, Hartford.....$100 00

Breed, Jerseys. Expenses consisted in delivering to retailers. Product of 16 head of cows, yielded 33,590 quarts of milk; returns from the same, $1,695.96; calves, $261—a total of $1,956.96, or an average of $122.31 per head. Pastured on upland in summer, with green corn-fodder; in winter were fed clover hay and cut corn-stalks. Their mess night and morning consisted of half a bushel of brewers' grains, 4 quarts cob meal, 1 quart cotton-seed meal per day.

BEST INCOME FROM A DAIRY.—Second Premium to John M. Lippincott, Moorestown.....$50 00

Breed of cattle, high-grade Jersey and Guernsey. Expense, 4 miles drive to deliver to retailers. Statement and product—My 14 cows produced 28,028 quarts of milk and 290 quarts of cream; sold at wholesale, amounting to $1,459.56; received from young stock, $70; total, $1,529.56; average per cow, $109.25. Treatment—During summer spent day and night on a permanent pasture, with light feed of green corn or cerealine fed at milking-time part of the time, in winter clover hay and stalks, with two feeds of from 4 to 6 quarts, according to time they have been milking, of either corn and cob meal or cerealine, mixed with wheat chaff and thoroughly moistened and allowed to remain wet between feeds. Run of yard in mild weather.

On motion, the committee adjourned.

GOVERNOR GEORGE T. WERTS,
I. W. NICHOLSON,
H. I. BUDD,
HENRY P. JONES,
THEO. F. D. BAKER,
P. T. QUINN,
THOMAS W. DAWSON.

(For discussion following this report, see minutes.—SECRETARY.)

REPORT

OF THE

STATE GRANGE OF NEW JERSEY

PATRONS OF HUSBANDRY.

(235)

NEW JERSEY STATE GRANGE,

PATRONS OF HUSBANDRY, 1893.

OFFICERS.

Master	JOHN T. COX	Readington, Hunterdon county.
Overseer	GEORGE W. JESSUP	Cinnaminson, Burlington county.
Lecturer	DAVID S. ADAMS	Mickleton, Gloucester county.
Steward	EDMUND BRADDOCK	Medford, Burlington county.
Assistant Steward	ALBERT HERITAGE	Swedesboro, Gloucester county.
Chaplain	FRANKLIN DYE	Trenton, Mercer county.
Treasurer	CHARLES COLLINS	Fellowship, Burlington county.
Secretary	M. D. DICKINSON	Woodstown, Salem county.
Gate-Keeper	E. E. HOLCOMBE	Mount Airy, Hunterdon county.
Pomona	NETTIE WELLS	Bradevelt, Monmouth county.
Flora	KATE B. LIPPINCOTT	Hartford, Burlington county.
Ceres	HANNAH C. HOLCOMBE	Mount Airy, Hunterdon county.
Lady Assistant Steward	CARRIE ATKINSON	Woodstown, Salem county.

EXECUTIVE COMMITTEE.

JOHN T. COX	Readington, Hunterdon county.
THOMAS BORTON	Mullica Hill, Gloucester county.
JAMES H. BAIRD	Marlboro, Monmouth county.
WM. B. LIPPINCOTT	Hartford, Burlington county.
J. H. M. COOK	Livingston, Essex county.
M. D. DICKINSON	Woodstown, Salem county.

STATE GRANGE MEETS ON THE THIRD TUESDAY IN DECEMBER, 1893.

POMONA GRANGES.

MASTERS AND SECRETARIES, WITH ADDRESSES.

1. Burlington—Master ..... JOHN M. LIPPINCOTT ... Moorestown, Burlington county.
   Secretary ..... GEO. L. GILLINGHAM ... Moorestown, Burlington county.
3. Hunterdon—Master ..... N. B. RITTENHOUSE ..... Sergeantsv'le, Hunterdon county.
   Secretary ..... J. B. FISHER ..... Sergeantsv'le, Hunterdon county.
5. Mercer.
6. Salem—Master ..... GEO. H. KIRBY ..... Woodstown, Salem county.
   Secretary ..... GEORGIE A. DUELL ..... Woodstown, Salem county.
8. Gloucester—Master ..... B. F. RULON ..... Swedesboro, Gloucester county.
   Secretary ..... MARY R. BROWN ..... Swedesboro, Gloucester county.
9. Centre District—Master ..... J. B. WARD ..... Lyons Farms, Union county.
   Secretary .. D. A. HOPPING ..... Hanover, Morris county.

DEPUTIES.

Burlington	JOHN M. LIPPINCOTT	Moorestown, Burlington county.
Camden	AMOS EBERT	Ashland, Camden county.
Cumberland	J. B. HILLIARD	Millville, Cumberland county.
Essex	GEO. W. DE CAMP	Roseland, Essex county.
Gloucester	WALTER HERITAGE	Mickleton, Gloucester county.
Hunterdon	HENRY F. BODINE	Locktown, Hunterdon county.
Sussex	NELSON DE WITT	Deckertown, Sussex county.
Mercer	IRA STOUT	Pennington, Mercer county.
Middlesex	A. S. APPELGET	Hightstown, Mercer county.
Somerset, Bergen, Hudson and Passaic	J. B. ROGERS	1195 Broad street, Newark.
Monmouth	JOHN STATESIR	Colt's Neck, Monmouth county.
Morris	E. H. BALL	Parsippany, Morris county.
Salem	RICHMAN COLES	Woodstown, Salem county.
Union	DR. J. B. WARD	Lyons Farms, Union county.
Warren	N. WARNE	Broadway, Warren county.

SUBORDINATE GRANGES.

Number.	NAME.	MASTERS.	P. O ADDRESS	SECRETARIES.	P. O. ADDRESS.
5	Swedesboro	Isaac Derrickson	Repaupo, Gloucester county	Emma C. Warrington.	Swedesboro, Gloucester county.
8	Moorestown	S. C. Roberts	Hartford, Burlington county	Sallie S. Dudley	Hartford, Burlington county.
9	*Woodstown	Edgar C. Moore	Woodstown, Salem county	A. W. Richman	Woodstown, Salem county.
11	Vineland	Anna M. Worden	Vineland, Cumberland county	Mary H. Lee	Vineland, Cumberland county.
12	Ringoes	P. W. Hartwell	Lambertville, Hunterdon county	Bessie D. Sked	Linvale, Hunterdon county.
14	Edgewood	N. S. Wright	Burlington, Burlington county	Edmund Cook	Burlington, Burlington county.
16	Hopewell	R. P. Jones	Shiloh, Cumberland county	J. C. Bivans	Shiloh, Cumberland county.
18	Cumberland	John Tyler, Jr	Greenwich, Cumberland county	M. Goodwin	Greenwich, Cumberland county.
26	Harrisonville	S. S. Conover	Harrisonville, Gloucester county	Charles K. Horner	Harrisonville, Gloucester county.
32	Bridgeport	David R. Black	Swedesboro, Gloucester county	Joseph W. Guest	Swedesboro, Gloucester county.
36	Medford	Isaiah Ballinger	Medford, Burlington county	Anna R. Ballinger	Medford, Burlington county.
38	Haddon	R. L. Shivers	Camden, Camden county	W. C. Nicholson	Haddonfield, Camden county.
39	Mantua	Henry M. Leap	Wenonah, Gloucester county	Jos. Noblit	Wenonah, Gloucester county.
43	Hope	Joseph S. Glaspey	Bridgeton, Cumberland county	P. L. Wheaton	Bridgeton, Cumberland county.
49	Rancocas	Joseph Lundy	Rancocas, Burlington county	J. B. Hilliard	Rancocas, Burlington county.
50	Pemberton	Theodore Budd	Pemberton, Burlington county	Henry R Lippincott	Pemberton, Burlington county.
51	Mullica Hill	Wm. H. Munion	Mullica Hill, Gloucester county	Mrs. Anna G. Gaunt	Mullica Hill, Gloucester county.
56	Readington	W. H. Opie	Readington, Hunterdon county	Wm. Connet	Readington, Hunterdon county.
57	Centre Grove	Wm. H. Taylor.	Millville, Cumberland county	Reuben C. Hilliard	Millville, Cumberland county.
58	Columbus	Charles Decou	Trenton, Mercer county	Robert Taylor	Columbus, Burlington county.
60	Course's Landing	Henry Gardiner	Sharptown, Salem county	E Atkinson	Woodstown, Salem county.
61	Crosswicks	A. Satterthwait	Crosswicks, Burlington county	Elizabeth A. Rogers	Crosswicks, Burlington county.
64	Pennington	John Fleming	Pennington, Mercer county	S. B. Ketcham	Pennington, Mercer county.
73	Ewing	W. H. Cadwalader	Trenton, Mercer county	Wallace Lanning	Trenton, Mercer county.
77	Mercer	A. L. Holcombe	Hopewell, Mercer county	W. I. Phillips	Hopewell, Mercer county.
78	Wantage	Geo. Vandruff	Deckertown, Sussex county	Belle De Witt	Deckertown, Sussex county.
79	Hamilton	David Lee	Hamilton Square, Mercer county	Mamie E. Cubberley	Hamilton Square, Mercer county.
81	Friesburg	Jos. G. Pierson	Friesburg, Salem county	C. F. Dickinson	Cohansey, Salem county.
85	Williamstown	Wm. H. Tice	Williamstown, Gloucester county	Charles F. Tice	Williamstown, Gloucester county.

SUBORDINATE GRANGES—*Continued.*

Number.	NAME.	MASTERS.	P. O. ADDRESS.	SECRETARIES.	P. O. ADDRESS.
88	Locktown	Robert T. Heath	Locktown, Hunterdon county	Russie Risler	Locktown, Hunterdon county.
90	Blackwood	J. S. North	Blackwood, Camden county	C. C. Stevenson	Blackwood, Camden county.
92	Monmouth	J. H. Baird	Marlboro, Monmouth county	W. H. Dubois	Marlboro, Monmouth county.
98	Allentown	Lawrence Tilton	Allentown, Monmouth county	G. W. Tilton	Ellisdale, Monmouth county.
99	Liberty	S. B. Wells	Bradevelt, Monmouth county	J. G. Taylor	Vanderburg, Monmouth county.
101	Sergeantsville	F. P. Williamson	Sergeantsville, Hunterdon county	W. D. Axtel	Sergeantsville, Hunterdon county.
104	Livingston	L. T. Rathburn	Livingston, Essex county	A. W. Harrison	Livingston, Essex county.
105	†Morris	Henry W. Young	Afton, Morris county	W. A. Howell	Afton, Morris county.
106	Kingwood	A. G. Hawk	Baptisttown, Hunterdon county	C. R. Strope	Barbertown, Hunterdon county.
107	Caldwell	R. C. Campbell	Caldwell, Essex county	S. Ezra Harrison	Caldwell, Essex county.
108	‡Roseland	Geo. E. De Camp	Roseland, Essex county	Lillian De Camp	Roseland, Essex county.
109	Enterprise	Wm. C. Bates	Parsippany, Morris county	E. Halsey Ball	Troy Hills, Morris county.
110	Warren	N. Warne	Broadway, Warren county	W. F. Pursell	New Village, Warren county.
111	Mickleton	James B. Cooper	Mickleton, Gloucester county	Hannah L Haines	Mickleton, Gloucester county.
112	Lyons Farms	Jos. B. Ward	Lyons Farms, Union county	A. P. Morris	Lyons Farms, Union county.
113	Pohatcong	D. C. Donnelly	Springtown, Warren county.	A. A. Painter	Shimer, Warren county.
114	Musconetcong	Absalom Apgar	Hampton Junction, Hunterdon county	Samuel C. Carpenter	Asbury, Warren county.

*Meets every Wednesday evening. †Meets first and third Tuesdays in each month. ‡Meets every Tuesday evening.

REPORT OF THE STATE GRANGE.

BY JOHN T. COX, MASTER.

To the Officers and Members of the New Jersey State Board of Agriculture—As Master of the New Jersey State Grange, I am highly gratified that I am able to report an increase of membership during the past year. The Order of Patrons of Husbandry is at once the most conservative and the most beneficial of all farmers' organizations. It stands aloof from all entangling alliances, political or otherwise, and yet the principles taught in the Grange, practiced in every-day life, will purify the whole political atmosphere of our country. Bribery, fraud, deceit, discrimination and corruption of the ballot are all frowned down upon by the Grange.

The Order in our State and in our country would only demand a proper equality, equity and fairness before the law.

The Grange has achieved much in a local way since its advent, and its national achievements are the wonder of an admiring people.

"Individual happiness depends upon general prosperity." This axiom is quoted everywhere, and as an actual truth is admitted upon every hand. What, then, should be the credit and standing of that organization which has done so much to advance the material and social interests of the agriculturist, and by this increase the general prosperity of all our people?

In the matter of education, the Grange has ever been foremost, and among its members are found the strongest advocates of increased educational facilities; institutes, agricultural and scientific lectures are supported; County Boards are maintained, and agricultural information is liberally disseminated; the influence and usefulness of the Grange is also made manifest in this body.

When the farmers of our State, educated in the Grange, thereby become parliamentarians and public speakers of no mean order, we need not look any longer to other classes to champion our cause, but

are able, of ourselves, to present to legislative bodies such demands as would tend to advance the farmer, and to secure for his class all proper enactments.

Laws passed in the interest of the agriculturist would not conflict with the interests of other citizens, notwithstanding the oft-asserted declarations of our law-makers.

As to trespass laws, dog laws, laws governing the transportation of perishable products, &c., the interest and welfare of the farmer should be of the first importance, as he is most directly interested.

The Order which we represent has secured much important legislation through the National Congress, and the members of the Legislative Committee are ever to be found at the National Capital while Congress is in session.

Our State Grange at its last session appointed a Committee on Legislation to look after the interests of the farmers of our State, and I will be surprised if this committee fails to secure recognition by our law-makers.

If the farmers of our whole State would unite in this noble Order, as they should, and through its ordained channels strive for the amelioration of the farmers' condition, their appeals to the Legislature would be irresistible, and the farmer would then come to occupy that position which his vocation entitles him to occupy.

For list of officers for 1893, list of Subordinate Granges, &c., I would respectfully refer you to our worthy Secretary.

THE TWENTIETH ANNUAL MEETING

OF THE

New Jersey State Board of Agriculture,

HELD IN THE

STATE HOUSE, TRENTON, N. J.,

Wednesday, Thursday and Friday,

JANUARY 18th, 19th AND 20th, 1893.

MINUTES OF THE TWENTIETH ANNUAL MEETING.

FIRST DAY.

MORNING SESSION.

The Twentieth Annual Meeting of the New Jersey State Board of Agriculture was called to order by the President, Hon. Edward Burrough.

The roll of Directors was called by the Secretary (see list, page 7), and the order of business, as prepared by the Executive Committee, was adopted, subject to such changes as might be necessary.

The reading of the minutes of the nineteenth annual meeting was dispensed with.

Mr. Dudley—I move that a committee of three be appointed to visit the Governor, and advise him that we will be glad to have him meet with us, and hear any remarks or suggestions he may have to make. I would also include in my motion that the retiring Governor be invited to come before the Board at any time he and Governor Werts may designate.

The motion was agreed to, and the Chair named the following committee: Messrs. Thomas H. Dudley, J. A. McBride and P. T. Quinn.

A committee, consisting of Messrs. H. J. Irick, W. R. Lippincott, J. M. White and D. A. Vanderveer, was also named by the Chair to invite the members of the Legislature to attend the sessions of the State Board.

Secretary Dye—If it is proper, I would like to make a statement at this time. Mr. Crane, of Essex, at the last annual meeting, offered the following resolution:

"WHEREAS, The Trespass laws of the State are not well understood by the farmers of the State; therefore, be it

"*Resolved*, That the Secretary of this State Board be instructed to have prepared by some competent legal authority a guide of procedure in cases of trespass, and have the same, as well as the laws on the subject, printed in the annual report of the Board."

There has been no action taken so far as outlining a form of procedure in cases of trespass, and the laws were not printed for the reason that there was too much involved. The publication of these laws would cover, perhaps, more space than all the proceedings of the Board; and to have a general form of procedure would be impossible, as the laws in regard to trespass are not statutory.

The law defines, in a general way, what constitutes trespass, but does not show how to proceed in individual cases; that is left for the party aggrieved and his lawyer to determine. Each case must be dealt with according to the peculiarities surrounding it.

On motion, the report of the Secretary was received and concurred in.

The Chair—I will announce the committees, as follows:

COMMITTEE ON CREDENTIALS.

M. D. DICKINSON.....Salem.
DENNIS C. CRANE.....Union.
V. P. HOFFMAN.....Atlantic.

COMMITTEE ON RESOLUTIONS.

H. V. M. DENNIS.....Monmouth.
JOHN T. COX.....Hunterdon.
A. W. DURYEA.....Hudson.

COMMITTEE ON REPORTS OF OFFICERS.

RALPH EGE.....Mercer.
DAVID BORTON.....Gloucester.
J. B. LIPPINCOTT.....Burlington.

COMMITTEE ON LEGISLATION.

DR. JOS. B. WARD.....Essex.
CHARLES COLLINS.....Burlington.
HON. B. E. TINE.....Hunterdon.

The report of the Executive Committee was read by Wm. R. Lippincott, and, on motion, received and referred to the Committee on Officers' Reports. (See report, page 5.)

The report of Committee on Legislation was presented by Dr. J. B. Ward, and is as follows:

REPORT OF COMMITTEE ON LEGISLATION.

Mr. President and Members of the State Board—At the last annual session of the State Board of Agriculture a committee was appointed to look after matters of legislation affecting the interests of the farmers of the State.

This committee had its first meeting on January 25th, in the office of Secretary Dye at the State House, and continued to meet from week to week during the sessions of Legislature, carefully noting all matters referred to them, besides presenting several bills on their own responsibility.

Among them was one introducing a joint resolution to have a portrait of Professor Cook placed in the State House. This failed to become a law, although it seemed to meet with no opposition, and, as your committee thought, passed both houses and only needed the signature of the Governor to become a law.

A subject that has been discussed before this Board many times and been reported in the minutes of past years, known as House Bill No. 117, which provided for a railroad commission, whose duty it should be to equitably adjust all freight rates throughout the State, and providing for the enforcement of the same, was amended by your committee and some of its objectionable parts stricken out without impairing its principal features. Introduced into the House, it was referred to the Committee on Railroads, in whose hands it remained during the remainder of the session. No arguments that we could use could change the minds of the honorable members, and we could not even obtain a hearing.

Senate Bill No. 117, an act for the preservation of sheep and other domestic animals, or, in other words, a dog law, introduced by Senator McMickle, failed to become a law, although it received the earnest support of your committee, knowing that it was following out the spirit of resolutions presented so many times before, not only to this Board but the various County Boards throughout the State.

Much opposition seemed to have arisen against a bill that was passed the preceding year, Assembly Bill 242, an act to provide for the more permanent improvement of the public roads of this State. An amendment was offered to make the bill operative, and after it was introduced into the House it seemed for a long time that it might fail to become a law. Your committee appealed to the constituency of some of the members and vast numbers of petitions were sent in favoring it, and after a long delay it was finally passed, but a day or two before the Legislature adjourned. It seems strange that farmers should so stand in their own light regarding this road question. I can only refer them to Union county, where property has more than doubled during the past three years under their improved road system.

His Excellency the Governor, in his Annual Message, recommended the creating a new officer of the government, to be known as a Commissioner of Agriculture, who should be nominated by the Governor and confirmed by the Senate. A bill was drawn to this effect, known as House Bill No. 148. This bill caused your committee much perplexity. While a minority of the committee favored it, we were not in a position at the time to determine the attitude of the farmers of the State concerning it, and for many reasons we could not seem to favor the bill. Our way was not clear to advocate its passage, and without our consent the bill would not be reported, and it finally died in the hands of the committee.

To meet some of the features of this bill we had one prepared and introduced, known as House Bill 362, an act to collect and compile statistics of the agricultural and horticultural products of the State, and to ascertain the relative value of farm lands. The authority for this was given to the Secretary of the State Board of Agriculture, subject to the approval of the Governor. This bill, too, failed to become a law.

Recognizing the fact that with our improved stone roads we must improve our draft wagons and widen our tires, we prepared and had introduced a bill known as Assembly Bill 445, an act to enable township committees to encourage the use of broad tires on wagons and carts by a rebatement of taxes. Tires should be not less than four inches in width and the rebate not exceed fifty cents for each wheel in use in any one year. All will admit that broad tires are a benefit to a road. It is stated that under the Highway act, and under

the Turnpike act of England, the weight each vehicle is allowed to carry is regulated by the width of the wheel. Large and broad wheels not only do less harm to the roads but cause less draught to the horses.

The Albany Railroad Company owns the public road running between Albany and Troy, and offers to reduce the tolls one-half on all heavily-loaded wagons which are provided with four-inch tires. This is a sensible move in the right direction. If the suggestion in question should be generally adopted the cause of road improvement would be greatly advanced.

This bill failed to become a law owing to the lateness of its introduction. It has been indorsed by the Road Convention and will be re-introduced at this session of the Legislature.

On motion, the report was received and ordered spread on the minutes, with the thanks of the Board to Messrs. Tine and Davidson for their efforts in behalf of the farmers of the State.

The report of the State Grange was then read by W. M. John T. Cox, and, on motion, received and ordered to be printed in the proceedings of the Board. (See report.)

The Chair—Is the report of the American Cranberry-Growers' Association ready?

Mr. White—We have no written report ready. Our meeting was held yesterday, and we had a very full and interesting session. I will hand in the report to the Secretary for publication.

After the annual meeting the following report was received, and is here inserted:

REPORT OF THE AMERICAN CRANBERRY-GROWERS' ASSOCIATION.

To the President and Members of the State Board of Agriculture:

GENTLEMEN—According to custom, two meetings were held during the year—the annual convention on the third Tuesday in August, and the annual meeting on the third Tuesday in January.

At these meetings the several standing committees report upon such matters as are referred to them, or as come within their province. The topic claiming most attention, because of its importance, has been that of market extension.

The annual product of this fruit is increasing so rapidly, especially

in Massachusetts, where the crop has been doubled in the last few years, that other markets are necessary to avert that too-common American disaster, overproduction. These discussions resulted in a conference of growers in Boston, January 15th, 1892, at which a committee was appointed to devise a plan for developing a foreign market.

The following were appointed such committee: Geo. F. Baker, Esq., 53 State street, Boston, Mass.; A. J. Rider, Trenton, N. J.; C. W. Wilkinson, Esq., 325 S. Water street, Philadelphia, Pa.; Emulous Small, Esq., Harwich Port, Mass.; G. R. Briggs, Esq., Plymouth, Mass.; A. D. Makepeace, Esq., West Barnstable, Mass.

The committee immediately organized by the election of George F. Baker, Chairman, and A. J. Rider, Secretary. Plans of organization and operation were discussed, and the Secretary was directed to formulate the same and submit copies to members of the committee for their approval, which was done. The same was submitted to and has been approved by the American Cranberry-Growers' Association, by the Cape Cod Cranberry-Growers' Association, and by all meetings of cranberry-growers in the East where the subject has been presented and understood.

The plan contemplates, first, the forming of a joint stock company, or use of the franchises of one already formed, individual growers to enter into a contract with this company to contribute to the capital stock of the company a certain percentage of their crop each year, for a period of three years, for foreign market purposes, the company agreeing to use the fruit so contributed for sale and distribution abroad under the direction of a competent and energetic agent.

This agreement is not to take effect until signed by growers representing a majority of the cranberry interest of the country.

Up to this writing, crops representing something over 250,000 bushels have been pledged in New Jersey, Connecticut, New York and Wisconsin.

The pledges of a few more prominent growers would give the requisite majority, and insure the inauguration of our enterprise, that would be productive of great good to individual growers, and of advantage to the State almost beyond estimate.

New Jersey alone has thousands of acres of unproductive and non-taxpaying lands that could and would be converted into valuable

cranberry plantations, yielding large revenues, if a market for the fruit could be assured.

Enterprises of less importance have received national support—why should not this? Certainly, if there is virtue in the rule to "help those who help themselves," here is an opportunity to practice it.

We believe government aid has never been asked or bestowed on this line, where the direct beneficiaries had led the way with such liberal and general contributions.

Is it too much to ask the State Board of Agriculture to use its influence, at least, to secure national assistance to the enterprise?

Respectfully submitted,

A. J. RIDER.

The Secretary—I want to call attention to a matter mentioned in the report of the Committee on Legislation—that in reference to a memorial to Dr. Cook. As you know, this originated last year with Mr. Thomas J. Beans, and was taken up by this organization. The Legislative Committee brought it before the Legislature, and it met with general approval, and it was the impression of the committee that the resolution had passed both houses. On looking into the matter, I found it had been referred to some committee of the Assembly, and by them overlooked. The State Grange and the State Horticultural Society have both passed resolutions asking that this be taken up again, and that Dr. Cook's portrait be placed in the State House.

Mr. Rogers—I move that the Standing Committee on Legislation for this year be authorized to use all their endeavors to have the matter passed at the present session of the Legislature.

Carried.

Mr. Dudley—It affords me great pleasure to state that Governor Werts is now present with us. [Applause.]

The Chair—I am glad to be able to present Governor Werts to the members of the State Board of Agriculture, and to say to the Governor that this body is composed of some of the most intelligent members of the farming profession of New Jersey. I will be glad, Governor, to have you take the chair. [Applause.]

Governor Werts—Gentlemen of the State Board of Agriculture, while I recognize the fact that farming is the most important industry

of our State, and one of the most intimately connected with its development, at the same time I am free to say it is a subject with which I am as little acquainted as with any subject I could undertake to discuss. I am aware, generally, of the objects and purposes of your association, and these objects and purposes have my entire approval and my hearty sympathy and support.

In so far as the pursuit of agriculture, its scientific development, tends to promote the industrial interests of the State and its material prosperity, it is certainly worthy of every encouragement the State and its Executive can offer, and for the encouragement of those objects and the encouragement of your Board I pledge you my sincere and hearty concurrence. [Applause.] It shall be my endeavor, inasmuch as I presume it to be my duty, to more fully acquaint myself with the objects and purposes of your association, to the end that I may more intelligently concur in whatever suggestions the Board may have to make. Beyond that, on this occasion, I do not know what I can say. I do not know what I am expected to discuss, or that I am expected to discuss anything, and I hope I will be excused from any attempt to offer suggestions at this time.

I thank you for your kind invitation, and with the assurance of my full sympathy with your objects and purposes, beg to be excused from further remarks. [Applause.]

Mr. McBride—I move a hearty vote of thanks to His Excellency for his assurances of sympathy with our purposes.

The motion was unanimously agreed to.

The Chair—I desire to announce that at the State exhibit at the World's Fair we have made arrangements by which we can exhibit a number of photographs. To-day we have a proposition from the photographers who are doing our work for us to take a photograph of the members of this Board. Governor Werts has kindly consented to be a farmer for the time and sit with us. Immediately after adjournment of the present session I hope the members will meet on the portico of the State House, where the picture will be taken. (See frontispiece.)

At this point I will call upon Mr. Thomas H. Dudley to give the Board some account of his observations concerning agricultural matters while in England last summer.

Mr. Dudley—During a visit to the old country last year I looked into the question of agriculture, to see what they are doing there. I

do this whenever I have an opportunity, in order that I may get new ideas, and I hope some of them may be of benefit to us here.

While in England I called on Mr. Greening, who is probably one of the foremost agriculturists there, though he has not had the experience of John Bennett Lawes, nor done so much for agriculture as he. There is probably no man living in the world to-day who has done as much as Mr. Lawes, for he has devoted a lifetime and a princely fortune to experimenting in agriculture, not with a view to making anything out of it for himself, but for the benefit of agriculture purely. When I visited his farm he had 200 workmen employed on 500 acres; he also had a laboratory, with 10 trained chemists at work in it. I said to him: "What do you make on your farm?" He laughed, and said: "It is all the other way. I don't make anything; I am experimenting." He has been experimenting for the last forty years, and he has published some eighty different volumes. Mr. Greening is a younger man, who takes a deep interest in agriculture, and is at the head of the Agricultural and Horticultural Society of England. It is for the purpose of talking to you of that association more than anything else that I have been invited to address you.

The farmers of England have found it absolutely necessary to form this association, in order to protect themselves in fertilizers, in seeds, and in agricultural implements, and this association has now become incorporated, and Mr. Greening is at the head of it. It is an exclusive association. I do not know the number of members, but it extends all over England.

They have a store in which they sell all kinds of agricultural implements to the members of the association exclusively; selling them the very best machinery at the lowest wholesale price. The sole object of the association is the benefit of its members. The association makes no profits on these sales. In the matter of seeds, they find it necessary to publish a journal, a copy of which Mr. Greening gave to me, although it is for members of the association exclusively. I told him I was connected with the State Board of Agriculture of New Jersey, and it would do no harm if he gave me one, as they could not be used against the association over in New Jersey, and I felt sure the State Board of Agriculture would be glad to have one. He finally consented, and put two of them into my hands. One of them is on Artificial Manures, published exclusively by the associa-

tion, and for the association; the other is on Farm Seeds, and they have a third on Farm Implements, with prices annexed.

Mr. John Bennett Lawes told me once that the great problem of agriculture was how to restore to the land that which the farmers were constantly taking from it. No doubt there is truth in that; but there is still another problem, and that is, not only to restore to the land those elements which are taken from it by the farm crop, but how best to feed the plant. How to feed the plant as you feed your cows, your horses, your pigs, your poultry, for profit—that is the great problem of to-day. Mr. Greening told me that the best practice in applying fertilizer is to scatter it on the soil and work it in lightly with a rake, rather than apply it to the root of the plant. This practice has been found to be best in England. They claim they get more benefit by raking the fertilizer in lightly, and I give you the idea for what it is worth. He is also in favor of grinding the fertilizer fine, and claims that better results are secured by this practice.

Sometimes they apply their fertilizers in drills, just as we do.

But there is another matter of still more importance. Among those who have been experimenting in agriculture there is a Frenchman, M. Ville, who has been experimenting for forty years. He commenced it in the time of Napoleon. Napoleon had great confidence in him and extended to him the aid of government, so far as he could, in carrying on these experiments. These experiments have been continued under the Republic, and the President of the Republic, M. Carnot, is very friendly to him. This gentleman claims that we can manufacture plants, and that is one of the astounding things to me, one of the things that struck me most in my conversations with Mr. Greening.

In his experiments M. Ville took flower pots which were glazed inside, and put wax on them also, so that nothing could interfere. He then filled the pots with sand and then took water that was distilled, perfectly free from any substance whatever, and put this on with certain fertilizers—and remember, the soil was nothing but pure sand—and with this and the aid of the atmosphere he produced at the rate of sixty bushels of wheat to the acre—actually manufactured it. Not a particle of stable manure was applied, but simply the application of chemistry, with the aid of nature, produced the plants.

These experiments are detailed in the pamphlets referred to at some length, and they are exceedingly interesting.

There is another pamphlet which accompanies these, and it is called the Chemistry of Farm Crops. There are three different manurial constituents in all ordinary farm plants, and these are well treated. It tells of wheat, rye, oats, barley, turnips, mangels, beans, peas, &c. He takes these three constituents and he shows just the proportions contained in every crop except Indian corn, which does not grow in England.

I think the time has arrived when the farmers of New Jersey should manufacture their own fertilizers. Hundreds of persons in the United States and hundreds in England have accumulated vast fortunes in the manufacture of fertilizers, and this at the expense of farmers. Mr. Phillips, of Philadelphia, accumulated an immense fortune, and half of it came from the farmers. The farmers have been grossly imposed upon in this matter. My connection with the Agricultural Experiment Station has shown me this. In Connecticut a man was going around selling fertilizers at $35 per ton, when an analysis of the fertilizer sold by him showed that it contained but $1.50 in value, and farmers bought it. It was not worth the carting, to say nothing of the expense of spreading it upon the land.

The New Jersey Agricultural Experiment Station has done a great deal for farmers in keeping up the quality of fertilizers, and I know of no other institution that could do more for you; but if you could form an association such as this one in England, and make your own fertilizers, and sell them to farmers, and also sell agricultural implements to members of the association, and even manufacture them for your members, thousands of dollars could be saved annually to your members in these items. Then there is the matter of seeds. With good seeds a great amount could be saved to the farmers, and such an association, with such a man at the head as Mr. Greening to carry on the experiments, and to have experiments conducted all over the State simultaneously, would be of immense benefit to you. The farmers of England have found this to be so, and they are no more intelligent than the farmers of this State. I have no plan formulated, but I felt it to be my duty to lay the matter before you as I have seen it, for I am interested in the agricultural development of the State, and I think this Board should take some action in the matter. A manufactory should be established at Trenton, or New Brunswick, or somewhere else, and make fertilizers for farmers all over the State. The factories now deliver their fertilizers at any station freight paid, and

there is no reason why a central manufactory would not meet the needs of the farmers of the State, for the present, at least. Then if you want a good fertilizer for your wheat or other crops you can get it. This can easily be done; these people in England do it for every crop they grow. I do not know that I have anything further to say. My object was merely to introduce the subject.

A Member—Are the members of this association the proprietors of these farms, or those who lease them?

Mr. Dudley—The farmers themselves. It now contains nearly all the farmers of England. It is called the Agricultural and Horticultural Association, Limited.

Mr. Crane—Is it not too strong an assertion to say you can manufacture a plant?

Mr. Dudley—No, sir; I think not. They can and do do it. You must, of course, have the seed. If you have the seed, with the aid of nature you can manufacture any plant you desire.

Mr. Lippincott—I move a vote of thanks to Mr. Dudley for his entertaining address, and for his courtesy in presenting the books to the Board.

Carried.

Mr. Applegate—I move that the Secretary be requested to make such extracts as he may deem pertinent from the books presented by Mr. Dudley, and have them included in the proceedings of this Board for reference.

Carried.

On motion, adjourned until 2 P. M.

NOTE.—In obedience to the foregoing resolution and as supplementing Mr. Dudley's remarks, I have made a few extracts from the more general statements contained in the pamphlet entitled "Artificial Manures," referred to by Mr. Dudley, and, after a brief extract from address on "Effectual Manuring," under the following heads: (1) The Principle of Complete Artificial Manures, (2) Methods of Using Ordinary Manures, (3) Sowing Artificial Manures, with some additional extracts.

The fertilizer formulas, prepared for the various crops grown in England, printed in the pamphlet, are numerous, but to reproduce any of them for our use they would have to be revised throughout. It is not thought advisable to do this, inasmuch as our own Experi-

ment Station is giving us, from time to time, such formulas as experience and science show to be best adapted to our soils and to produce the crops grown in the State. Furthermore, the formulas contained in the publication referred to were prepared for the English association and are their property.—SECRETARY.

"Agriculturists are too much in the habit of regarding artificial manure as physic rather than food. It is a mistake. Farm-yard dung is bulky plant-food. Artificial manure is concentrated plant-food. The first difference is that dung contains the elements of fertility (or plant-food) mixed with a large amount of other ingredients, and the second difference is that dung is in its way a complete manure, ready-mixed in the stable or cow-shed, whilst artificial manures are separate ingredients requiring to be mixed in proper proportions before they are used. The reason so much money has been fruitlessly wasted on artificial manure is not only because of frauds and adulterations. These are evils which cause much loss, but probably a greater evil is the prevalent ignorance of the properties of the separate constituents of artificial manures. To many users all artificial manures are much the same thing. A member of our association recently wrote to ask if nitrate of soda was not the proper dressing for his beans and peas. He might as well have asked if raw beef was the proper food for his horses and sheep. Although all plants require to some extent the same constituents of food, they require it in such greatly varying proportions that they may be easily starved to death for want of one constituent, whilst being overloaded with an excess of another. To feed plants properly whilst providing against exhaustion of the soil requires as much adjustment as the work of a skillful cook in preparing digestible and nourishing food for ourselves. But the advantage of complete manures is that each one is really the best for its own purpose. * * *

"THE PRINCIPLE OF COMPLETE ARTIFICIAL MANURES.

"If we examine the structure of a plant we find that every part of it, roots, stem, leaves and seeds, all require a combination of the same chemical constituents to build them up. But the plant in growing uses these chemical constituents in very different proportions. Whilst forming the roots a smaller supply of the more valuable elements of fertility are drawn upon than when forming the stem and leaves. When the seed or grain has to be developed the plant draws upon the best resources of the soil at a rate which is altogether disproportioned to its previous demands.

"In our pamphlet on Farm Seeds for 1881 I quoted the following table, showing the results of an analysis of the wheat plant, so far as the elements of phosphoric acid, potash and magnesia are in question:

	Proportions found in each 100 parts.		
	Phosphoric acid.	Potash.	Magnesia.
Roots.....	1.70	2.87	1.97
Straw.....	2.20	15.18	3.92
Grain.....	46.00	32.59	13.77

"These figures show us that the process of growing is not a simple accumulation of matter. It is a nicely-adjusted and constantly-varying process. If it is to be successfully carried out, so as to produce a perfect food for man or beast, the growing plant must find always within the reach of its roots all the necessary elements of fertility in abundant proportions. That is just what plants do find in a fertile soil, and what they miss in a barren one.

"But besides the variations in the digestive action of plants at different stages of their growth, there is the remarkable difference to be noted in the proportions of fertilizing ingredients consumed by different plants. Everybody is familiar with the phenomena of the luxurious growth of certain plants or weeds in particular places. A field sown with a hundred different plants and weeds, and afterwards left to itself, will soon develop a preference for one or more of the hundred varieties. These will grow and flourish whilst the others decline. The reason is that every piece of land is differently compounded by nature, and those plants will grow best which find a compound soil nearest to their own composition. * * *

"The principle of complete manures is simply to provide for each crop the full quantity, in correct proportions, of the mineral constituents it requires as food. Those elements are omitted from the manure which every soil is known to possess in abundance. As regards the nitrogen, about half of what the plant requires is supplied in the manure, the other half being furnished by the atmosphere, either direct or through the soil.

"This principle of preparing artificial manures was laid down by the eminent French chemist, M. Ville, as a result of the sixteen years' experiments he conducted under the French Government. It has been closely criticised, but has well stood the test of practical experience. If it errs, it errs on the side of safety. One can conceive of failure where a necessary element is absent from a manure or is not given in full proportion, but a failure can never be due to a manure which provides everything necessary for the plant in full proportion.

"At the worst, the complete manures may supply something beyond what the plant requires in a soil already pretty fertile; but where this happens, the result is simply that more available plant-food is put in the soil than is taken out by the crop. The fertile condition of the land is thus increased after the cropping, instead of being diminished.

"As some may not be familiar with the means by which M. Ville

proved the possibility of growing crops in the most barren soils by the help of properly-compounded artificial manures, I reproduce here an extract from the account I have published in our previous pamphlets. I will briefly repeat that M. Ville set himself to test the power of properly-constituted artificial manures upon soil as barren as could be found.

"M. Ville says: 'The great problem to be solved was to manufacture a plant as we manufacture soap, litharge, or sulphuric acid, by making use of the peculiar force resident in the seed, as we do elsewhere with steam or electricity. To render the solution of the problem positive and beyond doubt, I selected for the soil calcined sand, which is, as we know, pure silica; it was watered with distilled water, which, as we know, is pure water, and filled into pots of unglazed china, which, as an extra precaution, had been previously dipped into melted wax, in order to prevent the formation of those saline exudations with which the surface of all pottery becomes covered when it is exposed to moisture.

"'One last experiment,' says M. Ville, 'still remained to be tried. This was to mix nitrogenous matter with mineral matters, so forming a complete chemical manure. This was done, the contrast being striking, and the success complete. The plants appeared not to have suffered in the slightest degree, but attained the same development as they would have done in good soil; the leaves were broad and beautifully green, and the stalk more than four feet in height, whilst the ear was well formed and filled with grain. The conditions of perfect plant-nutrition had thus been realized in calcined sand.

"'We have thus succeeded,' says M. Ville, 'in producing plants artificially, without using farm-yard manure or any known substance. You will agree with me that this is an important fundamental point.

"'There is no mystery or undetermined force; a few chemical products of definite purity, some distilled water perfectly pure in itself, a few seeds to start with, and the result is a crop that will in every respect bear comparison with those obtained on thoroughly good soil. We are consequently justified in saying that the problem of vegetation has here received its absolute solution. The nitrogenous matter produces, by itself alone, a greater effect than all the mineral matters put together. But a good crop is not obtained until these two kinds of matters are united.' * * *

"USING ORDINARY MANURES.

"There are cases in which land-owners and farmers prefer to buy the manures in ordinary condition and mix them for themselves, sometimes from considerations of price, and sometimes in order to make up manures to their own specifications. In such cases the Association performs the service for its members of obtaining for them

the ordinary manures from the best makers or first importers at lowest wholesale prices. It also exacts guarantees of strength, and gives the same guarantees to its own buyers. These advantages sometimes amount to a clear saving of 50 per cent. as compared with buying in the open market.

"In dealing with ordinary artificial manures, I strongly recommend that a manure which practically contains only one essential element of plant growth should not be used alone, except as an adjunct to a liberal supply of farm manure. Farm manure is itself a complete manure, but its effect is greatly enhanced by adding superphosphate, dissolved bones, nitrate of soda, &c., according to the needs of the crop. On the other hand, the superphosphate or nitrate of soda alone could not be safely reckoned upon to grow a crop, or, if they did, the result would be exhaustion of the soil.

"In the second place, I recommend that ordinary manures should be carefully rendered as dry and fine before using as the circumstances of the user will permit. M. Ville thinks this point of so much importance that he recommends every agriculturist who can afford it to have a mill and grind up his manures with dry ashes or other absorbent material.

"Professor Sibson, in his Annual Report for 1886, also gives similar advice in the following terms:

"'Nitrate of soda, having been unprecedentedly cheap, has been most used, and, with sulphate of ammonia, affords the cheapest sources of nitrogen. Both these extensive manures are generally used too freely, or rather, not to the best advantage. Much economy would result by grinding them down with some absorbent material, so as to break down the natural lumps and crystals, which act too strongly and often injuriously on the plants of the crop with which they may happen to come into immediate contact, while other plants get none until sufficient rain falls to diffuse the whole. For the same reason it would be an advantage, from the agricultural point of view, to dry and grind to fine powder all supers and fixed artificial manures before application in the field, but as this would entail a loss of weight on drying, as well as a loss in soluble phosphate by conversion into precipitated phosphate, the plan is not likely to be adopted by manufacturers, but is worthy of trial by private users. I mention this because, even at the present time, the 'condition' of manures is not sufficiently appreciated, and many of the manures supplied under closely-cut contracts fail in this particular, and are practically worth less money than others in which this feature is better developed. * * *

"SOWING ARTIFICIAL MANURES.

"As regards the most effective mode of sowing artificial manure, the old idea was that the manure was best sown so as to get it mixed

up in the soil as near to the young plant-roots as possible. By comparing the results which are reported to me year by year, by many hundreds of our members, I have arrived at a distinct conviction that this plan is wrong. The true plan with artificial manures, such, at all events, as the Association supplies, is to sow them on the surface as top-dressings, and to merely lightly harrow them in when it is convenient to add that advantageous operation. * * * M. Ville, as the result of his sixteen or eighteen years' experiments, arrived at the conclusion that all artificial manures should be used as top-dressings. He also advocates dressing twice, instead of at one operation. I believe him to be right in both respects; but, of course, much must depend upon the convenience possessed by a farmer for carrying out this latter plan. One of our members reports to me that during a past season he has managed to raise good crops out of the very worst land by the use of the Association's manures alone, without any farm-yard dung. He adopted the plan of dividing the dressing into three portions, sown at three different times. * * *

"There must, of course, be a reason why surface-sowing or top-dressing yields better results than the old plan of mixing the manure with the soil under and around the roots. The latter plan was, no doubt, adopted originally because it had been found to be the best with farm-yard manure and with ground bones, the latter being the first form in which artificials were applied to the land in England. In these two cases the mixing of the manures with the earth effected two good objects. The soil fixed the volatile ammonia and hastened the decay of the materials.

"But it is very evident that when we are dealing with a high-class artificial manure we are dealing with a substance so highly soluble that we have no occasion to provide for its decomposition. We have rather to provide for absorbing it promptly and arresting its downward course. To put it on the top of the soil is the surest and most effectual means of doing this. If it is sown under the roots, half its most valuable constituents may have been washed down out of reach before the roots can reach them. If sown on the top, the roots find a soil permeated with fertility when they begin to send out their hair-like feeders in search of nutriment.

"Imagine a surface line of soil covered with a top-dressing of fine grains of well-mixed artificial manures. The first shower sends them dissolving downwards, ever widening or spreading as they go down. They will mingle and completely saturate the soil with fertility at a few inches below the surface. Now, imagine these same units mixed with a volume of earth from three or four inches to a foot below the surface line. Some of the nitrogenous material will, perhaps, be high up, some of the phosphatic midway, and some of the potassic material low down. The descending showers will carry the lowest entirely out of reach of the roots, and will, perhaps, fail to effect a complete mingling, even of the upper materials. The

tendency to dissolve and to go downwards quickly is the one thing to be remembered in considering which method of sowing gives the most complete admixture of the manures with the soil. * * *

"I repeat, therefore, the advice to sow artificial manures always on the surface, and afterwards stir the surface soil with the harrow where possible. The harrowing effects two good objects. It spreads the sowing more effectually, and if any volatile materials chance to be in the manure it fixes them in the soil at once.

* * * * * * * *

"And now we arrive at the question how best to obtain even and regular surface-sowing. Where this sowing has to be done by hand the most effectual way is to increase the bulk of manure to be sown by the addition of a large quantity of dry material. For this purpose dry ashes and dry fine earth are, perhaps, the most generally available, and it is worth while to accumulate a stock of these under shelter previous to the season for sowing. But a better plan is to have recourse to sowing by machine wherever this is possible."

FIRST DAY.

AFTERNOON SESSION.

The Chair—We will call for the report of the Secretary.

The Secretary read his report, which was received and referred to the Committee on Officers' Reports. (See report, page 35.)

The Chair—I will call for the nomination of members of the committee to nominate officers for the ensuing year. Will the delegates present from the different counties make their nominations as the roll of counties is called?

The following were named:

W. A. ELVINS.....Atlantic.
W. R. LIPPINCOTT.....Burlington.
E. S. HUSTON.....Camden.
THEO. F. D. BAKER.....Cumberland.
GEORGE DE CAMP.....Essex.
DAVID BORTON.....Gloucester.
JOHN T. COX.....Hunterdon.
SAMUEL B. KETCHAM.....Mercer.
SAMUEL BLISH.....Middlesex.
H. V. M. DENNIS.....Monmouth.

W. F. Ely.....Morris.
Charles M. Rorer.....Ocean.
Empson Atkinson.....Salem.
Joseph Fitzga.....Somerset.
Jas. A. McBride.....Sussex.
D. C. Crane.....Union.
Wm. O. Ward.....Warren.

Mr. Francis B. Lee, of Trenton, was then introduced, and addressed the Board on "New Agricultural Improvement in Southern New Jersey." (See address, page 61.)

The Chair—I find I am on the programme for an address. The Secretary, in making up his list of duties for the Board, very seldom forgets to put a portion of it on me, and in obedience to that demand I shall address you briefly.

(The President then read his annual address—see page 25—and continued his remarks, giving a brief history of the work assumed by the Executive Committee in the name of the State Board of Agriculture, at the request of the State World's Fair or Columbian Exposition Commissioners for New Jersey, in collecting and setting up the agricultural and horticultural exhibits. Besides stating what had been done up to date, he indicated what is yet necessary both for the completion of the pavilions and for the collection of such products as may be necessary to make up the full display according to the requirements of the Managers of the Exposition at Chicago. Diagrams and illustrations of buildings and space were shown, and many questions relating to the subject were asked by the members, which were answered by the President, who has the whole matter in charge, a full report of which he will make at the close of the Exposition.)

After the conclusion of Mr. Burrough's address a vote of thanks was tendered him for his entertaining remarks, and the address was received and referred to the Committee on Officers' Reports.

Mr. McBride then made the following motion: That at the next annual session of this State Board there be set apart on the programme a day for general discussion of subjects of interest to the farmers of the State; subjects for discussion to be prepared by a committee, which he would move to appoint.

This motion was discussed *pro* and *con*, and was finally laid on the table; whereupon Mr. McBride moved that at the close of every subject on the programme during the present session time be given for discussion and for asking questions.

Mr. Ege—I agree with the motion of Mr. McBride, as it is exactly in the line of the programme; discussion follows every subject named on the order of business. [Applause.]

Board then took recess until 7 P. M.

FIRST DAY.

EVENING SESSION.

The Chair—As none of the speakers appear to be present as yet, we will call for remarks.

The Secretary—The value of discussion has been emphasized, and we might have an experience meeting now on the peach question. Hunterdon county last year took $515,000 off—I came near saying—of her neglected peach orchards, and if she can do this I think we should all look into the matter more fully. I have noticed how neglectful many growers are of their orchards, and think more attention should be given them. Had Hunterdon county growers given their peach orchards the care they should have had, they might have taken a million dollars' worth of peaches off them last year, instead of the half-million. Some of you are full of this subject, and we would be glad to have you discuss it.

Mr. Ege—I have seen some of those peach orchards, some of them with weeds five feet high, and some of them where they have taken off two crops; and two crops, as you know, is contrary to my constitution and by-laws. [Laughter.]

Mr. Williams—I have seen some of those orchards which have not been cultivated since they were a year old. I hardly think the grower made anything off some of those orchards last year.

Mr. Blish—Have any of you tried spraying the peach?

Mr. Williams—Yes, sir; it is the most susceptible of any fruit tree.

Mr. Blish—What is your method of growing peaches?

Mr. Williams—It is not an exact science with us yet. We are trying some of the fertilizers on them with fair success.

Mr. Ege—What kind?

Mr. Williams—Potash. The peach is a great feeder of potash, because the stone makes a greater draft of this kind of food than any

other fruit we have. I don't know what our Professors would say about it, but I have often thought of the subject—what amount of stone we would get from an acre of peaches in full fruit. The peach has a very large stone as compared with any other fruit we grow, and potash enters very largely into the growth of the stone. Mr. Vincent, of Essex county, has a very large orchard of about 10,000 trees, and two or three years ago these were affected with the yellows and he thought they would all die. His intention was to grub them all up, but he found the expense of doing this would be pretty heavy and it would be cheaper to put on 200 or 300 pounds of fertilizer; so he put on bone-dust, and this last year you could not tell they ever had the yellows. The next season he gave them another lot of potash, and his success has been very gratifying.

A Member—How much bone-dust?

Mr. Williams—I cannot say positively. He is going to use potash instead of bone-dust this year.

Prof. Voorhees—I would like to add a word with reference to these manures for peach trees. No one using the commercial manures will ever say they will not answer, for they correct the tendency towards decay called the yellows. It seems to me that potash is the one very important element.

For the last four years we have had a general experiment with peach orchards in Somerset county, and we find that the use of the nitrates is an advantage; they are soluble, and get immediately into the circulation of the tree, causing them to produce the fruit and growth early in the season, the wood maturing, and not having that tendency to freeze which the late growth usually has—and such is often the case with the yard manures. I saw an orchard in 1889, I think, which every one said was doomed with the yellows. In the spring of that year there was applied to that land potash equivalent to 100 pounds, phosphoric acid 80 pounds, and nitrate of soda 40 pounds. This was in 1889; there were 600 trees, and any one looking at them would have said they would all die. This was in 1889, as I said, and the crop in 1891 and 1892 brought $900 net, and the trees look better to-day than they have ever looked, and they are now ten years old. It seems to me this question of feeding peach trees is an important one; it hinges upon the quantity used rather than upon the kind—the quantity rather than the quality. I don't object to the use of manure, and if you can't get the nitrate of soda, use the manures rather than nothing. Use plenty of fertilizers if you can

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get them, whether you get a crop or not. This same grower I referred to is using every year, crop or no crop, about $10 worth of fertilizer per acre. Sometimes he uses even more than this, for he has found it pays him well to do so, as he has peaches when no one else has.

Mr. Dye—What about wood-ashes?

Prof. Voorhees—They are very excellent. The only trouble is that they cost too much. Where you can get them for $10 per ton they are cheap enough, as they are about as good a source of manurial value as we can use. They contain considerable lime, which is also good. A good formula would be ground bone and kainit, in the proportion of one part of bone and two parts of kainit, applied in the fall, and in the spring 200 pounds of nitrate of soda per acre. Just take one ton of bone and two tons of kainit, and shut your eyes and go over the orchard; you can't put on too much.

Mr. Williams—Not long since I called attention to the Hales, of Connecticut. They are famous peach-growers. Their practice is to apply 800 pounds of muriate of potash and 1,200 pounds of bone to the acre, whether they get a crop or not. They have several orchards, and this has been their practice. Their Mountain Roses are "roses," sure. I saw their peaches last year, and such peaches I have never seen before nor since. These peaches bring fabulous prices; Hartford and Springfield take them all. The day I was there they loaded 111 baskets to go to Springfield, thirty miles away. The man who bought them preferred to pay the transportation by wagon rather than by rail, for the reason when they got to him they were in fine shape and the baskets were full; they were not mashed or mutilated. He got $2.50 per basket for them—for the No. 1's—and his No. 2 peaches were as fine as many of the No. 1's we generally see. He got $2 per basket for the No. 2 and $1.50 per basket for the No. 3 peaches; these were his prices at Springfield; he did not get quite so much at Hartford. One man said: "I think I must have some of your peaches, but they cost too much. I find, though, when I get your peaches I can get sixteen quarts out of a half-bushel, and I can sell them right along." That man could not afford to buy any but the Hale peaches. They have a corner on the peach market, and no one else gets a show.

"The Lightning-Rod Question" was then presented by Prof. Van Dyck. (See paper, page 55.)

On motion, adjourned to 9 A. M. Thursday.

SECOND DAY.

MORNING SESSION.

Board was called to order by the President. After routine business the subjects, "Birds Beneficial and Injurious to Agriculture," and "The Economic Relations of Birds to Agriculture, with Suggestions for State Legislation," were treated by Dr. H. B. Warren and Prof. S. N. Rhoads. (See papers, pages 69 and 79.)

Discussion on the general subject of trespass was then participated in, as follows:

Mr. Pohl—We would like to ask the assistance of the State Board in securing protection for our quail. There exists no law sufficient to accomplish this. In Ocean county, from the first day of the season until the close, we have a class of inhabitants who have no regard for the laws, for farmers, or for agricultural interests. They do just as they please, without regard to any laws on the subject. If you cause arrest it does no good, for you cannot convict, as these people are all in sympathy with each other. If one man does something wrong, others back him up in it. The law can do nothing unless you catch the man in the act of violating it. I had one man up for hunting rabbits and quail. I saw him put something in his pocket, but he swore he was not hunting at all, and I got left. [Laughter.] What can I do? I respectfully ask the State Board of Agriculture to give us some instructions what to do in this matter, and see if the laws cannot be upheld.

Mr. Dye—Two years ago Atlantic county came here with the same request in her report. It is a pertinent question.

The Chair—What action will you take on Mr. Pohl's remarks?

Mr. Roberts—Personally, I do not believe in the Game laws at all, though it may be an unpopular thing to say. What right has an association, whose members are mainly foreign to the State, to come here and shoot our quail and game? I believe the time has come when no one should have a license to shoot quail, but so far as the rabbit and the English hare are concerned, make them outlaws any time.

Mr. Crane—I indorse the remarks of the gentleman from Burlington. I don't wan't hunters to come across my place; they have no

right there. If I remonstrate with them they will insult me. We should do away with all Game laws and all hunting over our lands. The farmer can take care of the rabbits on his fields, and they belong to him. I think we should do away with all such privileges of hunting. I would like to relate a little incident of this running over our lands. About six weeks since, in returning home from Scotch Plains, I saw a lot of twenty or thirty foxhounds and twenty or thirty men coming across the fields and over fences—for it was not their purpose to go in the roads—from Plainfield to Springfield, some nine miles, across different farms, and doing much damage to property. The horses were tired with their run, and broke a good many rails in jumping the fences. They came along afterwards and put the broken top-rails in the bottom of the fence, but the men who owned the meadows they crossed would not have had the damage done them for $15 apiece; and yet there was not one cent paid for the privilege, that I know of. These people came from Newark, Montclair and New York. I don't care what kind of hunters they may be, they should be stopped.

Mr. Rogers—From year to year this question comes up before the State Grange, the State Horticultural and the State Agricultural Societies. The laws of the State of New Jersey are sufficiently broad to protect any land-owner in the rights of his premises, if he goes under the law. The difficulty is that very few people stop to inquire what the law is. Let us see what it is. The Trespass laws of the State are divided into two parts, one for residents of the State, and the other for non-residents. The law provides that the first thing a property-owner shall do is to put up the signs or notices prescribed by law: "No trespassing on these premises." When that is done, the first thing to decide by the person whose land is invaded is whether the invader is a resident or a non-resident of the State. If he be a non-resident, and is known as such, the Trespass law of the State is such that the owner of the land has the powers of a Constable to arrest the invader. He may confine him in any safe place on his premises, and, within a reasonable time, take him before some Justice of the Peace. The law provides that a reasonable time shall be twenty-four hours. There was a doubt at one time whether this law was good or bad, but the Supreme Court has decided that the law is good to-day. If the invader be a resident of the State, he must be proceeded against by warrant. The trouble is that many of the Justices

of the Peace do not know the distinction, and the owners of land do not take the trouble to inquire about the Trespass laws. These laws are sufficient if carried out. Let the owners of land enforce them and not permit them to be disobeyed. I examined the law carefully some four or five years ago, and there have been no changes since. The law is entirely sufficient, but, like many others, if it is not enforced it does no good.

Mr. Roberts—What is the penalty of the law?

Mr. Rogers—I do not recollect the penalty. I think there is a money penalty fixed for the non-resident, one-half to go to the owner of the land. I think there is also a money penalty attached to trespass by a resident of the State. The difficulty under the law is to determine whether the trespasser is a resident or not. If a resident, he must be arrested by warrant; if a non-resident, the farmer is a Constable, with all necessary powers to make the arrest.

Mr. Roberts—The whole thing is vicious. If I buy a piece of land and pay the taxes on it I have a right to everything that grows on it, no matter what it is. The game on my farm is as much mine as the corn in my crib. Mr. Rogers probably understands the law, but every farmer is not a lawyer. It is vicious to give any man, under any circumstances, the right to come on the property of another and help himself, without fee or reward. [Applause.]

Mr. Rogers—There is a misapprehension in regard to the ownership of game. The old Game laws gave the ownership of the game to the owner of the soil; now, the provision is that it is wild—that it has not been domesticated. A rabbit running over your premises is yours, provided you take legal means to protect it; but if you don't put up your signs you cannot arrest the trespasser. You must protect your game by signs, and you must prove that your signs were up at the time the arrest was made.

Mr. Roberts—Those men have no right there. I hold that if a man pays his taxes on his ground no other man has a right to put his foot on the premises. Why should we put up signs? It is a vicious provision, and I have felt it for years. I have never felt at liberty to put up signs, for the gunners are welcome to all the rabbits, yet the whole thing is an intolerable nuisance. The law says it is not right to kill rabbits out of season; I say the law is wrong. Rabbits are a nuisance, and should be killed at any time. They are worse than the hawks, wolves, foxes and weasels, ten times over, but you have no

right to kill them. The sign business is a nuisance; no man has any moral right to take possession of my premises without leave or license, sign or no sign.

The Secretary—We want a Trespass law which makes a man a trespasser as soon as he gets out of the street. In the city no one would think of going out of the street on another person's property for the purpose of trespass. Why should people be allowed to do so in the country? The law should go further than it does; a man should be supreme on his own premises, and if he finds game or anything else there let him destroy it himself. But, as insect-destroyers, it may become necessary to protect certain birds by law wherever found, for the general good.

Mr. Crane—There is a feeling against this gunning in our State. Those men I spoke of as foxhunters, and who keep their running-horses, are rich men's sons and reckless; they trespass across the property of many farmers, without compensating them for the privilege taken or damage done.

The Secretary—I think it would be well to refer this matter to a committee of three for consideration, and would so move.

Carried.

Mr. Rogers—It has been said that the cities are protected against trespassing, and why? Because the Councils pass ordinances as to highways and sidewalks. You say you have no protection, but where is your Township Committee? Why do they not pass an ordinance making it an act of trespass to leave the highways? They have not the courage to do their duty. They have the right to pass such regulations, and why do they not do so?

The Chair—There has been a feeling for years past—in fact, ever since the creation of the Agricultural College—that farmers were not receiving from the college the benefits they had a right to expect. Committees have been sent to visit the college, with a view to investigating its work, as though it were not properly carried on. It is a matter which has caused considerable thought to me, and I have personally investigated the subject, and have been forced to the conclusion that the whole thing is due to a misunderstanding, to a want of proper feeling between the college and the farmers. Probably both have been somewhat at fault—the one for censuring, and the other for failing to understand the wants of the farmers. I think that feeling has about reached its climax, for the authorities are now determined to make it

a college of agriculture more than in name. Their work is known to most of you, and the President has announced his determination to see that the work is brought down to the farmers. He has signified that intention by his acts and by addressing meetings in different parts of the State. He is with us this morning, and I therefore take the liberty of calling on Dr. Scott to address the Board on the work of the Agricultural College, and it affords me much pleasure to introduce him to the Board.

REMARKS ON THE WORK OF THE AGRICULTURAL COLLEGE.

BY AUSTIN SCOTT, LL.D., PRESIDENT.

Mr. President and Gentlemen of the State Board of Agriculture —The programme makes me a sort of interloper, and I recognize the very pleasant courtesy by which I am brought to my feet this morning. I am glad to have an opportunity to correct the wrong impression which seems to prevail in regard to the work of the Agricultural College. I will say but a few words, informally, and will not keep you long from the consideration of those subjects which are primarily in your thoughts.

As you know, I am President of the College for the Benefit of Agriculture and the Mechanic Arts, which is the official title of the institution. Let me further justify my right to address this body by saying that I am the product of three farms—a Massachusetts mountain farm, where my maternal grandfather, as he said, would work his finger to that knuckle [indicating] but that his boys and girls should have a chance. Secondly, I am the product of a Connecticut stony farm—and they are both pretty sorry-looking farms, I assure you. Thirdly, my father was a farmer, and his farm was in Ohio, with much richer soil, finer upland and deeper bottom-land than these other two farms, which belonged to my grandfathers. I have worked on all three of them myself as a youngster, and know whereof I speak. So I say that I can sympathize with you in this great work of ours—yours as practical farmers, and ours at the college—in making farming fuller of knowledge, less full of ignorance, broader and wider in its purpose, and greater in its results. I maintain, gentlemen, this is what our work will do. It will help you in your practical work, and you can help us by bringing your practice alongside

of our theory. In this work there is no antagonism. Permit me to tell you what we are attempting to do. We have a full four-years' course—a highly-scientific course—in agriculture, under the most-capable direction of my friend, Prof. Voorhees, and other able Professors, those of Botany, Entomology and Biology. We also have a short course, which is not very well attended, however. This short course is a six-weeks' course, taken from a leaf in the experience of New York State. We have also sent out lecturers the last two years, not only to address the official Boards of Agriculture, but also establishing extension courses, familiar to some of you here. These courses consist of twelve lectures, of one hour each, weekly. Following the lecture hour, there is an hour of class work, quizzing and questioning back and forth, and then there are papers on special subjects. This is followed at the close by an examination of those who may choose to take it. This course was given with great success in Freehold, and another in Keyport, and still another in Moorestown, and those of you coming from those places will bear testimony that they are not without good results. Prof. Van Dyck has also given a course of lectures on Chemistry. This may serve to show you that the college is doing its full share of the good work in the service of the State.

Recollect, gentlemen, our college, while it is called the State Agricultural College, was, by the wisdom of Congress in making the original grant for the benefit of agriculture, also founded for the benefit of the mechanic arts, and, further than that, it did not exclude the more purely literary topics. You want your sons not only to know farming, but to know other branches of knowledge. The first man I saw when I came in that door was a man I recognized by the back of his head—a man who graduated from a full four-years' course in agriculture in our college last June. Since then he has been doing a successful work on his father's farm. His brother was graduated, and became a preacher. Another brother, also a graduate, has just been made the manager of electrical works at the capital of the United States. I offer these three brothers as specimens of what we are doing in the college. They are the sons of a farmer, yet one is a preacher, one an electrician, and the other a scientific farmer, and the results thus far justify his choice of that business. I do not think we, as farmers, want anything for our boys but the best.

I make no special plea, gentlemen, but I ask you all to meet us at

New Brunswick, and we offer every facility for you to look at the work we are doing. You need but take a step from the train—let us know what train—and we will do the rest. We will show you what we are doing, and what we are trying to do; for, of course, as in raising pears, you take several years; in raising better grains, you do it by selection; so we are making every effort to make better farmers.

Now, what has the State done for us? Gentlemen, let me disabuse you of the idea that the State has given us aid. We have carried this on for thirty years, and have received next to nothing from the State until very recently. Let me bespeak your favor for the law passed two years ago, offering a free scholarship, through competition, to each Assembly District. There might now be 240 young men pursuing their studies under our care. That, added to the 40 from the counties, makes 280, and then the 10 offered by the college makes the total number 290, free of all expense for college charges. The living and the lodging the young man provides for himself, of course. That law was passed two years ago, and I bespeak your favorable consideration of that law, which, I am convinced, is doing a good work. Look into it, and then uphold it, as I am sure you will, by your words and your influence. Under that law we have received but a small fee, very much less than we have paid out. The great bulk of it is still due. The young men have come to us and we have taken care of them, but have received nothing, or next to nothing, in return. I state this openly to the State Board that you may see what the State College is doing, and what it will continue to do if upheld by the State. I am not pleading in behalf of the college, but I warn you against any bias I may be assumed to have; but look at it and study it carefully.

I tell you our purposes are larger, our plans are wider and greater than we have been able to carry out. We stand in the service of the State, and pledge our best efforts. We will follow in the footsteps of the great and good man to whom New Jersey owes so much—and I trust the resolution I have heard read will be followed by favorable action. Dr. Cook did more service to this State, as I have said on a former occasion, than many of us can believe. As he went back and forth through the State, grass grew where he trod. When he made, in connection with Professor Smock, that great series of maps, unexcelled in the world, he gave New Jersey anew into the possession of

its citizens. We are following as nearly as we can in the footsteps of that man, who was full of theory and who knew how to practice. We will follow as nearly as we can where he pointed the way.

Gentlemen, whatever our occupation, whatever our pursuit, he has set us an example as co-workers in God's great field.

So, gentlemen, there is no antagonism between us—you labor in this great field, and we in that, and all for the common end. There is only an imaginary line which separates us. It is God's wide field, and I pledge you that we of the State College will do all we can for your cause. Only examine our work and test it by its fruits, for the Holy Word is that "by their fruits shall ye know them." [Applause.]

I thank you, gentlemen, for the opportunity afforded me of presenting to you one or two points.

The Secretary—How many boys are in the college now, under the law you refer to?

Dr. Scott—I don't exactly recall the number. In the last class there were, I think, 54 who came in, some 14 or 15 not having passed. There were about 70 applications. It is supposed there will be one from each Assembly District, but, of course, if the quota is not filled they may come in from other districts. I think there are 54, or thereabouts, in this class, and about 30 in the preceding class. This has only been in operation two years now. The Trustees are carrying the expense, as we have received but one small payment from the State. The amount we have expended in carrying out this law far exceeds the amount received from the State.

Mr. Roberts—Did not the United States donate certain public lands for the benefit of the college, and did not this amount come to Rutgers College under certain conditions? Are not these 54 students benefited by this appropriation?

Dr. Scott—We have students other than those who are benefited by this appropriation. I think there are in the college some 180 or 190 in the scientific classes. There are, perhaps, 100 under the law passed two years ago, the others being under the county law. New Jersey was not as wise with her public lands as New York; the result from the sale of land-scrip was only a little over $100,000, and the interest of that is what we receive.

Mr. Pancoast—How many are pursuing the scientific course of agriculture?

Dr. Scott—Quite a number are doing so, but I cannot give you the exact number. All have instruction in agriculture, more or less. Sometimes they don't take instruction for a degree.

Mr. Pancoast—How many are expected to become farmers?

Dr. Scott—I don't know. They don't know themselves. They don't always determine their profession when entering college.

Mr. Pancoast—Is it not so that those who pursue agriculture bear no proportion to those who intend following other pursuits, and is not the course too difficult—are not the requirements for entering too difficult?

Dr. Scott—I think the reason why farming has not received so many of them as other professions is due to the fact that farming has not been as profitable as some other professions. There is a great world opening up in electricity and chemistry. As a rule, they do not determine at first what they will do.

Mr. Pancoast—Do you not think the qualifications for admission are against farmers' sons entering the college?

Dr. Scott—I have looked at it in this way: As a farmer, I should not want my son to have less than the best; I want him a man first, and then a farmer. [Applause.] You would not have a degree given to a man who had not some manner of intellectual success; you would not give a degree for plowing exactly, would you?

Mr. Pancoast—I have noticed that the colleges where the requirements are low are full of students, and where high there are very few of them. It seems to me, while it may not be the intention of the Faculty, the high requirements actually oppose a barrier against the entry of students, though the short course may remedy it, to a certain extent.

Dr. Scott—We are making every effort to meet the views of farmers on these matters, and trust you will examine into what we are doing.

Mr. McBride—Allow me to make a suggestion. So long as the farmers of New Jersey, or of any other State, think that the least smattering of an education is all that is required to become successful farmers, just so long the farmers of New Jersey and of the country will be in the background. [Applause.] I want the colleges of New Jersey, or of any other State, to aim to bring up the intellectual standard of the farmer equal to the intellectual standard of any other profession. As the President says, if you undertake to make a

farmer, make the best kind of one—and we have a magnificent example of it in the product of the three States he has told you of. [Laughter.] I hope we will all go away and drive from our minds the idea that anything is good enough for the farmer. Let us have it understood that our profession—and I call it a profession—entitles us to just as much intellectual development as it does to be the President of Rutgers College. [Applause.]

Mr. Roberts—Right in this line, when the Agricultural College was young, Dr. G. H. Cook did me the honor of inviting me to come to New Brunswick, without expressing his object in doing so. I went and met five or six other gentlemen, and he said he called us together to ask our opinions in reference to fixing a course of study for the Agricultural College. Each gave his views, and then it came my turn—and I remember it well. I said I thought the course should be exactly, in all respects, the same as for any other business man, excepting that it should be something broader and something fuller for the farmer, for more was expected of him. [Laughter.]

Mr. Ketcham—I want to indorse what Senator McBride has said. I can indorse every word in regard to Rutgers College, from my experience of a few years ago. This Board appointed a committee to visit the college, and I was one of them. We went to New Brunswick and were met by Dr. Cook, and we were shown the college with all its workings. Many of us went there prejudiced, and every one of us came away from there ready to indorse the college to its fullest extent. I do not think the qualifications are too high. If Mr. Pancoast will look into the dictionary he will find that this is not an academy. The entrance is such that any student can gain admission from any of the high schools of the State.

The Secretary—It seems to me if the Legislature has passed such a law, throwing open the doors for scholars from each legislative district, every possible advantage should be taken of it by the farmers of the State, and if the State has not done its part, this Board should take the matter up and call the attention of the proper authorities to the matter, so as to have the money given to the college. I would make that as a motion.

The motion was agreed to.

On motion, adjourned until 2:30 P. M.

SECOND DAY.

AFTERNOON SESSION.

NOTE.—The afternoon session was mainly taken up with the papers of Dr. Roberts and Prof. Voorhees, and the discussions thereon, after which the Board took recess until 7 P. M.

The discussion growing out of the report of the State Premium Committee, though occurring at different sessions, is placed together here for convenience of reference.—SECRETARY.

The Chair—I think it would be well to hear from the State Premium Committee at this time, if they are ready to report.

Mr. Baker read the report, which see, immediately following Report of the State Agricultural Society.

Emmor Roberts—There is one very gratifying feature of that report, that nearly all the premiums have been awarded to young men, under twenty-five years of age, most of them; more than that, I also conscientiously believe the reports are correct, and are in no way exaggerated.

Mr. Denise—I looked over that report a little, and in four cases I found the premium had been awarded to the smaller yield. That may be all right, and may be the law, but it strikes me as rather strange. Why is this? I think, perhaps, the committee have been guided by the net proceeds of the sales off one acre. If that is the case, it does not encourage a man to grow big crops. One man may have a closer market than the other, and he would have a decided advantage over the competitor living further off. I would like to hear the law read. Here is an instance in the report where one man has 16.16 tons of hay, and another has a lesser quantity, and receives the premium for the reason he may be nearer the market than the one having the larger crop. So with cabbages; one man grew 4,159 heads and received the premium over the man who raised 4,325 heads. The one with the smaller yield may perhaps have had a better market, and this won him the premium, rather than the large crop. Then take the case of the grapes and strawberries. If the law requires that judgment shall be passed on net results, it may be all right, but I think the idea of the premium is the quantity per acre.

Mr. Collins—It is hardly fair that parties should undertake to compete for those premiums, doing the best they can, and endeavoring to comply with all the regulations of the committee, and then not be noticed, even as a matter of courtesy, at least; and is it not due to those who endeavor to comply to say why they are railroaded out and not mentioned in the report at all? I would like to know why they are not noticed, if it is not out of the way to ask.

Mr. Baker—I was not present at the awarding of these premiums, as I did not reach Trenton until 12:15. I presume the reason some of the parties were not reported is that papers were not filed according to law. In regard to the award of the premium to the smaller yield, it is a question with the Premium Committee whether we should take the largest yield or the largest net results.

Mr. Nicholson—In answer to the gentleman from Burlington (Mr. Collins), the published rules of the State Agricultural Society *request* that all applications be made before the 1st of December, and that all applications be sent in before the 1st of January. It was worded "requested," and not "required." All applications brought in during the month of December were acted upon by the joint committees of the State Agricultural Society and the State Board of Agriculture, and some that were brought in during the month of January were, of course, thrown out. It was considered that, inasmuch as they had been *requested*, and not *required*, to be in by January 1st, all coming in after that date should be thrown out.

In regard to the manner of awarding, the committee were influenced by the return for the crop rather than by the very large yield per acre. It was thought if the crop cost as much as or more than the amount received for it, it was not a desirable result, and in such cases the premium would be awarded to the smaller yield. Matters of this kind must be considered in the short time the committee have in which to act on the reports.

Mr. Collins—It occurs to me that we should know why some of these reports are railroaded out, because I have in mind a case which does not come under the rule mentioned at all. Some of the very parties who have been awarded premiums in some cases have been rejected in others, and this, too, where all their papers were sent in in the same envelopes. They could not be thrown out because they were not in on time. I think some explanation is due those parties.

Mr. Williams—I am glad this subject has been brought up, as I

have been at a loss myself heretofore in regard to the rules governing the award of these premiums. If the money receipts are to be the primary feature the competitors would like to know it. For that reason I attended the meeting of the State Agricultural Society and broached the subject there. One of the gentlemen has alluded, and very properly, to a number of the competitors who were thrown out because they did not comply with the law. I state here, as I stated there, that if it is the money value of the crop that is to be considered, I know a man who last year took more *money* off of a *quarter acre* of grapes than was taken off these prize acres. I know another man who took more *money* year after year for several years from a half-acre than has been taken off these prize entry acres. There is no encouragement to these small growers. I am not a large farmer, but I grow a few grapes and other crops. I am not competing for these premiums, but if there is any way a class could be formed for smaller growers it would be giving us a chance, for some of us could testify to pretty large crops, and swear to them, too. It is said some of these oaths are not quite according to Hoyle, perhaps. [Laughter.] Still, if we can understand how these things are to be done, we can go at the matter intelligently. I think it would be well to have an expression here as to what is wanted by the farmers themselves. If you want large crops, all right. A man who makes two blades of grass grow where one formerly grew is a public benefactor, but he may be just as much a benefactor if he takes off a big crop of grapes. If we encourage the production of better grapes on a smaller acreage, why not provide a place for us, that we, too, may have a chance at the State's premiums?

Mr. Collins—The exhibit I referred to was one of butter. The report was inclosed with others which have drawn premiums.

Mr. Nicholson—It was reported to the joint committee yesterday that there was no application for a premium on butter.

Mr. Collins—I speak from personal knowledge when I say that such a report was made and was mailed to the committee in the same envelope with other reports which have been recognized and on which premiums have been awarded.

Mr. Nicholson—There was no such report handed in to the joint committee. It must have been lost. I believe it is the intention, if this Board sanctions it, to cut down the acreage to half an acre, or

less, on grapes, currants, &c., and on some of the smaller fruits, to get the best results.

Mr. Conrow—I think the greatest market value is what should be looked at; that should be the test. We want to improve our circumstances, and that can only be done by counting the profits that can be made on the crops.

Mr. Denise—That may all be very well, but I think the intention of the State in offering these premiums is to increase the production. As I have said before, the distance to market will affect the result. I may be located ten miles from a railroad station, where it will cost me considerably more money to get to market than the man who lives within a mile, while I may have a larger yield than he has. I don't think it is a fair comparison. One may have to cart hay seven or eight miles and another not over a mile. The man living at a distance from market is under a disadvantage compared with the man close to market.

Mr. Rogers—These premiums are paid under a State law, which is so indefinite that the committee acting under it cannot determine whether the yield shall be the basis or the amount of money received for the crop. The conditions under which these premiums are awarded are printed and distributed to competitors, and I understand that the joint committee have established the market value as the basis of award. I think, instead of offering resolutions, an effort should be made to change the law so that it shall specify the yield instead of the money value.

Mr. Nicholson—The law is very particular, and these premiums cannot be paid unless the Governor approves the award as one of the committee. The law is intended to stimulate agriculture, and not to induce the production of abnormal crops without regard to value. Mr. Denise has rightly said that one man may be contiguous to markets, and another may be located at some distance, but these matters are taken into consideration in awarding the premiums. The net proceeds control the award, taking into account the cost of production and of marketing. We may be right, and we may be wrong, and it is for this Board to deliver such an expression of opinion to that committee as will best conduce to the interests of agriculture in the State.*

*See page 211, Mr. Quinn's report. Also law published in Premium List of State Agricultural Society.—F. DYE.

A Member—Do I understand that you do exercise discretion in awarding these premiums, taking into account the cost of marketing, for instance?

Mr. Nicholson—Certainly.

Mr. Beans—There is one principle involved, however, which should have a bearing in coming to a decision; if you want to raise big crops you must have all the elements necessary to produce those crops. If you get the proper organism, you get quality as well as quantity. You might raise a large quantity of hay on an acre, and still not have a valuable crop; you may raise a large crop of potatoes of coarse quality, and still not be entitled to the premium. This law of organism, developed in the most perfect way, will produce not only big quality but big quantity, all things considered.

Mr. Williams—We will suppose a case. I will grow two tons of grapes and Mr. Beans three tons per acre, and I, being differently located, can sell my product for more money than he can. Am I to have the premium, because of my situation, rather than he, who has outdone me in his product? Is that fair? Who is to be rewarded? Is it my good luck or his superior ability? That is the point we wish to settle. If this law is so ambiguous I think it would be well for the committee to have our views on the matter. They cannot do everything in this one hour they have to award the premiums. What can the Governor be expected to know about them in half an hour? It seems to me perfectly preposterous.

Mr. Blish—Should not the question of cost of production be taken into consideration in awarding these premiums? What we want to stimulate in agriculture is the method of making the most money out of our crops. We want the greatest net proceeds. If you raise a crop of 50 bushels of wheat to the acre, and it costs you $60 to do it, the more you raise on that basis the poorer you will grow at the present prices.

A Member—If these rules governing the awarding of these State premiums can be made plainer, it should be done, so the State Board can know exactly where it stands.

The Secretary—The members of the Board are only looking for light as to the basis of awarding the State premiums. If a committee should be appointed to look into the matter, I think the State Agricultural Society would give them every facility for doing so. I would move to refer this subject to a special committee of three to

inquire into and report what the law is on the subject, and make such recommendations as to them may seem best.

Carried.

Mr. Nicholson—The award of these premiums depends very much upon the opinions of the farmers you pick out here and place on that committee. I think this discussion of value, because it shows an interest in the matter; if there were no interest there would be no discussion.

SECOND DAY.

EVENING SESSION.

The Chair—I am pleased to be able to introduce Dr. Halsted to this State Board, and he will now address you on "Pollenization and Fertilization of Plants."

Dr. Halsted—While the lights are being adjusted, I will say, briefly, that fertilization consists, essentially, in the union of two very small masses of living substances for the production of a third. That third one, into which the other two go, has a greater vitality than either of the two substances that have been combined. In other words, we have the using up of two distinct and separate portions of living matter in the plant for the production of the third.

(The Professor here began his illustrated lecture, which consisted of explanations of many lantern slides, and does not permit of a satisfactory presentation here without engravings. Some of the points treated of were the production of pollen, its transfer to other flowers by means of wind or insects, and its fecundation of the young seeds (ovules). The development of the young seeds was then shown from the time of fecundation until maturity was reached. Many of the methods for the securing of fecundation of the ovules by pollen of other flowers were shown, and finally hybrids and hybridization were considered.)

Mr. Williams—I move a vote of thanks to Dr. Halsted for his able and instructive lecture.

The motion was agreed to.

Mr. Crane—I do not know when I have listened to a sermon that has done more to convince me of the Creator than this. It has done me a great deal of good.

A Member—The Professor has made it clear that the honey-bee is a great help to the fruit-grower. We see in the horticultural papers that the honey-bee is such a damage to fruit-growers, and I have often heard them say the honey-bee was a great nuisance. Grape-growers are often at war with the bee-keepers, because they say the bees injure the fruit. I am glad he has brought it out so clearly before us, and I want to say that a bee never punctures the skin of the grape unless punctured already. It has not the facility for doing so, and is of much greater advantage to the farmer and fruit-grower than he is an injury.

Mr. Gillingham—What will be the effect of spraying the peach trees while in full bloom? Will there be enough of the poison deposited to injure the honey-bees?

Dr. Halsted—I would not spray at all while in blossom.

A Member—It has been demonstrated that this has killed millions of honey-bees. It has been done through prejudice, the horticulturists believing that the bees are injurious to the fruit.

Dr. Smith—It has not been proven that the spraying does kill the honey-bees. There have been a number of experiments tried by entomologists, but the experiments have not been conclusive as to whether or not the spraying kills the bees. At the same time, I would say it would be very poor practice to spray while the tree is in blossom. It should never be done.

A Member—Last year, at the Bee-Keepers' Convention, the State Entomologist was present on purpose to discuss this matter and find out the experiences of the bee-keepers. They were present from all parts of the country, and it was the unanimous opinion, brought about by experience, that millions of their bees had been destroyed by the spraying of fruit-trees while in bloom. The fact is there. If you feed your cow poison, you know what has killed her. The bees died by millions, and there was not one but believed that the poison applied to the blossoms did it. While the Entomologist used every possible means to get some of them to say it might have been caused by something else, the bee-keepers could not see it in that light. It is simply a fact—that is all.

The subject, "Insects of the Year," was then treated by Dr. J. B. Smith, State Entomologist (see address, page 157), after which the Board took recess until Friday morning.

THIRD DAY.

MORNING SESSION.

The Chair—I would like to state that individual exhibits at the World's Fair will be encouraged, and if any of you wish to make such exhibits, or if you know of any one desiring to do so, I will be glad to hear from you. These exhibits may be any shape, so they are an unmanufactured farm product.

Wm. R. Lippincott, of Fellowship—I have here the report of the committee to examine the Treasurer's accounts, and would state—

We have examined the books and vouchers of D. D. Denise, Treasurer, and find his accounts correct.

WM. R. LIPPINCOTT,
E. B. VOORHEES,
Auditing Committee.

On motion, the report was adopted and committee discharged with the thanks of the Board.

The Committee on Nomination of Officers then put in nomination for officers of the Board for the ensuing year the following-named gentlemen:

For President—Edward Burrough, Camden county.
For Vice President—E. B. Voorhees, Middlesex county.
For Secretary—Franklin Dye, Mercer county.
For Treasurer—D. D. Denise, Monmouth county.
For Members of Executive Committee—Wm. R. Lippincott, Burlington county; H. F. Bodine, Hunterdon county; Theo. F. D. Baker, Cumberland county.
For Chemist of State Board of Agriculture—E. B. Voorhees, Middlesex county.

Mr. Bacon—I desire to say I most heartily concur in the report of the committee, and hope it will be adopted by unanimous vote.

On motion, the report was adopted, the gentlemen named to be the officers of the State Board for the ensuing year, and the committee was discharged with the thanks of the Board.

The Chair—Gentlemen, I would be insensible to all the finer qualities of man did I not appreciate the honor you have done me in selecting me, for the seventh term, as President of this State Board, and can only say that I have endeavored to give you in the past my

best efforts towards the advancement of agriculture and horticulture in our State. I can promise you no more for the future than I have given you in the past, and ask the same indulgence for the future you have given me during the past years. With this understanding I will accept the position for the coming year, doing so with a full understanding of the responsibility the position carries with it. All I have said to you about the work entailed on your Executive Committee is true, and instead of these duties becoming less, they are constantly on the increase. Parties who had never heard of us a few years since are now constantly calling on us for assistance, and this all entails additional work on us.

Gentlemen, I thank you, but can promise you nothing I have not given you in the past. [Applause.]

The Committee on Officers' Reports report as follows:

Your Committee on Officers' Reports, after careful consideration, would say we commend the thorough work of the several officers, as it shows that your choice has been wise. Their reports show they have carefully attended to their duties and recommend such measures as they believe will be for the best interest of those engaged in agriculture.

We would call special attention to a few sections in the President's address, that they be taken up and considered separately by this Board:

To that portion referring to tariff on importation of farm products, also to that in regard to swill-milk. We also recommend that part referring to debt-paying associations to the thoughtful consideration of all.

We also make special mention of the able report of the Secretary, and find much in it which should be carefully considered here and at home. We would call special attention to that portion under head of "Marketing," and urge more thorough co-operation as recommended. We would call attention particularly to that portion on the advisability of publishing a report on agricultural resources of our State in detail.

Executive Committee's report we commend favorably, and make special mention of their efficient work, and recommend the continuance of the present system of making a synopsis from the county reports by committee as heretofore.

In conclusion, we report favorably, and recommend printing reports as read.

RALPH EGE,
D. BORTON,
J. M. LIPPINCOTT,
Committee.

On motion, the report was received and adopted, and the committee discharged with the thanks of the Board.

The Secretary—I was quite favorably impressed with the suggestion made on Tuesday by Mr. Collins, that the officers' reports should not all be brought together on the programme at the opening of the session. Although they are expected to give a resume of the work of the year, they can be put further apart on the programme, and be discussed after being read. It is possible this would be a wise change for another year.

A series of resolutions, prepared by Dr. Parry, relating to dairy inspection, the inspection of feeds used for cattle, and also for additional legislation concerning the quality of milk, were then presented by the committee on resolutions and, for a time, were discussed by the Board, when, on motion, they were laid on the table temporarily.

The Chair—I would like to have laid before the Board a statement of what the Horticultural Society has done in the way of preparation for their exhibit at the World's Fair, and will call on Mr. Ward to talk to you about it.

Mr. Ward gave a brief outline of what it was proposed to do at the Fair, and what had already been done, after which the Parry resolution was taken from the table, and a substitute resolution was offered by Mr. Tine, as follows:

"*Resolved*, That the Committee on Legislation of the State Board of Agriculture confer with the State Dairy Commissioner and prepare and have introduced a bill, at the present session of the Legislature, providing for the proper inspection of dairy cattle in the State."

The resolution was adopted without reference and referred to the Legislative Committee.

The Secretary—I notice that the National Board of Trade, now in session in Washington, have adopted resolutions opposing the passage of the proposed Anti-Option bill. We have two or three members from this city at that meeting. This opposition is in the face of the action of our State Grange and of the farmers throughout the country, and I would like to have the committee consider the matter and take some action.

Later, the committee reported for favorable action the following resolutions:

"Believing that gambling in agricultural products, or cornering and controlling the food of the people, is highly detrimental to the profits that should accrue to the producers of the country from a market created only by supply and demand, the New Jersey State Board of Agriculture desires to express its confidence in the bill known as the Hatch-Washburn bill and earnestly requests its passage.

"The committee recommend that this Board concur in the resolution as above, and that the Secretary forward the petition to the Senate of the United States."

"*Resolved*, That the New Jersey State Board of Agriculture respectfully requests that the legislative and executive representatives of the people give consideration to the extension of rural free postal delivery, and take such action as the importance of the subject, and as equity, may seem to demand."

Offered by Thomas J. Beans.

Your committee recommend the adoption of the resolutions.

The report of the committee was concurred in, and the resolutions were adopted.

The Chair here introduced Mr. George W. McGuire, State Dairy Commissioner, who read a paper on the "Sanitary Control of Milk." (See paper, page 149.)

Mr. Dudley—I have been exceedingly pleased by the paper just read by Mr. McGuire, and it is deserving of great attention from the Board. There is no article of food of more importance than milk. I am one of those people who believe one can learn everywhere, and from almost all sources, and during the past summer, in my visit to Europe, I went to the experiment farm of the Canton of Zurich. I found they were experimenting with their cattle in matters of food, and everything that has been said by the Dairy Commissioner here has been borne out, except they do not turn their cattle out to graze. They are exercised once a day, however, and this is all the exercise they get. They were the most magnificent cattle I ever saw. Their stables were clean and well ventilated, and the milk is regularly weighed and examined chemically, and reports are made upon it. They do not feed on anything like slops or brewers' grains. They have green food served to them once a day in the summer-time, but I could not get all the information I desired as to their feeding the year round. They feed ground peas and beans, and I suggested that they should get maize, as they have not tried it yet. They have reduced the business to a system, and there is no better milk in the

world than that which comes from this experiment farm. The Swiss and the French have paid great attention to the production of milk, and they certainly produce most excellent milk.

I also visited another herd there, that of a Mr. Houseman, who keeps a hotel at Luzerne, which is one of the best in Europe. He invited me during my stay of some ten days at his house to go to his farm. Learning he was deeply interested in agriculture, I went with him, and found he had twenty cows and two bulls. He had built a large barn and stable for them on the most approved plan. His cows were as fine as any I ever saw in a Swiss herd. You know they resemble very much the Jersey in color, but are larger in bone; we never see such Swiss cattle in this country, though we have them in name. I am sure if Mr. Houseman were introduced to these so-called Swiss cattle at our fairs he would never recognize them as such. One of his cows had the largest udder I ever saw, reaching nearly to the ground; she gave about thirty-five quarts of milk a day, which is a very large yield, as you will recognize, and the quality was of the finest, for I both saw and tested it on the hotel table.

In his barn he has a small railroad which runs in between his stalls, where the feed is brought in once a day. They found that ground peas and beans were very productive and more beneficial than most feeds, and they are fed very largely on these.

They go to greater expense there with their stables than the average farmer here could afford; they have everything very nicely arranged.

I was much pleased at being able to examine both these herds, one of 150 cows and the other of 20, the largest number I have seen, except at the French Exposition, where they had over 3,000 specimens of cattle. I think the French and Swiss, so far as the production of milk is concerned, are ahead of the United States; I am sorry to say so, but I believe it to be the fact. I am anxious to see my country in advance in everything; we are in advance in power, grandeur, civilization; we are the first in the world in these, and I want to be as far ahead in milk, and other agricultural products as well. We have the soil, the climate, the energy and the ability, and nowhere in the world are the farmers better educated than in the United States, and we can lead in agriculture if we are disposed to be honest with ourselves.

Mr. Rogers—Referring to Mr. McGuire's address, if I understand it right, the courts never interfere with the action of Boards of

Health in either the cities or the country. Then is there not sufficient law already on the statute-books giving Boards of Health in cities and boroughs, or the Township Committee in townships, the power to form Local Boards to prevent the sale of all impure foods and the improper herding of cattle?

Mr. McGuire—I think that is the fact. They have very ample and large powers to prevent anything of this kind. There are lots of these stables we have visited which are certainly a great nuisance and a menace to public health. I think the Local Health Boards have the power, and under the law of 1882 the municipal corporations have the right to regulate the sale of milk. They can pass ordinances to systematize the sale of milk as much as they please.

Mr. Rogers—If Boards of Health do not exercise their powers in protecting the public health, has not any citizen a right to indict them, or compel them by *mandamus* to perform their duties? Are there not sufficient statutes now? *

Mr. McGuire—It seems to be because the Local Boards of Health do not do their duty in this line. I think the trouble is that the attention of the Boards has never been called to the matter. In many cases these Boards have done a great deal of good work. In Newark the stables are kept in fine condition. In Paterson a permit is required to be taken out by the owners of cows before they can continue in the business. The Local Boards of Health, as a general thing, do not know their powers.

Mr. Rogers—Do not the Local Boards possess the same powers as those in the cities?

Mr. McGuire—Yes, sir; I believe so.

Mr. Rogers—Then why not appeal to the people, instead of asking the Legislature for more laws?

Dr. Conrow—I know one Board of Health that is constituted as follows: A merchant, a shoemaker, and a carpenter, composing the Township Committee; then there is the Assessor, who is, I believe, employed in a store in the city, and then the doctor. Is it not fortunate for the farmers in that township that the Board of Health does not know its authority? Would you like such a class of men to dictate to you how you are to control your dairy? Should they exert these arbitrary powers, as they have a right, they might be a

*There is some doubt as to the power of Health Boards under the act of 1882.—SECRETARY HUNT.

great disadvantage to the farming community. Can you get a Township Committee, the members depending upon the votes of the people for their re-election, to do their duty? I think it is fortunate they do not, for you want some one to attend to this who knows something of hygiene and the care of cattle.

A resolution has been offered here which the members of this Board do not like on account of the reference in it to tuberculosis. I do not blame you. Remarks have been made in regard to tuberculosis by speakers who should have known better. It has been said that this State was "rotten with tuberculosis;" also that it "could be detected as far as seen." That statement is not so. No veterinarian can go into a dairy and diagnose one-tenth of the cases of tuberculosis with certainty from a physical examination. No one knows how much tuberculosis there is in any State.

I hope the farmers will look after their Legislative Committee. There must be legislation in the matter, because our sister States are causing much agitation over this tuberculosis, and, if nothing is done here, the demand for New Jersey milk will lessen to a great extent. They must do something, but they must be cautious. There are too many incorrect statements at some of these farmers' meetings. If you advise legislation for an inspection of your dairy cattle, and do not require that farmers shall be properly compensated for diseased cattle caused to be killed, you will work a great injustice.

There is an agent available to our profession, called Koch's lymph, which is invaluable in the hands of an expert. The injections must be made properly, and a careful record kept of the animal's temperature, and it must be done with antiseptic precautions. If this is done properly, it will detect tuberculosis. I have never known it to fail. Do not allow them to examine your dairies with this tuberculin, unless the State is willing to bear a share of your losses. If this examination were made by competent men, it would probably work greatly to the advantage of the milkmen, but do not allow your Township Committee, as a Board of Health, to do this.

Mr. Pancoast—I wish to ask Dr. Conrow what effect it will have upon a herd of cattle to inject this lymph?

Dr. Conrow—The tuberculin has no effect on normal tissue. If a lesion caused by tubercle bacilli exists, it will set up a local inflammation around said lesion and cause an elevation of bodily temperature. The temperature may not rise over two degrees, and yet at

times it may be as high as six degrees. I have never known it fail, except in one case of an old cow, where one injection was made and there was no response, although the cow was found to have tuberculosis. In this case the lymph was old, had been diluted, and was not reliable. In the statistics of the German authorities, and in Austria and Russia, they consider the test invaluable as a diagnostic agent.

Mr. Abbott—I have been much interested in the remarks on this subject. I have been gratified with a number of the points brought out, and think I can explain some of the difficulties that have been here mentioned as to why the work has not been done that it now seems desirable should have been done. Thomas H. Dudley has told you something of the perfection of things in Europe. I have seen and learned somewhat of this perfection there as relating to the milk-supply. At Copenhagen the Supply Company is the best in the world in the protection of the milk for its consumers. In London, also, there is an excellent system. The reason why we are behind in these matters in the United States is that we started out wrong and have been working on the wrong line. There is provision for milk inspection in some thirty-three or thirty-five States in the Union, all, or nearly all, working, as we have heard here to-day, on the basis of the money-value of the milk, according to the percentage of solids. Our Inspectors and our Boards of Health have devoted almost their entire attention to the determination of this question of the money-value of the milk. The laws we now have prohibit the sale of milk from diseased cows and from cows fed on swill and other substances in a state of putrefaction, and I cannot understand why the Inspectors have not stopped the sale of milk from such dairies. Not only in this State, but in almost every other State where this kind of law is in force, the common practice is for the Inspectors to simply take the specific gravity of the milk, which hardly gives an iota of information as to the character of the milk from a sanitary point of view. Inspection has gone almost entirely on that line.

Now, the trouble has been with Inspectors and Boards of Health that they have been given something to work with, fixed legal limits, which should never have been given them. Europe, with all its excellent milk control, is a stranger to such legislation as we have here. There is nothing of the kind in England, for the British Parliament would not tolerate it. Our Inspectors have worked on this line, and made a show of earning their salaries, and have neglected

the weightier part of the law, allowing it to go by default. To show how utterly worthless this is as affecting people's health, you all know that milk is adulterated by the addition of water, yet you will scarcely find a physician in the country but will direct the addition of from 25 to 50 per cent. of water before feeding milk to babes. If physicians recommend the addition of water for infants, why all this talk about the water that comes from the milk dealers making it unwholesome and slaying people by the thousands? Inspection has been a sanitary fraud upon the public and has not been properly conducted in this country, and I hail with delight this movement to get the matter out of the old lines, and where it ought to be—on a sanitary basis. It is true, as the Inspector has said, that sanitary experts, the microscopists, have been unable to find any swill-fed milk that was diseased, but you can thank the cow for this. The cow seems to eliminate and destroy these disease germs, so far as I am informed. At the same time, no one wants that kind of milk. It is not reasonable to suppose it is as wholesome as the other, although the experts have been baffled in finding the disease germs in the milk. It is not right to sell that kind of milk, and I would like to see some action taken looking towards its abatement. In Great Britain, so much of the law as relates to the commercial value of the milk simply comes in with the general act in regard to adulteration. This act is more especially for the protection of the public from fraud.

The question has been asked here why the Local Boards of Health do not look after the enforcement of the laws, and it has been well answered by Dr. Conrow. They are not sufficiently informed upon this subject, and have no interest in the enforcement. The milk may be produced fifty miles from where it is used, and you cannot expect these Local Boards of Health to quarrel with the home farmers, when the product is sent to a distant city for consumption. They have little reason so to do.

In regard to tuberculosis, I have had, during the past fifteen or sixteen months, forty-four or forty-five herds, from which I receive my milk, under veterinarian inspection. I concluded this was the right thing to do. The consumers have a right to this protection. It has been alleged that New Jersey is rotten with tuberculosis. I have seen this statement within a month or two as having been made at one of the veterinary meetings at New Brunswick. It has been said that

the Jerseys are most suscepible to this disease, though I do not believe it, for I think the Holsteins are more susceptible.

I have had from 1,100 to 1,200 registered and high-grade Jersey and Guernsey cows under inspection during the past sixteen months; five of the number have been condemned and slaughtered. These herds have changed but slightly in their makeup. Those examined last year are being examined again this month. In reference to Dr. Conrow's statement, that only the tuberculin will determine whether animals are affected with tuberculosis, I would ask whether, when an animal is under the care of a veterinarian for fifteen or sixteen months, the veterinarian cannot detect the disease after that length of time? If not, and the development has been so slight for a year and a half, it cannot be very serious.

I have been particularly interested of late in the question as to whether or not the germ of tuberculosis is ever found in the milk of the tuberculous cow. A cow from one of the above-mentioned herds recently condemned was sent to the Pennsylvania University, and the milk carefully investigated to determine whether there were any microbes in it. I understand that Dr. Formad says there were some. The cow died of the disease. I have been told that in the Gillingham examinations for tubercle bacilli but few were found. I would like to be better informed on this question. Can it be that an animal that is so slightly tubercular as not to arouse suspicion on the part of the veterinarian during a year or a year and a half of inspection, could have its milk seriously affected? I don't believe it. My opinion is that if the dairy animal is diseased she will show it sufficiently for the veterinarian to detect it after such a length of time. I am, however, heartily in favor of whatever action may seem best in this line. I hope and believe that when the health authorities have their attention directed to this subject they will stop persecuting the poor farmer, who cannot always keep his milk up to the standard of 12 per cent. of solids, and whose milk is just as wholesome—and a little more so—as that from over-fed cows. By the time you force the cow up to the requirements for the solids in her milk, you are in danger of fevering her system, and making her unhealthy, and her milk unwholesome rather than more wholesome. I consider the present method of inspection a great mistake, and I hope to see a more enlightened movement, better in keeping with the nineteenth century.

Dr. Conrow.—In reference to the inspection of dairy cows, I have

been inspecting nine herds for Mr. Abbott, and I feel to-day, as I felt when I took hold of them, that our inspection would not exclude tuberculosis. The inspection is a good thing, and has a good effect. I reported a case as suspicious in my last examination; the cow had bronchitis; we always have that in tuberculosis, where the tubercles extend into the bronchi, although we can have bronchitis without having tuberculosis. I was there the other day and found the owner had destroyed the animal. I have another case. The owner sits in this room. I examined his herd the other day, and found a possible case of tuberculosis. On another farm, where I had condemned an animal previously, I discovered a case that I am positive is tuberculosis, yet I cannot find more than one case out of ten, and I defy other veterinarians to do better from a physical examination. I will quote a little instance that will do you good. One of the most experienced veterinarians—although not a graduate of medicine—condemned a heifer for tuberculosis in a herd of registered cattle. This heifer was taken to the Veterinary Department of the University of Pennsylvania, and kept there for six or seven months. After that length of time, one of the Professors, knowing it had been said this man had a hyper-sensitive ear, invited him to come and look at the animal. He was not told from what herd she came. He made an examination of her, and said she had no tuberculosis—not a bit of it—not a sign of it [laughter]—she is not tuberculous at all. The heifer was killed and had tuberculosis—a pronounced case at that. He condemned the animal once, and then, six or seven months afterwards, said it was not affected with tuberculosis. My advice to you is not to depend on any veterinarian's ear.

Now with regard to the gentleman on the floor here, where I said I had found a suspected case. He is willing that I should destroy the animal, but I am not positive; it is a suspicious case, but I would not say it was a case of tuberculosis. The animal is twelve years old, and cows do not often have the disease after that age. You seldom have consumption in a man after he is forty, nor would we expect a cancer in a human being under thirty. So with tuberculosis in human beings; at the age of eighteen, twenty to twenty-two years the cases most frequently appear, and after that age the liability diminishes. This cow looks well. Now, if we had some of this Koch's lymph, and used it and she responded we would kill her, but

I have none in stock. If the State would provide a place where it could be had I would be glad to send for it.

It has been remarked that the Inspector should act on the health of the animal as well as in relation to the solids in the milk. How can he act on the health of the animal? If he desired to do so he must employ some one, and it would be difficult to employ a man whom you would like to have come into your yards. Do you wish men to inspect your cattle who are without the proper education? I acknowledge here that I cannot diagnose more than one case out of ten, and yet I do know something of the disease, while these men do not. If you wish intelligent sanitary inspection of your stock, let this State Board ask for the passage of a law for the examination of your veterinarians before they shall be permitted to practice. You insist on this from your family physician; then why not insist on the same requirements from the men who shall treat your stock? Insist on an examination of your veterinarians; also insist on the State reimbursing you for cattle it is found necessary to destroy for the public health.

The Chair—I will announce the following as a committee to examine and report on the exhibits on the table: Enoch Evans, of Burlington; W. S. Silverthorn, of Warren; and Empson Atkinson, of Salem.

I will now call on Mr. D. C. Voorhees, of Blawenburg, who will talk to you on the "Importance of Good Seed." I take pleasure in introducing Mr. Voorhees to the Board. (See paper, page 101.)

On motion, a vote of thanks was tendered Mr. Voorhees for his able paper.

The Secretary—I am sorry we have not time to elaborate on this subject, for it is a most important factor in farming. If the seed is poor, we can expect nothing but failure.

Mr. Budd—The head of a large pork-packing house in Philadelphia wished to read a paper before this Board, but, through some misunderstanding, it was not placed on the programme. He wishes to convince the farmers that there is as much money in pork as in any other kind of stock. He is prepared to prove this to you, and, if the farmers are willing to change their methods, they will resume their old industry, formerly so prominent in a number of counties. I would ask that the Executive Committee be given authority to publish this paper in the proceedings of the Board, so it can be circulated through the State and the farmers get the benefit.

The Secretary—The proposition came from him too late to be

placed on the programme. It is a little singular that this paper should be *offered*, when we have been trying for three years to get a man to talk to us about pork.

On motion, it was ordered that the paper be printed in the Annual Report.

The Chair—I will announce the following committee to act on Mr. Rhoads' paper: S. B. Ketcham, I. W. Nicholson, T. J. Beans.

On Method of Awarding State Premiums, I will announce the following: D. D. Denise, Clayton Conrow and D. C. Lewis.

On the Committee on State Premiums, I will name D. C. Crane, in place of T. F. D. Baker.

Committee on Exhibits in the room report as follows:

We notice the following articles exhibited: Potatoes, sample Freeman, a medium-early and new variety; Burpee's Extra Early, somewhat earlier than Freeman, exhibited by E. Williams, Montclair, both recommended as very fine varieties.

Also, specimens of York Imperial apples, exhibited by George L. Gillingham; in quality, average; an annual bearer, hanging on the tree for a long while.

Sample of wheat, badly eaten by the grain moth, exhibited by Thomas J. Beans.

Two samples field corn, exhibited by J. Walter Pancoast, four ears, fertilized with 75 pounds Swift-Sure fertilizer on sod; four do., on ground in corn the past year. Also, sample of red shelled corn in glass urn. Lot of pop-corn, badly damaged by the wheat moth. Also, samples sugar corn, in same condition.

ENOCH EVANS,
ALBERT SILVERTHORN,
EMPSON ATKINSON,
Committee.

The report was accepted and the committee discharged with the thanks of the Board.

The Chair—The diseased vegetables and cereals here on the tables should have our careful attention, as they are of the utmost importance to us all.

Mr. Williams—I want to remind you once more of this anniversary year of our country. Your President has told you what he is doing, and you have heard what we are doing for the World's Fair. It is a burden that is imposed on us, and one that appeals to our patriotism. New Jersey was foremost in 1876, and we appeal to you to help us uphold our reputation. We appeal to you for aid in holding up our

standard alongside our sister States at that exhibition. There is a great deal to do, and we cannot do it without your hearty and earnest co-operation. It is better to give than to receive, the Good Book says. Many have experienced that. Many of us have labored for years, gratuitously, freely and honestly, for the welfare of the Horticultural Society of the State. We must do our utmost, without fear or favor, and without reward. Sustain the honor of our State, and when you are asked for assistance, give it heartily and freely. Let us hold up our end in competition with the world. [Applause.]

The Chair—You have heard the remarks of the President of the Horticultural Society, and I ask for him, as well as for myself, your hearty co-operation in this work. Let us do what we can to make our exhibit a success, and to uphold the honor of our State.

In closing the session, I thank you for your attention and for your kind consideration, and I trust it has been a season of profit to you all. It may have been laborious for some of us, but that is what we are here for. Let us go forth to our work with renewed energy, and with a determination to keep the standard of New Jersey's agriculture ever in the front rank.

Mr. Dudley—I would suggest the propriety of calling attention to the Road Convention to be held this afternoon, as some may not understand.

The Chair—The point is well taken. We will have a Road Convention in this room this afternoon, and we shall be glad to have you all remain. Come one, come all.

Mr. Conrow—I move we extend a vote of thanks to the Executive Committee for their efficient work, for I think it is due from us to them.

The motion was unanimously agreed to.

The Secretary—I think it is proper to extend a vote of thanks to the Superintendent of the State House for his courtesy and that of those under him, in making our stay comfortable.

On motion, a vote of thanks was extended as suggested by the Secretary.

The twentieth annual meeting of the State Board of Agriculture then adjourned *sine die*.

FRANKLIN DYE,
Secretary.

REPORTS

OF

County Boards of Agriculture.

NOTE.

Statistics of cereal production by counties are printed with the Secretary's report, pages 39 to 43. Statistical table No. 3 is printed here, as it is a part of the County Board reports. It is unsatisfactory, however, because it is incomplete as to detail, and for the reason that less than half of the counties of the State have reported. A complete return from all the counties on the basis outlined would be most valuable both for reference and *as a matter of record.* The importance of the latter point cannot be too strongly emphasized. Although the returns here given are not full and comprehensive, yet, in justice to those Secretaries who have reported, and as affording a basis for calculations of crop and stock yields and market values from year to year, the reports as made are printed, in the hope that more interest will be taken in this part of our work the coming year.—SECRETARY.

TABLE 3.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	CORN.			WHEAT.			RYE.			OATS.		
	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price per bushel December 1st—cents.	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price per bushel December 1st.	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price per bushel December 1st.	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price per bushel December 1st—cents.
Atlantic	94	33	68	100	17	$1 00	92	15	91	93	34	51
Burlington	75	45	55	105	20	75	80	12	60	85	25	40
Camden	100	30	48	110	23	80	105	15	57	.....	.....	.....
Gloucester	90	.....	60	90	.....	80	.....	.....	.....	.....	.....	.....
Hunterdon	80	35	50	100	15	80	100	14	60	85	25	35
Mercer	79	35	50	75	15	75	75	13	58	75	28	38
Monmouth	80	40	50	100	20	80	100	15	60	.....	.....	.....
Morris	100	40	50	80	15	90	100	20	65	100	40	42
Salem	90	35	45	100	15	75	.....	.....	.....	60	25	35
Union	80	.....	65	85	.....	90	90	.....	65	85	.....	45
From U. S. Department of Agriculture Reports of 1892	.....	32	58	.....	13.8	83	.....	13.5	62	.....	27.2	41
Total for the State from December Report, *ibid*	Acres. 288,732	Bushels. 9,124,000	Value. $5,291,880	Acres. 124,950	Bushels. 1,787,000	Value. $1,483,032	.....	.....	.....	Acres. 119,287	Bushels. 3,016,000	Value. $1,256,927

TABLE 3—Continued.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	BUCKWHEAT.			HAY.			POTATOES, WHITE.			POTATOES, SWEET.		
	Product compared with last year—per cent.	Average yield per acre—bushels.	Average price per bushel December 1st—cents.	Product compared with last year—per cent.	Average yield per acre—tons.	Average price per ton, prime, December 1st.	Product compared with last year—per cent.	Average yield per acre—barrels.	Price per barrel November 1st.	Product compared with last year.	Average yield per acre—barrels.	Price per barrel November 1st.
Atlantic	100	.....	.....	100	1¼	$18 00	95	22	$2 40	105	35	$2 50
Burlington	80	15	75	100	1½	18 00	65	30	2 00	105	60	3 00
Camden	.....	.....	.....	100	1½	.....	60	75	.....	100	150	.....
Gloucester	.....	.....	.....	100	.....	15 00	65	.....	.....	110	.....	2 50
Hunterdon	75	20	50	75	1	14 00	60	25	1 80	.....	.....	.....
Mercer	90	12½	60	70	1¼	16 00	70	32	2 00	105	125	2 75
Monmouth	.....	.....	.....	75	1½	15 00	50	80	1 80	100	130	1 75
Morris	110	25	50	75	1	16 00	50	30	2 40	.....	.....	.....
Salem	65	10	60	75	1¼	15 00	50	20	1 50	125	50	2 50
Union	85	.....	60	85	.....	18 00	85	.....	2 25	.....	.....	.....
From U. S. Department of Agriculture Reports of 1892	.....	12.5	57	.....	.....	14 25	.....	25	2 15	.....	66	.....

TABLE 3—Continued.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	APPLES.			PEARS.			PEACHES.			GRAPES.		
	Product compared with last year—per cent.	Average yield per acre—barrels.	Price per barrel November 1st.	Product compared with last year—per cent.	Average yield per acre—barrels.	Price per barrel November 1st.	Product compared with last year—per cent.	Average yield per acre—baskets.	Average price per basket for the season—cents.	Product compared with last year—per cent.	Average yield per acre—pounds.	Average price per pound for season—cents.
Atlantic	32	70	$2 65	46	32	$3 00	65	20	$1 50	105	2,000	2¾
Burlington	12	25	2 25	75	40	2 50	50	150	60	120	5,000	3
Camden	25	.....	.....	40	.....	2 50	10	.....	100	.....	.....	.....
Gloucester	35	.....	.....	65	.....	.....	20	.....	115	100	.....	.....
Hunterdon	65	.....	2 50	120	.....	1 50	65	*200	65	.....	.....	4
Mercer	20	30	2 25	90	150	2 00	65	125	75	95	1,800	4
Monmouth	50	.....	.....	80	.....	.....	50	.....	.....	100	.....	1½
Morris	50	.....	1 00	100	.....	.....	25	.....	60	.....	.....	.....
Salem	10	.....	1 60	25	.....	2 50	25	.....	.....	100	.....	.....
Union	40	.....	2 50	100	.....	4 00	40	.....	100	100	.....	4
From U. S. Department of Agriculture Reports for 1892	58	.....	.....	.....	.....	.....	57	.....	.....	92	.....	.....

*Total for county, 794,805.

TABLE 3—Continued.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	STRAWBERRIES.			RASPBERRIES.			BLACKBERRIES.			WATERMELONS.		
	Product compared with last year—per cent.	Average yield per acre—quarts.	Average price per quart for season—cents.	Product compared with last year—per cent.	Average yield per acre—quarts.	Average price per quart for season—cents.	Product compared with last year—per cent.	Average yield per acre—quarts.	Average price per quart for season—cents.	Product compared with last year—per cent.	Average yield per acre.	Average price per 100 for season.
Atlantic	68	2,200	6	93	1,000	10	92	1,200	7	110	800	$8 25
Burlington	80	2,000	8	65	900	10	80	2,200	9	110	900	8 00
Camden	80	.....	.....	.....	.....	.....	70	.....	.....	.....	.....	.....
Gloucester	75	.....	7	35	.....	.....	75	.....	.....	90	.....	.....
Hunterdon	100	.....	7	80	.....	9	80	.....	10	.....	.....	.....
Mercer	80	2,000	8	70	850	10	85	2,000	9	100	850	9 00
Monmouth	100	.....	.....	75	.....	.....	50	.....	.....	.....	.....	.....
Morris	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salem	100	.....	8	.....	.....	.....	.....	.....	.....	150	.....	.....
Union	100	.....	12	100	.....	10	100	.....	10	100	.....	.....

TABLE 3—Continued.

STATISTICAL TABLE OF FARM CROPS AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	CITRON MELONS, OR CANTALOUPES.			CUCUMBERS.			CABBAGES.			TOMATOES.*		
	Product compared with last year—per cent.	Average yield per acre—baskets.	Average price per ⅝-bushel basket for season—cents.	Product compared with last year—per cent.	Average yield per acre—baskets.	Average price per ⅝-bushel basket for season—cents.	Product compared with last year—per cent.	Average yield per acre—heads.	Average price per 100, November.	Product compared with last year—per cent.	Average yield per acre—tons.	Average price per ⅝-bushel basket—cents.
Atlantic	100	.....	30	80	... .	.....	95	2,200	$4 75	95	7	35
Burlington	95	270	30	50	125	40	50	3,000	5 00	80	6	35
Camden	.....	.....	.....	.....	.....	.....	60	2,500	3 50	85	....	.....
Gloucester	85	.....	50	.....	.....	.....	50	.....	....	75	.....	.....
Hunterdon	.....	.....	.....	.....	.....	.....	50	.....	4 00	40	.....	25
Mercer	90	250	35	70	125	45	50	2,500	4 00	75	7	30
Middlesex	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Monmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	.....	.....
Morris	.....	.....	.....	.....	.....	.....	50	.....	4 00	....	.....	25
Ocean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salem	150	.....	.....	50	.....	25	70	.....	4 00	125	9	50
Somerset	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union	100	.....	.....	85	.....	.....	40	.....	5 00	90	.....	.....
Warren	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*In canning tomatoes, New Jersey leads. In the pack by States, in cases of two dozen tins each, New Jersey has 950,833 for the year 1891.—United States Department of Agriculture December Report for 1891.

TABLE 3—Continued.

STATISTICAL TABLE OF FARM STOCK AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES	HORSES.				MULES.				COWS.			YOUNG CATTLE.	
	Total number compared with December 1st, 1891—per cent.	Average price between 1 and 3 years old.	Total number compared with December 1st, 1891—per cent.	Average price between 3 and 7 years old.	Total number compared with December 1st, 1891—per cent.	Average price between 1 and 3 years old.	Total number compared with December 1st, 1891—per cent.	Average price between 3 and 7 years old.	Total number compared with December 1st, 1891—per cent.	Average price between 3 and 7 years old.		Total number compared with December 1st, 1891—per cent.	Average price between 1 and 3 years old.
Atlantic	100	$80 00	100	$145 00	.....	.....	100	$175 00	100	$34 00	.....	100	$20 00
Burlington	100	70 00	100	125 00	100	$70 00	100	140 00	100	36 00	.....	100	20 00
Camden	100	.....	.....	140 00	100	.....	.....	150 00	.....	40 00	.....	.....	.....
Gloucester	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hunterdon	105	75 00	.....	125 00	100	.....	.....	140 00	100	38 00	.....	100	20 00
Mercer	101	50 00	100	125 00	160	80 00	100	150 00	105	35 00	.....	105	25 00
Monmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morris	100	.....	100	125 00	.....	.....	100	.....	100	30 00	.....	100	18 00
Salem	100	80 00	100	125 00	100	90 00	100	150 00	105	35 00	.....	100	22 00
Union	.....	.....	.....	150 00	.....	.....	.....	.....	.....	45 00	.....	.....	.....
From U. S. Department of Agriculture Report, January and February, 1893	.....	.....	.....	114 00	.....	.....	.....	118 75	.....	35 00	.....		
	Total number, 87,706	Total Value, $8,393,915	.....	.....	8,380	Total Value, $924,464	.....	.....	188,846	Total Value, $6,704,033	.....	Other cattle and oxen, 61,930, $1,773,961.	

NEW JERSEY STATE LIBRARY

TABLE 3—Continued.

STATISTICAL TABLE OF FARM STOCK AS REPORTED BY SECRETARIES OF THE COUNTY BOARDS.

COUNTIES.	VEAL CALVES.		SHEEP.		LAMBS.		SWINE.		TURKEYS.		CHICKENS.		WINTER WHEAT.		WINTER RYE.	
	Total number compared with December 1st, 1891—per cent.	Average price per pound for season—cents.	Total number compared with December 1st last year—per cent.	Average price per head for store sheep.	Total number compared with last year—per cent.	Average price per head for spring lambs.	Total number compared with December 1st—per cent.	Average price per pound December—cents.	Total number compared with December 1st—per cent.	Average price per pound November and December—cents.	Total number compared with December 1st—per cent.	Average price per pound November and December—cents.	Area sown compared with last year—per cent.	Average condition December 1st.	Area sown compared with last year—per cent.	Average condition December 1st.
Atlantic	100	7	.....	.....	.....	.....	97	8½	100	13	95	13	106	95	115	100
Burlington	90	6	55	$4 00	80	$5 00	85	7½	90	17	98	16	95	90	96	92
Camden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	100	70	110	80
Gloucester	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hunterdon	.....	6	.....	4 75	.....	4 50	90	7½	100	15	105	11	100	90	100	90
Mercer	100	6	95	4 00	100	5 00	85	7½	95	17	100	16	100	90	100	85
Monmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80	100	100	100
Morris	100	6	.....	5 00	.....	4 50	.....	8	.....	18	.....	13	100	80	100	80
Salem	100	5½	100	4 00	100	5 00	50	7½	100	18	100	15	100	85	.....	.....
Union	.....	7	.....	.....	.....	.....	.....	.....	.....	18	.....	16	.....	.....	.....	.....
From U. S. Department of Agriculture Report, January and February, 1893	.....	.....	Total number, 61,246	Total value, $256,743	.....	.....	Total number, 181,020	Total value, $2,850,984	.....	.....	.....	.....	95	96	.....	.....

ATLANTIC COUNTY.

ATLANTIC COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR THE YEAR 1893.

President .....PHILIP BERGMANN.....Egg Harbor City.
Vice President.....WILLIAM A. ELVINS.....Hammonton.
Secretary.. .....VALENTINE P. HOFMANN.....Egg Harbor City.
Treasurer..... ....FREDERICK FIEDLER .....Egg Harbor City.

BOARD OF DIRECTORS.

J. E. HOLMAN, Hammonton Fruit-Growers' Union, P. O. Hammonton.
G. W. ELVINS, Hammonton Fruit-Growers' Association, P. O., Hammonton.
J. J. KRAEMER, Egg Harbor City Agricultural Society, P. O., Egg Harbor City.
BERNARD GRAWE, Atlantic County Agricultural and Horticultural Association, P. O., Egg Harbor City.
WILLIAM KARRER, Germania Fruit-Growers' Union, P. O., Egg Harbor City.
D. U. BROWN, Director-at-Large, P. O., Elwood.

DELEGATES TO STATE BOARD.

WM. A. ELVINS (one year).....Hammonton.
V. P. HOFMANN (two years) .....Egg Harbor City.

ANNUAL REPORT.

BY V. P. HOFMANN.

MEETINGS.

The regular meeting of the Board was held on Tuesday, December 6th, 1892, in Egg Harbor City, and was better attended from remote places than from the immediate vicinity.

Crop reports from the different townships and appended remarks were presented and freely discussed.

As to causes of dearth of farm laborers, it was remarked that the general repugnance of Young America to this kind of labor would only aggravate this question for the future, if it was not that through the influx of immigration these voids were steadily filled.

Thorough organization amongst farmers was deemed urgent to remedy and alleviate the various injustices with which they are encompassed. One of the speakers insisted that one of the plans by which some of the desired measures could be effected would be by forming agricultural clubs or organizations in every school district, who could freely discuss all measures amongst themselves; use their influence during election of legislative officers; disseminate useful knowledge by collecting agricultural statistics in their district and forwarding them to a central county organization; by mutual co-operation in purchasing the materials and tools required for a thorough cultivation of the soil, and for proper returns of the results of their labor.

Prof. John B. Smith was introduced, and gave an interesting address upon the chief distinguishing traits of beneficial insects, which he divided into predaceous and parasitical and those injurious to vegetation. It was his impression that through the steady strides of cultivation many of the haunts and natural hiding-places of beneficial insects are destroyed, and that cultivation as now carried on is detrimental to the natural increase of predaceous and parasitical insects. To combat the raids of injurious insects, the thorough and steady appliance of the various insecticides is important; the protection of insectivorous birds and animals should be more insisted upon; also late fall plowing has proved beneficial in checking further propagation. Legislation was deemed deficient in not providing proper laws for checking the spread of injurious insects through wanton carelessness or gross negligence. He had carefully studied the appearance of new insects, and insisted that if such laws had been in operation and properly carried out the farming community would have saved great sums of money.

Upon the conclusion of his able remarks a vote of thanks was tendered him.

It was then resolved that a special meeting be held in Hammonton during February or March next ensuing.

GENERAL REMARKS.

C. P. S. Garwood, of Egg Harbor township, reports that he believes not more than five acres of wheat are sown in the township, and rye is sown only to plow under as a fertilizer; that the farmers of this section should be designated as truckers. Many of them now fail to raise enough grain to feed their stock, as the small vegetables and berries give so much better returns. Atlantic City being so near and freight rates so low, they realize much better returns than those who have to market their crops in Philadelphia and other large cities.

Chas. D. Saalmann, for Mullica township, reports that crops have not been as plentiful in this as in the preceding year, owing to a lack of rain. Scarlet clover is receiving more attention by our farmers, as it proves to be a very remunerative crop for soiling and green manure. The spraying of grape vines with the copper solutions has proved a success by diminishing the black rot and protecting the leaves from the various fungi, thus insuring perfect fruit. The strawberry crop was smaller than the preceding year, lack of rain and a high temperature destroying a part of the crop. The blackberry fields are invaded by the borer, and the acreage is thus gradually diminished.

Wm. A. Elvins, for Hammonton, reports that the falling off in strawberries was caused by heavy rains, when the plants were in bloom, covering the blossoms with dirt and preventing fertilization. The decrease in blackberries, by carelessness in not cutting out the stung canes and by the increase of the fungous pests.

Mr. Henry Y. Postma, Voluntary Weather Observer at Egg Harbor City, has kindly placed the following summary of meteorological observations for the past year at my disposal:

MONTHS.	TEMPERATURE.			Mean Precipitation in inches.
	Mean.	Max.	Min.	
December, 1891	30.45	62.04	11.04	3.25
January, 1892	30.33	60.08	3.05	5.26
February, 1892	30.41	55.09	10.01	2.12
March, 1892	30.28	59.04	11.07	7.21
April, 1892	48.85	82.01	24.00	3.13
May, 1892	59.96	85.07	39.00	4.39
June, 1892	72.22	94.00	44.03	2.77
July, 1892	72.06	99.08	50.02	5.42
August, 1892	71.52	95.00	54.01	5.62
September, 1892	62.11	84.03	37.01	1.25
October, 1892	52.34	81.00	27.00	0.25
November, 1892	42.07	69.06	16.08	7.40
Means	50.22	77.05	27.04	4.06
Average means since 1887	51.29	77.93	27.54	4.48

First light frost, October 3d; last light frost, April 16th.
First killing frost, October 10th; last killing frost, April 12th.

The farmers in this county have not had a prosperous year. The undue influence of the weather has had the effect of diminishing the yield of every farm product. Orchard fruits were very scarce, whilst in 1891 they were a drug upon the market. The only crop that found the weather desirable was the grape crop, which, in every respect, was as bountiful as in the previous year. Parties who gave their vines thorough cultivation and applied the Bordeaux mixture liberally and in time report splendid results. The Norton's Virginia Seedling did exceptionally well, and the saccharine quality of the grapes was fully fifteen to twenty degrees higher than in previous years. Very few grapes were sent to market, and the bulk was pressed into wine, so that the quantity of wine manufactured is fully equal to that of 1891.

The county has been remarkably exempt from contagious diseases of animals, but a few isolated cases of swine cholera coming to my attention.

Gradually some of our waste lands are opened to settlement. Within the past few years many new settlements have been formed

and settled, and, as the promoters of these enterprises evince thorough methods and pluck in presenting the claims of this county to the outside public, in respect to climate, general healthfulness, and a rational culture of the soil, it has been the means of inducing many persons to secure homes and settle here.

BURLINGTON COUNTY.

BURLINGTON COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President.....CHARLES PARRY.....Parry P. O.
Vice President.....JOHN M. LIPPINCOTT.....Moorestown.
Secretary.....HENRY I. BUDD.....Mount Holly.
Treasurer.....JAMES LIPPINCOTT.....Mount Holly.

BOARD OF DIRECTORS.

EMMOR ROBERTS, Burlington County Agricultural Society, P. O., Moorestown.
OWEN L. DUDLEY, Mount Laurel Farmers' Club, P. O., Mount Laurel.
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J. B. WARWICK, Moorestown Grange, P. O., Moorestown.
EDMUND COOK, Edgewood Grange, P. O. Burlington.
GEORGE GILLINGHAM, Director at Large, P. O., Moorestown.

DELEGATES TO STATE BOARD.

THOMAS J. BEANS (one year).....Moorestown.
JOSEPH H. MATLACK (two years).....Moorestown.

MEETINGS.

The regular meetings of the Board are held at Mount Holly, on the second Saturday of August and December, at ten o'clock A. M.

MOUNT LAUREL FARMERS' CLUB.

President, Edmund Darnell; Secretary, Japhet B. Joyce. Address of each, Mount Laurel.

COOPERTOWN FARMERS' CLUB.

President, Jos. E. Bishop; Vice President, James A. Stuart; Secretary, and Corresponding Secretary, John C. Stuart. Address of all, Beverly.

COLUMBUS GRANGE.

Master, Charles Decou, Trenton; Secretary, Robert Taylor, Columbus.

CROSSWICKS GRANGE.

Master, Alfred Satterthwaite; Secretary, Elizabeth A. Rogers. Address of each, Crosswicks.

MOORESTOWN GRANGE.

Master, Jacob W. Stiles, Fellowship; Secretary, Sallie A. Dudley, Hartford.

POMONA GRANGE.

Master, John M. Lippincott, Moorestown; Secretary, George L. Gillingham, Moorestown. Delegate to State Board of Agriculture (two years), George W. Jessup, Cinnaminson.

MEDFORD GRANGE.

Master, Isaiah Ballinger; Secretary, Anna R. Ballinger. Address of each, Medford.

PEMBERTON GRANGE.

Master, Theodore Budd; Secretary, Henry Lippincott. Address of each, Pemberton.

RANCOCAS GRANGE.

Master, Joseph Lundy; Secretary, Barclay Hilliard. Address of each, Rancocas.

EDGEWOOD GRANGE.

Master, Nathan Wright; Secretary, Edmund Cook. Address of each, Burlington.

ANNUAL REPORT.

BY HENRY I. BUDD.

A Farmers' Institute was held at the Court House, Mount Holly, N. J., Friday and Saturday, December 9th and 10th, under the auspices of the Burlington County Board of Agriculture, at its annual meeting, conducted by Franklin Dye, Secretary State Board.

There was a large attendance, and much enthusiasm manifested and many earnest questions asked of the persons reading papers. Some of the subjects treated are presented in full with this report.

REPORT OF THE CONDITION OF AGRICULTURE IN BURLINGTON COUNTY.

BY HENRY I. BUDD.

The following is a full report made by Henry I. Budd, Secretary of the Burlington County Board of Agriculture:

Since our last report the condition of agriculture in Burlington county has somewhat improved.

With the exception of grain, better average prices for products are being realized than for several years, but these prices are largely the result of scarcity, thus fully testifying to the law of supply and demand.

Three years ago the fruit and vegetable crops were, in most sections of the Union, entire failures. The result was that the supply of these products was far below the demand, and the prices for sections raising these products became very remunerative.

Last year nearly all crops yielded in bounteous profusion. The outcome was that, with the exception of rye and wheat, for which there was a large foreign demand, the prices were below the cost of production, and farming, except in the great grain-growing districts of the West, was generally unprofitable.

The growing season this year has been one of exceeding heat and dryness, checking the growth of hay and spring-planted crops, so that the markets are lightly filled, consequently the price of fruits and vegetables is quite satisfactory, thus illustrating the old maxim that half a crop is better than a whole one, defining the well-established trade law if demand runs ahead of supply prices will be large where there is a purchasing power. But it matters not what the ability is

to buy, plenty of money, the coffers of the country overflowing with silver and greenbacks, and every person so loaded they are seeking avenues to spend, yet if there are large crops, far beyond the needs of this and other countries, the prices will be low.

Political successes can have but little to do with prices, except they may hinder the movement of crops by shutting them out of ports by embargoes or high tariff.

The prophecy made some years ago by your Board, when they forwarded a resolution to our representatives in Congress, requesting them to use all their energy and power to persuade the German government to remove the embargo on American pork, that this removal would add at least $2 per hundred to the price of pork, seems to be realized. The food famine in that country has necessitated the German government to remove in a measure this embargo. This, together with the Reciprocity treaty and inspection of our meat products, has created such a demand for our pork that, according to Secretary Rusk, the total trade in hog products with Europe in May, 1892, amounted to 82,000,000 pounds, against 46,900,000 pounds in the same month of 1891; in June, 1892, the exports aggregated 85,700,000 pounds, against 46,500,000 pounds in the same month of the previous year; in July there was an increase of 41 per cent., and in August of 55 per cent. over the corresponding months of 1891.

Over 40,000,000 pounds of inspected pork have been exported since the law was put into operation, and a comparison of the four months of May, June, July and August, 1892, with the same months of 1891, shows an increase in the number of pounds of our export of pork products of 62 per cent., and an increase in value of 66½ per cent. The exports of dressed beef increased from 137,900,000 pounds in 1889 to 220,500,000 pounds in 1892, or about 60 per cent. During the past year there have been exported 394,607 head of live cattle, as against 205,786 exported in 1889.

The present price of pork in our county ranges from $7.50 to $8 per cwt.—two to three cents per pound higher than the average price for a number of years. And although on account of this persistent low price many of our farmers were forced out of its production, thus lowering our standard from being, from its early history, the banner pork county, yet this increased price means, this year, a large addition to the wealth of the county.

There is a partial recompense in the low price of grain that the average farmer can find some animal to feed it to with profit, thus realizing from 20 to 40 cents a bushel more for his grain than if he was to sell it direct to the mill or merchant.

The price of milk, ranging from 4 to 5 cents a quart, through the organization of the milk producers' association controlling the supply, makes a profitable outlet by feeding to cows much of the farmers' surplus grain.

The price of poultry, ranging from 16 to 20 cents a pound, gives

the farmer $1 a bushel for all the corn he skillfully feeds them, so he has reason for congratulation that there are three products of his farm—pork, milk and poultry—that will consume all his corn, rye, and some of his wheat, at a price far beyond the market quotation.

Cabbages, where growers succeeded in conquering the worms and drought, have proved an exceedingly remunerative crop, and will net more money to growers than many heavy crops often do, selling in large lots from $5 to $8 per hundred.

Tomatoes have averaged about two-thirds of a crop. The early hot weather destroyed the first blossoms, causing them to fruit badly, but later cooler weather produced a fair amount of fruit. A prolonged growing season allowed perfection, where early frosts would have caused failure. The prices in the city markets were remunerative; at the canneries, about the same as previous years, as contracts are made before the crop is planted.

Cranberries have been about half a crop, but are selling at nearly double the prices of last year, now commanding from $2.75 to $3 per bushel or crate.

Apples have been scarce and sold well, but much of the fruit pierced badly. Some of our painstaking growers had full crops, their well-filled pocket-books confirming them in their belief that spraying and careful fruit-growing is a profitable occupation.

The despised Keiffer pear of 1891 has this year proved a veritable bonanza to the fortunate owners of pear orchards; 5,000 to 15,000 baskets were realized from several orchards, selling all the way from 50 cents to $1 per basket. What more profitable marketing can be found, when 300 or 400 bushels per acre is no uncommon yield?

In the vicinity of Mount Holly there were two peach orchards that made handsome yields: There was an occasional orchard and a few scattering trees in other portions of the county that produced about one-half a crop. Prices ranged from 50 cents to $1.50 per basket. The average results for the past three years have not been satisfactory, consequently there is not much inclination to extend the culture.

There has been a full and fine crop of grapes, but prices have scarcely been remunerative.

Strawberries, raspberries and blackberries were moderate crops, prices not satisfactory to the average grower. If some plan of irrigation could be devised for these fruits their profit would be vastly enhanced, for dry weather seems always to pinch them when moisture is most needed for their development.

The melon crop, to some, has been remunerative; to others, the reverse. Some of our papers will probably give us some profitable instruction how in the future to reap gain from their planting. Thos. J. Beans writes:

"The sweet potato crop was not only heavy, but, owing to dryness of latter part of season, of very superior quality. The dryness of the ground at digging and absence of early freezing allowed the

placing of these in market in the best possible condition. The demand for them has been constantly at advancing prices to date. Vinelands are quoted at $3.75 to $4 per barrel. There were fewer than usual stored for winter sales. Prices are firm and supplies are light in New York City."

The white potato crop was light, not only here, but over much of the country. On November 29th, the receipts for past six days in New York market were 34,654 barrels; for corresponding six days last year, 55,931 barrels. The light receipts were already affecting importations, for on the 29th there came 1,884 sacks from Dundee, 1,429 sacks from Hull, 1,397 sacks from Liverpool, and 5,512 bushels from Nova Scotia.

The corn crop was fine in moist lands, fair on high, loamy soils, and poor on light and stiff, dry soils. It was gathered in good condition, and the fodder was better than the average and less waste of leaves by wind.

Although the extreme heat and drought of mid-July were so harmful to many crops on garden farms, the rainfall at beginning and close of the month was 6.58 inches more than the average.

The grass crop on most farms was light. The advancing price in our city market is making our fortunate farmers with a surplus realize that hay husbandry is one of our most profitable industriss.

Some of our more progressive farmers, hearing of the wonderful results from the growing of scarlet clover on the farms of Delaware, visited that State, and were so well pleased with what they saw that they and their neighbors seeded many acres in Burlington county. You, during the progress of the meeting, will be entertained and enlightened by their experience.

Since our last report, our county taxes have been much lessened. The rates of farm land have been reduced and the percentage lessened, thus, in a measure, lightening the burdens that for so many years rested so heavily upon our farming community. Our county debt has been virtually paid. Now, with wise management in the future, we need not repeat our past experience—increasing taxation as the prices of our farms and produce grew less.

The angumois grain moth in the stored wheat in portions of Chester and the river townships has made sad work in recently-threshed grain. Besides what it has already destroyed, what wheat the farmers cleaned out has been so injured that millers would only pay 60 cents per bushel for it. Others have had it ground at once for feed, instead of buying wheat bran. Barns that had a few specimens of the moth last year are badly infested this season. The Pennsylvania farmers say the only way to escape its ravages is to thresh early.

One farmer assured me his whole crop of 700 bushels was only fit for chicken or cow feed.

General condition of animals throughout the county healthy. No

hog or chicken cholera reported. No pleuro-pneumonia or tuberculosis among cattle.

Farmers tributary to Philadelphia now control the price of milk by taking care of the surplus. On account of the opposition of many large dealers and the importation of milk from western New York by these dealers, their surplus reached some days over 40,000 quarts, which they worked into butter. In the purchase and fitting up of a large property, at a cost of $35,000, in the center of the city, the association is preparing for butter manufacturing, cold storage, wholesaling milk in the territory of their opponents, and working their skim milk into some useful by-product, to profitably provide for the surplus and thus keep the value of 2,000 dairies up to a remunerative standard.

For the fiscal year which closed June 30th, 1892, our agricultural products constituted 78.1 per cent. of our unprecedented exports, the total exports being $1,030,278,030, and the value of the agricultural products $793,717,676, which exceeds by more than $150,000,000 the shipment of agricultural products in any previous year. Through the introduction, by the Agricultural Department, in Europe of the various products of Indian corn as articles of human food, our market for this staple promises to be vastly enlarged. These efforts have already stimulated exportations, and the future seems bright for at least our two greatest staples, pork and corn.

The immense contributions that agriculture each year makes to our national wealth should stimulate statesmen and all classes to do all that lies in their power to lighten the burdens of the farmer, for his prosperity is a thousand times reflected in the success of all other industries; the creations of his hands and soil enter into a thousand channels, which, if not filled with his products, commerce languishes, suffering among all trades and professions ensues, and national decay, instead of national prosperity, becomes the inheritance of the people.

"Sweet Potatoes with Chemical Manures," had been assigned to B. R. Black, Mullica Hill, and Theodore Brown, Swedesboro. Mr. Black read a paper. The speaker said the general supposition was that sweet potatoes could not be successfully grown with chemicals. He thought that he was safe in saying that one-half the farmers in Gloucester who invested largely in stable manure from the cities did not sell enough potatoes to pay for their purchases of fertilizers.

With the idea that chemicals could be profitably and economically used, a series of tests was made with chemicals. One man applied $12 worth of chemicals to an acre, which he made to compete with a heavy dressing of stable manure. The lot covered with the latter produced more potatoes than the former. Another test showed that

one plot with about $40 worth of stable manure and chemicals competed with $18 worth of chemicals. The first plot produced 78 barrels of potatoes; the second brought 118 barrels. The first plot was planted in hills, the other in drills. The speaker thought these tests showed conclusively that chemicals were beneficial. In another trial $11.30 of chemicals produced 957 pounds of potatoes, while $40 of stable manure gave 862 pounds. A good feature in connection with the use of chemicals was the absence of rot and noxious insects that usually infest the plants. The speaker thought it was best to get the nitrogen in fertilizers from animal substances.

Mr. Brown, on whose farm one of the experiments was made, told how the work was done.

A very able paper on "Sheep, Lambs and Wool for Profit," was read by Judge F. S. Holcombe, of Mount Airy.

The evening session was addressed by Edward Burrough, on "New Jersey and the Columbian Exposition," and Austin Scott, LL.D., President of Rutgers College, gave an able address on "Farm and College."

On Saturday morning, Secretary Budd read the Treasurer's report, which showed a small balance on the right side.

CAN POULTRY-RAISING BE MADE PROFITABLE? IF SO, HOW?

BY J. E. BARBER.

It is generally conceded by those living in the Eastern States, who farm to make a living, that farming, under present circumstances, is not satisfactory. Legislation, combination and organization are some of the many plans suggested with which to remedy existing evils. While these plans suggest many valuable features, they cannot alone work out a cure, since they fail to recognize the necessity of improvement in the farmers themselves. The time is fast approaching, if not already here, when the Eastern farmer who depends upon the product of a few acres to pay current expenses and afford a living for himself and family must make many radical changes.

We believe there is no other branch of business connected with farming that can be made to yield as great a return for the care bestowed as poultry, if properly looked after and attended to. We also believe, speaking in a general sense, that it is less cared for than

any other one thing the farmer seeks to produce. Poultry-raising with the average farmer is too similar to a side-show—a sort of an outside arrangement with which he says he hasn't time to bother. With him hens are a nuisance, and if he consents to keep a few to gratify the children and female members of the household, they (the hens) are merely staying with him upon probation, and they must keep off of his corn-field and out of his garden, or he immediately has two things—an empty shot-gun and a hot pot-pie.

The person who expects to make poultry-raising profitable must have good, sound, healthy stock, suitable buildings and yards, and, most important of all, he must have a knowledge of the attention poultry needs to make it profitable. Good stock is absolutely necessary. The once-popular notion that one hen was as good as another and would do to keep as long as she could cackle, is popular no more. We are living in a progressive age; modern thought has infused new life in every industry, has quickened every view of agriculture and stock-breeding; and the same spirit of improvement and enterprise that has given us the steel binder in place of the old-time sickle, that has substituted the steam thresher for the old lever power, has given us improved breeds of fowls that are much more profitable than the dunghills kept by our forefathers. It costs more to keep a poor old hen than a good young one, while the profits from the latter will be three times as great. Secure, then, to start with, good, young, well-bred hens, cross them with vigorous young cocks of the same breed, but of distinctly different blood. Infuse new blood you must, or all efforts of care in other directions are worse than wasted. The man who refuses to pay to a reliable breeder, who has spared neither time nor expense to raise good, clean stock, one dollar for a good, thoroughbred bird, but buys a mongrel at ten cents per pound, thinking he is thereby saving fifty cents, is penny wise and pound foolish. Watch that man, and next year this time he will be one of the first to howl about hard times, and swear that poultry-raising is unprofitable.

Many do worse still, and select the nicest of their own raising to keep over, or, worse yet, if the old cock has one sound eye and a single spur he is again put upon the walk to do duty. The theory that like begets like is demonstrated more clearly in the poultry-yard than any other place on the farm.

If you have secured good stock, give them good quarters. Keep

not more than forty hens together in a clean, comfortably-warm, well-ventilated house, pen or roost. Keep your hens and hen-houses free from lice by whitewashing twice a year with the best lime you may be able to procure. Put it on thick and hot, well mixed with kerosene oil and fine salt. Give every laying-box and roosting-perch a thorough coat of this mixture inside, outside and behind. Sprinkle floured sulphur and carbolic acid liberally inside nests and wherever fowls are kept. Follow these simple rules explicity, and lice will be to your poultry stock unknown; neglect them, and lice will run rampant, and your chickens droop and die. Feed your adult fowls liberally and regularly three times a day. The old theory that hens only need feed in winter, and then once a day, has long since been exploded. Change the food every day as often as they feed, feeding very little whole grain except wheat and oats.

The variety of fowls to keep and the kinds of feed to be given can only be determined when we know what you are aiming at. If you desire to raise chickens for market, and they can be more profitably raised for twelve cents per pound than can beef at seven, or pork at six, you should procure the kinds that are short and yellow-legged, solid, compact bodies, and have quick-maturing properties. Hatch your chicks as early in the winter or spring as your facilities for handling them, when hatched, will permit. Feed often and liberally, and sell them as soon as marketable. Not only does the three-pound chick in June bring more than the five-pound chick in December, but by selling at the former period you avoid all the risk of loss to which the bird is liable if held for more complete maturity. If you desire to raise and keep fowls for eggs, select those kinds that brood little and lay much. While the eggs are sold by the piece and not by the pound, the seven small eggs produced by the small non-setting hen will bring more than twice as much as the three larger eggs that will be about the weekly product of the large, broody hen.

The man who seeks to grow grain and increase the fertility of his soil without first determining the nature and composition of such soil, and what elements of plant-food it is most deficient in, and what fertilizing agents will best supply such deficiency with the least labor and at the most economical expense, is going it blind, as is also the man who attempts to raise eggs without knowing of what they are composed, and what varieties of food will furnish the most egg-material at the least expense. Meet the majority of farmers coming from

mill and put this question: "What's that feed for?" and you will get this answer: "Why, for the horses, cows and pigs, of course." We are slightly inquisitive, and venture another question: "What about your poultry?" The answer invariably is: "Oh, I throw them a little shelled corn; they don't lay a bit, and I hardly think they pay to bother with." No, I suppose they don't. If we want eggs we should feed our hens a scalded mess three hundred and sixty-five mornings in each year. What composed of? We will tell you. Half wheat bran and half cracked corn, or, better yet, cob meal; Mix enough cayenne pepper, sulphur and ground charcoal to season well, adding a pinch of salt. Chickens have palates as well as men, and can as well appreciate a good meal. A pint each of pork scraps, green cabbage and turnips, chopped fine, to each eight quarts of feed, makes a valuable addition, and gives them a morning meal that will be thankfully received, eaten with relish, and paid for before noon. Give laying hens all the milk they will consume. It would take longer than an ordinary lifetime to make some men believe that sour milk converted into eggs is worth as much per pound as sweet new milk will bring per pound at the creamery, yet such a statement we believe to be a true oue. Feed your laying hens a liberal supply of wheat at all seasons of the year. When the box where the screenings are stored is exhausted of its contents, do not fail to have access to the box, bin or bags containing your good clean wheat. If you are a small farmer, and keep one hundred and fifty laying hens, you have no wheat you can afford to sell at one dollar per bushel, but you can afford to feed it to your laying hens, who furnish a market when it may be made to bring you twice the sum offered at the mill. If there is one sprouted grain in the corner of one bag the wily miller will dock the whole load; the hens are more generous, and will give full value received.

Market your eggs as fast as they accumulate in sufficient quantities to render transportation convenient and profitable. It seldom pays to hold eggs, for fresh ones make better omelet and command a better figure in the market than stale ones.

Allow plenty of oyster shells (cracked or ground), coal ashes, gravel and sand to be placed where the fowls may consume what is wanted. It is just as easy for a jeweler to make a watch without wheels, or an engineer to run a locomotive without steam, as for a hen to lay eggs in winter without some such material with which to form the shell.

Keep the hens that are to produce the laying stock for next year warm and comfortable now, that they may brood and hatch early, thus giving you pullets that at six months of age will bring you more in eggs by two months' service than they can in six, if hatched two months later. The cows that are half starved and ill-housed in winter will produce little or no milk. The starved brood-sow will produce stunted, weak pigs, so the hens that are now allowed to roost in dead tree-tops and on rickety barn-yard gates will be so many waste-holes where the shiftless owner will drop some feed each day, but not enough to make them profitable.

A word or two in reference to hatching and rearing young chicks. For setting purposes select good-sized, uniform eggs that are the product of healthy, well-fed hens. The food a hen consumes has a great deal to do with the fertile properties of the eggs she lays. You may have one cock with forty hens or forty cocks with one hen, but unless the hen has proper food the percentage of fertile eggs will be low. Never set a hen until she is known to be thoroughly in earnest and adapted in size, breed and disposition for the arduous task assigned her.

When set (if faithful) reward such faithfulness by giving her daily care. Never set your hens so the period expires on Sunday, or on the day a visit is planned or company expected. If the hen and her charge pan out as we would have them, she has lots of business on hand and may need your assistance. Sprinkle the eggs frequently and liberally with milk-warm water for forty-eight hours previous to hatching, and there will be less chicks that die from failure to break through the hardest-shelled eggs. Leave the youngsters with their mother in the hatching-nest for full twenty-four hours after they first see the light of day. They will be gaining strength, and do not require food until the substance last taken from the egg to the stomach is exhausted. The first food given should be similar in quality to the last consumed from the parent egg, and hard-boiled eggs fed in frequent and liberal quantities is food enough for the first three days, after which mix with the eggs bread-crumbs, mashed potatoes and any other soft but dry food that judgment may suggest. Mouldy curd or wet cracked corn is just as disastrous to the lives of young chicks as opium and bad whisky are to the lives of men. Give the hen and her brood a roomy, clean coop, placed upon a clean board bottom that should extend twenty inches in front of coop, on which

extension the young chicks may be fed their eggs and bread-crumbs, while the mother is amused and kept quiet by giving her a few grains of corn inside of coop. Have a slide in front through which the chicks may be drawn when very young to their delicate meals. By thus handling they will soon become acquainted with the one who cares for them, and acquire those habits of tameness always desirable in all kinds of farm stock, for it is more pleasurable and more profitable to care for tame stock of any kind that that which is naturally wild. Change the location of your coops from year to year.

If you live on the old homestead don't think you must raise your chickens where your grandfather sought to raise his, but give them new grounds, thus avoiding disease that continuous location is sure to generate. Try to prevent disease rather than cure it. And remember that although it does not require as much study to become a successful poultry-raiser as it does to become a theologian, it does require some exercise of brains and a great deal of energy and faithful perseverance. As eternal watchfulness is the keynote of success in almost any business or undertaking, please remember that the occupation of growing poultry for profit is not a conspicuous exception to this rule. Guard against the encroachments of hawks, cats, rats and the many similar chicken enemies that will be free to visit you, blasting your hopes, destroying your profits and adding their mites toward making you prone to contradict the statement we, in closing, again make, that poultry-raising can be made profitable.

GRAPE AND PEAR CULTURE.

BY CHARLES PARRY.

The subject assigned me by our worthy Secretary, "The Culture of the Grape and Pear," is entirely too extensive to be treated within the limits of our article for this meeting. I can do nothing, therefore, but glance at some of the more important points, taking first—grapes.

Grape Culture.

Although grapes will grow and produce upon almost any soil that will grow corn, they do best upon a light top-soil underlaid with a loose, porous subsoil. On this kind of soil they are less subject to

the attacks of phylloxera and fungoid diseases, and they produce fruit of the finest appearance and highest quality, whether considered for wine or table use.

Clean culture, keeping the surface mellow, and a moderate use of commercial fertilizers is the treatment best adapted to the grape. Stable manure is more difficult to apply, and, being a prolific source of fungoid diseases, is not as suitable as commercial fertilizers. A fertilizer low in nitrogen where the vines are growing vigorously, with increasing quantities where the growth becomes weaker, will be found satisfactory.

Methods of training differ widely. In regions where there is little or no rain, as in California, and in some places where it does rain, the stump system prevails. The vines are trimmed back to a stump eighteen inches to two feet in height. The vines are staked for a few years until strong enough to support themselves, and thereafter need neither wire nor posts. When it is considered that a good vineyard will last one hundred years, it will be seen that the saving in wire and posts or stakes would be a very considerable item. When it is desired to farm the vines both ways, like corn, it is necessary to train them to stakes. Some practice the renewal system, cutting out every winter the canes that have borne the previous summer, in the same manner as is done with raspberries and blackberries, leaving two new ones each year to take their place. Others leave a permanent trunk four or five feet high and trim back to spurs on this.

The practice, however, that meets with most favor is to train to wires stretched to posts. Some use one wire and some two. The vines are trained up to the wires and an arm stretched in each direction and trimmed either on the renewal or spur system. The trimming must be varied according to the varieties and circumstances. If a Telegraph vine is given as much wood as a Concord or Cottage it will kill itself overbearing; or, if a Clinton is trimmed as short as a Concord, it will bear very few grapes. If the grapes are to be bagged, a few short arms of the strongest wood is all that should be left, so that the strength of the vine may be driven into a few large clusters, as it is a waste of time and money to bag small bunches. If bagging is not intended, more wood may be left, so as to make up in quantity what is lost in quality.

The question of varieties is a very important one, and must be decided by the taste of the grower. If he desires to grow a fine

article at a good price, and is willing to take the time and trouble to spray and bag, such varieties as the Niagara, Brighton, Duchesse, &c., will pay well. If he is willing to spray and not bag, Moore's Early, Concord, Pocklington and others may be grown. But, if he will neither bag nor spray, such varieties as Janesville, Ives, Champion, Elvira and Dracut Amber must be selected. It is asserted by epicures that these latter varieties are not fit to eat. I do not claim that they are, but I do claim that they sell well, and that the money they bring in market will buy groceries and pay a note in bank as well as the money obtained from the sale of Niagaras or Delawares, and, if they turn out more clear money per acre, they will be grown. So long as the market will take Champion grapes at four to six cents per pound, and a little later will only give three to four cents for Concord, just that long Champion will be grown.

As to spraying, it is a question whether it does not pay to spray all varieties of grapes. There are some that will grow well and bear well without it, but they do so much better with it, hold their foliage so much later, ripen their wood, and make such a strong growth for next year's crop, that they more than repay the trouble spent. By spraying with the Bordeaux mixture about three times and with the carbonate of copper once or twice, rosebugs permitting, a good crop of grapes is insured.

The profits of grape culture a few years back, when prices were higher, were very large. At present prices the returns are more moderate. But putting the yield at three tons per acre, and the finer varieties at six cents per pound, between $300 and $400 per acre would result, while commoner varieties, at three or four cents per pound, would yield about $200 per acre. In California, where the yield is from six to eight tons per acre, one to one and one-half cents per pound is considered satisfactory. But it is a question whether in the future these prices will be maintained. The minimum price at which New York grapes can be put in the market is about two cents per pound. When prices fall below that figure, shipments stop. The cost of package, delivery to cars, freight to Philadelphia, cartage to store and commissions are such that when a five-pound basket brings less than ten cents, there is but little left for the grower. It may be assumed, then, that two cents is about as low as grapes will be likely to get in the Philadelphia market, and those who can deliver their grapes to the commission stores from their own wagons can compete

profitably with that price. This would give a minimum return of $125 per acre, and will compare favorably with many farm crops. Grapes give paying returns with as little fertilizer as most any other crop; and, again, it must be remembered that most of the work, tying, staking and trimming, can be done in winter when there is little else to do, while the marketing comes in September, after the press of farm work is over and other marketing is scarce. Contrast this with citron, for instance, which is considered a profitable crop in this section, when the preparation of the ground, the cultivation, the picking and marketing, all come in the very busiest time of the year.

Again, for those engaged in such fruit culture, grapes fit in very nicely after blackberries. The same crates may be used to hold the five-pound boxes, and the same pickers will be glad to gather them at one-quarter cent per pound. Another advantage that grapes have is that they will hang for some time after they are ripe without spoiling. Strawberries, raspberries, blackberries, citrons, &c., must be marketed when ready. A long delay would spoil them, but grapes will wait. If it does not suit to gather them one day, the next or the day after will do, or they will wait until the next week, or even longer, without injury.

Pear Culture.

Pears will flourish on a heavier soil than is suitable for grapes, but it should be well drained, and, although heavy clay soils will grow pears well, and a large quantity of them, a lighter soil, with a subsoil of gravel or gravelly clay, will grow a much finer grade of fruit, and one that will sell for a much higher price in market. So sensitive are some varieties to situation that I know of two orchards of Seckel pears, a few hundred yards apart, the fruit from one selling readily at 50 cents per half-peck, while that from the other will not bring 50 cents per basket.

The best culture for a pear orchard is to grow some cultivated crop, such as corn, potatoes, cabbage, sweet potatoes or tomatoes among the trees. If the crops are well manured it will benefit the trees as well. The worst of all treatment is to sow grain or grass seed in a young orchard. The trees become stunted, and it ofttimes takes years to recover from the set-back.

As to varieties, a succession from earliest to latest is desirable. Lawson, Early Harvest and Clapp, for early; Bartlett, Le Conte,

Howell and Seckel, for medium, and Anjou, Duchesse, Keiffer and Lawrence, for late, are all well-tested, profitable varieties.

Too much care, however, cannot be expended in finding out what varieties do well in the neighborhood of the planter. For instance, I know of one orchard of Duchesse pears, two acres in extent, that for many years after the war yielded a yearly revenue of $1,000 per acre. A neighbor of the owner, being entranced by these delightful returns, concluded to participate in them, and being, moreover, a mathematician, he figured that if an acre returned $1,000, thirty acres would return $30,000. He, accordingly, planted thirty acres in pears, and, as the Bartlett was everywhere considered a more profitable variety than the Duchesse, he sought to improve upon his neighbor and planted Bartlett. The Bartletts grew like poplar trees, shooting up five and six feet in a season, but, before they came into bearing, they blighted and died by the thousand, and never bore enough pears to pay one-tenth the cost of the trees; and to-day there are not enough trees, or stumps even, left to mark the site of the wreck, while the two acres of the Duchesse continue to produce paying crops.

Once more. I know of an orchard of Keiffer pears, twenty acres in extent, that has been planted ten years and has not produced thirty baskets of fruit. The trees are rampant growers and large enough to produce twenty baskets to the tree. Every spring they are loaded with blossoms like a Wild Goose plum, and, like that plum, the fruit, as soon as it forms, drops off. And yet the Bartlett and Keiffer succeed admirably, as is well known, in many locations, although absolute failures in the localities referred to. These two instances are sufficient to emphasize the advice that a planter should select those varieties that do well in his own vicinity.

Opinions differ as to the advisability of spraying pear trees with arsenites. The good results are certainly not so marked as with apples. But, whatever may be the opinions as to the arsenites, there can be no question as to the benefit of spraying with the copper compound those varieties that suffer from leaf blight. Such varieties as Flemish Beauty, Beurre Clairgeau, and the like, are so much improved that they look like different pears; and the beauty and quality of the fruit is not the only gain—the quantity is increased, and trees that have heretofore borne biennially will become annual bearers. It can be regarded as a rule in fruit culture that trees or

vines that drop their leaves early in the season cannot produce the quantity of fruit they could if they held their leaves till frost. If the leaves drop as soon as or before the fruit matures, they cannot store up material and perfect fruit buds for another year; but, if the leaves remain green and healthy until frost, like they do on the Keiffer, Le Conte, Lawrence and others, they can not only mature the crop of fruit on the trees, but also prepare fruit buds for another year, so that varieties like the Bartlett and others, that are subject in some degree to leaf blight, may be greatly improved, and others, like Beurre Clairgeau, may be almost regenerated by this method.

The profits of the pear crop this year were more satisfactory than last year, for, although the yield was less, the price was much better. The scarcity of apples made pears sell, and, while other varieties did well, Keiffer was pre-eminently the variety of profit. The situation was in strong contrast with last year. Then, the growers were compelled to run around among the commission dealers to coax them to handle Keiffer pears. This year, long before the pears were ready, the commission men were running around among the growers soliciting consignments of Keiffers. Whole orchards were sold before they were ready to pick, the prices ranging from 40 to 50 cents per five-eighth-bushel basket in the orchard. The pears were eagerly bought as fast as they arrived in market, and in many cases engaged ahead by grocerymen in order to secure them.

The prices ranged from 30 to 35 cents for culls, 40 to 60 cents for primes, and 75 cents to $1 for extras per five-eighth-bushel basket, while part-rotten ones brought 25 cents. A low average for the crop would be $1 per bushel, and when it is stated that many orchards bore from 300 to 400 bushels per acre, the profits can easily be estimated—and the yields followed the unprecedented crop of last year, when it was asserted that the orchards could not bear another crop this year. The enormous crop and low prices of last year brought them into such general use, and so many new uses were discovered for them, that this season the demand exceeded the supply. To illustrate the many uses to which this royal fruit is adapted, I have examined this year fine samples of Keiffer cider, Keiffer vinegar, Keiffer wine and Keiffer champagne. Baked Keiffer, Keiffer sauce, Keiffer pie, and sliced Keiffer with sugar and cream were old friends, while Keiffer syrup for buckwheat cakes surpassed the famed maple syrup of Vermont; and canned Keiffers have become such a staple

article that the Baltimore canners kept the Philadelphia market this season cleaned up of primes, at prices that last year would have been considered large for double-extras.

The result of all this is that there is a craze for planting Keiffers. Those that already have orchards are planting more, while those who have none are making haste to get one. One grower, who now has seventy acres in full bearing, has recently purchased seventy-five acres more to plant with Keiffers. And, in conclusion, I cannot better illustrate the esteem in which the Keiffer is now held than by stating that many persons who a couple of years ago could not find language strong enough to execrate this detestable fruit are now quietly slipping in their orders for a few hundred trees.

W. T. Warner, of New Brunswick, spoke on "Market-Gardening Fifty Years Ago and Now." The speaker was a young man, and said it was rather out of place for one of his age to speak on happenings of over half a century ago, but his grandfather and father were market-gardeners, and he claimed to know something of the subject. The advantages and facilities of fifty years ago were very limited. New York and Philadelphia each had two firms selling seeds. There was not the market then for vegetables, nor was there such a variety. Tomatoes were not cultivated as now. The speaker's father set out about four hundred tomato plants, from which he supplied the entire neighborhood and had plenty left for the hogs. In fact, if he sold a basket of tomatoes on Saturday he thought he had done a big trade. Other products were the same, and there has been at least an increase of 500 per cent. in demand, with 100 per cent. increase in the quality of the products.

Joseph Engle, Jr., of Smithville, read a paper, "How Best to Grow and Market White Potatoes." The selection of the ground was of the utmost importance. It was better to raise one acre of potatoes on good ground than to attempt to raise ten times the amount on poor ground. The next important question is that of seed, and the speaker had found that home seed was of no account. Having secured good ground and good seed, especial attention should be paid to planting and cultivating. The potato-bug pest was not nearly of so much disadvantage as the fact that it was almost impossible to secure good Paris green with which to fight the bugs. The potatoes should be marketed as soon as they are of sufficient size to make a

fair appearance in market. The potato-bugs were worse the past year than at any time in Mr. Engle's experience.

"How Can Milk Producers Best Maintain the Fertility of the Soil?" was discussed by Prof. E. B. Voorhees, of New Brunswick. This was mainly a scientific talk, illustrated by statistics.

The much-discussed subject of roads was taken up by Clayton Conrow, who opened his remarks by saying that previous speakers had told how to raise crops, and it was left for him to speak of how to get them to market. If there are no good means to reach this desirable end, then the products of a farm were useless. He quoted the acts of legislation providing for road-building, with their amendments and repealers, which had been so numerous as to confuse the layman in his efforts to discover the law on the subject. The work of the legislators more closely resembled "crazy patchwork" than the outcome of intelligent thought and action. He reviewed the present system of laying out roads, where application must be made to the courts, who appoint surveyors, and the township pays the expense. In the matter of bridge-building, the county pays the bill. The speaker thought the State should pay for the roads.

Caleb Newbold did not see any good reason to still further burden taxpayers by building stone roads. Railroads gave his section plenty of accommodations. He did not believe poor roads were responsible for the depreciation of farm lands, but he did think the cheap rates which allowed Western farmers to bring in products at ruinous prices had considerable to do with that point.

Isaac Fennimore did not favor building stone roads as now conducted. He reviewed the experience of the city of Elizabeth in contradiction to the statement that such extensive improvements increased the value of property.

Judge Forsyth thought the proposed system of stone roads would prove an expensive luxury.

NEW JERSEY STATE LIBRARY

THE YEAR'S EXPERIENCE WITH SCARLET CLOVER.

BY THOMAS J. BEANS.

We all remember how we were thrilled when, as school-boys, we read of the great Englishman bowing to his peers in Parliament assembled, as he said: "Pardon me, my lords. Confidence is a plant of slow growth." Even in building our opinions, how careful we are to select and use only the very best materials in their construction. And how often we have been taught that one year's experience with some given plant, grain or fruit did not justify confidence. Of the many varieties we have tested in our county, how few whose good qualities have been so reliable as the Early Rose potato, the Fultz wheat, or the Wilson's early strawberry; how many were tested only to be abandoned? Not only do varieties that it is our business to cultivate come and go, but conditions change, and coincident with these are the presentation of opportunities from which we may choose those we deem best suited to meet the requirements for success. Our Secretary, interested in all that concerns the welfare of the agriculture of Burlington county, invites us to-day to consider the qualities and properties of the scarlet clover—*Trifolium incarnatum* of the scientist—and learn what we can of its claim to a place among our opportunities. I see it enumerated among the seeds distributed by our government in the year 1859, and described as "a good flowering variety—adapted to lawns."

In Government Annual Report for 1864 it is stated, "does well on rich ground, but does not seem to do well in our country, though repeatedly introduced and tried; not near as valuable as our red clover." At that date it was used on some of the best English farms as a forage crop. It will occur to us that, as at that time red clover was a reliable crop and is now an uncertain one, a comparison between the two varieties then and now might produce different results. It is an annual, has long been grown in Europe, especially in France and Italy. In our own country it has lately won good opinions from Delaware southward. In Delaware, where conditions most nearly resemble our own, it is claimed for it that when sown in July, August or September, it may be expected to mature a crop of seed about the first week of the following June. When sown in May, it grew vigorously but no blossoms appeared, and during winter it was destroyed

by a fungus; that it stools to an unusual degree; attains a height of two feet; will yield eight tons of green fodder between the 5th and 10th of May; roots to a depth of four feet, and, compared with red clover there, has the ability to flourish on relatively poor soils and superior development during fall, winter and spring.

It is not adapted to grow with winter grain, and is in blossom on or about the 1st of May.

Of the five varieties of this clover in Europe, four have scarlet blossoms, but differ in their relative powers to withstand winter weather, and they congratulate themselves in having secured for cultivation the hardiest variety. The fifth European variety spoken of is the Egyptian clover, a summer variety, with white blossoms, and cannot endure winter cold. Hence care is needed in procuring seed.

Good results are reported where sown in orchards or among corn at last dressing.

It has been utilized for plowing down for green manures, for silage, for soiling, for seed, for hay and winter and spring pasture. It is claimed, too, that in its capacity for performing the functions of a leguminous plant, in relation to furnishing plant-food to a succeeding crop, it is equal to red clover, but that it decays more rapidly underground.

Specific statements are made of the benefit received from its growth and plowing under for corn and orchards, for silage and for soiling. Though maturing early for hay, viz., first and second weeks of May, instances are given when it was successfully done. The yield of seed is given at 9 to 15 bushels per acre.

In the *Country Gentleman* for January 22d, 1891, J. S. Willis, of Milford, Del., reports:

"I commenced to use scarlet clover in 1880, and I now have from seventy to eighty acres which I shall turn under as green manure. My soil is a sandy loam, or, as some people think, sand without loam. In the dry summer my fields were dusty, but now those fields are covered with a green carpet of scarlet clover, and they have yielded 50 bushels of corn to the acre.

"There were reported 2,340 acres of scarlet clover on the farms of forty-four men, more than half of which was to be used for green manuring, and about one-third for seed. Seven-tenths of the crop in Kent county and nearly three-fourths of that in Sussex was growing in orchards."

The above in relation to the scarlet clover in Delaware is a mere, brief compilation of the bulletin for March, 1892, of the Delaware College Agricultural Experiment Station, signed by Arthur T. Neale, Director, and are incidents in the career of the plant in Delaware previous to March, 1892. In the Philadelphia *Weekly Press* of November 11th, 1892, there is a brief statement of results of culture during the present season, signed by M. H. Beckwith, Horticulturist and Entomologist of Delaware College Agricultural Experiment Station. He says there were 3,000 acres grown in Delaware the present season. The Delaware Fruit Exchange kept up prices at $7 per bushel, but also kept up quality; shipped to purchasers in good bags, sealed and warranted growth of 1892, and true to name. To justify this method, it was asserted that several varieties were imported, some of which would not survive even the mild winters of Delaware; much was not pure, and that one of these undesirable varieties was the Egyptian clover, which, if planted in the spring, is of quick growth, blossoms and matures seed earlier than crimson clover; has a white blossom, and does not survive winter if sown with crimson clover. He says fixing the price at $7 ($2 higher than last year) was a business mistake for it was not all sold, but if the price had been kept at $5 all would have been taken. Other parties sold for less. He also states that the dry weather of the present season has injured the seeding; it has either failed to grow or the young plants have died.

Many fields have so few plants living that they do not appear to have seeded, and from present appearances next season's crop will not supply the demand for seed. On our own field of twelve acres in wheat and rye we on March 31st, 1891, sowed red clover seed and harrowed it in with the Thomas smoothing harrow, with another sowing after the harrow. This sprouted and grew well during cool weather, but died before harvest. On August 7th we cut up the field with spading harrow, then sowed clover seed (of which that on one acre was scarlet clover), following with the Thomas smoothing harrow. The seed all sprouted and grew well for a while, but subsequently, during a dry spell, the young red clover plants died, but few of the crimson clover plants were to be seen, and it was with something of a surprise this spring we found enough to make quite a showing, that by stooling and vigorous growth made a good crop on a better part of the section, but a light one on the coarse sand. The red clover alongside only showed a plant here and there, not enough for mowing, and

cattle were turned to pasture it. They used the bunches of red clover that could be found, but disturbed the crimson clover very little until the seed was in the milk, when they stripped heads eagerly and apparently clean. The stiff stalks died, making quite a contribution of vegetable matter, and were trampled down by the cattle, and we thought the experiment ended; but a few weeks later (some time after a heavy rain) we found young plants growing so thickly that in places they hid the ground. These a subsequent hot, dry spell browned and apparently destroyed.

Some time after, we had a week of clouds and rain. There could be seen sprouting seed, some of them suspended among the debris in the enveloping chaff, and ever since there has been a thick setting of thrifty-looking plants. In germination and early part of development the scarlet clover seems altogether more vigorous than the red clover, with the cotyledons much more robust.

The present season we used seed purchased of the Delaware Fruit Exchange. We sowed on coarse drift sand, before the cultivator, at last dressing of citrons, one and one-half acres, July 9th to 16th, nearly all of which died. On August 4th, one and one-half acres before and also after the cultivator, at last dressing of tomatoes—a failure. Among corn, before cultivator, widened to cover space between two rows, September 9th and 16th, nine acres, the greater part coarse sand. Of this, the setting and appearance of plants to-day are very satisfactory indeed. The purpose is, if favored with a crop, to plow it under with manure for melons and citrons. On five or six acres of plowed sand, sowed September 14th and harrowed in with Thomas smoothing harrow, the plants look well. On nearly all this ground red clover seed has been sown among rye in the rotation in vain for twenty-six years.

The great agricultural chemist, Johnston, of England, in summarizing a description of the soils of our Atlantic slope, starts at the ocean's edge with the alluvial and fast tertiary and names its products, then leads us up to the tertiary sands, and names as their products, "pine forests, sandy barrens, little cultivation."

For some of us, this is the arena for the display of whatever of agricultural skill and energetic endeavor we may be capable of, and occupies so large a part of our county that we cannot, as good citizens, fail to be in sympathy with all efforts and adaptations likely to benefit it.

I have said clover seed sown on coarse sand, July 9th, failed to grow. It is to be remembered that our crops in such sand have to undergo a far higher temperature than those in ordinary soils. We know those who have leisure, inclination and ability for such investigation tell us there are two kinds of heat—heat of high intensity, derived directly from the sun, and that of low intensity. The first, like light, passes through all transparent bodies; the second does not to any considerable degree. The first may be converted into the second; hence, the accumulation of heat in an inclosed space covered with glass, through which sun-heat has passed as that of high intensity, is absorbed by materials within and radiated back as heat of low intensity, which cannot penetrate glass. Saussure, by covering with glass a box previously blackened, found within a temperature of 191 degrees. So we find we must be watchful and lift the sash over the plants in our hot-beds.

Does this explain why our nearly pure sands become so heated beneath a nearly vertical sun? During the summer of 1891, in our sweet potato patch, we found the thermometer, with bulb just beneath the surface, to indicate a temperature of 117 degrees, and during the great heat of June 17th of the present year, at 2 P. M., 140 degrees on the one and one-half acres where the clover seed sown July 9th failed to grow, and where, on August 1st, the citron vines were so wilted that many died, and the citrons on the vines in all stages of growth were burned so deeply that they were valueless for market purposes. In this dry, heat-absorbing soil commercial fertilizers do us little good unless we have frequent rains. But when we are fortunate enough to have a crop of weeds or other green vegetable matter to plow, we always derive benefit. That strange mystery—life from death—that confronts us wherever we turn, is operative here and always effective. We know that rains pass through coarse sand with little effect save a brief change in moisture and temperature. But we know, too, that rains never descend empty-handed, but organic and saline food, the exhalations from the earth, volatile matter, the result of chemical changes effected by man's activities and Nature's ceaseless transformations, are arrested, carried down and placed in position and form for most ready assimilation by growing plants, effecting at once purification of our atmosphere and refreshment and fertility to our land. If we have growing plants night and day through winter and spring, utilizing the rain and storing its contri-

butions within their organism, and then opportunely place this accumulation of plant-food and of moisture beneath the surface at the favorite feeding depth of the plants from whose culture we hope to derive profit, this is to take advantage of the resident forces of Nature—to work in harmony with her law, "Let nothing be wasted," and that other great law, "Life from Death."

MARKET-GARDENING FIFTY YEARS AGO AND NOW.

BY W. T. WOERNER, NEW BRUNSWICK, N. J.

In June, 1834, after a six-weeks' voyage across the broad Atlantic, my father, grandfather and great-grandfather landed in New York. Being professional gardeners, naturally their first thoughts were in the direction of growing vegetables for the market, consequently they started out in pursuit of suitable soil and locality. Such they found near Woodbridge, in Middlesex county, N. J. There they began growing vegetables on a small scale. A "truck-grower," as he was then called, was looked upon as something akin to a wizard. Everything he did was looked upon as mysterious, especially in that vicinity. Market-gardening then was in its infancy in New Jersey. The market-gardener in those days had many difficulties to overcome. In the first place, the soil was very poor for that purpose; stable manure was not so easy to be had then as now; commercial fertilizers were scarcely known, much less used. The only kind then to be had was Peruvian guano, which cost from $80 to $120 per ton, so it was out of the question to use much of that. A few bags were all any one could afford to use. We all know how that is all changed now. We can get good stable manure in any quantity at reasonable prices, delivered almost on our farms either by rail or water. The same with fertilizers. We can procure a good article for less than one-half the cost of Peruvian guano fifty years ago.

Then fifty years ago the market-gardener was obliged to grow his own stock of seed. He could not sit down and write an order to his seedsman and get just what he wanted. He would receive seeds properly named (on the package), but, alas! after waiting for weeks for them to mature (if they ever did), what disappointment in finding them far from what he expected. Fifty years ago there were not the

seedsmen there are now. New York had two and Philadelphia about the same. These same firms are in the business still. Did they not sell better seeds to-day than they did fifty years ago, they could not remain in the business two years, thanks to opposition. The competition is as strong in that line as in the fertilizer trade. They must sell an A1 article or get out of the business. Then fifty years ago there was not the market for vegetables there is now. People did not eat the quantity nor variety they do now. The vegetables then grown were principally lettuce, radishes, beets, peas, beans, cucumbers and, of course, cabbage and potatoes; also some sweet potatoes and sweet corn. Tomatoes were hardly used at all. My father set out 400 plants in 1836 and had enough fruit for all New Brunswick, Perth Amboy and Rahway, and still had enough to feed two hogs. I remember hearing him often say that if he could dispose of one basket on a Saturday in New Brunswick it was considered a big thing. We all know how that is changed now. The city of New Brunswick requires 1,000 baskets a day for two months while they are at their best. Then there is the lettuce business. Fifty years ago it was only used a few weeks in the spring and early summer, in limited quantities at that; now we are obliged to grow it the entire year. Fifty years ago 200 or 300 dozen would be sufficient for New Brunswick during the entire season. To-day it requires at least 10,000 dozen to supply the demand. Look at the celery trade. Fifty years ago it was scarcely used at all. If a gardener set out 500 or 1,000 plants it was considered a big thing (and it was, in the old trench system). Of this he would be obliged to use the greater part himself, as he could not find market for it. Look at it to-day. The city of New Brunswick requires at least a million of stalks each year.

Then there is spinach. If a gardener sowed one pound fifty years ago he would have enough to supply a town like New Brunswick and have some left. Now it requires the product of 500 pounds, grown on soil 100 per cent. better than it was then. The same can be said of asparagus. A bed one hundred feet square would be sufficient for New Brunswick fifty years ago. Now it requires the product of fifteen acres at least. How is it with cabbage? We sell 1,000 heads now where we did not sell a dozen fifty years ago. And so it goes on down through the entire list. Everything that was used fifty years ago has increased more than 500 per cent. Fifty years ago there was not the variety of vegetables there are now. We have not

only a larger variety, but they are 100 per cent. better in quality. The improvement in that line is very marked indeed. Take the one instance of the tomato. See the improvement on that in the last decade. Twenty years ago we had nothing like what we have to-day. What must they have been fifty years ago? The tomato then resembled a ripe Mango pepper when cut up more than anything else.

Fifty years ago there was very little done in the way of growing vegetables under glass. To-day every gardener is obliged to have several hundred hot-bed sashes in use six months in the year, and a great many that wish to keep abreast of the times must either have a hot-house or forcing-pit of some kind. A hot-house to grow vegetables in for the market was not thought of fifty years ago. Fifty years ago access to the large markets was not as easy as now. The roads were almost impassable part of the season, as they would be hub-deep in mud, and in some places there were no roads at all. You were obliged to drive through fields, or the best way you could get through.

To-day there is a great improvement in our highways over fifty years ago. You can now drive from New Brunswick to New York and not get the rims of your wheels wet in the worst weather. This is an improvement which I am sure every farmer or owner of a team should hail with delight. Let the good work go on until every main road throughout the entire State is macadamized. The market-gardener of to-day has the railroads and steamboats within easy reach, which will carry his produce rapidly and cheaply to the large markets. He is not obliged to drive over three miles to reach a station.

With a great variety of soils and a varied climate, populated with an industrious and energetic people, with great railroad and steamboat facilities, wedged as we are between the two largest fruit and vegetable markets on the globe, giving us an unlimited market for all we can produce, has given to New Jersey the title she deservedly bears, "the banner garden State of the Union."

CLIMATIC HISTORY NEAR MOORESTOWN, N. J.

Latitude, 40°, Longitude, 74° 54′; Above Tide, 71 Feet. For Year 1892.

	TEMPERATURE.			Rain and Melted Snow —Inches.	Snow—Inches.	COMPARED WITH NORMAL FOR PAST 28 YEARS.		Number of days on which 0.01 inch or more of rain fell.
	Maximum—Degrees.	Minimum—Degrees.	Mean—Degrees.			Temperature—Degrees.	Precipitation—Inches.	
January	61	7	29.40	5.64	11.7	—0.19	+2.13	11
February	52	13	34 01	2.73	Trace.	+2.39	—0.70	7
March	62	15	33.77	4 835	10.25	—3.70	+1.20	11
April	81	28	49.33	2.53	0.05	—0.10	—0.36	9
May	84	37	60.32	6.10	.....	—0.21	+2.24	12
June	92	47	72.32	2.145	.....	+2.09	—1.665	11
July	101	52	74 09	6.48	.....	—0.49	+2.12	8
August	94	57	72 44	3.70	.....	+0 51	—0.96	10
September	85	40	62.72	1.75	.....	—2.63	—2.19	5
October	80	30	52.23	0.38	.....	—1 14	—2.98	4
November	69	20	41.04	8 61	2.10	—0.96	+5.28	13
December	66	8	30.09	1.99	7.	—2 69	—1.34	8
For Year	.....	.....	50.98	46.89	31.10	—0.56	+2.85	99

Latest killing frost in spring, April 20th (minimum temperature, 32°); earliest in autumn, October 25th (minimum temperature, 32.5°), making length of season for out-of-door growth of tender vegetation 188 days.

The rainfall for June was but little more than two-thirds of average, and falling in light showers on 11 days, with intervening hot periods, was less helpful to the deeper-feeding roots. This, with the added unfavorable conditions in July made the white potato crop a light one, with the potatoes smaller in size and less attractive in appearance than Burlington county often produces.

Although July's rainfall was 2.12 inches greater than average, there had 2 53 inches of it fallen before the 3d of the month, and 3.68 inches of its supply was received after the 29th, leaving the intervening period with only 0.27 inches, with much bright sunshine, brisk west and northwest winds and very high temperature, so that on light, sandy soils corn was much injured, cantaloupe vines wilted badly, and attached fruit was sometimes so badly burned as to be valueless for market purposes.

The rainfall of 0.38 inch for October was the lightest for that month during the past 29 years, and that of 8.61 inches for November was the heaviest for that month during the same period.

BURLINGTON COUNTY AGRICULTURAL SOCIETY.

OFFICERS FOR 1893.—President, H. I. Budd; Vice President, Samuel H. Chambers; Recording Secretary, John B. Collins; Corresponding Secretary, Henry I. Budd; Treasurer, Edward B. Jones. Address of all, Mount Holly.

FINANCE COMMITTEE.—Henry C. Risdon, Joseph C. Kingdon, John B. Davis.

COUNSEL.—Joseph H. Gaskill, Mark R. Sooy.

BOARD OF DIRECTORS.—Henry I. Budd, Benjamin F. Deacon, Joseph Wills, Edward B. Jones, John B. Collins, Henry Ellis, Samuel H. Chambers, William R. Lippincott, Davis C. Wells, Frank N. Wood, J. Holmes Longstreet.

The forty-fifth annual fair will be held on their grounds, near Mount Holly, N. J., on September 12th, 13th, 14th and 15th, 1893.

ANNUAL MEETING.

The annual meeting of the stockholders of the Society was held at the Court House, Mount Holly, on Saturday afternoon, January 14th, 1893.

John B. Collins called the meeting to order. Edward Wills was elected Chairman, and John B. Collins, Secretary.

Minutes of last meeting read and approved.

Treasurer E. B. Jones read his report, which was adopted. The report follows:

TREASURER'S REPORT.

RECEIPTS.

Balance in Treasurer's hands January 13th, 1892.....	$767 32
Rent of grounds, buildings and chairs.....	174 85
Dining and refreshment stands.....	3,371 56
Amusements.....	1,118 42
Privileges	2,621 00
Coat and package-room.....	35 93
Entrance fee—horses.....	2,659 25
Entrance fee—cattle, sheep and swine.....	349 70
Entrance fee—poultry.....	412 03
Entrance fee—dogs	230 05
Admissions to grounds.....	9,806 61

Admissions to grand stand	$2,348 75
Admissions to ring	61 00
Materials sold	28 55
Advertising	514 94
Note in bank	1,929 29
Camden Safe Deposit Company, loan	12,500 00
Lunch counter	347 97
Balance due Treasurer	39 46
Total	$39,316 68

EXPENDITURES.

Repairs and alterations	$1,044 02
Fair supplies and expenses	492 67
Labor and teams	109 44
Water rent	45 00
State tax	4 00
National Trotting Association	50 00
Rent of office	150 00
Postage	172 54
Diplomas, medals and engraving	111 25
Advertising in newspapers	1,436 78
Advertising by posters	868 15
Printing	1,324 36
Decorating buildings	102 00
Society's guest and dining-room	190 35
Lunch counter	286 59
Hay, straw, poultry and dog feed	581 44
Freight and expressage	114 85
Telegraphing	10 93
Steam fire-engine	65 00
Guards, police and detectives	741 00
Clerks	694 23
Turnstile men	122 70
Judges and experts	150 00
Salaries	1,100 00
Amusements	1,315 00
Music	225 00
Entrance fees refunded	63 00
Notes in bank	13,500 00
Discount and interest	418 63
Insurance	40 00
Attorney's fees	65 00
Schedule	507 00
American Kennel Club	20 00
Premiums	13,195 75
Total	$39,316 68

President Henry I. Budd read the Directors' report, as follows:

DIRECTORS' REPORT.

Gentlemen—The management of the finances of an agricultural fair seems each year to be more and more fraught with difficulties.

Theories and practices that have been successful at one time fail at another. Varying conditions and changing moods of communities require different treatment—nothing so fickle as public opinion. The ideal policy of to-day becomes the unpopular one of to-morrow, and this applies particularly to agricultural fairs. Managers being ignorant, until they try, of the conditions of weather, the potency of other fairs and public places of amusement as rivals, are required to take risks without a knowledge of the outcome.

The bad weather of Wednesday, many political meetings, or causes of which we are ignorant, diminished our attendance compared with last year, making our admissions 6,638 less, a difference in receipts of $2,845.46.

Our receipts from horse entries were, 1891, $4,475.16; 1892, $2,659.25, a loss of $1,815.85. Our receipts from grand stand were $421.50 less than last year, although the free admissions were 1,275 less. Last year, stockholders and complimentary admissions to grand stand were 2,108; this year, 833, making a difference of receipts from these three main sources of revenue of $5,082.81.

Our receipts from refreshment-stand privileges and amusements were, in 1891, $4,371.90; 1892, $7,285.83, an increase for this year of $2,977.93. Our receipts from entries on cattle, sheep, swine, poultry and dogs were, in 1891, $409.91; 1892, $991.78, an increase of $581.87. Our receipts from all sources outside of notes, 1892, were $24,120.07.

Our expenses in all directions, except payment of notes, were $25,803.47.

Your Directors, in February of last year, negotiated a five-year 5 per cent. loan for $12,500, from the Camden Safe Deposit and Trust Company, for which they executed a mortgage upon the grounds and buildings of the Society. With this they paid a like amount of notes in bank, where they had been temporarily discounted for a number of years.

About $15,000 of the insurance on the buildings was renewed this year for five years at a cost of $477.35. The amount of insurance now on the buildings is $46,556.

Our dining-room for committees and guests gave 949 meals, at a cost for labor and food of $190.35. Our lunch counter, at a cost of $286.59, returned $347.97, a profit of $61.38, besides giving 683 tickets for coffee and rolls to employes.

Our expenses for printing and advertising were $353.42 less than last year.

Our premiums in 1891 were $12,539.75; 1892, $13,195.75, an increase of $656.

Our entries this year in speed horses, farm machinery and manufactured articles were far below the standard of previous years. The entries in utility horses, cattle, sheep, swine, poultry, pigeons and pets were large and above the average quality, taxing our capacity to care for them, and demanding a greater amount of our receipts to satisfy the premiums.

The art, the ladies' fancy and utility exhibits were large, up to, and in many instances excelling, those of previous years.

The plants and flowers excelled in quantity and quality former displays.

The fruits, vegetables and grains betrayed but little sign of the dry year that it was, for the tables scarcely afforded room for their display.

Our grape display was so fine that adjectives will scarcely describe it. One of the best authorities on grape culture in the State, in a prominent horticultural publication, thus expresses himself: "It is questionable whether a finer exhibit of grapes, combining size, beauty, quality, and all the essentials that go to make up a first-class product, as well as the extent of varieties, was ever before seen in this country."

This year, at considerable expense, we added the new feature of a bench show of high-class dogs, which proved to be one of our best attractions. And, now we have made the acquaintance and secured the confidence of the dog fanciers and kennel clubs of the country, we shall no doubt, in another year, be able to present to our visitors a larger and much more varied show.

If, in the future, for any reason we must expect a diminished attendance, we should decrease our premiums and attractions, our advertising and other expenses, and the number of our free admission tickets, stockholders' complimentaries and otherwise.

By pruning, we can reduce our outgoes several thousands of dollars, but extreme caution will have to be exercised or we may unwittingly correspondingly diminish our receipts.

If our own people, by the thousand, instead of being loyal to their own county fair, persist in spending their time and money for the advancement of outside expositions, they may, in the future, have reason to feel the need of an organization such as this, which has done more than any other to give Burlington county farms a world-wide reputation for advanced agriculture.

The report was received and ordered on the minutes.

Nomination and election of Directors was next in order. The following were elected: Henry I. Budd, Samuel H. Chambers, Joseph

Wills, John B. Collins, Edward B. Jones, David C. Wells, Benjamin F. Deacon, J. H. Longstreet, Henry Ellis, William R. Lippincott, R. Frank Wood.

A vote of thanks was tendered the retiring Directors for their efficient management of the Society's affairs.

The Chairman appointed Henry C. Risdon, John B. Davis and Joseph C. Kingdon an auditing committee, and the meeting adjourned.

CAMDEN COUNTY.

CAMDEN COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR THE YEAR 1893.

President .....ISAAC W. NICHOLSON .....Camden.
Vice President.....GEO. T. HAINES.....Haddonfield.
Secretary.....JOHN HUTCHINSON .....Haddonfield.
Treasurer.....NATHANIEL BARTON .....Mt. Ephraim.

DIRECTORS.—R. Cooper Morgan, Ezra C. Bell, Charles C. Stevenson, Amos Ebert, Geo. T. Haines.

DELEGATE TO STATE BOARD.—Charles C. Stevenson, Blackwood, two years.

ANNUAL REPORT.

BY JOHN HUTCHINSON.

The Camden County Board of Agriculture have held two meetings since the last annual report. A special meeting was held November 17th, 1892, at Blackwood.

Considerable time of this meeting was occupied with a discussion and remarks embodying the observations and experiences of farmers with the wheat-moth. A general disposition was manifested to learn more of the habits of this destructive insect, whose ravages have already been the cause of much loss to the farmers of this county.

The most successful methods of growing crops of clover claimed the interest of the members present, and it was generally conceded that the practice of sowing the seed in the fall in connection with winter grain would have to be abandoned, as in so large a percentage of years the success of this plan had been so limited.

Astonishing yields of hay from clover seed sown in summer, after a crop of early white potatoes had been dug, were reported. These

statements aroused much interest, and, as the attendance was good, it was resolved to hold the annual meeting at the same place. After some discussion on the different powers of absorption possessed by milk of various degrees of temperature, the Board adjourned.

The annual meeting of the Camden County Board of Agriculture was held at Blackwood November 22d, 1892, when an address on the origin and objects of the State Board of Agriculture and its desire to assist the County Boards, was delivered by Edward Burrough, President of the State Board, for the information of the gentlemen present.

A practical paper on poultry-raising by the incubator and brooder method, was read by Nathaniel Barton, in which artificial hatching was advocated as the most successful plan. During the past six years the profit of poultry-raising has been much lessened, and the statement was made that at this time the business is of doubtful profit.

AFTERNOON SESSION.

By request, Rev. F. R. Brace, late Superintendent of the Public Schools of this county, made some remarks on the efforts that have been made to introduce the study of agricultural chemistry into the public schools. In the course of his address he alluded to the great advance in agricultural science, as well as in all others, during the last one hundred years.

President Burrough, by request, addressed the Board on the road question, illustrating by facts and figures the practical economy of good public roads. That the question of such improvements is claiming a large share of attention in this county, as well as in other parts of the State, is evident; and the opinion is held by a great many farmers that stone roads have become a necessity, on our main thoroughfares at least. The lateness of the hour in the afternoon session precluded much discussion on the subject, but enough was said to give emphasis to the demand for better roads everywhere.

Both the meetings above referred to were among the best we have ever held, both in the attendance and in the interest shown.

ESSEX COUNTY.

ESSEX COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President	I. S. CRANE	Livingston.
Vice President	A. E. HEDDEN	Verona.
Treasurer	A. E. HEDDEN	Verona.
Secretary	J. H. M. COOK	Caldwell.

BOARD OF DIRECTORS.

C. B. CRANE	Caldwell.
R. C. CAMPBELL	Caldwell.
F. C. GOBLE	Verona.
WM. DEICKS, SR	Livingston.
A. W. HARRISON	Livingston.

DELEGATE TO STATE BOARD.

C. B. CRANE (for two years)	Caldwell.

ANNUAL REPORT.

The farming portion of Essex county is a land of steady habits, and a truthful report of one year will not vary materially from that of previous years as regards the crops grown and the methods pursued.

Nature has responded bountifully to our efforts, and our crops have fully equaled the average season, and prices have been fairly remunerative.

The wholesale dealers and middlemen are becoming fewer and less prominent every year, our farmers are selling more directly to the consumer, and the improvement in our traveling facilities to and from the cities is bringing the consumer directly among us, and in some instances converting our farms into suburban villages. We can notice steady progress in the direction of intelligent and scientific

farming. More advanced methods are pursued from year to year, which indicates that our farmers, and more especially the young and energetic, are working with their heads as well as with their hands.

The raising of milk continues to be the leading industry of our county. A number of large and commodious barns have been finished, and equipped with all the modern improvements for the comfort of the stock, as well as for the saving of labor, notably the new barn on the Fairfield dairy farm of Mr. Stephen Francisco, in Caldwell township, which is said to be the most complete dairy barn in the State. It is certainly commensurate with this age of progress.

Our Board has held the usual meetings during the year, and, with the assistance of the officers of the State Board, conducted two Farmers' Institutes, one at Caldwell and one at Livingston.

At the Caldwell Institute, Prof. Voorhees, of New Brunswick, favored us with an instructive address upon the various kinds of soils and the fertilizer best adapted to each. Mr. Dye spoke upon the education most essential for farmers, and his address was well appreciated. A discussion upon roads occupied a considerable portion of the afternoon session. In the evening, Mr. C. C. McBride, of Elizabeth, told us why the boys leave the farm, and Wm. R. Ward spoke about the culture of small fruits. Mr. E. Williams gave us some good plans for a family garden. The attendance was good, and all felt that the day had been profitably spent.

At the institute in Livingston we were unfortunate in having stormy weather, and, as a result, the attendance was small, but those present were well paid for coming. We were favored with an able address upon progressive agriculture by our State Secretary, and Mr. J. B. Sherman instructed us upon the raising and marketing of small fruits.

The work of draining the Passaic valley is still in progress, but no result is, as yet, apparent. The part of the work thus far done is the excavation of the rock below the reef and dam, which, although necessary to be done, cannot afford us any relief. So long as the reef and dam remain, all the meadows above are in as much danger as ever from the freshets. Our farmers are discouraged by this delay. They expected better results from all the time that has been spent upon this work. The health of our people, if nothing else, demands that these meadows be drained *at once*, and it is very hard to understand why it takes *years* to accomplish it.

The farming townships of our county are still in need of the same political reforms as noticed in my last report, viz., a fair representation in the county government, and a more equal system of taxation.

I am favored by Mr. Williams and Mr. Goble with the following reports, which I take pleasure in appending. Mr. T. F. D. Baker, of Bridgeton, a successful market-gardener, delivered an instructive address upon intensive farming before our Essex County Board of Agriculture. An extract from this address is appended.

REPORT OF MR. WILLIAMS UPON GRAPES.

Mr. E. Williams, of Montclair, reports the season of 1892 worthy of long remembrance as being very favorable for perfect maturity and development of the grape crop. The season up to the 1st of July was wet, greatly hindering cultivation and rendering nugatory much of our labor in this line. Many a day's war with the weeds was followed by a shower during the night, which gave our enemies a look of defiance the next morning. From July on, drought prevailed, which enabled us to clean up and keep so until our crop was harvested.

Moore's Early opened the season September 9th, just nine days later than the same variety ripened last year, and there was not a rainy day that interfered with harvesting the crop till it was finished. This unprecedented state of things enabled the grapes to ripen thoroughly and to attain their best quality, so that the loss from splitting was less than I had ever experienced.

The Pocklington suffered most from this, which seems to prove this variety to be chronically weak in any season here, and on my soil its redeeming qualities do not suffice to warrant its retention.

The Woodruff, which has a tendency to crack, showed scarcely any tendency to do so this season. The clusters were large, compact, generally shouldered, and the grapes ripened up to a high brick red, which made them very attractive to the eye. The quality, to my taste, though never very good, was rather better than usual.

Brighton and Lindley are my favorite red grapes, and both succeeded remarkably this season. The former were never finer on my grounds. These grapes were about as near perfection as possible for natives, and I notice a growing appreciation of such fruit among customers.

Niagara still holds its own against all competitors thus far among the white grapes, for size of berry, clusters and productiveness, while the quality meets with universal commendation, as I grow it, when fully ripe.

The Green Mountain promises to be the earliest white grape, with Colerain a close competitor. Diamond has not reached the ideal I had formed of it, yet I am hoping that another year may give the hoped-for increase in size of berry and cluster, as well as in good quality. Esther and Witt are among the new ones that are promising.

Worden, Cottage, Concord, Wilder, Herbert, Merrimac and Amima hold their own as the most desirable dark grapes.

Cottage sometimes drops badly soon after ripening, but this fault has not been apparent this year, showing that there is something in the season to counteract this habit.

There is little to choose between Delaware and Berckman. They are identical in size and color, and equally good in quality, but both are rather too small to be profitable. Eaton has size and good looks to recommend it, but it lacks that quality of sweetness which makes Worden and Cottage both so desirable. No matter how good a grape may be in other respects, if it lacks sugar to overcome its acidity, it fails to reach my standard for a table grape.

Elvira, Noah, Grein's Golden, Montefiore, and grapes of that class, may answer for wine and such use, where sugar can be added, but as table grapes they come under my ban. Lady Washington was never so fine as this season with me, and Brilliant would delight the taste of the most exacting connoisseur.

Rockwood was late in ripening; Catawba, Highland and Black Defiance ripened fairly well, which they do not usually do here.

Anthracnose was the only serious malady that troubled our vines, and is the one enemy we desire to subdue. There was very little rot or mildew, both of which seem controllable with copper sulphates.

REPORT BY MR. GOBLE ON GREEN-HOUSE BUSINESS.

The growth of the green-house business goes steadily on. More growers keep changing from the old style of hot-bed and cold-frame to the house, either with or without heat, the superiority of which it seems the masses are slow to grasp. When once they have tried the

house, they wonder how they ever got along with the hot-bed and cold-frame. But it is like many other things that we do not possess; once we obtain them, we are more unwilling to release, unless it be another step in advance.

There has been no marked increase in the amount of glass erected. There is fully as much glass in use at present as the needs of the market require, if prices are any criterion by which to judge.

Growers of both vegetables and flowers, I think, should turn their attention now to getting the most returns from the glass they have at present, rather than erecting more. Like our best farms, it is not the quantity of glass one has that makes the money, but the best culture. In other words, intensive culture under glass as well as on the farm.

Flowers of all kinds never sold so low as at this writing, January 25th, 1893, and the price all winter has been very low. At Christmas there was a big jump in prices for two or three days, and then everything fell flat again, and up to the present they have been unable to rise any higher than when they dropped, and probably will not before next winter. Good stuff will sell at some price, but poor finds its way to the ash-barrel and the dump.

This is not as it should be. It seems to me as though the supply has gotten ahead of the demand a long ways, and, unfortunately for the growers, they are unable to curtail the output of their plants by running on one-half time or one-fourth time until such time as the market would absorb all of their productions. This would be the way of procedure of the coal barons or manufacturers in general, but not so the poor florist. Through "sunshine and shadow" he pursues the even tenor of his way, and accepts what the good Lord sees fit to bestow on him, even though the receipts fail to cover expenses.

The rose still is "Queen;" more of them are grown, and better than ever before. The carnation, "the divine" flower, comes next, and a good second. To show how things change, two years ago pink carnations sold for the highest price, now they are the lowest. Two causes—not so many used, and more grown; supply and demand to the letter. White now brings the most money. Then follow violets, Roman hyacinths, lily of the valley, and a long list.

Rusts and various other things, both animate and inanimate, serve to make the florist's life anything but happy. It seems as though the Experiment Station might do something to help keep these pests in check.

EXTRACT FROM AN ADDRESS BY MR. T. F. D. BAKER.

All agriculture is divided into two great divisions as regards the manner in which it is pursued. One division is characterized by the attempt to produce, by high culture, proper feeding and double cropping, as much on one acre or on ten acres as is commonly produced on twice or even thrice that area. In this sort of agriculture all our efforts are intensified. It is intensive agriculture. The other division is characterized by the looser culture of many acres. All the operations are extensive. It is extensive agriculture. The great grain farms of the West are apt examples of extensive agriculture, where single owners own and operate whole townships and counties, numbering thousands of acres.

The limit of acres and the ambition for wide cultivation narrow as we approach the more densely-populated States of the East. This is particularly true of New Jersey. Situated as we are between the two great cities of New York and Philadelphia, with their million mouths to feed, we find our farmers drifting toward the intensive side of agriculture; and this high culture is really the only key to solve the problem of the depressed condition of the farmers of New Jersey. It has become a matter of vital importance that we familiarize ourselves with the process by which the land can be made to yield two and three crops during the season, and yield from $200 to $300, and even more in many instances, per acre in a single year. Our large cities, and, to a surprising extent, our small towns and villages, must be supplied with fresh and nutritious fruits and vegetables.

But it is only those growers who can grow the most, the earliest, and the best products on the least ground and with the smallest outlay, by means of their superior knowledge and adaptation to the business, that can hope for great success in gardening. The secret of success lies in the promptness and thoroughness with which every operation is conducted.

Each and every item of detail, from the preparation of the soil, selection of seed, proper varieties, &c., planting, enriching the soil, cultivation, harvesting and preparing the crop for market, and then a proper discretion as to markets, all tend to aid, and, in fact, are indispensable for success, and count for profit or loss just as an individual knowledge and ability is displayed in the management. The methods are, for the most part, simple and capable of application to any gar-

den and to most soils. But the vegetables rarely bring a high price, and the gardener can only make money by producing double the crop per acre, marketing them in season and in the most attractive condition—all the outgrowth of his acquired knowledge and applied skill, which are the only secrets of success.

I will endeavor to point out the essential points needful for success as they appear to me from my standpoint of observation, after sixteen years' practice among the vegetables and fruits of a market-garden.

My first place to look to as a source of profit in gardening would be the market I could supply. This is an all-important factor by which to gauge profit and loss. It is required that you become familiarily acquainted with the inhabitants; study their likes and dislikes in those matters pertaining to your business. Only through this knowledge gained by a few months' intermingling can you select such crops and in such quantities as will supply at a proper time the wants of the people. Such vegetables as are not known, or that are in light demand, encourage by keeping before their eyes, but only in small quantities, till the demand grows. I am speaking of small towns and cities, which I consider the best market in the country to-day for the gardener. Select the small towns with from 5,000 to 10,000 inhabitants, and content yourself to grow only such fruits and vegetables as are in demand, and only in such quantities as are needed.

The location of the garden is a very important matter, as well as its adaptability for the production of the various crops. In no branch of husbandry are time and labor required to account more for their output than in the garden. All operations are tedious, requiring deft action and diligent application. The crop that is weedy to-day, becomes hopelessly overgrown to-morrow. The vegetables that are in demand to-day on a light supply at a handsome profit, may to-morrow find a crowded market with a corresponding decline in prices. The location of the garden is a very important matter, because the time consumed in going to and from market, with the wear and tear, must be counted. Every hour so spent represents so much money. If one man can market his produce each morning in two hours, and it requires his competitor half a day to perform the same business, the first man realizes a margin of that much time, which counts as so much money. A near location enables one to take advantage of the ups and downs of the market, and a location where sufficient force

can be employed at short notice to gather a large crop and market it all the same day, is often a great advantage. An illustration of this occurred last summer. A grower of strawberries neglected to have a sufficient number of pickers to finish his patch on a Friday, and was compelled to finish the next day, it being Saturday. The berries, having to be sent ninety miles to market, had to lie over until Monday morning in the cars. The consequence was that the hot weather ruined them, and they had to be sold (544 quarts) for 2½ cents per quart, while those sent on Friday (864 quarts) brought 14½ cents per quart. Two and one-half cents per quart did not pay the expense of picking and freight.

Next to location, the adaptability of the soil and the acreage to be cultivated should be considered. If any one crop is to be made a specialty, it should not be decided upon hastily. Many things are to be taken into account, all of which are important, and will show for either profit or loss. The soil, the climate, facilities for marketing, amount of capital to work with, the amount of labor to be at command, and the character of the labor to be depended upon, are all important; but the most vital of all is the natural and inherent liking for the vocation we have chosen. We should not only avail ourselves of all existing knowledge, but persistently seek for more pertaining to our business. It has truthfully been said, "Brain is king, muscle is subject," and whoever is deficient in the former will succeed better in any other business than farming.

The garden should be confined to a few acres, and we should exert ourselves to intensify cultivation, and produce at least two crops per year on the same ground. The larger the number of crops grown, the greater the variety of tools and implements needed; all of them must be kept in repair, stored and cared for. This is an expense of no trifling amount.

A knowledge of the wants, habits and tendencies of the *particular* crop we cultivate, and the means of successfully combating and exterminating the fungi and insect enemy, is more essential to success than a superficial knoweldge of many crops. When the habits and wants of a plant have been made a special study, and these wants and conditions complied with by an intelligent cultivator, success is about as sure to follow his labor as seed-time and harvest are sure to come.

It has been demonstrated beyond a doubt that the quantity of acres and multiplicity of crops have nothing whatever to do with assured

success or profit in market-gardening. But, on the other hand, the man who has confined himself to a line of special crops, and those which by careful experiment he has found best adapted to his particular soil and market, and who has, through diligent application to his business, developed extra large yields and finest specimens, or, by his superior ability and intelligence, produced his crop but one week ahead of his competitor, is the man that reaps the reward and pockets the profits.

In my experience, soils do not exert the all-important influence claimed by some people, but there are exceptions to this assertion, and some soils are entirely unfitted for some crops, and no amount of knowledge employed in the cultivation and manipulation will alleviate that unfitness. The result will be a failure of the crop. Again, we find soils especially adapted to the growth and perfect development of certain plants, such as the peaty bottoms for celery; land which for some other crops would be entirely worthless, and to attempt a crop of early vegetables upon such soil would be virtually wasting time, labor and money.

A sandy loam as deep as friable is best for a general garden, but the matter is very largely within the control of the operator, provided the surface is underlaid with a good subsoil, which acts as a bank to retain the soil-water, with its mingled ingredients of plant-food which are and may have been applied from time to time. The subsoil can be by each year's cultivation gradually intermingled with the surface soil without injury, and by repeated operations of this kind, and liberal manuring, the soil will become as deep as can be plowed.

The fertility of the soil is a very important matter, and the best way to obtain this desired condition is a very perplexing question. Too many gardeners are hampered by a lack of funds or working capital to invest on a venture what to many appears to be a snug, round price for the land itself, in manure to produce the crop. In the selection of our fertilizing elements, a knowledge of the ash-ingredients of the plants to be fed aids in selecting from the various sources at our command. Plants, like mankind, have their likes and dislikes, yet do not possess the intelligent power which enables the individual to accept or reject; consequently, plants are often injured and their healthy vigor impaired by the application to the soil of some objectionable element.

Stable and yard manure is by many considered a complete manure, and as such indispensable for the market-garden; but my experience leads me to differ from this conclusion, and I give as my reason a series of trials and experiments, which have been very carefully conducted during a period of sixteen continuous years. As a result of my experiments, I find that a combination of stable manure and commercial fertilizers has and *invariably* does produce the best, earliest and, consequently, the most profitable crops. Aside from such combination, I have invariably received most satisfactory results from the use of fertilizers alone, at a less expense than when stable manure was applied alone on the same plot and crop. While I make all the manure I can, and save all I make, yet such is my experience that I do not buy one load a year, but depend entirely upon commercial fertilizers to produce my crops.

I have one plot of six acres that has been cropped continuously for fifteen years without the application of so much as a handful of stable or yard manure, and is producing better crops each year, and the soil still remains as loose and friable as when cultivation began. One reason that stable manure does not give the best result is that the time required to grow a crop of vegetables is so short, averaging only sixty-seven days—that is, for seven crops grown in the garden. This time is not sufficient for the elements of plant-food to get properly disseminated through the soil to afford the nourishment, as does the fertilizer.

GLOUCESTER COUNTY.

GLOUCESTER COUNTY BOARD OF AGRICULTURE.

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Vice President	SAMUEL ASHCRAFT	Mullica Hill.
Secretary	THEODORE BROWN	Swedesboro.
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DELEGATES TO STATE BOARD.

DAVID BORTON (two years)	Mullica Hill.
DAVID T. BROWN (one year)	Swedesboro.

ANNUAL REPORT.

BY THEODORE BROWN.

There have been five meetings of the Board the past year. The regular meetings are held the first Monday in December, March, June and September. One special meeting was held February 8th to hear the reports of the Delegates to State Board and to the State Horticultural Society. The attendance was good and much interest manifested.

Meeting, March 7th.—Discussion on improvement of roads, opened by D. S. Adams. The putting up and marketing of our produce, by Thos. Borton, John Repp and others. The general opinion expressed

was to keep the poor produce at home. Put the best up in good shape and have thoroughly honest men to sell it on its merits.

Meeting, June 6th.—The question of indorsing the new Telford Road law was discussed at length, when the following motion was carried:

"That we indorse the building of the one mile of Telford road petitioned for in Swedesboro under the new law."

Meeting, September 5th.—Questions discussed: "The most profitable variety of sweet potatoes;" "Are our county bridges costing more than is necessary?" John Repp reported that he was more convinced than ever as to the good results of spraying for the pear leaf blight—sprays with 6 ounces carbonate of copper, 2 quarts ammonia, to 100 gallons water.

Meeting, December 5th.—Amos Gardiner, President, gave an interesting account of his experiment with fertilizers on white potatoes.

CROP REPORT.

White Potatoes.—In this county mostly early varieties are planted. Owing to drouth and large acreage planted, the average crop was light and price low.

Sweet Potatoes.—This crop has the largest acreage in Gloucester county of any except grass and corn. The yield this year was early and large and the quality of the best. The acreage in the South was light, consequently they brought good prices. The first large shipments were about August 15th. Price, at Swedesboro station, $4.50 per barrel, falling to $2 per barrel September 1st, and $1.50 per barrel October 1st. These prices are little more than the average, but the large yield made them a profitable crop. The bulk of them were sold right from the field. Those who stored them for higher prices are realizing a handsome profit. Price, December 1st, $3 per barrel, with prospects in seller's favor.

Watermelons are planted largely in some sections of the county. The crop was late and heavy, quality good, but, with the exception of a few early ones, the price was not high enough to make a profit.

Cantaloupes were a medium crop; quality good where best varieties were planted. The price for "Golden Jenny" and "Jenny Lind" was from $1.50 to $4 per barrel. Some, picked green for shipping long distances, sold very much lower.

Early Tomatoes and Eggplants are grown extensively. This year tomatoes were a light yield, but the price was high and they were a profitable crop. Many crops were injured by worms eating them, causing them to rot. Eggplants were a good yield, but prices were low.

Grain.—Corn, an average crop, gathered in first-class condition. Wheat not so much planted as formerly, but yielded an average crop, as did rye.

Fruit.—All kinds of fruit were a light crop and prices high, with the exception of grapes, which were a heavy crop and prices below cost. The best crops of apples and pears were mostly in orchards that have been sprayed for two or three years.

Grass.—The pasturage for some parts of the season has been short; also, young sowed clover is not so large as we would like. The hay crop was above the average, and was secured in good condition.

Stock.—Since the formation of the Dairymen's Milk Protective Association, the production of milk is on the increase in this county. New milch cows are selling from $40 to $75. Hogs are more profitable than for several years. Price, $7.50 per 100 pounds. Large quantities of fine poultry are grown in this county, city buyers coming to all the principal villages and providing a cash market at remunerative prices. As an illustration: "On Thursday, December 15th, over fifty barrels of poultry were received by the dealers at Swedesboro, and over two thousand dollars were paid out by them. This does not include what was received by the local dealer. Prices ranged from 15 to 19 cents per pound." Farms are selling better than last year.

The County Board held a Farmers' Institute at Mullica Hill, November 10th and 11th, conducted by Franklin Dye, Secretary of State Board. A brief account of the proceedings, with some of the papers read, is presented with this report:

The Farmers' Institute, held at Mullica Hill, November 10th and 11th, was a complete success. The programme was fully carried out, and much interest was manifested by those present in discussing the various subjects as they were presented. The exhibit of choice apples, pears, corn, potatoes, celery, flowers, &c., attracted much attention.

At the evening session, President Burrough, of the State Board, gave a description of the World's Columbian Exposition buildings and their surroundings at Chicago, illustrated with maps, charts, &c. Mr. Burrough requested the farmers of Gloucester and Salem counties to bear in mind that next summer they will want vegetables displayed in the New Jersey pavilion at the Exposition; special display of potatoes being in September. Rare vegetables or fruits, old agricultural implements, &c., will be gladly received by the committee.

Prof. J. B. Smith, of New Brunswick, read a paper at the Friday afternoon session on sweet potato and melon insect pests, and he gave the farmers some very valuable information regarding these insects—their habits, ways of exterminating them, &c.

Prof. E. B. Voorhees read a paper, replete with valuable points, on maintaining the fertility of the soil on dairy farms.

Dr. Parry presented the benefits possible to milk producers from the Milk Protective Association. (See paper in Burlington County Report.)

Prof. Louis Bevier presented the work of the Agricultural College in its relations to the agricultural interests of the State, and bespoke the co-operation of the farmers in extending its usefulness.

E. Williams, of Montclair, N. J., gave a valuable lecture on "Fruit-growing." Mr. Williams spoke from a life-long experience in fruit culture, and his address was of great value to all who heard it.

Some of the papers read are printed herewith in full.

ARTIFICIAL HATCHING AND REARING OF CHICKENS.

BY MICHAEL K. BOYER, OF HAMMONTON, N. J.

I always enjoy the privilege of addressing farmers upon the subject of poultry-raising, for I believe that, as a class, no people are better adapted for the business than the men of the farm. My reasons for such a belief are several:

First. The farmer would make the business an adjunct to other work. In the town of Hammonton, where the broiler business is carried on on a more or less extensive scale, it forms an adjunct to such work as vegetable-growing or fruit-raising. In other words, it becomes a winter job for the farmer, and as such is profitable.

Second. With an unlimited range, poultry in its several branches can be more successfully raised. I believe the time is not far distant when every farm that is run by an enterprising farmer will carry on the artificial business of hatching and rearing chickens as a winter pursuit. Will it pay? Those trying it declare they can make more money with their brooding-houses than they can out of any of their summer crops. Of course, such opinions are open for discussion.

The very first thing to be done in this matter is to make a choice of incubators. There are many makes upon the market, and if I were going to give my opinion of them, I could occupy your time for several hours. Your best plan is to write to several of the manufacturers and get their circulars, from which you can better judge which you would like. Choosing incubators is about on a line with the selection of any other kind of machinery. More depends upon the operator than the machine, and for that reason it is too hard to point out the best. For fear that you may not have any addresses of reliable incubators, I would beg leave to submit to you the following addresses, from which can be secured circulars which will more generally describe what they have for sale: Prairie State Incubator Company, Homer City, Pa.; Pineland Incubator Company, Jamesburg, N. J.; Geo. W. Pressey, Hammonton, N. J.; James Rankin, South Easton, Mass.; A. F. Williams, Bristol, Conn. There are more reliable concerns, but I am only giving you those who, from my actual experience, have proven themselves to be responsible business men and makers of good machines. These same parties also make brooders.

Having made your selection of incubator, the next thing is to have a place to put it. I like the cellar plan the best. That is, dig a cellar about two or three feet deep, and wall it up with stone. Let the wall extend a foot or more above the level of the ground, and put a roof over it. This will give a place in which an even temperature can be kept, and in which an incubator can be run with considerably less trouble than when placed in a room. It must not be forgotten that all makes of incubators are affected by outside temper-

ature, so that a room that is readily changed from cold to warm must cause more or less trouble to the machine. While an expert might be able to keep abreast of these changes, an amateur, as a rule, would experience considerable loss.

The brooding-house comes next. The regular-style house is a long building heated by pipes. The building is divided into sections, or pens, and each one of these pens is supposed to accommodats from one hundred to one hundred and fifty chicks. But I do not recommend these large houses for the farmer, as he has the land to give the brooding better attention. The best plan is to have single brooders, and erect a small house for each brooder. As many of these houses can be put up as will be necessary to hold the amount hatched. Now, if these houses are scattered about, each flock can easily be taught to know their own home, and, after the chicks are two weeks old, there will be no more trouble with them than there would be with a hen and her young. This is the colonizing plan, and I think it is the best that can be adopted. There is more work attached to this system than the one-house plan, but the chicks will do better and the loss will be less than by any other method. Of course, there are no yards attached to these brooders, the chicks having an unlimited range. It might be questioned that it would be dangerous to allow the chicks at such a tender age to have their freedom. The first two weeks they, of course, would be kept indoors, as heat is the most necessary then. After two weeks old, they can safely be allowed outside, but for a few evenings care must be taken that they are all in. After a day or two they will understand it all. Chicks can stand considerable cold if a warm brooder is ready when they want it. Raise chicks in that way, and the stock will grow up hardier and there will be more money in it.

It is not my object in this address to give you all the particulars in the business. It would require entirely too much time to do that. I am here, mostly, to point out the rudiments, and, if possible, interest you in the enterprise. I want to show that you, as farmers, are well equipped for the work, and that the country is standing ready for the product.

What is an incubator? It is nothing more than an ingeniously-devised box, as it were, so constructed that it will hold the necessary heat by which the egg is hatched. Some machines have regulators, by which considerable labor is saved the operator, but there is no

machine made that will do *all* the work. Remember that. I mention this fact, inasmuch as some people seem to have the idea that a self-regulator can take the place of the man—that you merely "press the button and we do the rest." No. The best regulating machine in the country needs regulating, and without attention no incubator will work. An incubator, literally speaking, is a wooden hen. It takes the part of the real hen in furnishing the heat to the egg. The matter of moisture, ventilation and the minor details must be attended to by the operator, and, as these are of the utmost importance, it follows that a machine is what its operator makes it.

The argument is sometimes advanced that an incubator-hatched chick is never as hardy as one brought out by the hen. If the operator does his part, there is no reason why a chick hatched by the artificial method should not be as strong and healthy as one brought out by the natural method. The condition of the chick properly incubated is made so by the parent stock, for neither hen nor incubator can change the condition of the embryo chick.

But after the chick is hatched is when the fine work tells. Improper brooding will destroy more chicks than any incubator can hatch, so the question, Which is the best brooder? is probably more important than anything else. A brooder that will maintain a regularity of heat is just as important as an incubator that will keep up the temperature regularly. Nothing will destroy chicks so quickly as insufficient heat at night. Cold chicks will crowd; comfortable chicks will spread out in their brooder. When chicks crowd, the weaker ones are trampled underfoot, and those that are on the outer edge of the crowd are sure, sooner or later, to show signs of bowel troubles. Bowel troubles will perform the work of destruction.

"What shall we feed?" comes next. On this score, authorities differ. I am not prepared to say which method is the best, but I can give you the plan which I adopted, and which in my experience has been found good: I begin with roll-oats. I also scatter bread crumbs about so they can eat them at will. This style of feeding will do for the first week. Then mix a feed of one part bran, one part middlings and one part corn-meal, with a little meat scraps. Scald this mixture an hour before using, so that it can be thoroughly soaked and has a chance to swell. Feed it crumbly, never sloppy. Keep a watch on the bowels—if they are loose, increase the quantity of middlings; if they are costive, increase the bran. And when this method fails, and

there is undue looseness, I would recommend the remedy as given by G. A. McFetridge, in his book on "Poultry:" Give one teaspoonful of turpentine to one quart of soft food. Mix thoroughly before feeding. Give this mess morning and evening, and the balance of the day scatter cracked wheat about the pen at intervals of say two hours. A good plan is to bury some grain among litter of leaves, so as to induce exercise. They must also be supplied with green food. In winter, chopped cabbage is very good. Lettuce is also excellent when it can be had. A small box of charcoal and grit should be constantly within reach.

For grit, I like crushed flint the best, but, in case this cannot be had, ground oyster shells or gravel will do. After the chicks are three weeks old they should be gradually induced to eat whole wheat, and this should then be followed up with cracked corn, and finally whole corn. By the time you have got the chicks on a whole-grain diet, more than half the battle is won.

I have gone to some length on this feed question, because I think it is the most important of the entire work in broiler-raising.

Now, where farmers are so situated that they can give the work more winter care, it will pay them to continue hatching until way into the summer. It pays to do so, and some of the Hammonton men, who have been raising fruit in summer and broilers in winter, are now considering the advisability of operating their plants the entire year round. Certainly, if the summer prices keep up as they have been the past two years, there would be good money in it for them to do so.

I have been trying, but only with partial success so far, to induce the United States Agricultural Department at Washington to issue bulletins on the subject of broiler and egg-raising among the farmers, and thus give a wide circulation among the rural districts of such knowledge as will enable the farmers to undertake the work. Our markets are not half supplied, and poultry-raising is growing to be an important industry. It belongs to the farm as much as any other kind of stock-raising. We are annually taught by that excellent department how to manage our hogs, and cattle, and sheep, and horses, but the American hen is not protected. Our State experimental stations do not seem to think the business of sufficient importance, judging ftom the amount of experiments tried, and so it is that what is destined to become the greatest of all farm enterprises is cast aside for matters that are not of as much importance.

But the farmer can learn without the aid of the government, if he will. We have ably-edited papers and books upon the subject, and by the aid of these, and the experience that will naturally follow practical work, there is no reason why the farmers of Gloucester county should not make the artificial hatching and rearing of chickens and ducklings an important industry.

NOXIOUS WEEDS, AND HOW TO EXTERMINATE THEM.

BY BENJ. HERITAGE, OF MICKLETON, N. J.

We once knew a Pennsylvania farmer whose land was badly overrun with the horse nettle, and after having used every means in his power, without avail, to exterminate it, he called in the aid of the local Farmers' Club, and obtained the united information of its members relative thereto. He returned home with renewed hopes of making an early conquest. Time passed on, and after a considerable period had elapsed he reported to the club that he had got rid of the horse nettle. Greatly pleased and deeply interested, the members began to inquire how the difficult task had been accomplished. He informed them that he had sold his farm.

During the past season there has been found at Swedesboro, and another at Lansdowne, Pa., a specimen of *Solanum rostratum*, a full brother of the horse nettle; it has no common name given in the books. This is a pestiferous plant of the plains from Nebraska to Texas, and has been hitherto reported as spreading rapidly eastward as far as Illinois and Tennessee. It may be looked for soon, and, with the horse nettle, should be stamped out, if possible, on their first arrival here, else we may be unable to cope with them.

The Canada thistle has long had a very bad reputation, and as far back as 1848 our State Legislature passed an act to prevent its spreading. The act sets forth that "if any person or persons owning, possessing or having care or charge of any land or lands, improved or unimproved, inclosed or uninclosed, in this State, shall knowingly, willingly or willfully permit or suffer any Canada thistle to grow up thereon, and suffer the same to stand until its seeds get ripe, he, she, or they shall, for every stalk or branch thereof so suffered to grow up, forfeit and pay a fine of twenty-five cents, to be sued for and recovered, with costs, by any person, in his name, before any court of competent jurisdiction."

Further north this weed is a terrible pest. We have seen hundreds of farms completely overrun with it in the Eastern States, New York and Canada, where it was first discovered, whence its name. Like a very large majority of our bad weeds, it is an immigrant from Europe, where, strange to relate, it is a comparatively harmless plant, and spreads but little; while in the sections of this country above-mentioned it is peculiarly at home, and has greatly developed the character of spreading rapidly both by seeds and roots.

It, too, has at least gained a foothold in our county, as we have proved by ocular demonstration. There is a patch of it in the Repaupo meadows, and there was a small patch of it on the farm of Chas. Heritage, but, being early made acquainted with its bad character, he prosecuted a vigorous warfare against it, and completely stamped it out in this way: Every Second-day morning he took a hoe and removed every visible vestige of it. No plant can endure a long-continued warfare like that and survive. In this case, he succeeded in killing it the second season.

Isaac C. Martindale, a distinguished botanist of Camden, has thoroughly investigated this weed, and he asserts that, as far south as Camden, it very rarely or never produces fertile seeds. We first saw it in Repaupo in 1886, and, never having seen or heard from it since, we were desirous of ascertaining what the outcome of it had been—whether it still exists there or not, and, if so, whether it has spread much or not, and by what means, whether by seeds or roots, or both. Having these objects in view, we visited the locality recently and had an interview with the owner of the lot, who resides within three minutes' walk of the thistles. He was apprised of their bad character six years ago, and made acquainted with the law relative thereto, but he informed us on the occasion of our visit that he had never taken any steps towards their extermination. They are growing in good soil, on a ditch bank, in a pasture lot, where the stock have trampled them somewhat; otherwise, they have grown unmolested during the last six years, and we find they occupy very little if any more space now than then. The dead stalks that have bloomed the past season are very much farther apart than those of that time, and are probably about one-fourth as numerous. We thoroughly examined a large number of young plants, in order to ascertain if any of them were seedlings, and were delighted to find not a single one. All of them suckered from the old roots, and we record this as confirming the

investigation of our friend Martindale; for, had the plants produced perfect seeds, some of them, at least, would most undoubtedly have germinated and grown either among the old plants or in their vicinity. We were also pleased to see that the flowering stems had died, not to the ground merely, but to the bottom of their roots, as though they were biennials, and the indications are that in a few years, at furthest, the thistle, for this locality, will become extinct without any aid from the owner of the land, and, if it grows elsewhere as here, the Canada thistle need not be greatly feared by the farmers of Gloucester county; but, lest it should not, we would recommend a determined warfare against it on its first appearance.

In many parts of Virginia they have a very noxious weed, locally known as blue thistle, blueweed, &c., technically called viper's bugloss, the *Echium vulgare* of botanists. Along the line of some of the railroads the fields are literally covered with this pestiferous weed for miles together. It grows from one to two feet high, is rough, bristly, and bears short lateral clusters of showy, reddish-purple flowers, which change to a brilliant blue. It might well be an object of beauty for the flower-garden, were it not for its bad reputation. Being of a thistle-like nature, though of a different natural order from our six species of regular thistle, it is shunned by stock, and as it so nearly covers the ground, there is but little space left for the grass in the pasture-fields. These weeds must necessarily draw very heavily upon the valuable constituents of the soil, and the ground, already impoverished, is constantly becoming more and more so in consequence of them.

Whether this weed will ever become as well adapted to the soil of Gloucester county as it is to that of Virginia, we do not know, having had no ocular demonstration of the fact, as we have collected specimens of it and destroyed all the rest we saw in two different places within our borders. This, too, is a weed that should be closely watched, for should it ever gain such a foothold here as it has in some parts of Virginia it would greatly depreciate the value of our farms.

Among our eighteen species of Gloucester county knotweeds, or *Polygonums*, to which our leaden-heart and smartweed belong, there is one of recent introduction here which deserves more than a passing notice. It is known botanically as *Polygonum Muhlenbergii*, but without a common name given in the books. We have met with it only in the Repaupo meadows. The universal testimony of a number

of lot-owners on whose land it is found is that it put in an appearance there for the first time after the great freshet of 1876, when the enormous tidal wave overtopped the bank and inundated the entire tract. Ten years afterwards, when we first saw the weed, it had become fully established in some of the best lots of the tract, and was confined to those that had been plowed and cultivated.

It has the general character of all the other *Polygonums*, that is, its many enlarged joints, and stipules in the form of sheaths. Its generic name, *Polygonum*, is from the Greek word *polus*, many, and *gonu*, a knee, hence many knees or joints. We see the name whenever we meet with a plant of that genus. Its specific name is in honor of the Rev. Dr. Muhlenberg, of Philadelphia, a distinguished botanist who flourished during the early part of the present century. It is a perennial, and has very long, root-like subterranean stems, almost as thick and strong as grape vines. These stems throw up shoots at short intervals, and from various depths, and with the roots proper they form a subterranean network penetrating at least three feet into the earth, and how much farther we know not, as our investigations ceased at that depth. We measured a square foot of surface, and carefully removed the earth and roots from a six-inch space all around it, to the depth of one foot, in order that we might the better dig deeply. We then dug the plants on that square foot, going down to the depth of three and a half feet, and at that depth took out roots fully as thick through as the leaf-bearing stems. Three days after, we thought to weigh the product of that square foot, and found it exceeded the rate of twenty-seven tons per acre. What an impoverisher of the soil it must be!

It is very difficult to plow the infested land on account of the great root growth, and the after-cultivation is also difficult because of these subterranean stems and roots, not to mention the very vigorous growth of the weed. When portions catch on the cultivator and are dragged to another place and are dropped, they continue to grow. In this way the pestiferous thing soon becomes established in every portion of the lot.

None of those who had had experience with the plant ever saw any bloom upon it; but, upon our third visit to the locality, in company with a noted Philadelphia botanist, after a long and diligent search among seven acres of thickly-set plants, we succeeded in finding half a dozen specimens in bloom, but the flowers were fortunately all

abortive, and not a single seed would have been produced by the blooming plants. Later visits have confirmed the belief that the few flowers were all abortive. Did it produce seeds as abundantly as our other species of *Polygonum*, this noxious weed might soon become a great nuisance everywhere. It furnishes a good illustration of the fact that many plants which possess the power of spreading rapidly by their roots are wisely deprived of the ordinary method of propagating by seeds. Quack grass is another illustration. This pest spreads in a similar way by its stoloniferous roots. It blooms freely, but does not produce seeds in this section.

Sometimes seedsmen are responsible for the dissemination of noxious weeds, through their desire to lengthen their catalogue. A case in point comes to us in the fact that a well-known and generally reliable firm of New York, probably the largest dealers in seeds in the country, advertised a plant two or three years ago, which they said was a most excellent food for hogs, and recommended its cultivation. They stated the amount of seed it would require per acre and gave the botanical name of the plant, which was *Cyperus phymatodes*. Brother farmers, how many of you are aware that the plant is none other than the hated weed which you call coffee-grain? It is true, nevertheless.

Noxious weeds are often disseminated by sowing impure clover seed; and we are of the opinion that no time spent in his business will pay the farmer better than that occupied in the examination, with a microscope or lens, before purchasing, of samples of all his grass seeds, rejecting all that contain foul seeds. We once detected fourteen different species of noxious weed seeds in a small sample of clover seed offered us, and, had it been bestowed gratuitously, we think it would have proved dearer than pure seed at $20 per bushel. Therefore, we recommend the sowing of pure seed, not of grass only, but cereals as well, and that a war of extermination be waged against the countless host of noxious weeds that annually appropriate much of the fertility of our farms, and correspondingly lessen the profits of cultivating them.

GROWING SWEET POTATOES EARLY.

BY SAMUEL H. MOORE, SWEDESBORO, N. J.

Mr. Chairman, Ladies and Gentlemen—The subject "How to grow sweet potatoes early" is a matter which I have watched and tried to my own satisfaction. Although I may differ with some of

you, I will endeavor to give you my views on this subject. In order to grow sweet potatoes early, it is essential to commence one year previous to the growing of the crop; that is to say, by taking sod for watermelons or citron, and then plow down the trash or grass that may grow after them late in the fall, and give the same a top-dressing of manure, and leave on top of ground until spring; then apply a pulverizing harrow both ways so as to get the ground in good order; then strike out shallow and manure in hills about two feet seven inches apart; ridge the rows up as high as possible, that the sun may warm the ground. It is also necessary in growing early potatoes to have an early hot-bed, so as to have early sprouts. Great care should be taken to have the sprouts ready to set out as early as the weather will permit; put out none but good, hardy plants, as I find it very important to sort well the plants and set out no poor ones. When I come to gather them for market the hills vary but little.

In regard to manure, I find that old manure—not dead, but lively—hauled and turned in the fall and covered deep for winter, gives me the best results. The manure should be worked up very fine before it is put in the hill. I find that hills manured, made up and let settle before setting the sprouts give the best results. When once set out right, it does not pay to replant, as the replant is never ready to dig with the first setting.

As regards the farming, when they have been set out a few days or a week I commence farming by running the cultivator the same way that they are hilled up first, and then across the ridges, and go as close as possible without moving the plant or manure, and hoe after the third running of the cultivator. Keep the harrow going as often as possible, and keep the ground well stirred. Some use the side-plow all the time, but I think that a mistake. I prefer the half-plow or hoe-tooth until I lay them up, then use the side-plow and turn the vines and make a narrow ridge. Sweets to be dug early should be laid up as soon as possible after July 1st, and worked no more, unless to pull out grass or weeds.

Another very important matter in regard to growing sweet potatoes early is to have warm, early ground, as it is almost impossible to grow them early on heavy, cold land.

There is quite a difference in seed. The time was when we thought the Cedarville variety the earliest potato; but a variety called the Up-River seems to be the earliest at the present day, digging as soon

NEW JERSEY STATE LIBRARY

as August 19th, 1891, and August 15th, 1892, being the time our shippers commenced to barrel.

Some have tried the growing of early sweets on sod, by plowing late in the fall, so as to let the sod rot and pulverize better in the spring, which is mostly sure to grow a crop, but not as early as after melons. Some grow sweet potatoes early without broadcasting manure, but they have light, rich soil, and manure well in the hill. Setting out early, and by keeping the ground well worked and laying up early, get good results; in fact, the main secret is to have warm, early ground, set out early, work well and lay them up early, and they will mostly dig early. Sweets raised after sweets are apt not to grow as early the second year, as the fleas and bugs trouble them more than the first year. I would like to state right here that the past season I had a field that had in it ground disease. I tried a block right through the center of the field of applying Arrow guano or phosphate to the amount of about one tablespoonful of phosphate to the hill, dropping or spreading it on the manure. It needed no staking when we came to digging them. While those alongside were badly marked or eaten by the disease, where I put the phosphate they did not show the disease, and the yield was considerably better.

CHEMICALS AND CLOVER.

BY D. C. LEWIS, CRANBERRY, N. J.

Mr. President and Gentlemen—Whether or not my presence with you to-day will prove of any advantage to the farmers I know not. At all events, I presume Mr. F. Dye, Secretary of the State Board, is responsible for my being here.

The subject of chemicals and clover is one of vast importance to the farmers of New Jersey. The combination is essential to the success of agriculture with us, and hence I know of no subject of more general interest, nor one that requires a more careful consideration.

What I may suggest on this line is based wholly on my personal experience and observation. I am aware the soils of different localities vary and require different treatment in order to secure like results. I am one who fully believes the soil in my locality can be maintained and improved in fertility by the principle of chemicals and clover.

In our system of rotation I would rather sacrifice any crop than fail to get a crop of clover, as we do not recover from such failure until we reach the next rotation.

The system of rotation adopted by us and practiced for many years is one year, corn, followed by potatoes, to be succeeded by wheat sown to timothy in the fall, and by clover seed in the early spring, then to be mowed two years. Our yard manure is always applied on the sod for corn as soon after harvest as possible.

Our potato crop is grown exclusively with chemical manures, and we feed this crop liberally, believing we can hardly apply too liberally for profit. By this process we expect to secure, in any favorable season, from 200 to 250 bushels potatoes per acre. We have applied this fall to our wheat 450 pounds chemical manures per acre, making the total application for the year 1,650 pounds per acre. This covers the entire application for the five-years' rotation, at a cost this year per acre of $33.20.

To complete my story, I must, of necessity, go more into detail. Our farm has 90 acres under cultivation. We keep two teams and four cows. While we aim to make all the yard manure possible, you will, I think, readily notice our yard manure must be low in plant-food, as it represents our straw and waste fodder. We also aim to make about one ton of pork and grow a few chickens. In order to produce maximum crops, we must resort to other sources for the excess of plant-food, and hence we go to chemical manures for our supply, and we purchase the best grades under all circumstances, but with varying proportions, according to the crop to be treated.

I have said we applied this year 1,650 pounds chemical manures per acre to potatoes and wheat. That application was 1,000 pounds to potatoes, 200 pounds muriate of potash and 450 pounds of a different formula for wheat. This treatment will with us certainly give us maximum crops and leave our land in a higher state of cultivation.

Under this system of cultivation and treatment our sales have gone up from $1,000 to $1,500 per annum over what they were in the past, and we believe our farm is in a higher state of cultivation than at any previous period.

I am of the opinion that in the use of chemicals our farmers, as a rule, do not apply a sufficient quantity per acre to secure the best average results; still, there is progress in that direction. Again,

results are misleading; we are too apt to be governed by what we see, rather than by the facts. No doubt many of you have used an ordinary superphosphate alongside of a higher-grade manure, where the results appeared to be no better from the higher-cost manure than from the cheaper one. Is this a right conclusion? Let me give an illustration in my own experience under an experiment on wheat, where four formulas were represented, the first a complete manure to grow a wheat crop. In the other three formulas, one element of plant-food was dropped from each. When the wheat crop was harvested, no person could see any difference in the crop. I don't suppose there is a gentleman present who would for a moment believe a crop of wheat could be grown with the entire omission of either element of plant-food. This result is very plain, simply proving there was no deficiency in plant-food to produce a single crop of wheat. Does any one suppose for a moment that policy could be continued without impoverishment of the soil?

Our soils vary in texture, and hence must be treated differently, and I hold each must find out for himself the demands of his soil and treat it accordingly. We must have intelligence on the subject sufficient to know what we have applied, and with that knowledge we may soon learn how successfully to treat our soils. Again, we may be able to learn the demands of the different crops. I am a firm believer in special manures as the sure way to maintain the integrity of our soils.

During the last season we passed through the most prolonged drought that I remember. We have not had a storm in seven months, and but one substantial shower, July 3d, and yet a kind Providence has blessed us with fair crops—our potato crop, the most important to us, 100 bushels merchantable to the acre; our wheat, 24 bushels; corn, 40 bushels shelled; and our hay nearly an average crop, as near as we can estimate, over two tons per acre, thanks to high-grade manures.

I will add, Mr. President, that the liberal feeder has this year of drought the best all-round crops, especially hay. Of course, this applies to my own township.

I believe, further, more information may be derived on these subjects through a free discussion, and by questions and answers, than through any extended remarks or written essays.

GROWING STRAWBERRIES BY IRRIGATION.

BY JOHN REPP, GLASSBORO, N. J.

Mr. President, Ladies and Gentlemen—Growing strawberries with irrigation is something to which I gave a great deal of thought long before I put my thoughts in practice. When I first commenced to grow strawberries, after I had expended a great deal of hard labor and used large quantities of fertilizers to get a crop, about the time I commenced to pick my berries a drought would set in, a few hot days would blast all of my hopes, as well as my berries. If I got $100 per acre clear of expenses I thought I was doing well.

About ten years ago I built a dam across a small stream that is fed by springs, that runs through my place, inclosing about one-half an acre of water, three to four feet deep. The land I wanted to irrigate is from four to ten feet above the water. I first thought I would get a windmill and pump the water into a reservoir, but I found it would take 800 barrels of water to cover one acre one inch deep, as I wanted to grow about three acres. In time of drought it would be necessary to put on not less than one inch of water twice a week, so I put in a steam-pump that will pump from 800 to 1,000 barrels a day, an eight-horse-power boiler; the cost of all, including pipe and hose, $600.

I laid my land off in two blocks, two and one-half acres in one and three acres in the other. Between the blocks I laid a one-and-one-half-inch pipe under the ground. I have one of the blocks in berries each year. In planting, get ground fine and level; mark out with hand-marker, every other row twenty inches, every other twenty-eight inches; plant one foot in row; cultivate and hoe. In hoeing, the man walks in the wide row; by so doing leaves the ground a little lower between the narrow rows. In August I stop cultivating between the narrow rows, let them fill up with runners, and keep the wide rows cultivated till fall. Before winter sets in cover the beds with horse manure, about a car to the acre. In early spring rake the manure in wide rows, then cover the manure with salt hay, using one ton per acre. The 1st of May put on 800 pounds of good fertilizer.

As soon as it gets dry, start the pump. I run the rows the opposite way the main pipe runs, laying three-fourths-inch pipe ten feet apart; have spigots at about sixty feet apart on small pipe; connect

three-fourths-inch hose fifty feet long. A man changes the hose from row to row, letting the water down on the row. Do not wet the fertilizer. The longest that I used the pump in one year was nineteen days. My expenses for two men, fuel and wear of plant, are about $35 per day. My gross sales have been not less than $400 up to $700 per acre. This year my gross sales of three acres were $1,500, clear of picking; commission and freight were $1,000. As soon as the berries are picked I plow up and plant to another crop. I plant one block each year, and plow one up each year.

I have found only one kind that does well to irrigate, that is the "Glendale." I planted the "Gandy" last spring to try. I think it is a better berry. I picked this year from three acres 18,000 quarts, or 562 bushels. On one acre I picked 6,560 quarts, or 205 bushels.

Gloucester County Pomona Grange holds meetings quarterly. The meetings are largely attended, and subjects of interest to farmers are discussed with profit.

There are seven subordinate Granges in this county, all of which report an increased membership. They are as follows: Mullica Hill, Swedesboro, Mickleton, Harrisonville, Bridgeport, Williamstown and Mantua. For list of officers, see report of State Grange, page 235.

HUNTERDON COUNTY.

HUNTERDON COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President.....V. R. MATHEWS.....Ringoes.
Vice President.....Dr. N. B. BOLIEU.....Jutland.
Secretary.....W. W. CASE.....Baptisttown.
Treasurer.....I. H. HOFFMAN.....Baptisttown.

BOARD OF DIRECTORS.

New Jersey Fruit Exchange, J. T. Cox, Readington.
Hunterdon County Pomona Grange, David Bodine, Locktown.
Hunterdon County Agricultural Society, B. E. Tine, Stanton.
Hunterdon County Alliance, C. A. Godley, Milford.
Ringoes Grange, V. R. Mathews.
Kingwood Grange, J. S. Kerr.
Locktown Grange, G. W. Hockenbury.
Seargeantsville Grange, J. B. Fisher.
Readington Grange, James Lane.
Sunnyside Alliance, Isaac Hoffman, Jr.
Baptisttown Alliance, Paul C. La Rue.
Pleasant Run Alliance, David Cole.
Amwell Alliance, Benj. Abbott.
Bethlehem Alliance, E. B. Sturms.
Jutland Alliance, Samuel H. Boss.
Bunker Hill Alliance, H. W. Cronce.
Mt. Pleasant Alliance, Peter Mechlin.

DELEGATES TO STATE BOARD.

J. B. FISHER, Sergeantsville, one year.
HON. B. E. TINE, Stanton, two years.

COMMITTEE ON PEACH STATISTICS AND REPORTER TO STATE BOARD OF AGRICULTURE—Wm. W. Case.

MEETINGS OF COUNTY BOARD.

Regular meetings are held on the third Saturday in April, August and December.

Other organizations:

NEW JERSEY PEACH EXCHANGE.

President .....A. B. ALLEN .....Flemington.
Secretary.....H. F. BODINE .....Locktown.

HUNTERDON COUNTY PEACH EXCHANGE.

President.....N. B. BOILEU, M.D .....Jutland.
Secretary .....P. M. MECKLING.....Pittstown.

GRANGES.

Besides the Hunterdon County Pomona Grange, there are five subordinate Granges, as follows: Ringoes, Readington, Locktown, Sergeantsville, and Kingwood. For list of officers, see report of State Grange, page 235.

HUNTERDON COUNTY FARMERS' ALLIANCE AND INDUSTRIAL UNION.

President ....BENJ. BIRD.....Pattenburg.
Secretary .....REV. H. D. OPDYCKE .....Stanton.

SECRETARIES OF SUB-ALLIANCES.

Mt. Pleasant, E. C. Severs.
Pattenburg, Wm. S. McCrea.
Clinton, E. E. Bonnel.
Quakertown, G. E. Race.
Jutland, S. H. Boss.
Baptisttown, A. B. Chamberlain.
Junction, A. L. Shrope.
High Bridge, I. N. Alpaugh.
Sunnyside, Chas. Hummer.

Barley Sheaf, Elijah Lowe.
Califon, G. M. Lindaberry.
Cokesbury, Wm. A. Farley.
Lambertville, W. B. Reep.
Sand Brook, Isaac R. Crum.
Three Bridges, Wm. M. Dalley.

ANNUAL REPORT.

BY W. W. CASE.

More interest has been taken in farmers' organizations than formerly, but as yet no results of a definite character have been achieved. Three meetings of the County Board have been held since our last report. The first, on December 19th, 1891, was held in the Grand Jury room at Flemington. It was principally a business meeting and the programme of a routine character.

Resolutions were passed demanding a reduction of interest from six to five per cent.; also, condemning the present publication of the laws of New Jersey in the newspapers, and demanding that they be published in pamphlet form by the lowest responsible bidder; also, resolutions in favor of a State Commerce Commission, to regulate freight rates in New Jersey.

The April meeting was held at Baptisttown. A very able paper on the road question was read by E. D. Leidy, M.D. A very valuable paper on the past, present and future of dairying was read by G. W. Hockenbury, Esq., Superintendent of Locktown Dairymen's Association.

The August meeting was one mainly of routine business and some discussions on farm topics. The subject of crimson clover received some attention, and reports from those cultivating it would indicate that it will be a valuable addition to our soiling and foraging crops.

FARMERS' PICNIC.

A farmers' picnic, under the auspices of the Farmers' Alliance, was held at Packer's Island on August 4th. Addresses were made by Mrs. S. E. V. Emery, of Michigan; "Farmer" Deane, of York State; Franklin Dye, of State Board of Agriculture; W. C. Barrick,

Esq., of Flemington, and others. A crowd of some five thousand was in attendance, and the first farmers' picnic held in the county was a success.

SPRAYING OF FRUIT TREES.

Spraying is not receiving the attention that it shonld, and but little has been done of a practical nature. Most of the spraying done has been experimental, and results have not been satisfactory.

FRUIT.

The fruit crop has been below the average in quantity, but generally of fine quality, although some of the smaller fruits were injured by excessive heat and drought.

Cherries, especially the finer varieties, were almost an entire failure.

Raspberries, about three-fourths crop; sold at about 10 cents per quart in local markets.

Blackberries, about five-eighths crop; sold at about 12 cents per quart in local markets.

Owing to excessively-hot weather, the strawberry crop was, in many instances, badly scalded, and the yield much curtailed; yet, on the whole, the crop was large and prices remunerative. One grower reports shipping 400 crates from three and one-fourth acres, which, after deducting all expenses of shipping, picking, &c., netted a fraction over $2 per crate, or about $250 per acre. Their culture is on the increase, and, on the right kind of land, highly profitable.

Excepting in the northern part of the county, the apple crop is quite light, in many places not aggregating 25 per cent. of last year's crop; but in the northern sections reports at hand show the yield to be fully as large as last year's crop. Prices range from 30 to 50 cents per bushel.

Pears and grapes both yielded well, but neither are much cultivated, and produce barely enough to supply the local markets.

Peaches, the whole county over, averaged about one-half a crop, the yield being very unevenly distributed, along the Delaware and in the southern parts of the county the yield being barely 10 per cent. of a full crop; while in the northern and northeastern sections, particularly in White House vicinity, a nearly full crop was produced. What, how-

ever, was lacking in quantity was nearly or quite balanced by quality, and the prices received by the grower were eminently satisfactory. One of the largest growers of the county, Hon. J. N. Pidcock, of White House, reports an individual crop of 51,485 baskets, which netted, baskets included, 63 cents per basket, or considerably more than $32,000. The Hunterdon County Peach Exchange, at Pittstown, disposed of over 28,000 baskets during the season at an average of about 80 cents per basket (basket included). It is safe to assert that the total crop of the county (792,805 baskets) netted, on an average, 65 cents per basket, thus bringing the handsome sum of $515,000 into the county from this one source alone, giving a new impulse to one of our greatest industries, and reviving the hopes of a great many growers. It is needless to say, however, that, owing to two or three bad seasons, many growers became discouraged and neglected their orchards to such an extent that hundreds of acres of promising orchards were nearly, if not quite, ruined. Still, there are hundreds of acres of well-tilled orchards, which promise abundant rewards to their owners. I look upon the dead and neglected orchards, however, with a feeling akin to satisfaction, knowing full well that the poor fruit raised by slovenly growers will no longer compete with the luscious product of the careful orchardist, and be in the future the main cause of ruinous prices, as has been the case in the past. I am sorry to say that but very few new orchards are being planted, as it seems to forewarn us that the day of Hunterdon's great peach crops will soon be a thing of the past.

Regarding peach diseases, the true "yellows" prevail to a certain extent, but not nearly to the extent generally supposed. Yellow symptoms from non-cultivation and root aphis are very common, yet often yield to proper cultivation and fertility. As regards true "yellows," however, we demand a stringent law requiring the destruction of all infected trees before the leaves fall, as careful observations made the last few years, would indicate the disease one mainly of the leaves, or "tree consumption." I have noticed frequently that where a diseased tree was allowed to stand during the season, while neighboring trees showed no signs of disease that season, yet the next season showed all the trees within a radius over which the leaves from the diseased tree would naturally be carried by the wind in falling, to be affected. No remedy but the axe can be recommended at present. The greatest loss, by disease, to the grower is

occasioned by plum-rot, and, at present, it is much worse to contend with than all other troubles combined, frequently causing a loss of fully 50 per cent.

The peach-grower needs a strong organization considering the enormous production, while the fact is he is at the mercy, in many instances, of unscrupulous commission merchants and still more unscrupulous railroad companies. It is actually ridiculous that the grower will stand by and see the railroads charge him four times more for freight than he should be compelled to pay. It is simply outrageous that the grower is compelled to pay from $40 to $50 per car to have his peaches carried to market but fifty miles distant, yet such is the fact.

The two cents reduction per basket secured a few years ago through the efforts of the New Jersey Peach Exchange, saved the shippers the magnificent sum of over $35,000 in freights alone on the crops of the last two years; yet the Exchange gets but a feeble and inefficient support, and is already a house divided against itself. Five, or at most, six cents per basket is the maximim that should be allowed as freight, and not nine cents as at present.

The railroad companies running through our State seem to think the country theirs and not ours. While some of the railroads furnished first-class cars and equipments for peach shipments, one, at least, furnished but the meanest and poorest accommodations. The fruit was loaded in haphazard style on wild-cat trains, and reached the market in anything but first-class condition, and much of it had to be sold under price on that account. One basket of my own shipment was reported, by the commission merchant who sold them, not to contain more than two quarts of fruit when it reached him, and another basket in the same shipment, so badly bruised and mussed as to be worthless; yet all claims for damages were utterly ignored. These peaches were shipped from a point that received 3,800 baskets during the season, and would have received as many more had proper accommodations been offered; yet not a single car was ever left at the station on which the grower could load his own fruit in a careful manner. The peaches were always loaded into cars attached to coal trains.

The law making the Jersey peach basket a standard size (16 qts.), is highly satisfactory among the peach-growers.

FARMING, CROPS, ETC.

The crops are not nearly up to the yield of last year, owing to protracted drought. Pasture has been short most of the season, and prices of farm crops have fallen off greatly from those of last year.

Hay was not more than three-fourths of a crop, although a large surplus above home needs was cut. Reports from Flemington and Three Bridges merchants show that more than 6,200 tons were received at those points for year ending October 31st, 1892, for which an average price was paid of above $13 per ton.

Corn only about 80 per cent. of last year's yield, and selling, December 1st, at 50 cents. The crop was badly injured by August drought.

Oats were also a short crop, being badly injured in the spring by the rust; selling, December 1st, at 30 cents per bushel.

Rye nearly or quite a full crop, but price much lower than last year; selling, December 1st, at 1 cent per pound. The crop, however, is much more profitable than wheat, as it costs much less to produce it, while it gives fully as great if not greater proceeds per acre than wheat.

Potatoes are not much more than one-fourth crop, and will hardly suffice for local needs; selling, December 1st, at 75 cents per bushel.

Tomatoes not much above 25 per cent. of an ordinary yield, and the pack has been extremely light. The Butterfoss Canning Company, Lambertville, N. J., report a pack of 115,000 cans, against 540,000 cans packed last year. They manufactured 383 tons of tomatoes, for which they paid from $6.50 to $7 per ton at factory. It would certainly seem that there was room for more canning factories in the county, especially along the fertile valley of the Delaware, and, at prices paid in the past, be highly remunerative to the grower.

Poultry is receiving more attention every year, especially the egg product. Turkeys are also profitable, and would be raised in much greater uumbers were it not for their roaming and destructive habits. Price, dressed, for Thanksgiving, 16 cents per pound.

Pork-raising is much more remunerative than for some years past, although not nearly so many hogs are raised for market as formerly. Prices ranged, December 1st, from 6 to 7½ cents per pound, much higher than for several years past.

Sheep-raising is still kept in the background. The dog crop, however, is large and flourishing. I am informed that it costs dog-owners in Union township, this county, the sum of six dollars each to pay dog damages to stook. A proper dog law made and strictly enforced would, in a short time, again place sheep husbandry on its proper footing, and it would again be adding to the profits of general farming in a substantial manner.

The horse is receiving rather more attention than formerly. First-class farm horses range from $120 to $140 per head.

BEE-KEEPING.

The honey crop, which some years reached above 15,000 pounds, was almost a total failure. My own crop reached but 750 pounds, and I am safe in asserting that the crop throughout the county did not reach above a total of 2,500 pounds. Yet, the labors of the bee were not in vain, for they were of inestimable value to the fruit-grower in the cross-fertilization of the extremely scanty fruit-bloom of the past season. Bees should be kept in every neighborhood, and on most farms. They usually pay a large return for care given, and in the culture of fruit are a far more important factor than spraying, as fruit cannot be produced unless the bloom is completely fertilized, no matter to what extent insecticides are used for spraying. Most of the early fall of peaches (June drop), apples, &c., is caused from imperfect cross-fertilization—fully as much as is caused by insect pests. The few past seasons have given rather meager honey crops, and prove rather discouraging to the professional apiarist. There are at present over a dozen apiaries in the county that number from twenty to eighty colonies each.

DAIRYING.

Much more interest is being taken in the dairy question than for some time past, especialy as regards the creamery business. A new creamery has been established at Idell and is doing a flourishing business. All the old creameries report much larger receipts the past year than formerly, and all have realized much better net results.

All of our creameries have now adopted the butter-fat system of

determining the value of milk from different herds, and all milk is now paid for according to the actual per cent. of butter-fat it contains. The system is very satisfactory in its workings, and the careful feeder no longer has to share his profits with the sloven, but gets the just rewards for his care and labor.

Oak Summit Dairymen's Association make the following report for the past year:

Milk received			1,473,271 lbs.
Butter made and sold	59,067 lbs.,	realizing	$16,798 77
Cheese " "	300 "	"	30 00
Cream " "	362½ gals.,	"	235 80
Total			$17,063 77

I append the following valuable report of the practical workings of the butter-fat system, kindly furnished me by Mr. G. W. Hockenbury, Superintendent of Locktown Darymen's Association, which I quote in full. In submitting the accompanying tabulated statement of the workings of the Locktown Darymen's Association, I wish to state that the past year has been the most prosperous for our creamery of any for the past six or eight, both in the way of an increased milk-supply and higher prices for products.

Prior to August 1st, 1891, the creamery had been run on the pooling system, *i. e.* each patron received the same price per hundred pounds for milk; but at that date the Board of Directors adopted what is known as the relative-value plan, *i. e.* each patron receives pay for his milk according to the amount of butter-fat it contains, as determined by what is known as the butter-fat or oil test. This is accomplished by taking a given quantity of milk, putting it into a bottle, the long, slim neck of which is marked into hundredths, adding chemicals which effect a separation of the fat, after which it is put into a centrifugal machine, which forces the fat up into the neck of the bottle, where it is easily measured, and thereby shows how much butter-fat would be in 100 pounds of milk like the sample.

By reference to the table, it will be noticed (taking the month of November as an example) that the best milk brought that month averaged 6.04 lbs. butter-fat to 100 lbs. of milk; the price paid per lb. for butter-fat was 26 cents which entitled the producer to $1.56+ per 100 lbs. of milk; while the patron who brought the poorest milk,

(3.88) received only $1.01— per 100 lbs. Under the old system of pooling each of these patrons would have received $1.15+ per 100 lbs. Thus it will readily be seen the injustice to patron No. 1 under the old system, while patron No. 2 was reaping benefits to which he was not entitled.

The tendency of the pooling system was to lower the grade of milk, while the tendency of the present plan is to raise it, and we expect, in the course of a few years, to hear of a much better showing being made by all creameries that pay for milk according to its quality.

REPORT OF THE WORKINGS OF LOCKTOWN DAIRYMEN'S ASSOCIATION, FOR THE YEAR ENDING OCTOBER 31ST, 1892.

MONTH.	Number of pounds of milk received.	Number of pounds of butter made.	Butter sold for	Cream sold for	Average butter-fat test of all milk received	Highest average test of individual herd.	Lowest average test of individual herd.	Price paid per lb. for butter-fat.	Average price paid per 100 lbs. for milk.
1891.									
November.....	80,877	3,832	$1,097 16	.....	4.44	6.04	3.88	$0 26	$1 15+
December	73,435	3,350	1,043 49	$5 76	4.28	5.55	3.74	29	1 24+
1892.									
January.....	76,509	3,432	1,135 67	.....	4.30	5.30	3.65	30	1 29+
February.....	72,516	3,177	976 16	.....	4.10	5.13	3.42	29	1 19—
March	75,944	3,283	1,024 56	.....	4.09	5.46	3.53	29	1 18+
April.....	76,397	3,049	863 22	27 20	4.00	4.76	3.48	25	1 00
May.....	104,619	4,222	899 88	61 43	3.99	4.78	3 62	20	80—
June.....	122,737	4,374	883 86	188 97	4.21	5.05	3.85	18	75+
July.....	107,801	3,559	891 00	362 76	4.29	5.04	3.88	23	99—
August	106,042	3,315	918 35	435 92	4 29	5.07	3.45	26	1 11+
September.....	103,299	4,430	1,174 68	74 43	4.29	5.10	3.48	25	1 07+
October.....	96,781	4,476	1,327 92	7 44	4.48	5.57	3.76	28	1 25+
Total.....	1,096,957	44,499	$12,235 95	$1,163 91	.....	.....	.....	.....	.....

VALUE OF FARMING LANDS.

Farm lands do not seem to be advancing in price, although the demand is better than for some time past. Farms containing good buildings and in a good state of cultivation rarely reach $40 per acre, and quite a large number have sold at from $25 to $30 per acre. A

farm of 108 acres, with first-class buildings, sold a few days ago at $33 per acre. Sixty dollars per acre would have been refused eight or ten years ago. Taxes still remain as high as ever; ditto interest. Money at 6 per cent. on farm lands is a higher rate of interest than 60 per cent. of the farms will produce. At the present rate of depreciation in the value of farm products, many would still have a hard time to make both ends meet at 4 per cent. We hope, though, that farm prosperity may now take an upward turn.

One of the greatest nuisances that the farming counties of our State at present are cursed with is our pernicious system of County Freeholders. The method of awarding contracts, the wages paid for work done, the character of the work and of the material used, with the prices paid for the same, all show the system to be a most pernicious one from beginning to end, and one that ought to be abolished by the next Legislature of New Jersey.

ROADS.

One of our greatest drawbacks are our miserable mud roads, and they are, in my estimation, a very strong factor in the depreciation of farm values. The township in which I reside expends about $2,000 per year for roads, and has done so for the last half-century, and yet they are not one bit better than they were twenty years ago, and during the winter months are barely passable for weeks at a time. Sods and loose dirt seem to be the end and aim of all our Road Overseers, and almost impassable mud-holes have to be dragged through often, when a good, substantial stone roadway could be built at the mere expense of throwing the stones into the road-bed. The people, however, seem to be waking up, and are now giving the subject serious thought. We need State help, as the expense is too great to be borne by us as individuals, although we could greatly assist. The abuses of the present system are ably set forth in the following paper, read by E. D. Leidy, M.D., at the April meeting of the County Board of Agriculture:

The road question of to-day is one of the most important in our country; and as it is one that interests all, we are not surprised at the interest manifested by so many taxpayers. The roads have been neglected, while other improvements of less importance have been made. But our roads have not received the proper attention for the amount

of money expended. If the farmers were to hire a man and he did the same amount of work for them that they do on the road, they would discharge him before the day's work was done.

But as long as the present system of working out taxes is continued, it will be a hard matter to get a day's work done in a day on roads. According to the amount of money raised each year by taxation for the past ten years, we have expended nearly $22,000 in this township. Now, can you show me any road that has been permanently improved during that time? I only know of one short piece, which the Overseer piked near his home, and nearly all at his own expense. The same work goes on from year to year—throwing mud, &c., in the road from ditches alongside, which oftentimes makes them worse instead of better. If they are worked with plows and shovels, we find sod, mud, &c., in the road that makes it impossible to trot with a buggy. If worked with a scraper, we often find the dirt heaped in the middle of the road, like a windrow of hay. This may seem exaggerated, but we have seen it. If we *must* have dirt roads, let us have the best we can make; and the first thing necessary is good drainage. Penfold, in his treatise on roads, says: "Next in order comes drainage. No attempt at repair must be made until great care has been bestowed on this point. A point so important in road-making, that any exertion in other respects will be fruitless when this is unattended to." He further recommends underdraining, in the middle of the road, with tile, &c. But with many of our roads this would be of very little importance when our side-ditches are not opened.

1. In some places our roads are concave, thereby converting the middle of the road into a ditch. In other places the ditches are opened so deep that the water cannot escape except by absorption or evaporation. These evils can be greatly improved by having the road slightly convex. Too much convexity will hinder drainage, as every wagon that passes along the road will be compelled to keep the middle track and consequently wear ruts that will hold the water, and thus retard the very object we most desire.

2. By having the ditches of sufficient depth and grade that the water can readily run off. In places where there are obstructions in or across the ditches, as bridges and culverts, the plow or scraper is run out to avoid them, and the debris which has collected there receives no attention. Consequently, after a heavy rain, the water is drained and runs across the road. The cost of repairing this damage in washing the road will be many times the expense of removing the debris with a shovel when the road was worked. We seldom see a man following the plow or scraper to open these places.

But our dirt roads do not meet the requirement of the traveling public. They are good during dry weather, but after a heavy rain,

or during winter or spring, after a thaw, they are beyond description. Now, is it necessary to have the roads in this condition? There are two questions just here that would suggest themselves:

First. How can we permanently improve the roads?
Second. How can we meet the expense?

The first is much easier to answer than the second. To the first, any one would say, "By stoning." Macadam and Telford were both advocates of this method. Their methods were somewhat different, but the principle the same.

Mr. Isaac B. Potter, in his article in the "Century Magazine" this month (April), quotes Mr. Francis B. Loomis, commercial agent at St. Etienue, as saying: "The road system of France has been of far greater value to the country as a means of raising the value of lands, and of putting the small peasant proprietors in easy communication with their markets, than have railways. It is the opinion of well-informed Frenchmen who have made a practical study of economic problems that the superb roads of France have been one of the most steady and potent contributions to the material development and marvelous financial elasticity of the country. The far-reaching and splendidly-maintained road system has distinctly favored the success of the small landed proprietors, and in their prosperity, and the ensuing distribution of wealth, lies the key to the secret of the wonderful financial vitality and solid prosperity of the French nation." France, at the present time, has the best road system in the world.

England, Norway, Switzerland, Italy, and some of the States in Germany have suffered from bad roads. They are now macadamizing, and establishing good roads. This country, while advancing in other respects, is sadly neglecting this important branch of improvement.

Union and Essex counties, in this State, are doing good work in this direction. Kentucky, Tennessee and Massachusetts have pikes that speak well for their enterprising inhabitants. Some may say it is inconvenient to procure stone at many places. That is true, but in passing through Kingwood township, as well as others in this county, we find places where we can scarcely pull through the mud with two horses, and plenty of stone within a rod of the road. Why were not these places stoned years ago? Surely it was not on account of expense, with stone so convenient. At the township election this spring, I endeavored to have the road appropriation divided, so that a portion would be used for working, and the remainder for stoning the road. Only a very short piece could receive the proper working, but that would be better than none. Perhaps if we were to petition the Legislature they would appropriate a sum that, in a few years, would greatly benefit our roads.

I hope, if there is a movement in that direction, we will not be like the farmers of Albany county, N. Y. When that county was

deluged with mud, the Legislature had a committee appointed to report on an appropriation to better the condition of the roads. The farmers of that county could not get there in time, on account of the bad roads, but they telegraphed not to let the committee report until they could get there to oppose the measure, as it would greatly increase their taxes. At this very time this august body was making appropriations of millions to better the condition of New York City, State canals, Hudson river, and the new $25,000,000 State Capitol.

The farmer is the most generous man in the world. He will pay taxes year after year to support the State and its corporations; but if he is offered anything in return, that will benefit or enrich him, he will positively refuse to accept it. He thinks it will increase his taxes. He does not consider that the money will be appropriated to some city or corporation, which will enrich them. He is willing to pay taxes to help them, but when it is expended where it will benefit him he protests against it.

Road-making is a science. Lafayette College, Easton, offers free tuition for one man in each county in the State to study this subject. It will not be many years before we will find our roads greatly improved, as the public will soon see they are suffering great inconvenience, as well as loss of time, in their present condition, and will demand this improvement to be made.

MERCER COUNTY.

MERCER COUNTY BOARD OF AGRICULTURE.

(Organized March 20th, 1883.)

OFFICERS OF THE BOARD FOR 1893.

President.....S. B. KETCHAM.....Pennington.
Vice President.....WALLACE LANNING.....Trenton.
Treasurer.....H. R. WITHINGTON.....Titusville.
Secretary.....FRANKLIN DYE.....Trenton.

DIRECTORS.—J. V. Green, J. B. Horn, A. L. Holcombe, Edw. Howe, David Lee, D. C. McGalliard, J. F. Phillips, T. B. De Cou, Gilbert D. Rue, J. W. Fleming.

LEGISLATIVE COMMITTEE.—S. B. Ketcham, J. V. Green, A. D. Anderson.

DELEGATES TO STATE BOARD.—S. B. Ketcham, two years; Ralph Ege, one year.

SOCIETIES REPRESENTED.

Princeton Agricultural Association, organized in 1840.
Hopewell Farmers' Club, organized in 1868.
Mercer Grange, No. 77.
Pennington Grange, No. 64.
Hamilton Township Agricultural Association.
Hamilton Grange, No. 79.
Ewing Grange, No. 73.
Titusville Farmers' Club.

ANNUAL REPORT.

BY THE SECRETARY.

AUXILIARY SOCIETIES.

The value of a farmers' organization to the neighborhood in which it is located depends largely upon the extent of the membership. If this comprises but a small per cent. of the total number of the farmers, its usefulness will be correspondingly limited. But if, on the other hand, farmers are generally alive to the needs and uses of organization and unite to make a County Board, for example, all it is capable of accomplishing for the improvement of the agricultural industries, it will be a success. As a means of strengthening the larger societies, territorially, at least, township and sub-organizations are highly valuable and quite essential, and when both are in active operation their power to assist each other becomes reciprocal.

The Mercer County Board of Agriculture has been quite fortunate in this respect. It is interesting to record that some of the very best and most successful farmers of their time in this county were awake to the importance of organization among farmers. For instance, the Princeton Agricultural Association, embracing many of the most experienced, successful and progressive farmers of the neighborhood, was organized in 1840, under the presidency of the late Caleb Smith Green, and continued in successful operation until the time of his death, when the meetings were suspended for several years, and were resumed twenty-seven years ago under the presidency of the late Governor Olden, meeting every four weeks at the residences of its members for the discussion of subjects connected with agriculture, and for the inspection and criticism of the stock, crops, methods and general surroundings of premises visited.

A subject is always chosen for discussion at the next meeting, for which the members are expected to be prepared. Usually, a member is appointed to read a paper on the subject adopted for discussion, and the members are all called upon to give their experience and views on the subject. The meetings are well attended, conducted with much spirit, and are felt to be both pleasant and profitable.

The afternoon is devoted to the usual routine business, and farm,

crop and stock inspection, after which entertainment is provided by the host. In the evening the appointed paper is read and discussed.

A later addition to the work of this society, and which has been found helpful to its members, is the preparation, by a committee, of a bulletin of information respecting articles in demand or for sale by the members. This bulletin is read at each monthly meeting, and it frequently occurs that wants are promptly met and sales secured which are highly satisfactory. By a course like this, farmers become mutually helpful, as they should be. By dealing with their fellow-members, they deal with men in whom they have confidence, and ordinary risks and exorbitant prices are obviated.

I have given the above, thus in detail, believing it to be an example worthy of imitation by all our County Boards of Agriculture.

Our next oldest local organization is the Hopewell Farmers' Club, which has been organized about a quarter of a century. It is still in active operation and doing a good work in the surrounding neighborhood.

The Granges named, with the Hamilton Township Agricultural Association, were organized at various times between 1870 and 1883. While the Granges are not as strong numerically as they were some years since, they are still active. The County Board is the outgrowth of, and has been largely maintained by the organizations named. Either their prosperity or their decline has a corresponding effect upon the life of the Board. It is for this reason I emphasize the importance of local organizations to the County Board. The stream connot maintain its life-giving current if the springs become dry.

AGRICULTURE, GENERAL.

The agriculture of Mercer county, using the term comprehensively, is not equal to the best examples found in the State, and yet I believe it to be, for the whole county, *above the average* for the State. There are however, serious general defects (and similar ones exist throughout the State) which should receive the attention of the County Board and of progressive farmers generally. Some of these are the prevalence in some neighborhoods of a luxuriant crop of noxious weeds, which are allowed to go to seed on some farms, to the great disadvantage of surrounding farmers. Wild carrot and white daisy are general pests and they are the most prolific. Another defect which

greatly mars an otherwise sightly farm or neighborhood is the "hedge" nuisance. Fences are the primary cause of these; they furnish a stopping-place for drifting seeds, a resort for the birds, which often distribute the same, and a suitable place for such seeds to germinate and grow. Furthermore the fence corner furnishes the most suitable place, according to the practice of some farmers, for the deposit of stones, stumps, brush, &c. These accumulations make it extremely difficult to eradicate growing weeds, and, as a result, they are allowed to go on multiplying and spreading at will. To these weeds and sundry accumulations are added, year by year, poison ivy, elder, &c. with such native trees as may be allowed to grow, until both field and public highway are partially overrun. Who has not seen such evidence of agricultural progress, (?) and who would not join in condemning such practices? An additional injury likely to result from such hedges is the propagation and spread of fungous germs, and of insects injurious to agriculture. Again, in connection with the above, as intimated, our roadways in many neighborhoods are unsightly in the extreme. Nothing detracts so much from an otherwise beautiful farming region as do such roads. Is it not possible to secure a forward movement whereby our roads shall be made, drained and maintained as good as may be possible, within the limits of the money raised for this purpose? And next in importance, have them kept free from weeds, briars, brush and other extraneous accumulations.

Some years ago some enterprising citizens of Ewing township organized a "Neighborhood Improvement Association," which had for its object, among others, a general reform along the lines named above. Could not our local and county organizations properly take up these and similar matters of improvement? A strong effort should also be made to bring about a better general system of orcharding, and this largely in the matter of spraying to destroy injurious insects. That these are on the increase is beyond question, and they are not confined to fruits alone. It is not enough for a farmer to say he does not believe in spraying, and therefore neglects it, when his annual product of insects is ruining his neighbors' crops.

Our rights are mutual, and the rights of the individual cease when the rights of the community begin. More attention should be given to methods of cultivation, and to the use of such fertilizers and insecticides as will aid in exterminating the eggs and larvæ of all insects injurious to farm crops.

CROP YIELDS—CANNING INDUSTRY.

But few crops have been as good this year as they were last, and prices for cereals are low. For crop yields, see State statistical table.

A new and flourishing industry has been established in the vicinity of Hopewell during the year by the organization of the Hopewell Valley Cannery Company, which has manufactured over 200,000 cans of tomatoes, and disposed of them at very satisfactory prices. An encouraging feature of this organization, and one that reflects credit on the farmers of that section, is that it is composed almost exclusively of farmers who are growers of the fruit used. The Hopewell Creamery, too, has taken a new lease of life since it was purchased by two gentlemen residing in that town. Its business will be extended, so as to make it a source of profit to the farmers of the locality. These two enterprises, with others in the formative state, will add much to the varied and growing industries of that attractive and healthful locality.

Titusville and Hightstown also have each a cannery establishment owned by the farmers. They are doing a thriving business.

In cereal productions, Mercer county, in common with others, has reduced her acreage during the last decade. The chief contributing cause to this decrease I take to be the prevailing low prices. The cause of these I do not here discuss. Though I speak of low prices as the chief cause, I believe other crops have been found which pay better than grain-growing has, and this may be a second reason. The falling off in cereal production in this county is as follows:

BUCKWHEAT.		CORN.		OATS.		WHEAT.	
Acres.	Bush.	Acres.	Bush.	Acres.	Bush.	Acres.	Bush.
913	9,373	21,673	702,937	12,899	396,570	11,985	158,417
61	215	18,158	604,510	11,665	296,247	11,188	181,793
852	9,158	3,515	98,427	1,234	100,323	*797	†12,276

Total decrease in Mercer county, 7,119 acres.

In wheat, we have the cheering feature of a decreased area of 797 acres, and an increase in the product from the decreased area of 12,276 bushels, being an increase per acre of from 13.2 bushels in 1879 to 16.2 bushels in 1889. And this is the direction the agriculture of the future should take; decrease the area, increase the product.

*Decrease. †Increase.

The meetings of the Board have been maintained, and some of them were of unusual interest.

The annual meeting was held at the Court House, March 16th, and was very largely attended. A number of members from other County Boards of the State were present. After transacting the regular business, the President delivered his annual address. Following is a synopsis:

Another year of our existence as a Board of Agriculture is a matter of history. It is not a pleasant theme for us to be continually complaining of our condition, nor is it my object to refer to this old subject for this purpose. But the press has so largely commented on the farmer's greatly improved condition that many have, without doubt, been led to a false conclusion.

A comparison of the leading field or cereal crops and the prices obtained for them are facts that cannot be disputed.

After citing the yields of the various farm crops and the prices received for them, Mr. Ketcham continued.

The question of hindrances to the farmer's financial advancement has been so frequently discussed by this Board and elsewhere that it is useless to call attention in this direction. But the increasing burdens of taxation are augmented year after year. Public officials seem determined to outdo their predecessors in the expenditure of public money, of which the farmer bears the largest proportionate share. His property cannot be hidden from the Assessors, and a large portion of the farming lands in this county are being rated at higher value than the same would bring in open market. We all know that farms offered at public sale will not command a price equal to the cost of improvements thereon, except they are needed for county stone quarries, tramp-houses, &c. A simple reference to this new enterprise opens a field the bounds of which cannot be defined. We see in the extreme northwest corner of the county a small cloud looming up around what is known as "Bell Mount," which, if carefully managed, may produce good results, and if not, a gigantic elephant, whose power may become ruinous in its exercise. I have yet to see any statement in mathematics showing where any decided gain is to be derived by the county from the contemplated improvements, in addition to the cost of land. Extensive improvements of a costly nature are necessary, such as the purchase and erection of a stone crusher, a commodious and securely-built jail, with houses for a Warden and the usual number of superintendents, foremen and assistants, regarded as indispensable to public institutions. We all agree that criminals under sentence should be employed, not at some-

thing that is simply amusement, but hard work that is punishment, and will prevent a desire to become a county boarder at stated times. All efforts in the past to employ the inmates of our County Jail have proved to be of small benefit, and a new effort of such an expensive nature should be thoroughly investigated and conducted in the most careful manner.

THE ROAD QUESTION DISCUSSED.

Another important subject receiving public attention, not only for discussion, but practical work, is the public road question. At a recent meeting of the State Board of Agriculture, a road convention was called, under its auspices, composed of citizens from different parts of the State. Exhaustive papers, carefully prepared, were read, containing many practical thoughts, and in some instances vivid pictures from imaginary or isolated instances were adroitly drawn.

The prevailing dirt roads in country districts, with their clouds of dust, were regarded as almost barbarous; thousands of farmers were unable to vote and a multitude of children were deprived from attending the public schools because of bad roads, and some suggest the building of Macadam roads as a panacea for the hard struggle attending the farmer's business; that his share of taxes in building the same would be inconsiderable. One gentleman submitted the following estimate: A Macadam road in this county, of five miles, costing $25,000, would increase the tax on an $8,000 farm, the assessed value being but $4,000, $37.72; if this is extended over a period of twenty years by issuing bonds at 4 per cent., the annual increase would be but $2.78. This looks very small, but how many $8,000 farms are assessed 50 per cent. below value? Only a few, adjacent to our large towns and, as Trenton, where the land is increased in value because of special demands, and not for agricultural purposes. Further, as has been stated, and can be proven from facts, many farms are assessed for more than they would bring at public sale, and I am well satisfied that the farms of Hopewell township, on an average, would not command rates for which they are assessed. Now, suppose the county builds these roads from Trenton to Princeton, Bordentown, Hopewell and Bell Mount, a distance of forty miles or more, at a cost of $200,000, and farms assessed at their true value, the yearly increase on the $4,000 farm, according to the above estimate, would be $44.48; add to this another $100,000, which will probably be the cost of the County Farm when all completed, and we can begin to forecast future taxation. Another consideration is: Can county bonds for such an amount be floated at 4 per cent.? This is doubtful, as the last issue was 5 per cent. and realized a slight premium.

Again, who has ever known a single voter to be disfranchised because of the roads? If a man is interested in an election he will

always get there, and if conveyance is needed, money from the campaign fund will procure a dozen teams, if necessary, to bring him to the polls.

How many children in the country districts are debarred from school on account of roads? Our school districts are so arranged that most of the scholars walk daily to the district school-house except in time of deep snow, which neither stone nor dirt road will prevent. These facts are from my own observation in Hopewell township, concerning which the statement was made that $50,000 were spent in fifteen years for repairing dirt roads, and to-day are as bad as ever. The roads in that township have been greatly improved. Of course, in the spring, when the frost leaves, the road-bed in many places becomes soft and unfit for heavy hauling; and when certain portions become miry, as soon as can be done they are stoned, thus made solid for the future. I may here add that the law enacted last winter, giving the Township Committee control, has been of great benefit. We have about one hundred and thirty miles of public road, divided formerly into thirty-eight districts. These were reduced to eight, and the best men selected, without regard to political views, to perform the work. This has been efficiently done—much better than ever before. The cause of much road trouble has been with the people in the districts. A strife would arise for the choice of Overseer, and the candidate who could secure the most friends to vote for him was often elected, without regard to proper qualification.

Another proposal for good roads was to regulate the width of tires and axles by law, making all four-wheeled freight wagons with tires from four to six inches wide, and the fore axle from ten to fourteen inches shorter than the hind axle. Gentlemen, who ever heard any practical man advance such an absurd proposition?

Where is there a man who, hauling on a farm or elsewhere, compelled at times to drive over soft ground, that would want wheels on the same wagon of different tread? I sincerely hope the State Board of Agriculture will never indorse such dreamy measures.

In reference to the statement that these macadamized roads would greatly enhance the value of farms and make their owners more prosperous, this would, as I have stated, be the case near the city, but in our more remote rural districts, where there is no demand for land, except for farming, the benefit would be very small. This is confirmed by experience in our own vicinity. In 1857 the owners of farms between Trenton and Pennington, with a few others, decided that a turnpike between these places could be made a paying investment and greatly increase the value of their farms. A charter was obtained, the road constructed out of the best accessible material, at a cost of $4,000 per mile, and how much has the land increased in value?

Two years ago a farm adjoining this highway, within six miles of Trenton, was sold at private sale for a trifle over $50 per acre, and the

owner during the thirty years of occupancy had spent more in permanent improvements than the amount realized; and recently another, still more desirable, changed owners at $37.25 per acre.

The value of agricultural land is determined, as in all other business enterprises, according to the income arising from the investment. Our farms that twenty-five years ago would bring $100 per acre will now beg a customer at $40. And why? Our roads are as good or better now than then, and if this was not the cause of decreased value it surely cannot cause an increase. Give the farmer a price for his products that will pay and his land will increase in value.

I ask your indulgence for occupying so much time on this matter, but an honored professor has said "the most unworthy alarm in road talk is that of the man or paper that screams high taxes." We, as farmers, know too well what high taxes mean; how burdensome they are, while the many thousands invested in palatial buildings with princely endowments for educational purposes are exempt from taxation.

While I have presented the negative side of these things, I do not wish to be understood as opposed to good roads; they are desirable. But let our Freeholders move carefully in the matter. Our county until recently was free from debt, and a burden is not desirable for those who succeed us.

"Pay as you go" is the safest rule. How much better for a man to leave his family a comfortable home, free from debt, than a more extravagant one adorned with a mortgage; and if the building of costly, and in some cases useless, bridges can be checked, with the convict labor judiciously employed, a few miles of road could be built each year without additional burden to us or our posterity.

There are other matters of a public nature in which we have special interest. Elementary agriculture is advocated as an important study for the public school in country districts. This would give the future farmers a great advantage over the present; for at the beginning they would possess knowledge that we have acquired after years of both study and practice.

A subject in this connection that is worthy of notice is the University Extension movement, which has been in successful operation in Monmouth county during the past winter. This is conducted largely by the officers of our Agricultural College and Experiment Station, consisting of lectures on scientific agriculture, such as cannot be given in detail except in regular course.

The knowledge we have already received from occasional talks and the bulletins from this source, has been of great value. It has enlightened the farmers on the elements of plant-food, the insect pests which have caused great pecuniary loss, and remedies for the same, with valuable information on numerous topics that only a scientist can give.

If Monmouth county can secure a class for this advanced department, Mercer, with such excellent facilities, should not be slow to accept the offer. I ask you to give this subject due consideration during the coming summer.

FARMERS WANT FREE MAIL SERVICE.

The establishing of a free mail delivery in rural sections is strongly urged. This would be a great favor, not simply as a matter of convenience, which would be great, but an important factor towards increasing the intelligence of our people. Many who now take a weekly paper would have a daily; a larger number of periodicals would be sought for, and many of our more isolated homes would thus be brought into sympathy with the outside world. But it is doubtful if such a plan can be executed for years to come.

In conclusion, brother farmers, we may ask, What of the future? Is the outlook bright, or is it gloomy? How well for us that we do not know! We must toil on, hope on. Amid all the discouragements, it is gratifying to know that the number of failures among us is less in proportion to numbers than any other occupation, and why? We answer, by a close application to business, industrious habits, and a close economy on the part of the farmer and his family.

The lands of this country are gradually passing into the possession of a foreign-born population. They, many of them, come to our shores determined to obtain a home of their own, and for this they work hard, practice economy, and soon become comfortable, where the native fails to succeed.

The spirit of the age is extravagance in private as well as public life. The youthful couple want to begin life with the same surroundings as in the parental home, and here is the great mistake so many make.

If they, at the commencement of life, would be willing to live in the same manner, and practice the same industry as fifty years ago, there is no reason why they should not succeed.

Let us go forward to the labors of another year, striving the best we can to honor and advance the interests of our calling, to add dignity to labor, and stand fearless and forever for the right.

A vote of thanks was tendered the President for his able address. Points in the address—the free mail delivery and better roads—were discussed by Secretary Dye, Samuel Fowler, of Allentown; Elias Welling, of Trenton; D. V. Carhart, of Hightstown, and others. It was thought that there should be a special law to put roads under the management of one man. One member stated that they bought

a stone crusher and utilized all the stones on their farms by putting them on the road four to five inches deep. The result is that they have a good road. The road tax has not been increased, and their roads are improving.

The Executive Committee presented the following report:

The agricultural interests of the different townships here represented have been, during the past year, in a fairly prosperous condition. Crops have been good, and although large prices have not been realized, good fair prices for most crops have been received. The different societies under the auspices of this Board are in a fairly healthy condition. The meetings of the Board have been well attended and an increasing interest manifested.

The "Babcock Milk Test" was exhibited and explained. A test of milk of different breeds of cows was made by Charles S. Cathcart, of the State Experiment Station, assisted by Prof. E. B. Voorhees. C. B. Sears, of the State College Farm, exhibited and operated a hand Centrifugal Cream Separator. The Babcock milk tests tended to show the amount of butter fats in the different breeds of milch cows.

Subjects presented and discussed at other meetings were—

First. "Fruit as a paying product." Mr. Carhart said that when the crop is abundant buyers are few, but if the yield is short the demand was great. D. D. Denise believed a reasonable amount of fruit could be grown by most farmers in connection with other crops, and that it will pay to do so. A young farmer should plant fruit trees and vines. He can attend to them when other crops are not needing his care. Each additional product for sale helps along. The chief cause of profitless fruit orchards is the want of care. Put on manure and give cultivation.

Second. "Best methods of producing hay." This was presented by Adam Graff, who favored fall seeding; thorough cultivation before seeding and a liberal application of fertilizer; would sow for hay eight quarts of clover seed and four quarts of timothy. Two mottoes he had put into the head of his farm account book are: "Sow clover seed like a spendthrift," "Save manure like a miser." Crimson or scarlet clover was advocated as a most valuable fertilizer. Those who had grown it and experienced the increased yields of the crops following it were well pleased with it.

Third. "Obstacles to success in agriculture." This was opened by Judge Woodbridge Strong. He said one of the greatest obstacles to progress is the farmers themselves. Let every man do his own original thinking; find the truth. The laws are here, and we should square ourselves to them. The tendency is to oppose the truth if it is against us or our theories.

At the November meeting, "Prospects for young men in the farming business as compared with forty years ago, and as compared with other businesses," was discussed.

Senator Rue said he began farming in 1853; in a few years he bought a farm for $75 per acre. It would yield one-third more per acre now than then. Fertilizer (Squankum marl and lime) was then carted from twenty-odd miles distant. Believes that now is a much better time to start in the farming business than it was forty years ago, with the exception of the high prices obtained during the war. If a man will commence now and be economical, he will succeed. Land is as cheap and yet better than it was forty years ago. He ought to succeed.

Mr. Ege said: What is success? Is it riches? Let a man neglect social, religious and other privileges for money-getting, and he will die a miserable failure; but if he rears his children respectably and sound in morals and education, though he dies poor, he is a success. You must figure on your farms at the present value of farm land. Then you will find your farms are paying you 6 per cent., if you manage right.

The general conclusion reached was that this is a most favorable time to buy a farm and to engage in the farming business in this county and in the State.

Mr. Eastburn Reeder read a carefully-prepared paper, "What shall we do with our lands?" He proved conclusively that there are crops which can, from time to time, be substituted for such as have ceased to be profitable, and if this is done a farm even remote from market can be made to pay a good per cent. The speaker presented his own farm accounts, and they established what he said most conclusively.

A valuable address on "Which way shall we turn for profit?" was delivered by H. W. Collingwood. The speaker stated there were periodical changes which occur at corresponding intervals of history,

and that agriculture had been of late years passing through such a change. He believed that we are now on the eve of a re-adjustment of our business to these changed conditions, and that better times for the great business of agriculture are at hand.

In concluding this report, I reiterate my faith in the value of farmers' organizations, and the good results that may be realized by meeting together and discussing the practical part of the farming business. Contact of mind with mind, experience with experience in friendly discussion, cannot be lost. May the good work be kept up in Mercer county and throughout the State.

EDUCATIONAL FACILITIES.

The county abounds in educational advantages. The College at Princeton, with the Theological Seminary, affords unusual opportunity to secure a thorough education in any line of desirable study. The State Normal and Model Schools at Trenton, now enlarged and equipped for the great work of developing teachers, are more popular and efficient than ever before. The flourishing Seminary at Pennington and the Peddie Institute at Hightstown are meeting the requirements of our growing demands for more general and complete education. In addition to the above, some of which have a name which is known throughout the civilized world as associated with learning, there are other schools of a select character doing a local work which is highly valued by their patrons. You who have families to educate, come, therefore, and settle in Mercer county. We can feed you, clothe you and educate your children; welcome you to any of our many churches, as you prefer, and give you the advantages of good society.

The Great Inter-State Fair Association, being an outgrowth and enlargement of the Mercer County Agricultural Fair Association, organized in 1885 by this County Board of Agriculture, the annual report of the present society is presented with this report and is as follows:

Inter-State Fair Association, Trenton, N. J.

Report of the Board of Directors.

Trenton, N. J., February 25th, 1893.

To the Stockholders of the Inter-State Fair Association:

Your Board of Directors take pleasure in submitting for your consideration the results of the Fifth Annual Fair, and congratulate you once more upon the success of the Association.

Briefly told, the story of the year is as follows:

Gross receipts of Fair	$62,064 75
Expenses	49,878 43
Net profit	$12,186 32

This amount was disbursed as follows:

Dividend of six per cent	$6,900 00
Expended in permanent improvements and betterments	3,558 97
Paid on account of note indebtedness	1,700 00
Balance on hand	27 35
Total	$12,186 32

The improvements and betterments referred to above consist of the erection of sixteen (16) small refreshment booths, one (1) large booth for dining-room purposes, accommodations for the express companies, and the building of a high board fence for shielding the electric road from the driveway at entrance. A number of tables and chairs were added to the dining-room furniture, and two additional turn-stiles placed in the Grand Stand entrance. Fifty-five hundred feet of two-inch iron pipe and fittings were purchased for the purpose of insuring a reliable water-supply. The wisdom of this expenditure was demonstrated by the fact that our original water-supply gave out on Tuesday, the second day of the fair, and we were dependent for almost our entire supply through the new channel.

Embodying the foregoing details in our general account, we have the following:

ASSETS.

Real estate	$19,771 61
Buildings and improvements	123,350 45
Furniture and fixtures	5,474 23
Cash on hand	61 37
	$148,657 66

LIABILITIES.

Capital stock		$115,000 00
Notes outstanding		800 00
Undivided profits—		
1888	$2,737 07	
1889	5,034 13	
1890	9,952 60	
1891	9,847 54	
1892	5,286 32	
		32,857 66
		$148,657 66

The exhibition, in many of its features and proportions, has exceeded the early calculations of its projectors, and renders it necessary for them to enlarge their primary conception of what the business requires. The demand for more extensive Grand Stand accommodations has become imperative, and your Board of Directors, after mature consideration, beg to recommend that a resolution be passed by the stockholders, authorizing the sale of stock up to the amount of $150,000, the limit of our capital under our present corporate rights. This will enable the Board to make the improvements, which seem to be positively necessary for the advancement and development of the interests of the Association. As a partial explanation of the causes which have led your Board of Directors to make the recommendation above, we submit the following statement, showing the profits accruing from the present Grand Stand for the five years last past:

RECEIPTS.

	Admission.	Refreshment Privileges.	Total.
1888	$2,435 24	$1,581 00	$4,016 24
1889	4,435 50	2,191 50	6,627 00
1890	5,808 50	3,535 60	9,344 10
1891	6,265 50	4,269 50	10,526 00
1892	7,262 50	4,377 00	11,639 50
	$26,198 24	$15,954 60	$42,152 84

Total receipts	$42,152 84
Total cost	18,087 50
Net gain (five years)	$24,125 34

The amount disbursed for dividends from the institution of the Association to date has been as follows:

1888	$3,595 00
1889	5,000 00
1890	5,750 00
1891	6,900 00
1892	6,900 00
Making a total of	$28,145 00

By comparison, you will observe that the gross amount of dividends paid out up to date has been a little more than the net profits on the Grand Stand.

The above statement would certainly seem to justify the expansion of accommodations in a direction where the money returns for the investment have proven so satisfactory.

Our superior facilities and advantages for still greater attainments are admitted by all, and the Association has elicited the highest praise from every quarter. Unanimity of thought and action in our Board has been one of the pleasant recollections of the past five years, and the future bids promise of a steady development and healthy growth.

We close by giving the following extract from an editorial contained in "The Cultivator and Country Gentleman," the leading agricultural journal of the country, for October 6th, 1892:

"System and business-like efficiency characterize the workings of the Trenton Fair to an unusual degree. Little need to look elsewhere for an explanation of its satisfactory balance-sheets. A better-conducted Fair, or better exhibits generally, would be hard to find."

By order of the Board.

(Signed) JNO. GUILD MUIRHEID,
Secretary.

MIDDLESEX COUNTY.

MIDDLESEX COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President	WOODBRIDGE STRONG	New Brunswick.
Vice President	SAMUEL BLISH	New Brunswick.
Secretary	ZENAS HENDERSON	Milltown.
Treasurer	ZENAS HENDERSON	Milltown.

DIRECTORS.

JOHN B. FIELD	Bound Brook.
W. T. WOENER	New Brunswick.
GEO. W. MOUNT	Kingston.
JAHU PIERSON	Jamesburg.
D. C. LEWIS	Cranbury.
DANIEL HERBERT	Milltown.

DELEGATES TO STATE BOARD.

SAMUEL BLISH (one year)	New Brunswick.
ZENAS HENDERSON (two years)	Milltown.

ANNUAL REPORT.

BY J. M. WHITE.

This Board has held four meetings and one two-days' Institute, with about the usual interest manifested. At these meetings were discussed the following topics:

January 9th, Prof. J. B. Smith, of the Experiment Station, delivered an address on "Benefits resulting from Farmers' Institutes," and a lively discussion followed the address, and resulted in the Board resolving to hold an Institute some time during the winter. At the same meeting the question of better roads was earnestly discussed,

and various opinions prevailed, but all agreed that there was need of better roads, but differed in their views of how to obtain them.

"Free postal delivery for the rural districts" was also debated and was almost unanimously favored, and petitions for it were circulated and numerously signed.

At another meeting President Burrough was present, and spoke upon the Columbian Exposition, showing charts of the grounds and various buildings, and giving explanations of the same.

Prof. J. B. Smith spoke on the "Prevention of insect injury," by co-operation or by law, and expression was given to the wish that the State Board might use its influence with the incoming Legislature to have some law passed upon the subject.

"Clover as a fertilizer" was discussed with much interest by Prof. E. B. Voorhees and others, and those who had used clover as a manure agreed that it was one of the cheapest and best of fertilizers.

At the Institute held in February, Mr. D. C. Lewis, of Cranbury, read a paper on "Potato culture."

Adam Graff, of Elmer, one on "Grass: its value and possibilities."

J. H. Denise, of Freehold, one on "Hay culture and harvesting."

J. M. White, on "Fruit culture, and how to do it."

Prof. J. B. Smith, one on "Insects injurious to fruits."

D. D. Denise, of Freehold, one on "Marketing farm crops: criticisms and suggestions."

Capt. Samuel Blish, of New Brunswick, one on "Tobacco culture."

W. T. Woerner, of New Brunswick, one on "Market-gardening fifty years ago and now."

Cyrus B. Crane, of Caldwell, and Edwin Allen, of New Brunswick, on "Drainage of farm lands: need of, best material, methods, and advantage."

Prof. E. B. Voorhees, of New Brunswick, spoke on "Manures, and how to use them."

B. C. Sears, of New Brunswick, on "Dairying: the cow, the feed, and the management."

Prof. B. D. Halsted, of Experiment Station, New Brunswick, on "Flora culture for the home and market."

Following the discussion of the dairy question, Prof. Voorhees and Mr. Cathcart, of Experiment Station, exhibited at work a Babcock Tester and a Cream Separator.

All these questions were quite fully and earnestly discussed and

much interest manifested, and so much good was accomplished that this Board desires to hold another Institute in February next.

Although the farmers of this county do not co-operate and work for each other's good so much as could be desired, and there is by no means the attendance at our meetings there should be, there is a conviction that there is an advancement in the methods of farming; but far more improvement would be seen if all would take advantage of the lights held out to them.

The present season has not been noted for large crops, as almost all of them have been shortened by drought, but the deficiency in quantity has been largely made up in increase in price, so that farmers have, on an average, done about as well as last year with much larger crops.

Asparagus was a fairly good crop and sold at satisfactory prices.

Strawberries were an abundant crop and realized fair prices, averaging about 7½ cents per quart, and gave an average yield of about 2,000 quarts per acre.

Raspberries were injured by blight, rust and drought, and gave an average yield of only about 1,200 quarts per acre, which sold for an average price of about 11 cents per quart.

Blackberries were injured by rust, blight, other diseases and drought to such an extent as to be nearly a failure.

Pears were a full crop of about 100 barrels per acre, and selling at an average price of about $2.75 net per barrel.

Peaches were 40 per cent. of a crop, and sold at an average for all grades for about 65 cents per basket.

Apples were 25 per cent. of a crop, of poor quality, yielding about 60 barrels per acre, and selling at $1.60 to $2.50 per barrel November 1st.

Grapes were 75 per cent. of a crop, of good quality, giving 4,500 pounds per acre, and sold at 2 cents to 6 cents per pound.

Cabbage was a light crop of generally poor quality, yielding about 2,500 heads per acre, and sold from $2 to $6 per 100 heads as to quality.

Corn was about 60 per cent. of a crop, averaging 20 bushels per acre, and selling at 50 cents per bushel.

Wheat was 90 per cent. of a crop, of good quality, yielding, on an average, 18 bushels per acre, and selling at 70 cents per bushel. The highest yield reported was by F. Atman, of New Brunswick, of 35

bushels per acre. It was of the Fultz variety, sown after potatoes which had been highly fertilized.

Rye was a full crop, averaging 14 bushels per acre, and selling at 60 cents per bushel.

Hay was 70 per cent. of a crop, of good quality, giving about 1 ton per acre, and selling from $14 to $18 per ton.

White potatoes were 50 per cent. of a crop, of quality from very poor to first-rate, yielding about 30 barrels per acre, and selling at $1.50 to $2.50 per barrel. The largest crop was reported by F. Atman, of New Brunswick, of 60 barrels per acre.

Sweet potatoes were a full crop, of good quality, selling at $3 per barrel.

There are probably 5 per cent. more horses than one year ago, with average price of 1 to 3 years old, $65, and of 3 to 7 years old, $90.

Mules are about the same in number as a year ago; average price for 1 to 3 years old, $60, and for 3 to 7 years old, $80.

Milch cows—same in number as last year; average price, $40.

Young cattle—same in number, with average price $20.

No sheep and lambs reported.

Swine—90 per cent. of last year's number, selling at 7 cents per pound.

Turkeys—90 per cent. as many as last year, selling at 14 cents.

Chickens—same in number as last year, selling at 12 cents.

There was about 90 per cent. as much wheat sown as last year, and the condition 90 per cent.; sown earlier than last. No injury from the fly.

Acreage and condition of rye, 100; sown earlier than last year, and without injury from fly.

The number of farm laborers is decreasing, because other occupations pay better. One correspondent says, Americans go West, and Irish hold political offices.

Wages are higher than five years ago, good help receiving $12 to $15 per month with board.

Potatoes are receiving more, and oats and wheat less attention than five years ago, on account of the difference in profits.

Spraying of fruit trees is slightly increasing.

Farmers are taking more interest in improved roads than formerly, and three pieces of Macadam road have been built during the year in this county.

Farmers are more interested in farmers' organizations than formerly, but not enough yet.

We think the greatest need of agriculture to-day is a closer study of the more improved methods of farming, the practice of more economy, a greater application of business principles to all matters pertaining to farming, and more co-operation among farmers. One correspondent says, "reduction of taxation—tax all property of every kind, exempting nothing but free-school property."

MONMOUTH COUNTY.

MONMOUTH COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President.....WM. H. REID.....Tennent.
Vice President.....C. D. B. FORMAN.....Freehold.
Secretary.....D. AUGUSTUS VANDERVEER.....Manalapan.
Treasurer.....JOHN B. CONOVER.....Freehold.

BOARD OF DIRECTORS.

JOHN H. DENISE.....Freehold.
DAVID BAIRD.....Manalapan.
JAMES H. BAIRD.....Marlboro.
RUSHMER MILLER.....Farmingdale.
J. T. FIELD.....Red Bank.
JOHN C. VAN DOREN.....Manalapan.
S. W. FOWLER.....Allentown.
JOHN R. DU BOIS.....Holmdel.
HOWARD ELY.....Holmdel.
W. T. PARKER.....Little Silver.
JOHNSON TAYLOR.....Ocean Grove.
HAL. ALLAIRE.....Allaire.

EXECUTIVE COMMITTEE.

D. D. DENISE.....Freehold.
H. V. M. DENNIS.....Freehold.
PETER F. CONOVER.....Freehold.

DELEGATES TO STATE BOARD.

H. V. M. DENNIS (one year).....Freehold.
L. F. S. SCHENCK (two years).....Marlboro.

DELEGATES TO STATE HORTICULTURAL SOCIETY.

FRANK DENISE (one year).....Freehold.
J. J. BEERS (one year).....Keyport.

COMMITTEE ON LEGISLATION.

D. D. DENISE.....Freehold.
DR. W. S. COMBS.....Freehold.
C. D. B. FORMAN.....Freehold.

Organizations in the county auxiliary to the County Board:

FRUIT-GROWERS' ASSOCIATION.

President.....WM. MORRELL.....Hazlet.
Secretary.....TAYLOR H. CARHART.....Hazlet.

And Monmouth, Liberty and Allentown Granges. For officers of the latter, see Report of State Grange, page 240.

MEETINGS OF COUNTY BOARD.

The regular meetings are held at Freehold in January, March, August and November.

ANNUAL REPORT.

BY D. AUGUSTUS VANDERVEER.

The past year has been noted for its peculiar atmospheric conditions as affecting the various products of the farm, beginning with the seeding of wheat and rye in the fall of 1891. There was much grain sown late, but, owing to the unusually mild weather during December and continuing throughout the winter, it started and grew well and yielded full average crops. The spring months were not so favorable at planting-time, being too cold and wet for potatoes and corn, the seed in many fields having rotted so badly they had to be replanted. Then the heavy rain and wind storms, and in some localities accompanied with hail, in June and early July, caused great damage to fruit and other crops. Many buildings were blown down and large trees uprooted. The hail of June 30th destroyed small fruit, particularly the grape, by bruising and splitting. The most serious damage was caused by the long-continued drought during July, August and September. The strawberry and other small-fruit crops were shortened; apples were caused to drop; corn and potatoes did not set; the grass and pasture were much injured; streams and wells in many sections went dry. Insects did not cause very much damage, as they are greatly controlled by spraying, the greatest injury being done by the rosebug, which appeared about the 8th of June in vast

numbers, destroying the cherry crop and injuring the grape. The leaf blight, affecting the potato and other vegetables, seems to be on the increase. Growers are planting more early varieties of potatoes than late, so they will mature before the blight appears.

Our farmers have used more home-mixed fertilizers the past year than ever before, purchasing the different materials and mixing them themselves, which is a great saving in cost, getting a purer article and obtaining better results. No experiments were made by members under the auspices of the Board. A summary of the general condition of crops will be found in the Directors' report.

We have a membership of 130, which is increasing, and many attend our meetings who are not members, and the interest is increasing. Four regular meetings have been held during the year, and, in addition, a course of extension lectures on Scientific Agriculture, by Prof. E. B. Voorhees, of the State College, was held, mainly supported by members of our County Board.

MEETINGS OF COUNTY BOARD.

The first meeting was held February 16th, 1892. Subject discussed: "Our public roads: best method of building, maintaining and management," introduced by Mr. Wilbur A. Heisley, followed by Hon. Thomas H. Dudley, J. E. Owens, S. W. Fowler, E. G. Harrison and others.

Meeting held March 22d, 1892. Address by Prof. J. B. Smith, of the Experiment Station, on "Spraying," followed by an address on

THE CAUSE AND CURE FOR THE PRESENT CRISIS, WHEN LEGISLATION IS THE GODFATHER OF CAPITAL AND THE AMERICAN FARMER IS TURNED INTO A BEGGAR.

BY L. F. S. SCHENCK, OF MARLBORO.

Mr. President, Ladies and Gentlemen—It is said, "The wheel of fortune goes 'round, and it will come to you," but suppose it be loaded—what then? When will it come? Never.

I see before me men I have known from my youth up, and I know you to be industrious and painstaking, as if, in obedience to the divine injunction, "In the sweat of thy face shalt thou eat bread," work were but a toy in your hands. I have heard your essays upon

the growth of crops, which would do justice to a scientist; and in response to diligence and the best appliances, with a willing earth and a beneficent Benefactor, your harvests have rolled in like a flood. But have you done as well as if corn had sold at 70 cents and wheat at $1.25 per bushel? Upon your farm you grow and sell yearly 200 bushels of wheat and 500 bushels of corn. The wheat, at $1.25 per bushel, amounts to $250; at $1 per bushel, to $200, a difference of $50. In 15 years it would amount to $750. The corn, at 70 cents per bushel, amounts to $350; at 55 cents, to $275, a difference of $75. In 15 years it would amount to $1,125, a total on both crops of $1,875. Upon a larger farm you grow 400 bushels of wheat and 1,000 bushels of corn. The wheat, at $1.25 per bushel, amounts to $500; at $1, to $400, a difference of $100. In 15 years it would amount to $1,500. The corn, at 70 cents, amounts to $700; at 55 cents, to $550, a difference of $150. In 15 years it would amount to $2,250, a total on both crops of $3,750. The average export price of wheat for the 5 years preceding 1876 was $1.31.6 per bushel; for the 15 years following, $1.04; actual difference, 27.6 cents per bushel. The average export price of corn for the 5 years preceding 1876 was 71 cents per bushel; for the 15 years following, 55 cents; actual difference, 16 cents per bushel. (Why the estimates are made for the 15 years will appear as I advance.) Adding the shortage upon the first farm, $1,875, to its shrinkage in value, $4,900 (35 per cent.), we have a total loss of $6,675. Adding the shortage upon the second farm, $3,750, to its shrinkage, $8,000 (40 per cent.), we have a total loss of $11,750. Upon every farm in this State (34,000) the losses sustained are proportionate with the above estimates. The average *farm* price of wheat in the United States for the 5 years preceding 1876 was $1.11.7 per bushel; for the 15 years following, 87.6 cents, a difference of 24 cents per bushel. The average *farm* price for corn for the 5 years preceding 1876 was 48.5 cents per bushel; for the 15 years following, 39.9 cents, a difference of 8.6 cents per bushel. The loss in *value* upon the wheat grown in the United States during the 15 years named, amounting to 6,419,205,264 bushels, is $1,540,609,263. The loss in *value* upon the corn grown during the 15 years, 24,086,906,578 bushels, is $2,070,473,965, a total loss in value upon corn and wheat of $3,611,083,228. The loss to the farmers upon the wheat exported (from 1876 to 1889), 1,641,749,668 bushels, is $410,437,417; upon the balance grown (from 1876 to 1890, inclusive),

4,777,455,566 bushels, deducting from it 1,054,875,704 bushels for sowing, and 2,101,780,462 bushels (44 per cent.) as consumed by farmers' families, a total of 3,156,656,166 bushels, leaves 1,620,799,400 bushels, which, at 24 cents, farm value, amounts to $388,991,856; adding to this sum the loss upon exports, $410,437,417, we have actual loss on wheat, $799,829,273. The loss to the farmers upon the corn exported (from 1876 to 1889), 827,432,135 bushels, is $124,114,820; upon the balance grown (after deducting 44 per cent. as consumed at home), 13,025,305,689 bushels, at 8.6 cents (farm value), is $1,120,176,289; adding to this sum loss on exports, $124,114,820, we have actual loss on corn, $1,132,587,771. *The actual loss to the farmers* of the United States upon wheat and corn for the 15 years, commencing with 1876, amounts to the enormous sum of $1,932,417,044.

Have these losses been felt? for these sums are so vast it is impossible to comprehend them excepting as they are felt. George Cary Eggleston says: "In New England, farms that were once sufficiently valuable to make their owners well-to-do men have been abandoned in despair, and are to be had for the taking. The fact that they are not taken is sufficient indication that their cultivation must be a losing process." Governor Boies, of Iowa, says: "When we consider the immense capital invested in the farms of a single State, and are told that for five whole years it has not paid enough to compensate the labor employed, it is apparent that no other business could have withstood such a condition of adversity during so prolonged a period." In New York, Pennsylvania, Virginia, aye, in every State where farming was once remunerative, there is universal distress. In the Dakotas, with a wheat harvest of 40,000,000 bushels, there is want and poverty. In one county in Kansas 1,100 mortgages are on the docket. I sometimes think, as large potato-growers, it is impossible for us to realize the situation. Just above us, with unsurpassed railroad facilities to the two largest and best markets on this continent, as fine farms as the sun ever shown on, with handsome buildings, erected when farming paid, can be had for from $30 to $45 per acre. (It is not necessary to go West for cheap land.) In many cases the buildings are worth more than the prices asked for the farms. You can journey for days, and it is impossible to find a farm that is not for sale. In one case the owner of two large farms, from an unfortunate investment, was obliged to give up one, and was left with a small

mortgage upon the other. The money has been asked for; to raise it is impossible; the farm is going; the owner insane. Forty per cent. in losses upon $10,197,096,776 of farm values is its summary, the gigantic sum of $4,078,839,710.

Is it not a crisis? In danger the fleet of foot take to the hills; the wild beast seeks its lair; and, in financial distress, the farmer wends his way to the neighboring bank:

Farmer—This note is for renewal of the one due to-day, please.

Cashier—Well, really, we have all we can do to accommodate our depositors.

Farmer—Please kindly renew it; it's impossible for me to pay it to-day.

Cashier—I regret it very much, but I suppose it will have to go to protest.

That means suit, the judgment; it's the road to the home, the anxious wife and dear ones. Down, then, upon your bended knees, as before your God, crying for time and for help. Verily, he who in other days was prosperous, for no fault of his is turned into the beggar.

Why is it? is the greatest question ever presented to an agricultural people. Can it be overproduction? In 1885, with a per capita of 4.49 bushels, wheat sold for 87 cents per bushel, as against $1.31 for the 5 years preceding 1876, when the average per capita was 4.85 bushels—44 cents in favor of the larger per capita. In 1887, with a per capita of 5.47 bushels, wheat sold for 85 cents, as against $1.11 in 1880, when the per capita was 6 07 bushels—26 cents per bushel in favor of the larger per capita. For the 5 years commencing with 1885, the average per capita was 5.01 bushels; average price of wheat, 88 cents per bushel, as against $1.07 for the 5 years preceding 1885, when the average per capita was 5.92 bushels—19 cents in favor of the larger per capita. The proof is, that while the smaller per capita should bring the larger price, the average result is the contrary, and the cause for so serious a decline cannot be overproduction.

Its solution is in the rate of exchange between London and India, which is caused by the change of ratio between gold and silver. England is our best wheat market, and India is our competitor in that market. England's standard is gold. India's standard is silver. In England, the coinage of gold is free, the owner of the bullion receiving its market price, which is fixed by act of Parliament at £3 17*s.* 10½*d.* an ounce. In India, silver is coined by the Government,

at the ratio of 1 to 15, its quite uniform value for more than a century prior to 1794, and is a full legal tender. From the earliest civilization, gold and silver have been used as money, and its ratio was so uniform under a free and gratuitous coinage, from its earliest history, that it was considered its normal condition. One to 15½ was first established in France by the Declaration of Louis XVI., in 1785. The single standard of gold was first adopted in England in 1816, and in Portugal in 1854; but through all these years the ratio of 1 to 15½ remained firm, and it was not until Germany, by the laws of December 4th, 1871, and July 9th, 1873, had demonetized silver, and to replace it with gold had thrown large quantities upon the London market, that the stability of its ratio was broken. In distrust, every nation in Europe with a double standard closed its mints to free silver coinage, and in 1876 silver fell to 79.2 cents. From this point, excepting the year of famine in India (1877), wheat in its decline has kept pace with silver, as has been shown in the estimates. In the remittances of India to London of £17,000,000 yearly, the loss from the depreciation of the silver is more than £2,000,000. With the silver of India in the London market, if wheat is $1 in India, the India $1 will be purchased in London for 79 cents in gold and sent to India, where it will pay $1 for the wheat, when it cost but 79 cents in London. Can American wheat be sold in the same market for more money? No; 79 cents must be its price. The market then stands: Wheat in India, $1; wheat in London, 79 cents; American wheat, 79 cents. The silver rupee is the standard coin of India, which circulates for 47.37 cents. In London it is taken by weight at the market price of silver (January 1st, 1890), 33.2 cents in gold, three rupees for $1. If wheat is $1.42 per bushel, it will be paid for in India with the three rupees, which cost in London but $1, and circulate in India for $1.42. The market will then stand: Wheat in London, $1; American wheat, $1; wheat in India, $1.42—American wheat at a discount of 30 per cent. With the average crop, and the usual market, as silver depreciates, wheat must advance in India or fall in London. The London market fixes the price of the whole American product. Silver to-day is 41½*d.* in London, $1 for 70 cents. The quotations are:

Silver at a discount of 30 per cent.
American wheat at a discount of 30 per cent.
American farms at a discount of 30 per cent.

Italy prohibited the importation of American pork, February 20th, 1879; France, February 18th, 1881; Austria, March 10th, 1881; Turkey, June 3d, 1882; Germany, March 6th, 1883; Greece, April 7th–19th, 1883, and the exports of bacon and hams dropped from 759,773,109 pounds in 1880, to 340,258,670 pounds in 1883, a decline of 419,514,439 pounds. Corn dropped 10 cents per bushel. For the five years following, with an average per capita of 28 bushels, the price was 37 cents, farm value, as against 47 cents during the heavy-feeding period, from 1879 to 1883, when the per capita was 27.83 bushels. The restrictions which have been removed are as follows, viz.: Germany, September 3d, 1891; Denmark, September 8th, 1891; Italy, October 17th, 1891; Austria, December 4th, 1891; France, December 5th, 1891, and we hope to recover the loss in which the feeding of hogs is so important a factor. From 1876 to 1883 the average fall in corn, at farm values, was 6.6 cents per bushel, which was, no doubt, due to its sympathy with the wheat market.

Upon the wheat alone exported to England from 1876 to 1889 the farmers of America have lost $186,811,383. England has it, and "expects no change in the existing monetary system of British India."

Could a more subtle device be found to rob our people? and yet, with the English capitalist, the American monometallist will tell you these are the best conditions for the poor man; that "he does not want to be paid in a depreciated dollar." Is not seventy cents a depreciated dollar? and it is not of our making. The cry of the hungry is for bread. Who is an-hungered? Not the rich, for they can spend the last dollar and the last cent for food; but with money gone, what then? Must the poor man be a beggar? No, but he must have work, for it places into his hands money, the circulating medium. Is work plenty? In Marlboro the day laborers have not had an average of fifteen days' work the winter. The truth is, the other extreme (although I do not advocate it), when gold is circulating above par, is best for agriculture and its labors, for it adds a bounty to all exports, making a demand for more work at better prices. Such a condition would place the English imports at a discount in the American market and drive England into bi-metallism. The result would be a money harvest, and American agriculture would reap that harvest. Mine is the normal condition, when the

volume of metallic money is not controlled by the legislator, but when nature's stock of gold and silver, accumulating from age to age, is the monetary supply. That supply of gold is $4,000,000,000; of silver, $3,850,000,000; the total coinage of the world, $7,850,000,000. Can one-half perform the functions of the whole? How even the total mass can measure "the vast amount of human commodities, which sink and swell with seed-time and harvest," is a miracle among measures; and yet, the capitalist will tell you he wants nothing but gold, and that silver is only a commodity; when it is measured it is a commodity, but when its weight, its fineness and its uses as a full debt tender are defined by law, and you place the stamp of the Government upon it, it becomes a measure of values, and is not a commodity; it has passed from the chrysalis into a new birth.

Only $4,000,000,000 of gold for 1,480,000,000 of people; $2 a head? It is an absurdity. Land at five cents an acre; twenty acres to buy a dollar. *Who can measure the disrupting of all financial systems?* But capital wants it, and would soon have it all, as is the condition in Russia, where 30,000,000 are starving; and it is due, not alone to the failure of one crop, but that for years the farmers' products have been placed in the hopper, the Government has worked the mill, and run the money into another man's sack. We have one of those mills here.

I have read, in one of the papers of our county, that "the imbecile farmers are in favor of cheap money." Can it be that farmers are in favor of cheap money, with a loss of from 20 to 30 per cent. upon every bushel of wheat, and a shrinkage of 30, 40, 50, we cannot tell how many per cent. upon farm values? No. The farmer is in favor of one ratio for all nations, for it will add 20 cents to every bushel of wheat and restore his lost values. Write it, then, upon your head-lines, blast it upon the four winds of heaven, yea, write it upon the sun, that it may be reflected upon everything animate and inanimate, that the farmers of this land are in favor of silver at 129.

But what are our relations with other classes?

The circulation of the National Banks is based upon Government bonds. As the bonds are purchased from the banks by the Government, an amount proportionate to the purchase is withdrawn from circulation, which causes contraction, an injury to the whole people, as it reduces the per capita, which, in the United States, is only $22.36, while in France the per capita is $14.55. Better pay the

bonds when due, as the money is needed by the farmers for immediate uses at home. It would be paid to the retail merchant, by him to the city wholesale merchant; it would go its round in the ordinary channels of trade, benefiting all classes.

Manufacturing, stimulated by a market, held at good prices by the Government, has yielded profits before unknown in all time, and profits have rolled into capital, and capital has fortified itself within the bulwark of Trust—Cotton Oil Trust, White Lead Trust, Window Glass Trust, Steel Trust, American Axe and Edge Tool Trust, Sugar Trust, Twine Trust, Coffin Trust. One hundred Trusts, representing more than $2,000,000,000 of capital. Ninety per cent. of the staple articles of commerce are under the co-operation of organized syndicates. The prices are fixed for the merchant, his profits are added; he takes 40 per cent., you lose 40 per cent.; 80 per cent. between you. Your products are taken at a discount of 30 per cent.; you lose 30 per cent., he takes 30 per cent.; 60 per cent. between you—140 per cent. between you in one transaction. Is it any wonder that your two-thirds of the nation's wealth has changed into one-third? Every time they deal with you they get the best of you. They have already taken one-third; when will they have the balance? The mighty wheel of fortune goes round; $100,000 profits to the Twine Trust—it's $100,000 against you, $200,000 between you; $27,000,000 to the Sugar Trust—it's $27,000,000 against you, $54,000,000 between you; $20,000,000 premium to the bondholders, paid by the Government to relieve the money market. Did you ever hear of the Government relieving the agricultural market? It is the money you have paid into the United States treasury—just the tobacco tax with $1,000,000 added. Is the $20,000,000 a debt? No. Why, then, pay the tax on tobacco and give it to capital? Capital takes it—it's $20,000,000 against you, $40,000,000 between you; at every revolution it's going.

To-day I ask of capital, "What are you trying to do with us?" and the answer comes, as in the last tragedy, when the murderer was asked, "What are you trying to do with me?" His answer was, "Nothing."

Under the mighty load, the half of which I have not told you, American agriculture reels like a drunkard; it is drugged by legislation.

The biting lash, the galling chains, have lacerated the flesh of the

slave, but, amid the intelligence, culture and refinement of the nineteenth century, these are the wrongs which gall the soul of man.

Basing the estimates upon farm profits and farm values, if there are one hundred farmers in Monmouth county worth as much to-day as they were fifteen years ago, tell me who they are; if there are ten, tell me; if there is one, tell me.

When your life's work is ended, who will take your farm? Will your son want it? No. Will your daughter want it? No. Why not? Because the business is at a discount.

Government of Trusts, godfather of capital, perverted justice, know you that the agricultural interests of this country are prostrate, with sting of death piercing every artery?

With bronzed cheeks, with hardened hands, with toughened sinews and with clothing soiled from the dust of toil, we have furnished bread for the rich man's table below its cost; yea, in obedience to law, we have sacrificed $20,000,000,000 upon our country's altar. Is it not enough? Who shall answer? Oh, the legislator must answer, for these wrongs were born of law, and the statute-book is its only antidote.

I stood in the Art Gallery at the Centennial and saw the master-painting—"The Landing of the Pilgrim Fathers." Every countenance was radiant with beauty, lighted from the inward emotions, for they came—

> "Not as the flying come,
> In silence and in fear;
> They shook the depths of the desert gloom
> With their hymns of lofty cheer."

Aye, as the unpinioned eagle soars sunward in its flight, so they came to loose the fettered spirit and bid the new-born hope bask in the sunlight of liberty. In that liberty we were born—the light of the ages—but class legislation has dimmed its luster. Equality before the law, the fundamental principle of justice, has been trodden under the aggressions of capital, and we are its victims. Shall we die this death? Nay. Rather make ready for the conflict, for the battle of the century is yet to be fought, not with the sword, not at the cannon's mouth, but at the ballot-box.

The Star of Bethlehem lighted the dawn of a new day, and "It is finished" cleft the rocks and rent the vail of the temple in twain,

for out of a chaotic night Christianity is crowned, a triumphant conqueror.

Organization is the star of hope which shall lighten this chaotic crisis, and its finished work, amid the heavy tread and the loud acclaim of its united thousands, will be our deliverance.

At next meeting, held August 27th, 1892, Mr. D. D. Denise introduced the first topic, "Wheat: varieties, method of growing, &c." He said he grows the Pool and Fulcaster, after potatoes; does not plow, but prepares the ground with a spring-tooth harrow, from 1½ to 2 inches in depth, and likes a hard bottom; he sows from 1½ to 1¾ bushels per acre, and uses from 200 to 300 pounds C fertilizer per acre; he prefers testing the new varieties of wheat for seed, and puts the seed in with a drill. He does not think the crop a profitable one for Monmouth county farmers to grow.

Mr. J. H. Denise said he grows the Pool and Fulcaster varieties, one-half of each, and practices thin seeding, 1 bushel and 4 quarts per acre, and obtains a yield of 35 bushels per acre; he considers thin seeding better for the wheat and grass crops; heavy seeding causes the wheat to lodge.

Mr. C. D. B. Forman thought that thin seeding did not affect the grass crop; he sows 1 bushel per acre if sown early, and more if late.

Mr. J. B. Conover said he sows Russian Red; yields good and quality good.

J. H. Baird stated that deep plowing for wheat caused the roots to grow down, and thus become broken off by frost.

Franklin Dye advocated plowing the usual depth, and then rolling and harrowing to pack the ground before sowing.

D. H. Van Mater was in favor of plowing six inches in depth.

Andrew Perrine plowed and rolled, and sowed 1½ bushels per acre.

W. H. Reid had the best results from a hard bottom with two inches of mellow seed-bed; he thought the hard bottom retained more moisture.

S. W. Fowler, of Allentown, grows the Blue Stem; average yield, 18 bushels per acre. He said it did not pay to grow wheat for the crop alone, but it did pay to grow to fit the land for other crops and grass.

Daniel Jones said he grows the Russian Red; it yields 30 bushels, and Fulcaster yields 22 bushels per acre; he sows 2 bushels of seed per acre.

George Jones sows the Russian Red, and its yield was 33½ bushels per acre; he applies 200 pounds of fertilizer per acre.

Thomas Smith sows September 10th, and the yield is 30 bushels of Fulcaster per acre.

W. H. Wikoff sows Fulcaster, and raises 28½ bushels per acre.

It was decided that the general time of sowing should be from the 10th to the 28th of September.

On a vote being taken as to the quantity of seed to sow per acre, the majority was in favor of 1½ bushels per acre.

The next topic, "Potatoes: best varieties, and how to grow the most profitable crops," was introduced by W. H. Reid. He said the best for shipment were the large white varieties, Peerless, Jumbo and American Giant; for home or near-by market the Queen, Rose, Monroe Seedling and Rural No. 2 were the best. He would keep the seed intended for planting as near the freezing point as possible, and he preferred Northern seed, but home-grown seed was as good if kept properly; would plow and plant very early, cultivate well three or four times, and plow last to hill up. Plant 4 inches deep, rows 2 feet 10 inches apart, and from 10 to 15 inches in row, according to variety; would cut the seed thirty days before planting and sprinkle with dust; manures the ground and applies 1,000 pounds C fertilizer per acre.

D. D. Denise said he had no success with the Queen variety; he also considered Northern seed best on account of keeping and freer from blight.

Franklin Dye said that Mercer county growers had good success with home-grown seed, if planted late for seed; they did not get so large and kept better than those planted early.

S. W. Fowler said that for the Trenton market the Beauty of Hebron and Early Rose were the best; he would cut and plant fresh.

Thomas S. Smith said that Beauty of Hebron did not do well on his farm at Smithburg, but did on his father's farm near Perrineville, as the soil was different.

C. D. B. Forman had grown the American Giant some ten or twelve years, and had found no variety to yield as well; the quality was not very good, but it brought the most money.

Andrew Perrine planted American Giant and Rural No. 2.

Albert Perrine planted his seed as soon as cut.

J. H. Denise planted American Giant, and the yield was 85 barrels

per acre; he tried an experiment this season with special and complete fertilizers, resulting in favor of the complete fertilizer.

The question, "Can farmers adopt any better method for marketing their farm products?" was then discussed.

D. D. Denise spoke in favor of the farmers organizing and employing an agent, to be located here, to be in telegraphic communication daily with different markets to ascertain where the best prices could be obtained.

S. W. Fowler was in favor of the present method.

L. F. S. Schenck moved that a committee of five be appointed by the Chair to investigate the subject and report at the next meeting.

At the annual meeting held November 15th, 1892, the annual address by President H. V. M. Dennis was delivered; also, an address by Mr. J. H. Hale, of South Glastonbury, Conn., on "The business side of modern fruit culture," after which the annual report of the Board of Directors was presented.

THE PRESIDENT'S ADDRESS.

The past year has brought with it the usual hopes and fears, successes and disappointments, and although, owing to climatic influences, the soil has not responded so liberally to the labors of the husbandman as the previous season, prices have been better, and the net cash results are probably as favorable. Indeed, in a season like the past, the difference between intelligent, thoughtful methods, with careful culture, and thoughtless methods, with careless culture, have been more plainly visible than in the recent more favorable seasons. It used to be said that any fool can be a farmer, but that time has long since passed away, and it is more and more apparent that the farmer, in these days of rapid progress and continually changing conditions and surroundings, must cultivate brain as well as, if not instead of, brawn, in order to reach the greatest success and keep pace with his fellow-citizens of other pursuits. Another has said: "The farmer's occupation is the most important of any. As he works to the best advantage, the world gains and mankind lives the easier and pleasanter. He feeds and clothes the world, and his industry sets all others in profitable motion. It is for him, primarily, that the railroads are made and the ships plow the ocean. The farmer's crops are the talk of the financiers, and the banks arrange their funds for the purchase of them. Every other industry waits on that of the farmer, and surely it must be for the general advantage that the farmers should be the most intelligent of men when all this responsibility falls on them."

Now, the aim and purpose of this organization is, primarily, our mutual improvement, and ultimately our material welfare. That we have not departed from our primary object during the past year can, I think, be confidently asserted.

Taking advantage of the University Extension course so liberally offered by Rutgers College, we secured a full course of twelve lectures on agriculture. This required one meeting each week for three months, and for well-directed, systematic study and aggregate amount of work done, surpassed that of any previous year in our history. We were taught how the soils were formed, and of what composed; how plants feed, and what food is necessary for their highest development; the amount and availability of plant-food in different substances; the feeding and manurial values of food for animals, and many other things that are interesting and instructive and of practical value.

The regular meetings during the year have been of interest, but there is a feeling that much more could and should have been achieved.

There has been a growing tendency among us to vie with each other in producing large yields per acre. Now, this may be carried too far, and may result in financial loss to the individual. I am satisfied that some crops will not pay their board under any circumstances, and the better we board them the more we will be out of pocket. We may be able to maintain them when prices are high, but we have no encouragement to plant in view of high prices, for the tendency all over the world, in all commodities, is to lower prices. This has been caused by the invention of labor-saving machinery and more skillful methods, and, as the same cause applies to the farm, it is not likely that agricultural products will prove an exception to the general rule. This is a subject that may well occupy the attention of this Board, and I suggest, as one of the important themes of future study, not how to secure the greatest yield without regard to cost, but how to so balance cost with production as to make each acre of the farm return the greatest net cash income. This will require care, thought, discretion and experiment.

The desirability of bringing producer and consumer in closer relation has been a subject of great interest and much discussion in farmer's meetings for many years, and yet the producer is as far from the consumer as he ever was, and, in fact, they are about as far apart as they can well get. Now, if this is a practical question, it is to our advantage, and we ought to do something with it. If not, the further discussion of the subject is rainbow-chasing—a waste of time—and we ought as practical men to drop it. The chief recommendation of the present system of marketing seems to be custom. We have always followed this plan, but, while the system has remained, the times and our surroundings have changed. That was the age of the stage coach, canal boat, sailing vessel and long distances. This is an age of steam and electricity and short distances, and we must

adapt ourselves to the change or pay the penalty for our perverseness and stupidity—in common parlance, "get left." We can load a car at Freehold, or any of our railroad depots, and send it without breaking freight to almost any station in the United States, and are practically in speaking distance. This subject will be presented to you by your committee, appointed for that purpose, and I beg for it your earnest, thoughtful consideration. It is a complex problem, and many knotty points will present themselves for solution, and one of the symbols in the equation may represent a small amount of money; but do not let that discourage or hinder you, because "it is possible to hold a three-cent piece so close to your eye that you can't see a dollar."

Now, I might present several other subjects of general interest for future consideration, but, in recalling to mind my last annual address, I fear that I then made the mistake of recommending too many subjects at one time; the natural tendency being to bewilder and confuse rather than concentrate, and the natural result follows—because we cannot take up all at once, to do nothing with any. And, therefore, at this time, I will only call your special attention to the two subjects I have already mentioned, and if we successfully work these out to their logical conclusions we will have enough to occupy our time and attention, and will have taken a long stride in the direction of the ultimate object of this organization, viz., our material welfare.

But, gentlemen, in order to secure anything like success in any direction, we must have the earnest, hearty co-operation of all; for, while there is in man a natural tendency to progress, a feeling of unrest with present attainments and a desire to better his condition, and while the individual may be, of himself, powerless to gain advancement, it is a recognized fact that it can be accomplished by bringing mind in contact with mind, by social intercourse and by united effort, and the advantages and strength of organization are forcibly illustrated in all departments of life, and why the farmers are so slow to grasp this power is simply incomprehensible.

The subject of "Good Roads" is just now prominent and attracting general attention, and, whether we are ready for it or not, will be forced upon us. This is a subject with more than one side, and requires careful thought and prudent action. That good roads are desirable, add to our comfort, are an evidence of thrift and enterprise and a source of pride, all will admit; but of what the roads shall be made and the expense of construction should be determined by the financial ability and the advantages accruing to those who have to pay the cost. I believe we ought to have the very best roads that we can build with the available material at hand, and that the money raised for that purpose should be used with some intelligent system and where it will do the most good, but when I hear of importing, bodily, rock-ribbed roads into Monmouth county I confess to a feeling of skepticism.

I desire and think it appropriate at this time to call your attention to the fact that Rutgers College offers, in the University Extension plan, to furnish other courses of instruction on different subjects at very small expense, and, although some of these may not be absolutely necessary to the farmer in the pursuit of his calling, yet it would educate, elevate and refine, and make society in this community more attractive and desirable, and thereby, incidentally, enhance the value of our investments.

Now, gentlemen, in closing, I want to take this opportunity to thank you for your uniform kindness and courtesy to me during the time that I have occupied this chair. I shall always hold in pleasant remembrance the two years of official relation, and shall ever feel grateful and proud of the fact that I have had the high honor of being the chief officer of so honorable and intelligent a body as the Monmouth County Board of Agriculture.

Following this was an address by J. H. Hale, of South Glastonbury, Conn., upon "The business side of modern fruit culture."

The stress of his remarks was laid upon the so-called "topping-out," and the great advantage in the long run of packing the products of the farm the same all the way from the top of the package. He told a graphic story of how he conducted the marketing of his peach crops. Three distinct grades were made, according to size, quality and condition. To designate these three grades he had labels printed upon three distinctly-different colors—red, white and blue. The fruit was always packed in the brightest new baskets he could buy, and the labels pasted on conspicuously. The red label meant that the basket contained extra-fine selected fruit—"fancy trade;" the white stood for first-class stock, and the blue for "seconds." From top to bottom of the basket the grade was the same. There were no inferior peaches in the center. The label was a guarantee. "We let no one turn the fruit out to see, telling them if it was not just as represented to bring it back. Last year there were only two baskets returned out of many thousands sold. We could not account for them. It was the mistake of the packers of the orchard. We got a reputation, and it paid us to put up our goods that way. We found ready sales, and made money. We rented a store in a busy part of the city and made it a headquarters. We advertised and made ourselves known to the people. Next year we are going to advertise more extensively. We believe in printer's ink to boom business, and we are going to use it for all it is worth."

D. D. Denise, for the committee appointed to prepare a plan of

operation for the better marketing of fruit, made the following report:

Your committee beg to report that, after considerable discussion, they think it will be to the interest of the farmers to employ a person to ascertain the various markets for sale of farm products, to make sales and purchases of various kinds; that they have an office whereby needful information can be obtained; also that they employ legal counsel.

The report was accepted, and, after somewhat of discussion, a motion prevailed to continue the committee, and directing them to call a meeting of the farmers in this section for further discussion and action in the matter.

DIRECTORS' ANNUAL REPORT.

The annual report of the Board of Directors was made by John H. Denise, as follows:

Year by year the farmers of our county are becoming more studious in their research for the hidden treasure upon which hinges their success as agriculturists, viz., how to grow larger crops with less expense.

The introduction of new machinery, new methods of fertilization and a diversified system of cropping, opens to the farmer a broader field for thought. Agricultural periodicals, experiment stations, farmers' institutes, lecture bureaus, and many other aids placed within our reach are invaluable helps and worthy of our study. It is evident that more of our farmers are looking into their profession with a view to the application of business principles to its management. There is not so much of the guesswork system, but a desire to know what constitutes a balanced ration for our stock, and also for the soil. As is oft said, "Necessity is the mother of invention," so competition and dwarfed margins necessitate the farmer of to-day, if to be successful in his calling, to put more intelligence into his business. No enterprise in this age can succeed without the combination of both thought and labor.

As we failed to secure a meeting of the Board at the proper time to arrange for experimental work, nothing was done in that direction under their supervision.

CROP REPORTS.

The general yield of all crops is something below an average. Prices, however, in most instances have been well sustained, and sales will not vary much from former years.

Asparagus, being among the first for market, made good returns. This vegetable is fast growing in favor, and, where soil is suitable, it is worth considering as a market crop.

Small fruits responded nicely where proper care was given them, and prices were good. The vine fruit crop was very remunerative, in some instances selling from $400 to $500 per acre, expenses to be deducted. This report comes from one of the shore townships.

The tomato is receiving more attention than formerly. The early market prices were good. The crop for the factory in this locality yielded about, gross sales, $75 per acre.

The potato crop yield was about 70 per cent. of an average; cause, lack of moisture. In a portion of the county the potato is extensively grown as a field crop, and is the most profitable crop in favored localities. Prices for early market were low. Present price, $1.75 per barrel; yield ranging from 20 to 115 barrels per acre. Sweet potatoes yielded well; both quality and price are good.

Market-gardening in the shore townships is the most profitable, and will eventually root out the primitive methods of the pioneer.

Corn crop is below the average in yield, but quality is good. Yield, 75 per cent.; 20 to 74 bushels per acre reported. Price, 50 cents. Boiling-corn has been a good crop, yielding in some instances 70 tons, $90 per acre gross sales. This is worthy a trial.

Wheat gave an excellent yield of fine quality. Crops reported, 15 to 42 bushels per acre; average, 20 bushels per acre. Price, 80 cents. No profit in too large acreage for wheat.

Rye has been a good crop. Yield, about 15 bushels per acre; straw, 1 ton per acre. About equal in value to wheat.

Hay a little below an average. Much of the crop was damaged in harvesting. From one-half to 3 tons per acre reported—a very wide margin. Price, $14 to $17 per ton.

Pasturage poor on account of dry season. Growing grain doing well, but timothy seeding thin. Acreage about an average.

Apples and peaches about half crop. Prices good throughout the shipping season.

Pears a fair crop and quality good. Crop of some farms running up to 1,000 barrels. Price, gross, $2 to $4 per barrel.

Live stock has been free from any serious disease; a little hog cholera and some poultry distemper.

Little attention is given to sheep-growing. As sheep decrease dogs increase, and the latter are fast gaining the supremacy, and it may be

that our tables will soon be graced with dog-chop, as there seems to be but little chance for the lamb.

The milk industry is on the increase. This argues well for the future of the farm, as the beef business in our section has become a thing of the past.

The cultivation of flowers, green-house plants and vegetables under glass, by the aid of artificial heat, is receiving some attention, and, we believe, will insure success to an expert on account of the growing demand for these luxuries.

We have had less of the insect pest to contend with than in former years, and fruits and plant-life have been freer from fungous attacks that have been so prevalent for a few years. We think we may well give the sunshine credit for this blessing, though it did seemingly scorch vegetation a fraction.

In the review of the year's output we can recognize the guiding hand of One that never errs, and to whom our sincere thanks are due for the liberal harvest gathered by the husbandman.

J. H. Denise,
W. H. Reid,
Rushmere Miller,
S. W. Fowler,
J. L. Conover.

MORRIS COUNTY.

MORRIS COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President	HON. A. W. CUTLER	Morristown.
Secretary	W. F. ELY	Madison.
Treasurer	GEORGE COOK	Hanover.

BOARD OF DIRECTORS.

M. M. COOK	Hanover.
B. S. CONDIT	Troy Hills.
J. J. MITCHELL	Whippany.
H. M. YOUNG	Afton.
S. M. HOPPING	Hanover.
W. M. JAMES	Afton.
ROBERT BLAKE	Madison.
OSCAR LINDSLEY	Morristown.
WILLIAM B. LINDSLEY	New Vernon.
SAMUEL BRANT	Madison.
JOHN OLIVER	New Vernon.

DELEGATES TO STATE BOARD.

W. F. ELY	1893.
H. W. YOUNG	1893 and 1894.

ANNUAL REPORT.

The Morris County Board of Agriculture held its annual meeting at Afton on December 17th, 1892, and elected the above officers for the coming year.

The inclosed reports about cover all given from the different ones sent throughout the county :

Farm laborers are on the decrease. The cause is attributed to the increase of manufactories. Farm wages are somewhat higher, and run from $15 to $20 per month, with board, to $30 per month without board.

Market-garden crops are receiving more attention than formerly and winter grain less, which is attributed to better prices for the former than the latter.

Spraying fruit trees is not practiced.

Farmers are taking a growing interest in the subject of improved roads, and also in the matter of organization.

Our potato crop was very much injured by the so-called new blight, which destroyed the tops before the tubers had attained their growth. There was little if any rotting of the tubers.

Field turnips were affected by rot. The disease seemed to closely follow an attack of the thrips insect. As the new potato blight first appeared on the leaves injured by the potato beetle, so the rot in the turnip fields showed on the plants where the foliage was cut in shreds by the thrips. I think spraying would be of doubtful value, as the little rascals attack the under side of the leaf, and, sucking the juice, induce decay, until the plant has the appearance of having been shot full of holes.*

The Swede turnips were but little affected.

Our Road law is not proving satisfactory in this section. If all Town Committemen were practical road men I think it would do fairly well, but such, unfortunately, is not the case. The tendency seems to be to elect town or village men to the township offices, and, as a consequence, roads near to towns or villages are improved and the outlying districts suffer neglect.

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* NOTE.—The above statement was sent to Prof. Smith for examination. He makes the following statement.—SECRETARY.

"The 'thrips' here referred to is evidently the turnip flea-beetle, which eats little holes, as described. Spraying with an arsenical mixture by means of the under-spray nozzle would be effective. Almost all diseases first attack weakened plants."—J. B. S.

OCEAN COUNTY.

A County Board of Agriculture was organized at Toms River, October 15th, 1892, when the following-named persons were elected officers for the ensuing year:

President.....SAMUEL H. POLHEMUS.....Toms River.
Vice President.....ELIJAH B. NEWMAN.....Toms River.
Secretary.....PETER TILTON.....Toms River.
Treasurer.....G. W. ROGERS.....Toms River.

DIRECTORS.—C. Milton Rorer, Wm. H. Wood, Daniel McEwen, Garnet V. Hyers, M. G. Pohl.

DELEGATES TO STATE BOARD.—C. Milton Rorer (one year), M. G. Pohl (two years).

The Ocean County Board of Agriculture has held a number of meetings since it was organized. At the first meeting, the Committee on By-laws made their report, and the different sections were read and accepted.

The next meeting was held at the Court House. Mr. F. Dye, J. B. Smith, Professor of Entomology, and Mr. Wm. R. Ward addressed the audience.

Secretary Dye, who has been untiring in his efforts to aid us in organizing a County Board of Agriculture for this county, urged those present to join the Board and co-operate for the improvement of the agricultural and horticultural interests of the county, and for the elevation of the farmer and his family. There are many advantages to be gained by those engaged in the same or kindred pursuits by united action, and farmers cannot hope to go forward in all respects as rapidly single-handed as it will be possible for them to do when their strength and wisdom are concentrated to reach definite ends.

Prof. Smith's address was on the subject of Entomology, and adapted to this section of the State. Many questions were asked in

relation to cranberry culture, the enemies to the plant and the fruit, &c., which were answered by the Professor. Much valuable information was elicited. The address being full of instruction, was highly appreciated. Mr. Ward's purpose was mainly to solicit contributions from Ocean county for the horticultural exhibit at the World's Fair. He gave a description of progress made up to date and an outline of the proposed plan and of the extent of the horticultural exhibit to be made.

It is a very difficult matter to make the average farmer understand the great value of the Board, and apparently more advanced men will not put their shoulder to the wheel.

Taking farming all through, the old way is perhaps predominating yet, but light has broken upon the agriculturist by aid of the steady influence of new-comers.

The different pamphlets and reports received from the State Board and the Experiment Station do good work.

The Farmers' Alliance had a strong grip on the farmers for awhile, but, owing to certain adverse influences, its further development has been retarded.

Stock is doing well; no disease reported.

Small fruit is planted more freely and has good market.

SALEM COUNTY.

SALEM COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President	RICHMAN COLES	Woodstown.
Vice President	M. T. M. GARRISON	Elmer.
Secretary	H. C. PERRY	Friesburg.
Treasurer	J. WALTER PANCOAST	Sharptown.

DIRECTORS.

RICHMAN COLES	Woodstown.
M. T. M. GARRISON	Elmer.
H. C. PERRY	Friesburg.
J. WALTER PANCOAST	Sharptown.
M. D. DICKINSON	Woodstown.
JOS. L. DUELL	Woodstown.
CHAS. R. LOVELAND	Cohansey.
EDWIN L. BORTON	Woodstown.
EMPSON ATKINSON	Woodstown.

DELEGATES TO STATE BOARD.

EMPSON ATKINSON (one year)	Woodstown.
WOODNUTT PETTIT (two years)	Salem.

ANNUAL REPORT.

BY H. C. PERRY.

PROCEEDINGS OF COUNTY BOARD.

The County Board has held four meetings during the year. At the annual meeting in Woodstown, January 27th, Mr. J. M. White, of New Brunswick, gave an instructive paper on "The culture of asparagus for profit." Mr. White said he preferred a sandy soil with

a clay subsoil. The land should be well pulverized, and the asparagus planted in rows 5 feet apart, using fine manure in the row; set plants 18 inches apart in the row, and do not cover all at once, and keep free from weeds. He clears off all rubbish in the fall, and in the spring he fertilizes with 15 loads of manure and 4 tons of kainit per acre. He cuts every day during the season, and markets as soon as possible after cutting.

The next meeting of the Board was held in Elmer, April 27th. At this meeting Hon. Edward Burrough, President of the State Board, gave an interesting address on "The road question from the farmers' standpoint: their building, repairs and maintenance."

Dr. C. P. Atkinson, of Palatine, gave an address on "The benefits to farmers through co-operation."

Also discusssed poultry-raising and the spraying of fruit trees.

The next meeting was held in Friesburg, July 27th. The day was excessively hot, but the attendance was large.

Franklin Dye, Secretary of the State Board, gave an interesting address on "The possibilities of progressive agriculture," in which he showed clearly from statistics that if the farmers of the county would increase their yield of products per acre to a point easily attainable by proper manuring and cultivation, there would be added to each farm of the county, at present prices of farm crops, over $300 annually, and to the county more than $500,000 a year.

After the address followed a discussion on peach-growing.

At the next meeting of the Board, held in Woodstown, October 26th, Dr. W. C. Parry, of Burlington county, addressed the Board on the subject of "Producing and marketing milk." He said the dairy interests are destined to be ranked as the most valuable agricultural industry in the State, and in the future the cow will be the most valuable machine on the farm. He advocated diversified farming—not depending on one branch entirely. He discouraged the making of poor butter, and denounced the manufacture and sale of imitation butter. He advocated the dairymen's association for the sale of milk.

After the address of Dr. Parry, Robert Gwynne, Jr., County Superintendent of Schools, gave a very interesting address on "Our public schools, and what can we do to improve them?"

CONDITION OF AGRICULTURE.

In looking over the condition of agriculture in Salem county, we find that we have had fairly good crops in the season just closed. Corn was a little below the average, about 35 bushels per acre; price, 45 cents per bushel. Wheat was about an average crop, but in some sections damaged by the "Angoumois grain moth," rendering it almost, or quite, worthless except for feed for stock. Price for good wheat, 75 cents per bushel; average crop, about 15 bushels per acre. Oats have been a poor crop for several years, and this year was not an exception, although the crop was better than in some past years. Pasture was good early in the season, but late pasture was poor on account of drought. Hay was a little below the average yield, about 1¼ tons per acre; price per ton, $15. White potatoes were only about half a crop. They came up poorly, and the dry spell cut the crop short, although some farmers had a fair crop. Average yield estimated at 50 bushels per acre; average price, 65 cents per bushel. Sweet potatoes have been a good crop, rather above the average. Yield, 50 barrels per acre; price per barrel, $2.50.

FRUITS.

Apples and peaches a light crop, especially when compared with the large crop of last year. Pears, grapes, strawberries, raspberries and blackberries were about average crops and brought fair prices. Watermelons and citrons were a good crop. Tomatoes were a full average crop, yield about nine tons per acre, and sold at the canneries at $6 per ton, being quite an important and growing industry—the output for the present year being estimated at 11,000,000 cans, requiring 25,882 tons of tomatoes, amounting to the sum of $155,292 to the growers.

STOCK.

There has been no prevailing disease among stock, and the percentage of all is probably about the same as last year, with, perhaps, a slight increase in the number of milch cows and a decrease in the number of swine, the former caused by an increasing interest in the

dairy and the latter from the prevailing low price of pork for the last few years and the scarcity of pigs in the spring.

POULTRY.

Poultry continues to claim the attention of the farmers to quite an extent; although I know of none in the county devoted exclusively to the business, yet it is quite an item on almost every farm.

SOMERSET COUNTY.

SOMERSET COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President.....DAVID C. VOORHEES.....Blawenburg.
Vice President.....AMOS C. SUTPHEN.....Bedminster.
Secretary.....A. P. SUTPHEN.....Somerville.
Treasurer.....GEO. H. MILLER.....Somerville.

BOARD OF DIRECTORS.

Bedminster Township.—PETER D. LANE, Bedminster; WM. C. LANE, North Branch.

Bernards Township.—JOHN A. LAYTON, Liberty Corner; WM. V. D. LAYTON, Liberty Corner.

Branchburg Township.—ABRAM DU MONT, North Branch Station; ABRAM A. CORTELYOU, Neshanic Station.

Bridgewater Township—JOSEPH FITZGA, Somerville; JOHN H. LORD, Somerville.

Franklin Township.—A. V. D. POLHEMUS, Franklin Park; PETER J. STAATS, South Bound Brook.

Hillsborough Township.—THOMAS C. STRYKER, Frankford; E. B. COOK, Belle Mead.

Montgomery Township.—JOHN J. BROKAW, Harlingen; STEPHEN S. VOORHEES.

North Plainfield Township.—GEO. W. BULLMAN, Plainfield; A. P. VOORHEES, Plainfield.

Warren Township.—THOMAS C. BIRD, Warrenville; ISRAEL J. COON, Warrenville.

DELEGATE TO STATE BOARD.

JACOB S. HOAGLAND (for two years).....Harlingen.

REPORT.

BY THE SECRETARY.

Four public meetings have been held during the past year.

At the meeting held January 15th, 1892, the Board was partially organized. The day was very stormy, and very few farmers were present. Mr. Franklin Dye, State Secretary, was present and addressed the meeting, dwelling particularly upon the importance and advantages of county organization. At this meeting it was resolved to perfect a county organization, and the meeting adjourned to March 12th next.

On March 12th a fair number of farmers met and the organization was perfected by the adoption of a constitution and by-laws and the election of officers.

At the afternoon session Mr. C. C. McBride, editor of "The Elizabeth Daily Journal" read a very able and interesting paper upon the subject of "Some of the advantages to be secured by farmers through organization." He spoke of the decrease in the value of farms in the past twenty years, and gave good and sufficient reasons therefor, and claimed that farmers would be obliged to organize and co-operate to overcome the Western competition. They also needed organization to secure better roads. This subject should be discussed by the farmers in order that they may agree as to what kind of roads to build and the amount of money they can afford to spend. This matter of roads is beginning to press so hard that Somerset county must take it up. The address was well received and highly appreciated by the farmers. No better man could have been selected. Mr. McBride is a product of Somerset county; he was born in Washington Valley.

Byron Halsted, M.D., was expected to read a paper at this meeting but was unable to be present on account of illness.

State Secretary Dye was present and made an address full of practical hints.

The next quarterly meeting was held August 13th, at which meeting an increased number of farmers were in attendance. The meeting was addressed by Secretary Dye, Prof. E. B. Voorhees and Vice President David C. Voorhees. Secretary Dye spoke in high praise

of Somerset as a farming section of the State, and urged the farmers to take hold of this County Board and make it accomplish what it is intended to do, viz., to improve the agriculturist and the agriculture of the county.

Prof. Voorhees spoke upon the topic "Manures," and in the course of his address said: "Natural manure is that which is made without mechanical manipulation or artificial means. Artificial manures are compounded from different sources, of different ingredients, &c. Then there are complete manures; barn-yard manure is of this character. There are also natural incomplete manures, as ashes, marl, &c. Nitrogen, phosphoric acid and potash make a complete manure. Incomplete manures are lacking in one or the other of these ingredients in whole or in part. Nitrate of soda is an incomplete manure, but, intelligently applied, it will nearly, if not quite, double the crops of the county, but must be used wisely," &c., &c.

The Professor continued his address, speaking of manures of immediate or more remote availability, of phosphoric acid, the soluble and the reverted. For quick action the soluble is preferable, although there is not much difference between that and the reverted in this respect. Insoluble phosphoric acid is much slower, and requires a much longer time before made available. The same ingredient in ground bone becomes available much sooner, because sooner dissolved in ground bone than in South Carolina rock. The best manure is that which gives you the best results for your money, and you alone can determine that. Nitrogen is of but little use on corn, because when corn is growing most rapidly the activities of Nature are in full blast and supply this need. As the Professor proceeded questions were asked concerning best ingredients to use for the different farm crops. For clover, phosphoric acid, potash and lime are needed, but no nitrogen.

Common clover as a manure was discussed.

This was a most interesting and profitable meeting, and was such as to encourage the officers of the Board.

The fourth and last meeting was held December 3d. At this meeting there were present fifty-four farmers. It was a useful and interesting meeting. Vice President David C. Voorhees addressed the meeting upon the subject of "Good seeds," showing the importance of selecting and planting only fully-developed, uniform, and perfect seeds, and the cleanest and best that can be obtained. He displayed

samples of corn. His address was full of practical ideas and facts collected by him, and produced an effect upon the farmers present calculated to set them thinking out the importance of this matter of good seeds. (See address in proceedings of State Board.)

At the afternoon session, Mr. S. B. Ketcham, of Pennington, read a paper upon "The essentials to success in farming." This was an admirable address, replete with practical ideas of the lecturer and in his own language, and was particularly interesting from the fact of his own success as a farmer.

The farmers present were highly gratified with this meeting, and manifested their interest by expressions of satisfaction, and the addresses brought out discussion from such experienced farmers as Messrs. Stryker, Veghte, Fitzga, Cook, Lindsley, Perlee, Dr. Tompkins, and others.

SUSSEX COUNTY.

SUSSEX COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President	Hon. Thomas Lawrence	Hamburg.
Vice Presidents	L. H. S. Martin	Newton.
	Oscar Dunn	Deckertown.
Treasurer	Thomas Armstrong	Deckertown.
Secretary	E. N. Millen	Deckertown.

DIRECTORS.

C. C. Cox	Andover.
P. D. Smith	Byram.
Geo. Roe	Frankford.
P. Struble	Hampton.
Geo. Baxter	Lafayette.
L. H. S. Martin	Newton.
Jacob Wolfe	Green.
Wm. Owen	Vernon.
Jacob Roe	Walpack.
Geo. Hursh	Sandyston.
Jas. E. Cole	Montague.
Garret Gunderman	Sparta.
Thos. Lawrence	Hardyston.
J. A. McBride	Wantage.
——— ———	Stillwater.

Delegates to State Board.—Hon. J. A. McBride, one year; Thomas Armstrong, two years.

ANNUAL REPORT.

The seventh annual meeting of the Sussex County Board of Agriculture, held December 23d, was an interesting and instructive one. The three sessions were all well attended. The forenoon was devoted to re-organizing the Board on a new and better basis. At the after-

noon and evening sessions, Prof. I. P. Roberts, of Cornell University; Prof. E. B. Voorhees, Secretary Dye and W. R. Lippincott, of the State Board staff, gave excellent addresses. These meetings have accomplished much good, and are growing in favor. There is a demand that they be held more frequently, here and in other parts of the county. A committee has been appointed by the Board to take charge of meetings in several townships during the present winter. The farmers, as a class, are eager to learn of improved methods of practice which promise to increase their profits. There is a growing tendency to abandon milk-selling as a specialty, and adopt a diversified system of farming, as in the days when Sussex county was celebrated for its gilt-edged butter. The most prosperous, happy and contented farmers in our county to-day are those that, being comparatively out of reach of the railroads, are still making choice butter and pork for a never overstocked market. Milk-selling is exhaustive of soil-fertility, and producers in this county are waking up to the fact that they are sending the wealth of their soil to the city without receiving an adequate return for it. Few farms from which milk has been sold are as productive as they were when the milk was fed up at home. A few have returned to butter-making where the old dairy skill has not all died out, and more have gone into fruit-growing, poultry-raising and truck-farming. Peaches do admirably on Sussex soil, and dealers are looking to this locality as a future source of supply for the near-by cities. Many thousand trees have been planted annually for the past few years, and these orchards have proved a profitable source of income to their owners. Apples are also receiving more attention than in former years, and the orchards are better cared for. The apple crop of 1892 was a profitable one, owing to the scarcity of apples in the West. Small fruits have been grown to some extent in this county, and in most parts the soil seems admirably adapted to them. Grain is not grown as extensively as in former years, owing to Western competition making this branch of farming unprofitable; yet we have lands excellently adapted to all the cereals. The pasture lands of Sussex are seldom excelled, and hold their own in point of fertility with wonderful tenacity.

Sussex county has long been noted for the horses it produced, of excellent and enduring quality. Our upland pastures, both on the slate and limestone formations, grow the best of bones and fat and

muscles, and use on these hills makes them hardy as well as handy. Goldsmith Maid, the greatest campaigner the world has ever known, was bred and reared on the slate hills of Wantage township. This important horse-industry, with others, is rapidly forging to the front. Some excellent horses, of thoroughbred, trotting, hackney and draft bloods, have been brought into the county and are still further improving the class of equine stock found within its borders.

More well-bred cattle are in the county than ever before. Thoroughbred bulls of the best dairy breeds have been sought for, and there is gradual grading up of the native stock going on. Our farmers appreciate the fact as never before that only the rich can afford to keep poor cows. Ayrshires and Guernseys appear to find most favor, or it may, in other words, be stated that the breeds named, along with the Jersey, best suit our pastures and other conditions, although in some parts of the county the Dutch breeds find favor.

This county has too many dogs and too few sheep. Its hilly pastures are admirably adapted to the production of first-quality wool and mutton. There are not nearly enough sheep bred here to supply the local demand for mutton.

Altogether, the past year has been one of steady progress toward an improved agriculture. The stringency of the times, the growing scarcity of hired help and other circumstances, have set farmers to thinking as never before how to make their farms bring in more money. If competition in one line has made it unprofitable, there is always some other specialty to turn to that pays better. If manufacturers tempt hired help from the farms, the farmers must meet the situation and make more money by becoming manufacturers in their own line of business. Better products and leading specialties are more looked after. Any one can sell raw products and inferior goods, often at a loss, but there is room for the exercise of skill in producing the *best*, on the farm as elsewhere, which always brings its reward.

UNION COUNTY.

UNION COUNTY BOARD OF AGRICULTURE.

OFFICERS FOR 1893.

President	JOHN O. MAGIE	Elizabeth.
Secretary	DENNIS C. CRANE	Westfield.
Treasurer	ROBERT WOODRUFF	Westfield.
Librarian	DENNIS C. CRANE	Westfield.

DIRECTORS.

DENNIS LONG	Irvington.
C. C. MCBRIDE	Elizabeth.
BENJ. W. TUCKER	Elizabeth.
MOSES O. WINANS	Elizabeth.
F. E. WOODRUFF	Cranford.
JOHN O. MAGIE	Elizabeth.
DENNIS C. CRANE	Westfield.
ROBERT WOODRUFF	Westfield.

DELEGATES TO STATE BOARD.

DENNIS C. CRANE	Westfield.
OGDEN WOODRUFF	Elizabeth.

ANNUAL REPORT.

BY DENNIS C. CRANE, SECRETARY.

The meetings of the Board have been attended with about the same interest and by the same persons as in former years. Seven afternoon meetings have been held at the Court House, Elizabeth, and an all-day meeting in February at Westfield. The meeting at Westfield was unusually well attended and instructive. Prof. E. B. Voorhees and Dr. Halsted, of the New Jersey Experiment Station; Judge F. S. Holcomb, of Hunterdon county; Cyrus Crane, of Cald-

well; E. Williams, of Montclair, and Wm. R. Ward, of Lyons Farms, were present and spoke on the subjects assigned them. The Board provided a dinner for all who came.

The weather during the past year has been quite favorable for the farmer and gardener. The planting, cultivating and harvesting seasons were not interfered with by continuous storms. During the summer and fall there was less rain than usual, so that late cabbage and fall-sown grain and timothy suffered considerably, and wells and streams went dry, putting some to inconvenience in watering their stock. Hay and grain were harvested in good condition. Prices have been satisfactory. Our fruit-growers begin to realize more fully the necessity of spraying fruit trees. There was a good crop of small fruits and pears, and a medium crop of peaches and apples.

Waste land is another question which our Board is considering. Travelers passing through our county on the railroads (of which we have seven, five of them trunk lines to the South and West) have wondered, especially if they were practical farmers, why it is that so much apparently good land is allowed to lie idle, growing only noxious weeds. The land is good, is easily worked, adapted for growing all kinds of farm crops and fruit, with a good home market near. For twenty-five miles out from New York, between the towns and villages, there are thousands of acres thrown out to commons, mostly along the railroads. It is a disgrace and injury to us and misrepresents our farming. Its slovenly, unsightly appearance unfavorably impresses strangers and those who come to buy, and consequently depresses real estate values. It is an unnecessary evil and ought to be remedied. Thirty years ago it grew good crops, was well fenced into fields, where were cattle, sheep and horses grazing. There were ample farm buildings and pleasant homes, where native-born, intelligent farmers lived. But real estate speculators and business men from New York began to look upon it with coveting eyes. The prices offered tempted the old settlers and they parted with the old homestead. It has since frequently changed owners and been shamefully treated. The business man bought as an investment and for a home in the country, trusting to hired men to do the farming. He soon found regular farming did not pay, so the outside fields were neglected. The house, stable, garden and lawn received all attention. The speculator's object was to cut the fields into building lots and sell them to persons seeking cheap homes in the country.

The land was surveyed, mapped out into streets and building lots. The contractor was employed to turnpike the streets and clean up hedgerows, fences and all. The lots were advertised in the newspapers and by circulars, showing the many advantages of the location and the certainty of its becoming a city in the near future. Free excursions, lunches and music generally resulted in the sale of quite a number of lots at satisfactory prices, the buyer paying down a small sum. The selling of the lots and a record being made in the court-house established the streets. Now commences the ebb-tide. Reflection caused many of the buyers to hesitate about paying down any more. Failing in this, the land reverted to the speculator. Possibly, after a year or two, the speculator, not realizing all he anticipated, becomes discouraged, and, not able to pay principal or interest on the mortgage given, fails. The capitalist then buys the unsold property as an investment to hold until the growth of the village increases its value. While the meadows paid for mowing, and the soil grew crops without manure, it was rented, mostly to foreigners; but this stopped after a while, and we have the land as we have stated—owned mostly by non-resident capitalists, without pride in keeping it up and unwilling to rent it at a price or for a term satisfactory to those who would cultivate it. What shall we do? We might say, in justice to the real estate man, that while he has broken up farming and spoiled the beauty of the landscape, in many places there can be seen redeeming features worthy of praise, as on isolated and fenced-in city lots can be seen quite a number of tasty, modern-built houses, the garden and lawn well kept and made beautiful with flowers and graveled walks. The owners are among our most enterprising and useful citizens, and they join us in demanding that this neglected land be better cared for. We want some law that will give our Town Committees power to tax every building lot or acre one dollar, annually, in addition to the regular tax, to be assessed and collected in the regular way, which should be kept as a fund for encouraging clean cultivation and good farming in the township.

Some of these wealthy sharpers neglect their land on purpose to keep down the valuation by the Assessor, claiming it yields them nothing and has only a farm value; but let a buyer go to them, or a railroad be surveyed through it, and see what they will ask. If anyone is to have a reduction, give it to those who live on their places and keep them up, support the church, the school, and whatever is

for the public good. What is true in our county is equally true in Essex, Hudson and Bergen counties, and other directions out from New York.

Especially during the past two or three years have speculators been buying eligible farms, and cutting them up into building lots. While we would not discourage the coming of good people among us, nor put anything unnecessary in the way of those engaged in this business, still we think they need regulating. Not only should they be required to keep up a system of cultivation, and fertilizing the land and rotation of crops, that will preserve its appearance and fertility, but the township should be a partner in saying how streets shall be laid out, and the size of the lot. It may look like trampling upon the rights of property and liberties of individuals, still we think the community has rights as well as the individual, and should have a voice in the matter.

(For "Mementos of the Past," see page 23, report of committee on County Board Reports.)

In contrast with the uncultivated land of which we have spoken, we might mention some places that are objects of favorable comment from those who pass by them.

Mr. Chauncey B. Ripley, of Westfield, owns several hundred acres, keeps some sixty head of registered Jerseys, of which "Pedro Royal Marjoram" is at the head. He underdrains, manures highly, grows heavy crops, especially of clover, timothy, corn and rye, but no weeds are seen. The roads running through his place are lined with fine maple and elm trees. The sidewalks and ditch banks are in grass, and are mowed several times through the summer. The center of the highways (at cost to himself) is macadamized with crushed stone, and a straight edge preserved between the traveled way and the green grass border, giving the farm an altogether park-like appearance.

South of Plainfield, near Marconnier station, on the Lehigh Valley railroad, is the Holly Grove Farm, owned by Gen. Samuel K. Schwenk. He has a herd of registered Jerseys of fashionable strain, something over fifty head. They have been exhibited at the different fairs in New Jersey and other States, and admired by all who have seen them. He retails the milk in Plainfield to families who are willing to pay one or two cents a quart over the price for common milk. He has extensive outbuildings fitted with all the modern improvements for comfort and convenience—silo, cutters, grinders, automatic water troughs, chain ties, manure gratings, &c. Large

quantities of beets and mangels are raised annually for feeding to the stock, and vegetables for the Plainfield market. The place gives evidence of thrift and good management.

In the suburbs of Plainfield, a little north, under the mountain, are the farm and residence of John Taylor Johnson, ex-President of the Central railroad. About one hundred acres are kept in a park; it is adorned with serpentine drives and walks which are covered with crushed stone. Ornamental hedges, shade trees, shrubs and flowers are all kept in order. Back from this and nearer the mountain are the numerous farm buildings for housing the stock. Mr. Johnson's son keeps the herd of registered Jerseys—about seventy head. The morning's milk is sold in Plainfield at a premium; the evening's milk is made into butter. In connection with the place is a large hennery.

On the road from Plainfield to Springfield are the handsome residences and grounds of the late Dr. Abraham Coles and Warren Ackerman. The most creditable work of Mr. Ackerman is the reclaiming and beautifying of the deserted village of Feltville, now called Glenside, between the First and Second mountains. The dozen or more houses are used in summer for keeping boarders of the better class. In the vicinity are mountains, ravines and streams of water, a good-sized lake, abrupt mountain sides, extensive woods, rocky glens and well-built Macadam roads. Mr. Ackerman is the largest land-owner in the county.

We would like to mention and describe the places of those who farm as intelligently and profitably but in a smaller way. For the most part they are descendants of the old settlers, inheriting the old homesteads and possessing many of the old-time virtues of industry and frugality, with a practical knowledge of farming. They each own from thirty to one hundred acres of land, mostly under cultivation. Their principal efforts are devoted to general farming. They keep, on an average, from ten to forty cows, many of them thoroughbreds and their grades. Some sell the milk at the door to retailers who pay three cents a quart in summer and four cents a quart in winter. Quite a number retail the milk in the near-by towns and receive six and eight cents a quart. The feed of the cows in summer is largely green rye, clover and fodder corn, with the addition of some corn-meal and bran and fresh beer grains. Through the day they run out in the woods and lowlands to pasture. In the winter

the day's ration consists of corn-stalks, hay and three pecks of beer grains, with six quarts of corn-meal and wheat bran. They are housed in warm stables and kept in place with stanchions.

For raising milk for selling to families, the Jersey, Ayrshire and Holstein breeds each have their advocates. One farmer has a herd of Dutch Belted cattle. As there are poor cows in all breeds, so there are good individual cows in all. The feeding and keeping has much to do with the quantity and quality of the milk. For butter and cream, no doubt the Jersey excels, but those who keep the Ayrshires claim that she is more hardy and will live and thrive on poorer pasture in summer and coarser fodder in winter, while, on the same feed, she will give more milk, which has in it the elements of her nature, namely, nerve, vigor and vitality. Such milk is specially adapted for small children and those with weak digestion. The Holstein has of late years been sought after for crossing on the best native cows. Not only are they as a rule good milkers, but the calves weigh more.

Our farmers do not see much profit in producing milk at present prices, especially those who have to depend on hired help. The redeeming features, however, are that the cows pasture on waste land, and eat much rough fodder grown on the place that might otherwise go to waste, and it affords work for the hired men in winter. Then, too, some money is coming in every day, and the manure pile is increased.

GARDENING, ETC.

Every year there is an increasing number who grow late garden vegetables, and they are sold at wholesale in Newark or the near-by towns. White potatoes, cabbage, tomatoes, sweet corn and turnips are the principal crops, and those having a warm, rich, well-drained soil, not too far away, succeed best. A canning factory at Elizabeth consumes large quantities of tomatoes grown by our farmers. The factory pays $9 a ton delivered, contracting to take all they raise.

On the stony, hilly land of Summit and New Providence townships some peaches are raised. The growers sell them direct to consumers or grocerymen, and so get the top market price. There are a few engaged in keeping poultry, mostly for eggs, who have a stock of from three hundred to one thousand fowls. Some make money in

raising Pekin ducks and selling them when six or eight weeks old. Another makes money growing mushrooms in winter, selling them for $1 a pound. Strawberries, raspberries, currants and pears are raised sufficient for the home market in their time.

GOOD ROADS.

Some years ago we agitated the question of improving our country roads. One winter meeting, at least, was devoted to the discussion of the question. Essays were read, and the proceedings published in our county papers. The movement then begun has resulted in our having to-day all our main roads—some forty miles or more—nicely graded, thirty-six feet wide, and sixteen feet of the center laid with Telford pavement, hard and smooth at all times of the year. In addition to this, nearly all our town and village streets and half of our by-roads have been improved with a coating of broken stone. Special money is voted every year for this purpose, and there is little or no grumbling because of it; in fact, no tax is paid more willingly, for every property-owner enjoys the pleasure of riding over these roads, and realizes their advantage over the stony, muddy roads of the past. He sees, also, that real estate values have doubled. Furthermore, there has been a large influx of new-comers, mostly business men and clerks from New York, who have bought and built homes, thus increasing the value of property, and affording a home market for what is produced.

COUNTRY ROAD-MAKING.

While we have in the past had considerable to say in our annual reports about making roads, we feel again like emphasizing the importance of the subject. Having suffered from bad roads, and now enjoying, for the most part, good roads, we wonder how we endured bad roads so long. There are a few points we will touch upon, just to keep the subject before the people. Trap-rock stone, put through a crusher and broken to a size not over one or two inches in diameter, we find is the best material for improving our country roads.

For ordinary roads, we think Macadam is the cheapest, easiest made and repaired, pleasantest to ride over, and least likely to become rough. Telford pavement, which is large stone closely and carefully

laid over a slight arch in the road-bed, so that when wedged and hammered down the arch, as in a bridge, prevents any part from sinking, and then covered with fine stone, is good, if well done, especially where there is a springy or spongy soil and very heavy travel; but Telford pavement, as we already find on our county roads, unless kept repaired with fresh coatings of crushed stone, wears down to the large stones and makes a rough road. There is danger, also, from frost, subsoil-water and heavy teaming, which work large stones to the surface, where they become a nuisance. We think it of first importance in stoning a road, to first give it a good grade. To be sure you are right, we advise putting the work out on contract, advertising for bids, hiring a home engineer to make a profile of the roads to be stoned, to drive the stakes, and then see that the contractor or Road Overseer works according to them. Road-making should be made more of a profession, and only those employed who know how and pride themselves on doing good, honest work. Those who have done good service, continue in office, even though they require an extra fifty cents or one dollar a day.

In townships or counties where there is a good quality of stone for road-making we think it good policy for the township or county to own a quarry, locate the prison there, buy a stone-crusher and engine, hire an engineer and superintendent, and set the county prisoners to work mining and handling the stone to the crusher. This crushed stone to be sold to road districts and townships at cost price, 2,000 pounds to be given for a ton, net. The carting of these stones to be done at any season of the year, when farmers have spare time; pay, 35 cents a ton the first mile and 10 cents for every additional mile the load is carted. A two-ton load carted four miles would amount to $1.30; the stone to be loaded for him at the crusher. Certificates of tons carted from the superintendent at the crusher, indorsed by the district overseer, should entitle the carter to his pay at the end of the week. The Township Committee should provide funds in anticipation of taxes, so that the Collector or Town Treasurer would be able to pay bills on presentation. This money would not only help the farmer to improve his place and meet his obligations but encourage him to vote for liberal road appropriations, for he could see that the roads were improved, that the money was not wasted paying stone-crusher men for stone never delivered, contractors for work and depth of stone

never furnished according to specifications, Italians and foreign contractors carrying the money out of the township. Cheap crushed stone and good roads from the crusher will hasten the coming of good roads, therefore the first road to be improved should be the one leading from the crusher. Do the cleaning out of the ditches, turnpiking and picking up of all surface-stones and scraping in the spring. Then the soil is loose; grass and weeds will not interfere with doing good work. In the fall and winter cart the stone and macadamize the roads.

On the ordinary country road, after it has been brought to a proper grade and a sure outlet for water made, round it with a road machine. Where the road from ditch to ditch is thirty-six feet wide, make the crown twelve inches high on the high ground, and if possible eighteen inches on the low ground, then cover the center evenly, ten or twelve feet wide, with a coat three inches deep of stone of a size that will go through a two-inch screen. For binding, spread evenly over the surface a light covering of clay, just enough to fill the crevices after it is washed down by a good rain. If a two or three-ton roller is to be had, as soon as the rain is over roll it well, pressing and dovetailing the stones together. Then put on another coat of stone, not over one inch in diameter, three inches deep, and spread evenly over this another coat of fine stone screenings from the crusher. Now, if a street sprinkler can be secured, wet it well, and roll until it is compacted together thoroughly. Where the land is low, or the ground inclined to be springy, make each separate coat four inches thick, and possibly five inches. It is important to have the stones spread evenly, and not all fine stones in one place and coarse in another, as is apt to be the case when the loads are dumped in a heap and leveled carelessly. Where the most fine stone are it wears out soonest and leaves a hole.

A cubic yard of trap-rock weighs about 2,700 pounds, and ought to cover a surface six inches deep, ten feet wide, and four feet parallel with the road. The dealer's price is usually $1 at the crusher. As there are 5,280 lineal feet in one mile, it would take 1,320 cubic yards, or $1,320 for the material for one mile of road, besides the cost of grading, carting and spreading of stone, sprinkling and rolling. Many of our less-important roads do not at first get this six-inch coat, possibly not over three inches, and spread only eight feet wide. A cubic yard is made to go eight or ten feet parallel with the

road, and it answers well for three to five years, when it will need another coat of three or four inches. Possibly this course is advisable. All the roads will be improved in half the time. When only a thin coat is put on, the size of the stone should not be over one inch in diameter.

TRESPASSING.

The dry weather through the summer and fall favored the burning of falling leaves. In Westfield and Fanwood townships large tracts of valuable wood were burned over, doing much damage, especially to the rail fences and young growth of trees. The supposition is that gunners started the fire. Our farmers are in the minority and find it hard sometimes to contend with the outlaws who come out of the towns and villages. They act as if farmers and fruit-raisers had no rights they were bound to respect. What good are gunners in our State, anyway? We would like to see the Game laws enforced every day in the year. We have no destructive wild animals and birds but what the farmers can manage. The few rabbits, squirrels, robins and quail he wants himself, and he is the only one who has a legal right to them. Hunters tramp our fields, break down our fences, pull down our wood piles, set fire accidentally, if not intentionally, to hay stacks and woods. If you remonstrate with them, they defy and insult you. Gunning is a barbarous instinct, cruel, and, in our county, unprofitable.

CROSS-COUNTRY RUN.

Saturday, December 17th, I accidentally saw, near Scotch Plains, what is called among sporting men "a cross-country run," a sport growing fashionable because "it's English, you know." The run was from Plainfield to Springfield, nine miles. There were between twenty-five and thirty riders, each dressed with a high hat, red frock coat, white pants and high-top boots, mounted on long-legged, small-bodied running horses. Some distance in the lead were about as many large hounds following the scent of a dead fox that had been dragged over the ground before them. To follow the road was not their purpose, but to take a zigzag course across the country, the more post-and-rail fences in the way to jump, the better. In five minutes they came in sight and were out of sight. They crossed five

fields and one road, jumping seven four-rail fences. Some of the horses, being tired, failed to clear the top rails and broke them. One new rail was too strong and threw horse and rider headlong. In the short half-mile that I saw, twenty rails had been broken. Meadows were tramped (for the ground was soft) in a way the owner would not have had done for $10. In the ride of nine miles, it is safe to say the actual damage done to fences, meadows and grain-fields was not less than $100. The injury done to the feelings of the owners of the land, having reckless, haughty, spendthrift young men riding roughshod over them without their consent, might be variously estimated. The organization is made up of wealthy young men living in this section of the State, scattered, so if you were inclined to arrest and prosecute them, you would not know where to find them; but the farmers have to grin and bear it, for, like a thief in the night, they come and go unaware.

MUSHROOM CULTURE.

BY I. TOWNLEY.

In reply to your request for a brief paper on Mushrooms, I would say: There are two cellars in use. In one, cows were kept, but they were finally sold, owing to the uncertain demand for milk. They are both ceiled overhead—one nine feet high, the other seven feet six inches. The higher ceiling would possibly accommodate four beds in tiers, but only three are used and four tiers, making twelve beds four feet wide and twenty-eight feet long; while in the other there are three tiers of only two beds each, occupying the body of the cellar, and bunks around the walls making twelve additional beds, containing in all 2,500 square feet. No. 4 Hitching's heater easily keeps these cellars between 50° and 60°, as the heating of cellars is much easier than of green-houses. Certainly not more coal is burned than in an ordinary base-burning stove.

The first year brought a partial failure, owing partly to following the English plan of permitting a high heat in the beds after they were made, and partly to making the beds too thick. The heat drove out the moisture, and the interior became so dry that nothing could possibly grow in them. In the cooler English climate this high temperature may serve a better purpose, but in our continental air and hot suns must be used with caution. Some experiments have been

made this year up to 110 degrees, then at once taking off two or three inches of the top and shaking in soil, which have proved successful. Last year 900 pounds were produced, which averaged 75 cents per pound wholesale. This gave a good profit.

The following are some of the methods used in preparing the manure:

First. Simply spreading out thinly to dry, not allowing it to heat. This plan would better suit the moist climate of England, but would undoubtedly result in fair crops in our comparatively dry air, provided the material is properly moistened when laid down, accompanied with a proper temperature and fresh material at the start. In every case only fresh horse manure should be used, free from all rubbish.

Second. Laying down the load when brought home, under cover, eight or ten inches in depth, shaking over thoroughly once a day for three or four days, bringing up the bottom at each turning and throwing in the sides that are apt to get unduly dry. Then mix one-fourth or one-third soil, make thin beds, not over six or eight inches in thickness, and let nitrification go on under these circumstances. This will answer for the hot weather of August and September.

Third. Piling the manure as obtained three or four feet in depth, turning daily for two or three weeks. When beds are made in winter, piling it is, of course, necessary, as heat is indispensable.

Fourth. Mix one-third soil and make the bed at once. Some raisers mix the same bulk of loam to the fresh manure, in hot weather, and then lay it down. Those who have been greatly annoyed with firefang in August, are tempted to try any feasible plan to escape it.

Fifth. Give two or three handlings in bulk, in hot weather, to allow the heat and air to do their partial work, then shake out thoroughly one foot in depth, mix three or four inches of soil according to natural temperature, and lay down the bed six or seven inches in depth, shaking an inch of soil into the surface. If the heat rises above 90 degrees shake in more soil, or make holes six or eight inches apart in the bed. No bed, after it is laid down, should be allowed to heat above 90 degrees and remain very long in that condition.

Sixth. To careful and painstaking raisers another method is open which is worthy of trial. After allowing heat and oxidation to do their partial work, in order to be more sure of 40 degrees, after the beds are made, make them two or three inches deeper than you intend to have them finally, and allow the heat to rise to that degree. (In hot weather it often gets there without that trouble.) As soon as it reaches 110 degrees, take off the top, shake in an inch or two of soil, made very rich in humus, at once, tread hard, reduce the heat to 90 degrees and keep it there, or below. Under these conditions carbonic acid will have been formed in large quantities at the new surface, made by removing the top, both from the manure and the rich soil, the disintegrating effect of which, together with the solubility produced by the heat, is very marked. The spawn is planted in a new surface, where the carbonic acid and heat have rendered solvent the greatest amount of plant-food. In all cases retain a fair amount of moisture, and in this case, last-stated, allow something for the extra heat, which drives out moisture very rapidly from a mushroom bed. The great trouble about a high degree of heat is, it is allowed to remain too long, so that the bed becomes unduly dry and sometimes firefanged. Two beds were laid down in this way last fall which gave very fine first crops; how they will hold out, the season must determine. It may prove necessary, where a very rich nitrogenous soil is used, to make thin beds, as the heat of the manure and rich soil together, where thick beds are made, will give an extra 10 degrees of latent bottom heat. This grows the spawn very rapidly, and although the first crop will make a fine show, it probably would not be a lasting one. If such beds are made thin, the fluctuations of the atmosphere will govern to a greater extent the latent heat, and when the temperature falls will deposit more moisture from the air all through the bed.

Thin beds also are a great saving of material, and although they may require more frequent waterings, they are more easily moistened all through. If any vegetable material is added to the soil, it should be done three months previous to using. Some raisers use poor soil for the spawn to run in; they would have nothing to do with manure-fatted loam. The object probably is to keep the bottom heat lower, say 60 degrees, which, under some circumstances, will give a more lasting crop. Last year, in the fall, we picked 100 pounds of mush-

rooms from a small lean-to on the north side of the barn, using rotted sods for mixing and soiling, which had been slightly enriched with additional vegetable matter, three months previous; also containing some leaves and tan. It is doubtful whether poor soil would have produced that amount.

It will answer to spawn the beds at 90 degrees when heat is on the decline, but seventy-five to eighty-five degrees is the usual temperature. Place the spawn, broken into one-and-one-half-inch pieces, just under the surface, about ten inches apart, and after a few days cover the bed with one and one-half inches of soil.

By making a bed or two every month, beginning the middle of August, up to January 1st, mushrooms may be picked from October 1st to May 15th. It is not expensive. Hauling, turning the manure and laying down the beds are the main items. Any intelligent boy ten years old can pick, trim and ship them to market. This business has come to stay. It is very desirable that others take it up, perhaps better in a small way at first, and assist in placing it on a sure basis, so that raisers will no longer "keep dark," and a crop of mushrooms will be as sure as a crop of potatoes.

REPORT

OF THE

STATE ROAD CONVENTION.

JANUARY 20, 1893.

(463)

NEW JERSEY STATE ROAD IMPROVEMENT ASSOCIATION.

The second meeting, first annual convention of the New Jersey State Road Improvement Association, was held in the State House, January 20th, 1893, connected with and immediately following the twentieth annual meeting of the State Board of Agriculture.

The object of this Association, as understood by the Secretary, is to arouse a spirit of road improvement throughout the entire State on safe and conservative lines, to aid in securing such legislation as may be helpful, and also to prevent the building of costly roads in counties where the taxable property, the actual demands of travel, and the population will not warrant the expenditure.

With this object in view, the following subjects were chosen for discussion, whereby the two sides to this question could be presented and the middle line determined.

If the proceedings which follow are attentively perused, they will be found to be helpful and instructive in the way of reaching a conclusion.—SECRETARY.

EXTRACT FROM PROGRAMME.

"The annual meeting of the State Board of Agriculture will precede the Road Convention, and persons expecting to attend either meeting are cordially invited to attend both. *Members of the State Board of Agriculture are requested to attend the Road Convention.* Organizations of farmers and other associations interested in road improvement are invited to send delegates.

"Although, with the regular order of business, an outline of subjects is presented for discussion, it is not intended that this shall be inflexible. The convention is called for practical work, and it will direct the business of the hour.

Topics for Discussion.

"1. 'Progress of the movement for better roads.' Opened by Isaac B. Potter, Secretary New York State Road Improvement Association. General remarks.

"2. 'Necessary requirements of taxable property and of population for the construction of stone roads.' Gen. James F. Rusling, Trenton.

"3. 'The road problem in New Jersey,' by Prof. John C. Smock, State Geologist.

"4. 'Annual cost of dirt roads in New Jersey.' E. G. Harrison, Asbury Park.

"5. 'Defects in the construction and management of dirt roads.' Ralph Ege, Esq., Hopewell."

OFFICERS

OF THE

NEW JERSEY STATE ROAD IMPROVEMENT ASSOCIATION.

President.....HON. EDWARD BURROUGH, Merchantville, Camden county.
Vice President. ....C. C. MCBRIDE, Elizabeth, Union county.
Secretary and Treasurer.....FRANKLIN DYE, Trenton, Mercer county.

EXECUTIVE COMMITTEE.

First District.....HON. THOS. H. DUDLEY, Camden, Camden county.
Second District .....CLAYTON CONROW, Cinnaminson, Burlington county.
Third District.....E. G. HARRISON, Asbury Park, Monmouth county.
Fourth District.....HON. B. E. TINE, Stanton, Hunterdon county.
Fifth District.....ABRAM W. DURYEA, New Durham, Hudson county.
Sixth District.....JAMES OWEN, Newark, Essex county.
Seventh District.....E. W. JOHNSON, Jersey City, Hudson county.
Eighth District.....DR. G. CARLTON BROWN, Elizabeth, Union county.
With the President, Vice President, Secretary and Treasurer.

ADVISORY COMMITTEE.

Atlantic .....THEO. H. BOYSON, M.D.
Bergen .....ROBERT M. WATSON.
Burlington.....HEULINGS LIPPINCOTT.
Camden .....ELWOOD EVANS.
Cape May.....——— ———
Cumberland.....THEODORE F. BAKER.
Essex .....WILLIAM R. WARD.
Gloucester.....J. J. DAVIDSON.
Hudson.....JAMES MOYLAND.
Hunterdon .....HENRY F. BODINE.
Mercer .....GEN. J. F. RUSLING.
Middlesex.....A. S. APPELGET.
Monmouth ... .J. H. DENISE.
Morris .....G. W. HOWELL.
Ocean.....C. M. RORER.
Passaic.....C. R. WISE.
Salem.....RICHMAN COLES.
Somerset .....D. C. VOORHEES.
Sussex .....HON. A. J. MCBRIDE.
Union.....WM. T. WEST.
Warren.....MR FITCH.

STATE ROAD CONVENTION.

THE NEW JERSEY STATE ROAD IMPROVEMENT ASSOCIATION.

TRENTON, N. J., Friday, January 20th, 1893.

The Road Convention was called to order by Hon. Edward Burrough, President, with a large attendance.

The roll of officers was called, and showed all present.

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

The Treasurer, Mr. Dye, reported as follows:

TREASURER'S REPORT.

TRENTON, January 20th, 1892.

Report of Franklin Dye, Treasurer, in Account with the New Jersey State Road Improvement Association.

December 1st, 1892.—Credit by membership fees from—		
Edward Burrough	$1 00	
Dr. C. B. Ripley	1 00	
Hon. Thos. H. Dudley	1 00	
Dr. G. Carlton Brown	1 00	
C. C. McBride	1 00	
Clayton Conrow	1 00	
E. G. Harrison	1 00	
Hon. Benj. E. Tine	1 00	
Dr. Jos. B. Ward	1 00	
Franklin Dye	1 00	
		$10 00
Contribution of Thos. H. Dudley		25 00
		$35 00

New Jersey State Road Improvement Association to Franklin Dye, Treasurer, Dr.

January 9th, 1893.—To 500 stamped envelopes, 2-cent	$11 00	
Naar, Day & Naar, printing 500 constitutions of Association, 500 circular-letters, and 450 envelope headings	11 50	
		$22 50
Stamps and stationery		1 00
		$23 50
Balance on hand January 20th, 1892		11 50
		$35 00

Mr. Ege—I move that the report of the Treasurer be accepted, and the by-laws embodied in his report be adopted as the by-laws of this Association.

The motion was agreed to.

Mr. Dudley—On behalf of the Executive Committee I would report that we held one meeting, as reported by the Secretary. We discussed various questions, the principal one being the advisability of attempting to amend the State Aid law this year, and it was finally decided to be inexpedient to make the attempt at the present session of the Legislature. Whilst there are defects in the law, and some very glaring ones, it was thought by the committee to be unwise at the present session to ask for any amendments. One feature in the law which was discussed is that which requires that all roads built under this law shall be of stone. The hardship of this portion of the law, to counties distant from railroad transportation and where there are no natural beds of stone, is apparent. The expense is too great to compel them to construct roads of stone while they have an abundance of gravel to construct turnpikes, and this is all that is necessary in such cases. It was thought best to make no effort to amend this at the present session, however, but let the law work another year. With regard to the tread of wagons driving over these stone roads, it was thought advisable that all tires should be broadened out to at least four inches, as these would tend to benefit the roads rather than injure them. The narrow tire, in passing over the stone roads, cuts in and tends to destroy them, no matter whether they are Telford or Macadam. I have on one side of my home a Telford and on the other side a rubble road, and these narrow-tread wagons cut

them up badly and destroy them, making it necessary to repair them constantly, while if the tires were broad they would improve the roads instead of injuring them. These points were all admitted by the committee. It was thought very desirable, for instance, that Township Committees should allow those using wide tires a rebate on taxes, something like fifty cents per wheel. The committee thought this would induce the farmers in time to use wide tires, instead of those now in use. All these questions were discussed, with various others, but inasmuch as the State Aid law has not been in operation very long, it was thought best to let it rest for another year. So far as the law has worked it has been beneficial. Some roads have been constructed under it, and they are a great improvement to the neighborhood. We had better hold on to what we have, even if it is in an imperfect condition, rather than take the chances of losing it. These views were held unanimously by the committee, and it was thought best to do nothing by way of amendment this year.

The Chair—I will announce the committees, though I am somewhat embarrassed in making a proper distribution of the members:

On Reports of Officers—Clayton Conrow, P. T. Quinn, D. C. Voorhees.

On Resolutions—Thos. H. Dudley, G. Carlton Brown, E. G. Harrison.

On Increase of Membership—C. C. McBride, Ralph Ege, H. F. Bodine.

On Nomination of Officers—Dr. Jos. B. Ward, Empson Atkinson, Wm. R. Lippincott.

The Chair—I find that I am on the programme for an address, but I beg to state to the Convention that my attention, for the past few weeks, has been fully occupied with the duties pertaining to my position with the State Board of Agriculture, and I have been unable to prepare an address. I will speak to you briefly, however, on the topics which most concern this Convention, as they have come before me during the past year.

ADDRESS OF HON. EDWARD BURROUGH.

Immediately after the adjournment of the last Road Convention, the Executive Committee was called together, and the resolutions and business that had been adopted by this Convention were laid before them. Circumstances were such that I could not meet with them at that time. A Committee on Legislation was appointed, and a report has been made, partially, by the chairman. They labored well and faithfully, and the results of their labors are already known to you. One of the first works that engaged their attention was to prevent the passage of obnoxious laws or amendments likely to be detrimental to our interests. The first legislation secured was the Road law, whereby the Overseer of Highways was abolished. This law, as you know, was wide in its scope, and reached into many minor and petty offices all over the State. It was natural that friction should be produced with so many of these petty officers interested, and the abolishing of these offices was found to be one of the most useful laws passed for years towards securing good roads. By that act we have abolished the Overseers entirely, and have placed the care of the roads in the hands of the Township Committee, and the people now know to whom to look, and who to hold responsible for the care of their roads. The power is also in the hands of the Township Committee, who can and should purchase good and suitable road materials.

I wish to remind you that it remains with you and with us to see that your Township Committees fully understand the duties that are conferred upon them. We want them educated to the fact that the mere taking of mud out of the ditches and placing it in the center of the road is neither road-making nor road-mending. This was the Overseers' method—year after year the same thing. The moneys appropriated have in many cases been ample and sufficient to keep the roads in good repair, if properly expended. The method in which this money has been wasted is familiar to you all, and the roads remain in the same condition. We should let the Township Committees understand that we consider them the guardians of the roads. Let them purchase suitable material, and see that it is properly applied; let them understand that they have the power to do this, and to take care of, not only one or two, but of all the roads of the township. They can appoint a Supervisor, and they can do this work by or through him, or through their Engineer. It has been plain

that no one has been giving it the needed attention, and that those having the care of the roads had no practical knowledge of the work expected of them. If this money is taken care of and properly expended, good results will be obtained. Ditches should be cleaned out and the roads kept cleaned and trimmed along the sides, and a practical system should be adopted and enforced, which would result not only in better roads, but would also enhance the value of the property bordering thereon. It was neglect on the part of those formerly in power, but the responsibility is now in the hands of the Township Committees, and we expect better results. That they can better the condition of the roads must be apparent to every one.

The next business that engaged their attention and to which they bent their energies was to make the law of 1891, known as the State Aid act, effective. The law, as you are aware, conferred certain powers and duties on the Commissioner of Agriculture. As there was no such officer in existence, the law was, consequently, inoperative and void. Under instructions from this Road Convention, they drafted a bill whereby the duties of the proposed Commissioner of Agriculture devolved on the President of the State Board of Agriculture, largely increasing his duties. I wish to speak of this act and the increased duties caused by its passage more fully.

As soon as the bill became a law—which it did as soon as Governor Abbett could get hold of it—there came a demand for State aid from all parts of the State, and I had letters from every direction—from the Gulf of Mexico to the Great Lakes; from the Central and Southern States; from Illinois, Kansas, Arkansas, and from all quarters came the demand for information. I had newspapers mailed to me wherein the entire law had been printed, where the display heads of the article bore such expressions as "A Good Law," "A Step Forward," &c., showing that the thoughts of both conservative and progressive men had centered on the action of this Road Convention of last year, with a determination to find out what we were doing.

About the first of April I was asked to go and look at a piece of road in Gloucester county, where a petition had been circulated and signed unanimously. I found there were several things it was necessary to know if the act was to be put in practical operation. I had an interview with the Governor, and the law was taken up by us and gone over in all its details to map out some course of action. A few of the points agreed upon were these: the law was flexible in rela-

tion to the width of the road to be built, but there must be a stopping-place somewhere; in some places nine-foot roads were asked for, while others asked for sixteen and even twenty-four feet in width. The width was considered in that interview with the Governor. It was thought that the law very properly should be flexible, as it might be impossible to insist on a certain width throughout the length of a road; for instance, in cases where causeways have been built across marsh land or in the approaches to a bridge, it might be impossible to build the road of an established width, without expensive filling to provide shouldering for the stone. The result of that conference was, it was decided that the minimum width of any road to receive State aid would be ten feet. Having established this point the question of grading next came up. The Governor was willing to put a little more work on the President of the State Board of Agriculture, and gave him instructions to go over every road applied for, before these roads could be built, or the specifications for such piece of road should be adopted, to ascertain how the road was to be built as regards width, grade, &c. The next question was in regard to the thickness of these stone road-beds; there is nothing in the law which says how deep the stone shall be; here it is flexible again, and we wished to have some understanding in regard to the thickness they should be laid. We were advised to consult engineers, and did so—and I wish to take this means of acknowledging their many kindnesses, giving us their ideas, and copies of their specifications, &c. We took into consideration the character of the soil over which the roads were to be laid. In the first place, to have a good road we must have a good bed and a good roof to turn the water and keep it out of the bed of the road. Some soils would admit of a less thickness than others; in some cases we found that a Macadam road from six to nine inches in depth would not be sufficient to bear the travel over them, and it was found necessary to put down a Telford foundation. All these questions had to be taken up and decided, and most of them fell to the President of the State Board of Agriculture, by direction of the Governor.

The next call after Gloucester county was Mercer. I went over some of their roads, but there was nothing more done in that county, as it was found the road they proposed to lay ran across corporate limits, while the act was for rural districts only. Another feature of the law which required careful consideration was the point at which the road should start and where it should end. In order that you may

understand the necessity for this, the law says that no road shall be built less than one mile in length; the road can start anywhere and go as far as you please, if to the county line, but if any part of that road less than one mile in length is not included in the first specification, it cannot thereafter be laid. Again, if a road were built in one county, running up to the county line, and less than one mile were left in the adjoining county, this could not be built under the present law, hence the necessity of careful consideration as to the starting-point and termination of each piece of road proposed to be laid. In other words, if you start a piece of road it should be built to the end of that road if possible, or there might be no chance of having it completed under the existing law.

The next county was Monmouth. I went over their roads and saw where great preparations had been made by the residents for the widening of the road. One man had a portico which had cost him $3,000, and he had sacrificed the whole of it for the purpose of straightening the road in front of his property. They offered to do all the grading necessary before the road should be laid. And this was another question which received considerable attention. So far as could be seen, it was the intention of the law that the grading should be included in the total cost of the work, and this would eat up the appropriation very rapidly, and we must be cautious about every item of expense. It was considered that if these roads should be taken care of by the county after they were built, the townships would be relieved of any further expense on them. They would be relieved of any further expense of taking the mud out of the ditches and putting it in the middle of the road, and they could therefore afford to prepare the roads for the stone, using the money they would ordinarily expend in repairs each year. This argument was used with the Township Committees, and I have never yet found an instance where they did not see the justice of the argument and accede to it, and the Township Committee or the property owners have done all the grading necessary so far. This grading is done according to their own ideas, or those of the engineer employed by them.

In Monmouth county, as I have stated, we found they had not only graded, but they had straightened and widened their road, making it entirely without expense to the State, county or the township. For some cause, the status of which I have never been able to ascertain, the specifications for this road never reached me.

I was next called to the county of Burlington. The township of Chester, with great energy and enterprise, had gone out in the township and borrowed money, and proposed to put down twelve miles of the leading roads of the township—principally roads leading into the town of Moorestown, the shire town—making a series of handsome and durable stone roads. They had gone so far all around the town, and felt desirous of going farther, hence the continuation of these roads was requested of the State, tending to a consolidation of all these roads in one system. I found their roads in good shape, so far as the foundations were concerned, and no difficulty as to the superstructure. Their specifications were received, but after the approval of the specifications by the President of the State Board, no further action was taken by the Board of Freeholders of the county, and there the matter rests.

In the meantime, the next county to make application was Camden. A road was applied for, and a petition, unanimously signed, was received. This road was to run from Merchantville to the county line, or within a half-mile of the county line, which was objectionable, as, no matter how much might be done, there would be a link missing at this point. This matter was afterwards adjusted, but, unfortunately, by a change in the law, they had a dual Board of Freeholders, and nothing could be done until the rights of the respective Boards could be determined by the courts. It is probable that the road will be built in the spring, as soon as matters can again be put in shape.

While these matters were engaging our attention, Middlesex county came down with a rush to know why something could not be done for them. I told them there was no reason, so far as I could see. They took the back track, and went to the Freeholders first, and they declared the roads to be county roads, and appropriated certain moneys for their maintenance. Then they came to us with the specifications, and I went over the roads with them. After a consultation with these men who were interested in having the roads built, we decided on three roads, and the specifications were approved. Whilst consulting in regard to these roads, the Board of Freeholders asked how much money was left under the act available for their roads. I told them that, under the circumstances, every dollar was available that remained of the $75,000, and this acted like magic. They immediately borrowed $50,000 or $60,000 to put the roads down—for

their share of the expense—and immediately extended the proposed roads to be improved five miles more, or thereabouts, making about ten miles in Middlesex county to be improved under the new law, and the State paid them, on the 27th of December, $20,661.85, being the first money paid by the State of New Jersey for improved roadways. It is also the first money ever paid in the United States under a law granting State aid for the construction of public roads.

I beg you will remember this: That in the meeting last year a gentleman from Morris county offered a resolution that the officers of the Board should look into the Road laws of the different States and Territories, and investigate them and formulate a proposed law for the permanent improvement of our highways. The idea of this was to find some better system of laws than we had, and a diligent search was made all through the Eastern and Western States. The Secretary also made an extended trip to the Pacific Slope, and was instructed to inquire into the different Road laws in the States through which he traveled, and it was found that no State in the Union had ever passed a State Aid Road law except the State of New Jersey, and it was the first State that ever appropriated a dollar towards the permanent improvement of its roads.

The provisions of the New Jersey act, with its flexibility, was of such a character as to commend itself to others. It has been extensively copied by the neighboring States, and has also been brought to the attention of the Judges of our courts. We find that it is a far better law than some of its projectors ever anticipated, and they did not know how well they were building. The law is a good one, but some of its features could be improved on were the opportunity offered. The necessity for this legislation is apparent to all of you; the cost of production to the farmer must be lessened in every possible way, and by every practical means. We are wearing out our horses and wagons at an enormous rate, and every effort must be made to reduce this expense.

Tie a string to the public buildings in Philadelphia, thirty miles long, and describe a circle around the city, and I doubt if any man living in that circuit could approximate the cost of horseflesh worn out every year, or rather the amount of money expended by farmers in that limit each year. What becomes of this horseflesh? Farmers tell us it don't pay to keep up this heavy wear and tear, but they pay these bills all along the line, yet the money lost in horseflesh alone

by these bad roads is far more—is a far heavier tax than their road tax would be with improved roadways. [Applause.]

Another feature of this is the GREAT ADVANTAGE of these stone roads to the farmers. I do not know how better to illustrate that than by my own practice. I live within two miles of a stone road leading to Camden. My tenant hauls manure from Philadelphia during the fall, and goes down with two horses and brings out a load with the two. When he gets within two miles of home, he must there double up his teams in order to bring the two-horse load the balance of the distance to my farm. It takes him longer to come those two miles than to come the entire four miles from Camden to Merchantville, and he is frequently obliged to throw part of the load off to get home with the four horses. During the course of the season I have had these teams photographed. One of these pictures shows one of the loads within two miles of home, doubling up to bring the load the balance of the distance, and the other shows the men in the act of unloading a portion of the load to bring the balance home. They have come as far as they could with four, and are still unable to get the balance of the way with the two-horse load. It is this waste of time which makes it important to farmers that we should have improved highways. I know it is necessary to educate the people up to this idea of stone roads, and that it requires a great deal of education in some cases. No man knows this better than myself. I was opposed to the passage of the Union county act, but I have been over those roads, and I have found that the most remarkable feature is that the taxes are not as high as before they built the stone roads.

As I have stated, I have gone over this matter very thoroughly, and I am entirely convinced of the necessity of improved roads. We know that the railroads go everywhere, and these improved roadways can reach out their arms and open up these arteries of trade. What the veins are to the body so these cross-country roads are to the community. Prosperity is halted by these bad roads, and these arteries must be kept open by good roads.

There is one other question I wish to speak to you about. In many sections of the State there are toll roads but the day of such roads is past. We can all remember when toll bridges were in vogue, but they would not be tolerated now. I cannot say a word against turnpikes, for they have done a great deal of good in the State of New Jersey; they were the first to improve the State, and they deserve all

credit that may be given them, but we have outgrown them, and they can hardly be maintained except at a loss. I think the county and State should free these turnpikes by some equitable methods; we should have an enabling act passed, by which the corporations that have put down stone roads can transfer them to the counties or the State, so they can be made county or State roads.

I do not believe in opposing anything that will build up improved roads in our county or in our State, but I venture to make this prophecy: there will not be a toll road in New Jersey ten years from to-day.

Gentlemen, I thank you for your attention.

Mr. Fennimore—I understood you to say the county of Middlesex took $20,000 out of this appropriation of $75,000; could they not have taken the entire $75,000 if they so desired? I ask for information.

Mr. Burrough—Yes, sir; if they had built roads enough. Out of the $75,000 available there were but $20,600, or thereabouts, expended, because the roads were not completed. The act says the roads shall be completed between the 15th and 31st of December. On the 15th the Governor sent for me, and about the same time Middlesex asked for ten days more in which to complete the roads then under construction. We agreed to wait for them until the 27th of December, and then we would act on their specifications, and they finally completed the roads so far as the State was concerned, and their proportion was paid them. The balance of the fund has lapsed into the State treasury.

I wish to state, also, that I have applications for over eleven miles of roads to be built in Mercer county. I shall have the maps for these roads on file before I leave here. The movement is still extending, and the difficulty will be to get money enough for next year's work, I fear. [Applause.]

I now beg leave to introduce Mr. Ege, who will talk to you on this subject.

DEFECTS IN THE CONSTRUCTION AND MANAGEMENT OF DIRT ROADS.

BY RALPH EGE, ESQ.

Mr. President and Gentlemen of the Convention—I have been congratulating myself that, as this was the last subject on the programme, I would have the privilege of throwing mud, and our friends of the opposition would have no opportunity to throw stones back; but, on account of the absence of the other speakers, the programme has been very unexpectedly reversed, and the prophecy verified that "the last shall be first."

As we look out upon the face of Nature to-day, and see it arrayed in its spotless robe of dazzling white, our country roads would seem to be without "spot or wrinkle," or any such thing; the silent forces of Nature have kindly and charitably drawn a mantle over all their defects and deformities, and, for the time, they are almost forgotten. But, like the scribes and Pharisees of old, they are "whited sepulchers," which indeed appear beautiful without, but within are "full of all uncleanness."

The hideous deformities, the unsightly rubbish, the unspeakably filthy pools and puddles, the rocks, and roots, and stumps, and stones which lie concealed beneath the pure and beautiful mantle, are too soul-harrowing to contemplate; and as we glide over its smooth surface, keeping time to the cheery music of the jingling bells, the idea that, after all, the road we are riding over is but of the "earth, earthy," seems too sacrilegious to entertain for a moment, and the disgusting and offensive abominations which are such familiar objects along the country road, during the summer and autumn months, seem like a dream of the far-away and almost forgotten past.

But lo! the south wind blows for a night, the soft rain-drops sing their sweet and soothing lullaby on the "shingles overhead," and our beautiful dream has vanished, the mantle has been rudely withdrawn, its glory has departed, and one glance at the country road that, but a few hours before, lay in all its quiet beauty, and purity, and transcendent loveliness, is sufficient to satisfy us that a thing of beauty is not always a joy forever; and we forthwith climb down from our heights of poetical fancy, we hang our "harps upon the willows,"

and our song of joy is turned into a wail of mourning as we go floundering and wallowing through seas of mud.

To illustrate the unfathomable nature of the country road when the frost goes out in the spring, I will relate the experience of a Western pioneer, which, by the way, I do not vouch for, but leave you to draw your own conclusions. He had the misfortune to break down in the middle of a sink-hole, and after alighting and feeling around for a resting-place for the sole of his foot, he found what he supposed to be a rock, and after getting firmly anchored and ready to make the necessary repairs, he was nearly frightened out of his boots by hearing a voice, coming up from the depths below, shouting: "Hello, there, stranger! Step around lightly, there's another fellow under me yet."

The age in which we live is one of progressive civilization, and we proudly point to the results of modern invention, ingenuity and enterprise by which we are surrounded, and flatter ourselves that we are far in advance of the civilization of ancient times in everything which makes a nation great, or which goes to make life worth the living. We ruthlessly place our hands upon the time-honored fabrics our forefathers erected and the sacred relics they so tenderly cherished and tear them away, to be replaced by modern structures more in keeping with our advanced and progressive ideas, and then, from the dizzy heights of scientific knowledge and mechanical ingenuity which we imagine we occupy, we look back and down upon the centuries past and vainly boast that we have reached the highest point in the history of the race.

But with all the proficiency in the mechanical arts and sciences, and all the inventions which characterize our intelligent and enlightened nineteenth century civilization, the humiliating truth must be admitted that among the civilized nations of the earth but little, if any, substantial improvement has been made in the past two thousand years in the art of constructing permanent and durable public highways, and the majority of them to-day are no better than the highways of the extinct empires of ancient times.

Many of the most public highways of the ancients were so solid and so well graded that immense blocks of stone were transported over them vast distances; and some of those old roads still exist, prominent among which stands the famous "Appian Way" of the old Roman Empire, which remains in a good state of preservation as

a noble and enduring monument to their engineering skill and their patient and persevering labor.

Other similar highways could be referred to, but we will not pursue this train of thought further, as the present generation is not so much interested in the history of the highways of past ages as in the highways and by-ways of the present era, and of our own commonwealth.

Our prosperity and general welfare as individuals and communities depend so largely upon the facilities afforded for easy and rapid communication and transportation, that the subject is engaging the attention of many of the most prominent statesmen and political economists of our day to see if some method cannot be devised that will be an improvement upon the present system, and give us much better roads at a cost that will be within reach, and not be excessive and unreasonable. New Road laws are enacted and re-enacted, the system is constructed and reconstructed, and after they are tested they are found to be so defective and their abuses so notorious that our highways are neither constructed nor reconstructed; the funds appropriated in many instances evaporate or become absorbed in some mysterious and unaccountable manner. We do not "mend our ways," and they remain a standing reproach to the intelligence and enterprise of the age.

This State Board of Agriculture has been wrestling with this problem for years, and has repeatedly called upon the learned scientists of our own and other States to assist in solving the problem, and they tell us to construct Macadam roads, at a cost of from five to ten thousand dollars per mile, and levy a tax to foot the bill. The problem is so easy that it should have been solved long ago.

But there are thousands of public-spirited, enterprising citizens all over our State who have an intensely-practical way of viewing this great question; and while they are desirous of improving our roads, they regard this stone road idea as visionary and impracticable from the fact that it would cost more than the assessed valuation of all the farms in the State to carry it out, and they deem it unwise and inexpedient at the present time to place the additional burden of taxation upon the farmers which would be necessary to build such expensive roads. Granting that the State pay one-third of the expense out of any moneys in the treasury not otherwise appropriated, we maintain that, considering the present depressed condition of the farming interests, it is unjust to expect them to shoulder the additional burden

which would be necessary to comply with the conditions, and that the wiser and safer plan would be to so construct and manage the dirt road that it would be firm and solid for at least ten months in the year.

Some portions of our State are availing themselves of the benefits of the new law, but the prospect of having any considerable number of our roads macadamized is very remote; and we propose to prove that, with intelligent effort and constant supervision, it is possible to have a good dirt road nearly, if not quite, all the year at a very small cost, in most cases not exceeding $20 per mile annually for the whole State. In this I speak advisedly, having held the position of a Road Supervisor almost continuously for more than a quarter of a century, and having improved and kept in excellent repair a section of public road at the above expense.

To do this effectually, the middle of the road must be kept well rounded up, the surface-drains must have sufficient fall and good outlets in order to secure thorough drainage, and all miry and marshy places must be thoroughly underdrained, so that no water is left standing on the surface, either in the road or surface-ditches, twenty-four hours after a heavy rain—one of the greatest defects of our present system being in allowing water to stand in the ditches on the roadside to soak through under the road-bed. This is often the fault of the property-owners, who obstruct them with defective culverts, and resist all attempts of the Supervisor to cut ditches across their lanes, past their farm buildings or the entrance to their fields, and the public is compelled to suffer the consequences of their perversity and obstinacy.

The Supervisor opens the surface-ditches thoroughly along his neighbor's premises, and perhaps the next day his neighbor hauls manure to his field or hay to his barn, and fills up the ditch with old rails, slabs, stones, or any rubbish that happens to be available, and then covers the pile with a heavy coating of sods, utterly disregarding the claims of the public, who have paid their money for an open ditch. The ditch is effectually choked, the water is turned in the road to wash a gully or cause a sink-hole, and the road is often left in that condition until the following year, when the same process of opening and filling up is repeated; and if the Supervisor has the courage to remonstrate or order the obstruction removed, he is put down as a petty tyrant, unworthy of respect or confidence. This also

applies in the case of outlets to surface-drains, most of which are through private property. The Supervisor turns the water in the field one day, and the property-owner turns it back in the road the next, and it is generally allowed to remain so and cause a sink-hole for the public to wallow through the balance of the year—the Supervisor preferring to ignore the claims resting upon him as a public officer and be at peace with his neighbor. My brother farmers can doubtless recall many such instances as the above, where the will of the public has been thwarted and defeated by the property-owners along the highway, and more strife and contention have originated over private lanes, and crossings and outlets to ditches than from any other cause in connection with our road system. The law is plain and explicit on these points, but we all know it is very seldom enforced where the property-owners are determined in their opposition, and the only remedy is to have Supervisors appointed who have grit and "sand" enough in their composition to enforce the law for the public good, and who will not be bulldozed nor intimidated.

The next defect we shall notice is in construction. Many roads are not of sufficient width to make a roadway with a ditch on either side to carry off the surface-water. If they were wide enough originally, they have been encroached upon by the land-owners until they are not over ten or twelve feet in width between the high banks, and some even less. This will apply especially to the by-roads in the hilly and rolling portions of the State. Many of these so-called roads were originally horse-paths cut through the wilderness from one settlement to another, with no design other than to make a path for their pack-horses, and avoid the marshy places, enabling them to ford the streams at the most available points.

As time advanced, settlements were made all along those paths, houses and fences were built, and the track widened just enough to admit of the passage of vehicles. This was the primitive highway of our forefathers, and hundreds of miles of such roads still exist. They are given the dignity of roads in name, but are nothing but huge gullies in reality, with fences, and often farm buildings, constructed as near the gullies as they can be built. These gullies have been wearing down for nearly two centuries—and are still wearing down—until they have become so narrow that it is an utter impossibility for two vehicles to pass. Our Hunterdon, Somerset and Morris friends present know of miles of such roads in the northern half of

our State, and through the building of railroads and the springing up of towns and stations in out-of-the-way places, some of those roads have become the principal thoroughfares.

Those narrow roads winding around between high banks, fringed with fruit tree and vines, or with cedar and pine, are very romantic and picturesque as "lovers' lanes" on a summer evening, but there is no poetry in meeting a runaway team in such a place, and as a public thoroughfare such a road is a public nuisance, for which there seems to be no remedy, as they cannot be relaid and graded without involving an immense expense, which, in very many instances, would not be justifiable.

Another defect in the management of dirt roads is their not being worked at the proper time. Much of it is delayed or postponed until after the busy season among farmers is over, and then the ground has become so hard that it requires the labor of three men to do the work that could have easily been performed by one man at the proper time. This may not seem to be much on a small job of work, but when it comes to using $3,000 to do the work that could have been done at an expense of $1,000, it appears in a very different light. The ground is so hard that it is impossible to work in the places most needing it, and the money is expended in throwing the soft mud in the road where it would be far better to do nothing. But the idea that is kept uppermost is that *the money has been appropriated*, and it must be used somewhere, and the work is done very hastily and imperfectly, and if the money has been expended, they feel that their duty is done until more is appropriated.

A dirt road should be put in good repair as early in the spring as possible, and kept in repair by constant and intelligent supervision, kept up all through the year. The most serious defect in the management of dirt roads is the want of a thorough system of underdrains. We have shown that surface-drains, as generally managed, are a failure in consequence of defective culverts and farm crossings, and at their best they do not draw the water far enough from the surface to leave a solid road-bed during the winter and spring months; but a deep, well-laid underdrain is beyond all such obstructions as we have named, and will do its work effectively every month in the year, and is especially serviceable during the winter and spring months, when surface-drains are often choked up with snow and ice and not in working condition. A good underdrain will

make a perfect drainage on narrow roads, enabling carriages to pass without the danger of overturning that there is where surface-drains are deep, and a road well underdrained will be solid from fence to fence, and a loaded wagon can be driven anywhere without danger of miring. And one of its greatest advantages is that a plow can be used to open surface-drains at any time during the winter and early spring months when the frost will permit. We have observed the practical workings of this system on the flat prairies of the West for many years, and roads which were absolutely impassable under the system of surface-drainage made passable at all seasons of the year by a thorough system of underdrains and the frequent use of the grader, keeping the road well rounded up.

Their system, if adopted here, could be made much more effectual and permanent from the fact that our land generally is more rolling and our soils more gravelly and porous. Their method is to lay two drains, about twelve feet apart and about half way between the driveway and the surface-drains, and lay in four or six-inch round, porous tile. A little earth is then thrown on with the shovel to hold them in position, and the grader (or scraper, as we call it) does the balance of the work in filling up rapidly and thoroughly.

It has been found that, unless the road is very narrow, two drains are far more effectual than one in the middle of the road, as the surface on each side of the track does not become so hard and the water is absorbed more rapidly, and the road becomes sufficiently dry to admit of being scraped within a few hours after a heavy rain, and before it gets cut up and rutted by heavy teaming.

It must be remembered that, with good, deep underdrains, the work of drainage goes on while the surface is frozen, and as soon as the frost goes out the surface-water is immediately absorbed and the surface dries off, and can be graded and scraped, while the roads not underdrained are in an almost impassable condition. One of the advantages of having two drains is that if one should get choked up or the outlet obstructed, the other will do the work, but not so rapidly and thoroughly as when both are in good working condition.

The underdrains on the prairie roads are often miles in length, and through knolls or ridges are ten feet or more in depth, in order to secure sufficient fall and a good outlet. I have in mind one drain thirteen feet in depth, draining some hundreds of acres of very valuable land, which was utterly worthless before draining. In many

places a surface-drain could not be opened deep enough to secure an outlet and leave a roadway unless a wall was built and the road protected by railing.

Time will not admit of my discussing this most important branch of road-making further at this time, but it cannot be too strongly urged upon those who feel an interest in having our dirt roads improved by every means possible, and all farmers who have had experience in underdraining can appreciate the force of my remarks on this subject.

Another very serious defect in the management of dirt roads is in not making use of the best material available. The soft soil and sods from the ditches are thrown in the road, to be converted into the lightest of dust, so annoying and disagreeable in summer, and abounding with the disease germs and malaria of the swamps and marshes, which you are forced to inhale with every breath.

In winter and spring this same light, airy material is converted into a sticky, slippery, slimy substance, which, for want of a better name, we call mud—an indefinable combination of organic matter, such as decomposed grass, leaves, weeds and filth of every description, which would be a grand success as a fertilizer, but, as a top-dressing for a highway, is an unmitigated nuisance and a most miserable and disgusting failure.

In making a dirt road, the top soil should always be taken from the ditches and roadside and used as a top-dressing for the adjoining fields, or to fill up some hollow or wash-out, and only the gritty, gravelly or shaly subsoil used in making the road-bed. This material, if put on wet, soon becomes so hard that it is almost impervious to water, and, if kept smooth by the frequent use of the grader, will make a solid road at all times, if well underdrained to begin with.

Still another defect in our system is the character of the labor employed, and in this custom has led the way for nearly two centuries, and the rut is worn so deep that it is very difficult for us to climb out. Nearly all of us present are farmers, and we can well remember that after the hard, monotonous drudgery of sowing and planting the spring crops, we farmer boys looked forward with bright anticipations to the time when the summons would come to work on the road and an opportunity offered to get acquainted with our new neighbors and have a good social time and enjoy the pleasure of a holiday. Not only "we boys," but the long-handled shovel brigade also turned out

for a dress parade. They had paid their money and they were bound to see the show, and whenever a vehicle happened to come along it was the signal for the whole brigade to "order arms" and "be at ease" until it disappeared from view, and if the Overseer had the temerity or audacity to utter a protest against having a picnic at the public expense it was gently hinted that the men he employed had the power to make and unmake Overseers, and were masters of the situation. All he had to do was to "keep mum" and mark down full time, or off would go his official head, and one would be put on that knew enough to be silent in the presence of his superiors and only speak when spoken to. These remarks hew uncomfortably close to the line, but we all know that the present method of "working out taxes" is one of the most notorious abuses of the system, and that a radical and thorough reform must be inaugurated before the money appropriated for working the roads will be honestly and economically expended.

The new Road law is intended to remedy this and other abuses of the old system, and will be tested in some localities, while in others the old rut will be followed, and all new laws that do not conform to ancient usages will be regarded with suspicion and as an innovation upon the time-honored customs of our forefathers.

The material for a dirt road is inexpensive—"cheap as dirt"—but labor is very costly, and only the very best available should be employed, and if *the* best can be found within the bounds of the district where the work is to be done, give them the preference by all means, but the "eminently respectable" veterans of the old battered stove-pipe hat brigade who always stand ready to volunteer their services that they may have an opportunity to oversee the Overseer, have a social chat with their neighbors and "loaf" out their taxes by leaning on a long-handled shovel, are not to be given the preference hereafter. Working out taxes in that way has been "weighed in the balance and found wanting." The day has passed when an Overseer feels obliged out of courtesy to employ those to work on the road who never work at home. A new era has dawned in this respect, and we hope that with competent labor, intelligent management and good material the dirt roads of the future may be a great improvement on the present. That there is room for improvement, all will admit, and it must also be admitted that a *good dirt road* is a much easier and

more comfortable road for light driving nine months in the year than any stone roads now in existence.

A macadamized road at a cost of eight or ten thousand dollars per mile would be a very expensive luxury for the remaining three winter months, and in our latitude the roads are frozen and covered with snow the greater portion of that period, leaving, at most, only a few weeks when the stone road would be a luxury in northern New Jersey; and the balance of the year it would be a nuisance, unless kept in better repair than most of the stone roads either in our State or in Pennsylvania at the present time.

The dirt roads of our State, under the present management, are a failure, and we have attempted briefly to point out the causes and suggest the remedies, and we leave the subject, thanking you for your kind indulgence.

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

Mr. Crane—I suppose I will be classed with the unprogressive people if I second the motion for a vote of thanks to Mr. Ege for his paper. It is a most excellent paper, and points out many of the extravagant methods in vogue in caring for country roads. What we want is good roads. I would rather have dirt roads than stone roads, as they are more pleasant for driving if properly kept, although stone roads are better for heavy work. We want good roads; how can we get them? Let the county put up a crusher and sell the broken stone at cost. Then let the farmers cart the stone at so much per load, and in this way we can get stone roads cheaply. Begin to build your roads at the quarry, so the stone for the roads beyond can be carted more easily and cheaply.

Mr. Dudley—Suppose you have no quarries. How will you get the stone when you have no quarry near by?

Mr. Crane—If you have no quarries in Camden county, you have the river and canal; cart the stone from the docks to the roads.

Mr. Dudley—Suppose you are forty or fifty miles from the river—and this is no uncommon distance in some of the counties of this State. In many places there is no water transportation.

Mr. Crane—Where stone are not available use good gravel, and let farmers cart it at so much per load.

The Committee on Increase of Membership reported themselves in

readiness to receive names of new members, with their membership fees, and also call for contributions of money, literature, or anything to promote the road question.

The Secretary—I was interested in the question of the rights of Supervisors to drain the roads. There should be sufficient power given to drain the roads properly, and the matter of underdraining, too, is very important. Most of us are traveling over dirt roads daily, and will be obliged to do so for the remainder of our lives. More care should be given to the proper method of draining, grading and repairing these dirt roads of daily use. Can this Association help do this? Can we not aid in having these roads maintained better than Mr. Ege says they are? Some one has remarked that you may have all the laws you want in these particulars, they will not be lived up to, and it seems to be too near the truth. Most sections of the State have good road materials, but proper management is wanted in applying this material, and in *keeping the roads in repair* after they are built. Constant supervision is necessary in every detail, and unless we have this we cannot have good roads.

An instance was brought to my notice in Sussex county where the road lay upon a side-hill, and was liable to wash out to such an extent as to make travel thereon at times dangerous. By the usual *long-between-times* method of working roads, the Overseer could not keep this place in repair. The Township Committee finally decided to give it in charge of one man for the year. With his wheelbarrow and shovel, the old man to whom the job was given *kept it in repair the year through*, and it was stated by reliable farmers that that was about the only piece of road in the county that was *always good*, and the expense was less than under the previous management.

A Member—The difficulty is that there is a little dirt thrown on the roads at a time of year when no other work can be done, and then the roads are left for eight or ten months of the year without any further attention.

Mr. Dudley—This whole matter seems to me of so much importance I cannot forbear detaining you for a few moments with some of the ideas that have occurred to me. I am so well satisfied that it is to the interest, particularly of the farmers of New Jersey—more so than to any other class of people—that they should have good roads, that it seems to me the strangest thing there should be any opposition at all. I am one of those who believe that the lands of New

Jersey, situated as the State is, in an anomalous position, with no like piece of land anywhere, having such natural advantages—I say I am so well satisfied that it will pay the farmers themselves in the enhancement of the value of their farms, to put the roads in good condition, that I cannot forbear to express myself upon the subject. It has so happened I have been obliged to travel in England a great deal during my life. I do not speak of it boastfully, but I have traveled many thousand miles in Europe, and have seen much of their roads, and whilst I am always boasting of the United States, I am satisfied we are far behind all the countries in the world, so far as our roads are concerned. The roads in France, for instance, are good and are kept in good condition. The same thing may be said of England, as I speak from personal experience and observation. Our people here seem to be afraid to put the roads in good condition. It is true, the law here is weak in some respects. The Supervisor there rounds his roads up so the water will run off and then, if necessary, goes on to the farmers' land and opens proper drains and ditches to carry the water away, and in this way they get good roads all over England. Fortunately for them they have stone quarries in almost every part of England, except in Kent, in the south, and there they have the chalk cliffs, and they use this for improving their highways. I believe every foot of land in New Jersey will enhance double in value over what it is to-day if you will put your roads in good condition. Look at your position, with New York on one side with its 1,500,000 people, and, with Brooklyn, making 2,000,000 inhabitants; go nine miles farther and you have Newark, with 175,000 inhabitants; a little farther, and you have Philadelphia with 1,500,000 inhabitants, and only a narrow strip of land between, about sixty miles in width, with the Atlantic on one side and the Delaware on the other. It is only intended to raise produce for these great cities, and the heaviest tax you farmers are paying, as your President has said in the State Board, is the tax of getting your produce to market. I tell you it is so, and you yourselves will bear me out in the assertion, if you will only look into it. New Jersey will be one vast garden if you put your roads in proper condition so your lands will be readily accessible to market. Thirty years ago, when the turnpike from Camden to Moorestown was constructed—most of those who were present then have since passed away—I said: "Construct this road, and every foot of land will be worth double what it is to-day." My

friends, there is not to-day a foot of land along that turnpike that is not worth four or five times what it would then have brought, and some of it is worth ten times—twenty times—what it would have brought then.

One thing one of the gentlemen has mentioned—I am almost ashamed to refer to it—that people are distrustful of the very men they elect to take charge of their roads. It is so. Now, that is all in your own hands. Elect proper Supervisors, elect honest men who will deal honestly by your roads, as you deal with your farms and with those in your employ. See that the money you raise is properly expended, and then you will have taken the first step towards good roads.

I traveled over a piece of road in Europe last year—a piece finished within the year—leading from Interlaken right along the bank of the lake. It is a public highway, and the whole of that road, for a distance of six miles, is cut in the solid rock. There are no less than five tunnels to be passed through, and these are excavated right through solid rock; and on the side towards the lake there is a line of solid masonry, eighteen inches thick and high enough to prevent carriages from going over the edge. I was greatly surprised on seeing this road; I had heard of it several times, and hired a carriage to go out and examine it, and I was struck with wonder. It had been cut by the cantons through which the road passed. The expense must have been enormous, though I could not learn how many thousands of dollars per mile, but you can estimate it for yourselves. Cutting the road through such rocks and building this wall must have been very expensive. And yet this was a public road, seven or eight miles in length, and paid for by the people themselves, and, without doubt, cost more money than would be necessary to put all the roads of New Jersey in proper condition. And yet you are haggling over bad roads—not individually, of course, for I believe you are in favor of good roads. The people are not educated to the need of good roads as they should be. You drag your heavy loads over bad roads, to the market from your farms, and from the farm to the mill and back again, at double or treble the cost of taking the same loads over good roads, and there is where the expense comes in. It is in every way material that you should improve your highways and reduce this cost, for both you and your lands will be benefited by the change, and you will receive four-fold

in return for every dollar you expend. Your teams will be benefited and saved, and your expenses will be decreased, and it will not be necessary to keep so many teams, for the same power will not be required in handling your products. When I see the effects in Europe—in little, petty principalities—where they are expending so much money in improving and maintaining permanent roads, and then look in my own State, with its natural advantages, I cannot forbear to raise my voice in favor of good roads and good highways. [Applause.]

On motion, a vote of thanks was extended Mr. Dudley for his valuable remarks.

The Chair then introduced Prof. John C. Smock, State Geologist, who spoke as follows:

THE ROAD PROBLEM IN NEW JERSEY.

ADDRESS BY PROF. SMOCK.

Mr. President and Gentlemen—As State Geologist, I have nothing to offer in the way of constructing roads, because that is a practical question with which you are more familiar than I am. In a previous meeting of this Road Convention I have given some statistics and some notes upon the localities where stone is to be found.

Of course it is possible for the geologist to indicate the localities where stone suitable for road-building is to be found, and also where good gravel may be found.

I may add here that the Geological Survey is at present engaged in a more particular detail of the surface formations of the State. When this is completed it will be possible to show you by a map the actual areas of gravel, so far as is possible for the geologist to discover.

What I have to offer to-day is only in the way of statistics. It has seemed that this discussion in regard to roads has needed some more accurate basis than you have had. Of course the men living in Monmouth county, for instance, are familiar with the roads in Monmouth county, and so with those living in other counties, but not with the roads in other parts of the State, and the Survey has made maps showing accurately these roads throughout the State—so accurately your President has relied on them for his measurements of roads.

The first question to decide, it seems to me, is the total number of miles of road in the State, and these have been measured accurately. In 1887 there were 18,768 miles of public roads in the State of New Jersey—that is to say, roads which may be called country roads, not in municipalities, nor within the limits of cities, but country roads, properly speaking—18,768 miles. Of course, to-day, there are more. It is nearly 1,000 miles per county, or 2½ miles for each square mile of territory; in other words, 1 mile of road for every 250 acres of land. The problem is, how these roads are to be built. If you lay Telford roads, at the lowest reasonable estimates per mile, the cost would be at the rate of about $40 for every acre in the State. If you use gravel at the rate of $2,000 per mile the cost would be $8 per acre. You can see what a large sum this is, and what a tax it would be.

Before coming here I attempted to show the main thoroughfares of the State, and to that end I directed the topographer to indicate on a map the main roads of the State. I told him I thought about 1,500 miles in length would be about all that were necessary, and that he should take the most heavily-traveled roads in making his selection. He has attempted to do this, though I may say I think it is a failure. I think any commission or any body of men attempting this will acknowledge their failure before they have proceeded very far with it. We have attempted it, however, and there is the result on the map I have placed before you. We have roads running from every county seat, from four to six in number, radiating in different directions to main centers of population. According to that scheme, worth little or much as it may be—little, in my opinion—there are 693 miles in what may be called northern New Jersey, north of Trenton and New Brunswick, and 738 miles in the southern portion of the State. These 693 miles would have to be built of stone, because gravel is not available. If built of stone, at a cost of $10,000 per mile, they would cost us $6,930,000. In the southern portion of the State, building 738 miles, at a cost of $2,500 per mile for gravel roads, the total cost would be $1,845,000, or a grand total of $8,775,000. This is on a basis of $10,000 per mile for stone and $2,500 per mile for gravel roads. We made still another estimate at $7,500 per mile for stone and $2,000 per mile for gravel roads, which makes a total cost of $6,763,500, of which amount $1,476,000 would be expended on the gravel roads of South Jersey.

Mr. Conrow—How deep do you contemplate making those stone roads?

Prof. Smock—I have made no estimate of the size or width of the road, but have taken the figures as I have found them. The total valuation of ratable property in 1892 was $742,759,000 in the State. Using these figures as a basis of our scheme, we find that the cost of these roads would be, in the lesser cost, nine mills, and in the other, twelve mills on the dollar. [Applause] That is all I have done in the matter, and I give you these estimates for what they are worth. I thank you for listening to these few desultory remarks.

Mr. Harrison—I am very much interested in what the Professor has stated, but I think it rather misleading to put down the cost of these roads at $10,000 per mile, or even at $7,500 mile. We can make a very good road for much less money. Of course, if you run from gutter to gutter the cost will run up, but there are many good roads in this State, but nine or ten feet wide, which have cost only $3,500 per mile, eight inches deep. You can build a road ten feet wide and eight inches deep in almost any place accessible by rail, within two to four miles of the railway, for $4,000 per mile. The difference between the cost of these roads the Professor has alluded to, at $10,000 and at $4,000 per mile, would be very great, and instead of the cost being $40 per acre, it would amount to but $16 per acre. I merely make these remarks to correct the impression which might go forth in regard to the cost of these improved roads; it is not advisable to recommend roads at $10,000 per mile, when $4,000 will be ample for all purposes.

Mr. McBride—In the line of Mr. Harrison's remarks, I am glad this impression has been corrected, for if the idea were to go forth that the cost of these roads would be equal to a valuation of $40 per acre on our farm lands we might as well shut up the shop and go home, for we could never get another mile in New Jersey on that basis. Farmers would never consent to place a mortgage of $40 per acre on their lands, in State bonds or anything of the kind.

A Member—I think the engineer we had here a year ago was asked what it would cost to lay these stone roads, and he said anywhere north of Trenton they could not be put down for less than $10,000 per mile, on the average.

Mr. Owens—I made a statement last year, and see no reason to change it, though I have built stone roads that have not cost more

than $2,500 or $3,000 per mile, twelve feet in width, hauling the stone from two to four miles. I would like particularly to emphasize Mr. Harrison's remarks, and, if the Professor will allow me, to criticise his statements somewhat, for I would not like to see it go forth as the official statement of this association that a stone road would ordinarily cost anything like the amount he has mentioned. While I am on my feet I will allude to the practice in Passaic county. You gentlemen from the southern part of the State have heard from Union and from Essex counties, but nothing from Passaic. Passaic county has done more in its way in the interest of good roads than any other county in this State. You can go through any part of Passaic county almost, from end to end, without getting off the hard roads. You can go in any direction from Newark without getting off the stone roads. A gentleman told me he had driven twenty-five miles in Passaic county without getting off stone roads during his travels. I think the roads of Passaic were built rather too cheaply, however. The object of the Board of Freeholders was to get over the roads as cheaply and as quickly as possible, compatible with substantial roads, and the Telford is but about four inches thick. They were built at a cost of $2,500 per mile. The item of first cost of construction was the most considered, but we have faced the music, and we have got our roads and have raised the money to keep them in repair. But the latter is not so troublesome, for when the road is once built public sentiment will force the officials to keep it in repair.

I think the question of first cost is so material to this whole road question that it ought to be definitely stated. No wildcat proposition of a road to cost $10,000 per mile should be considered, as it is entirely unnecessary for the average country road. Suburban roads frequently cost that amount, but these improvements have nothing to do with the road improvements we are aiming at—the country roads throughout the State. In suburban improvements the cost is paid for by individuals, and they are entitled to all they want to pay for, but this has nothing whatever to do with the public country roads—with the general road system of the State.

Mr. Lippincott—It has been admitted in the address of the President that $20,000 were paid in Middlesex for the State's share of the expense of ten miles of road. Is not that at the rate of $6,000 per mile?

The Chair—I did not give you the exact length of the roads built in Middlesex county. I have not the specifications here, and cannot recall the exact number of miles, but I think there were about ten miles. The cost of these roads was to be $1 per lineal foot, twelve feet wide and eight inches deep. This was the contract where the haul was longest, being about four miles. Another piece of road, handier to the railway, was built for about the same amount, fourteen feet wide and nine inches in depth. The specifications now out in the county are made per lineal foot, and they cost from 90 cents to $1.10 per lineal foot.

When I was first called to Middlesex county I was asked to approve a road four inches in depth. They thought four inches of stone on top of the roadway would be sufficient. Recognizing the importance of a good foundation, the State would not approve of a road put down in that manner. I told them if they would make it six inches deep it would answer, but I could not approve of four inches. They finally concluded to make it eight inches deep, the cost not to exceed $1.25 per foot, running directly away from transportation. I was afterwards asked to permit an amendment making the roads nine inches, at a cost not to exceed $1 per lineal foot, and most of the roads are twelve feet wide, and as good as any roads in the State.

Professor Smock—Perhaps I should explain myself more fully. In the estimate I gave of the 18,000 miles of roads it was on the supposition that all be built of stone. Everyone wants his road stoned, and if you insist on this you will find the average cost much higher than some of the prices given. If all insist on having their roads stoned it cannot be done for less. It would cost $40 per acre for stone, or $8 per acre to build all of gravel. I do not put this forward as a practical statement at all, but to show that it would be impossible to build all these roads, on account of the enormous cost. I very much question whether you can build Telford roads all over northern New Jersey for much less than $7,000 per mile, for this reason: In Union, Essex and Passaic counties you are right in the heart of the region of trap rock, which furnishes the best road-making material. In the other counties you must pay for transportation, and besides some of these roads are fully ten miles from transportation. Now, if you will average the cost of doing this work, I doubt if it can be done for much less than $10,000 per mile for Telford. We had so many statements

as to the cost we did not know which to use, and in looking over these various statements I concluded I would use that of $10,000 per mile, used last year by Dr. Ripley,* I think. We cannot make these roads all gravel or all stone, but we can select those which are needful, and improve them, but if you undertake to do all it will end in failure. Improve the more important, and let the others come afterwards.

Mr. Harrison—The question is asked what these roads cost. Last summer over eleven miles were built in Chester township at a cost of about $39,000; that is less than $3,500 per mile. The Clerk of the township is present, and can bear me out in this statement. They are not the best roads, perhaps, but it is the best investment the citizens of Chester ever made, as it meets their wants. Where the necessities were greater the citizens supplemented the cost, and had the road built wider, in some places fifteen feet, the township contract calling for a roadway nine feet wide. These roads have practically demonstrated this fact: that roads not over three miles from transportation can be built so as to be serviceable at a cost not exceeding $3,500 per mile. Take that home with you, and think over it. [Laughter.] These roads are nine feet wide, and are six to eight inches deep if of Macadam, and ten inches deep if of Telford, and they cost less than $3,500 per mile.

Mr. Conrow—The object of the State Aid Road law has been to aid communities in building improved roads, the intention being to stone the leading roads. Now, can't we come to some conclusion as to this—have certain roads designated as State roads or county roads, which shall be built under State supervision and State control, and paid for largely from the State treasury? In Burlington county there ought to be about ninety miles. Cannot the citizens agree on these roads—that would be three roads across the county—that would answer our purposes very largely? I would like to see this Association express its sense on this matter.

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*Dr. Ripley's statement before the State Board of Agriculture, annual meeting January, 1891, is as follows: "I believe that the general opinion among engineers is that for our [Union county] soil the Telford road is the best and cheapest in the end, but is far more expensive than the Macadam. Our roads here cost us $10,000 per mile. The width, as a rule, is sixteen feet; some of them are narrower; they got short of money and they thought it would answer the purpose, so it was not made as wide. They are eight, ten and twelve inches deep; total depth composed of two-thirds large and one-third broken stone."—SECRETARY.

Now, we have the land-owners adjacent to the road to be improved interested, and both the State and county interested. If one refuses to act, the thing falls. Cannot the citizens get together in some way and agree on the roads, in Burlington county, for example, to be improved? We don't want to raid the State treasury, nor to swamp the counties with expenses, but to go about the work judiciously and carefully. We are now behind every civilized nation in the world with our roads, and we want to get this thing started. Then, again, we don't know how to build stone roads; the matter has not been studied. It is a scientific question, and must be undertaken in a scientific way by men who understand their business. We cannot set our old Overseers to building stone roads, for they will be failures. Therefore, I would like to see some plan or some system tried, and see the work well done. Then, again, I do not think we should build a piece here and there, for that is objectionable. If this Convention would express itself in this line it might have great weight in the future.

This is the way France has built her roads, and she has the finest system of roads in the civilized world. The leading roads have been built and paid for by the national treasury, and we should do likewise. When we find a good thing, let us follow it. England has done the same thing. Every road there has been paid for by the nation, and they have good roads.

Mr. Fowler—It seems to me a little misleading to bring up continually this question of the condition of roads on the Continent. I have never seen them, but our friend, Mr. Dudley, has told us they have the material for building stone roads right about them, with a few exceptions. Then labor costs twelve to eighteen cents per day there, and the market products are transported by women and dogs, and he has told us before this is one of the reasons why they have good roads—they have no heavy travel over their roads. Another statement our friend has made is that farm lands will double in value if we have stone roads. While I am in favor of stone roads, I say we have good roads, as it is, during eight months of the year, and during half the other four months, too, and there is no trouble in getting produce to market a distance of five, ten or twenty miles. The same power that now produces our truck will take it to market. We do not have such markets as those who live near the cities, and those who have town lots for sale; they want stone roads, of course.

Mr. Crane—May I speak a word for Union county? Our farmers there feared the same thing, and felt confident the cost of these roads would be burdensome upon them. They wanted good roads, but were afraid of the expense, but the roads were built at the immense cost of $10,000 a mile, or nearly so—$325,000 were raised for forty miles of road. To-day you can go into that county and you won't find one taxpayer but says he is glad the roads were built. We pay our taxes willingly, and when we look at our tax bills we are surprised that they are so small. We pay interest every year, and place an amount in the sinking fund, and in twenty years we will have good roads, and have them paid for. Our land has doubled in value, and people are coming there and building houses, and taxables are on the increase, and there is great improvement all round. People are locating there, and making a market for our produce at good prices.

The benefit we derive in the saving of teams, labor, harness and horses is fifty times the amount of our taxes. Yet I would not advise counties farther from New York than we are to do as we have done, as they would not be justified in doing so; but make your roads good—put on Macadam, as they did in Passaic, if you cannot stand Telford. Have stone roads by all means. I have been over the roads of Passaic county, and I know they have good roads there. The law is a good one, and is a step in the right direction. Let us hold on to it, by all means. [Applause.]

Mr. Dudley—In reply to the gentleman to my right [Mr. Fowler], I did not advocate—and if he supposes I did he entirely misunderstood me—I did not advocate putting down stone roads everywhere in the State, or that it was necessary to do so to enhance the value of our property. I do not think it is necessary to build stone roads everywhere. Indeed, I suppose, from what I have said here, you all understood I do not advocate stone roads in South Jersey, where the expense would be too great. In many parts of Burlington, and at points where the transportation is too expensive, gravel should be used, as stone is too expensive, and gravel is all that is necessary. Wherever we are on the line of a railway, or on navigable water, or within reasonable distance, we can use stone. I am aware our present Road law was not framed in such a way as to permit this option in the use of material, and if any amendments are offered I hope one of that kind will be introduced, although your Executive Committee do not think it expedient or wise to offer any amendments at this session

of the Legislature, but would leave the law as it is, and have the roads constructed in patchwork—if you please—but have them built, for every patch you construct in New Jersey will be an object lesson, and other people will insist on having their roads patched also, and you will go on patching until the patches unite and you will have good roads—and, my word for it, if you have good roads every acre of land will double in value.

Mr. Lippincott—How much are lands worth in England?

Mr. Dudley—I don't know enough about it to say, though values have greatly increased there, and they have constructed these improved roads all over England and all over France and in Switzerland, through the mountain passes.

In 1850 or 1852, before the Camden and Atlantic railroad was built, I had occasion to go to Mays Landing court, to attend to some cases there. We took a two-horse stage in the morning, and I can remember about 12 o'clock we came to a spot—we had been walking the horses—and the driver said we must get out and walk, or the horses would be stalled and we would not get to Mays Landing. We got out and walked through the heavy sand, and one of the gentlemen—I cannot now recall his name—said: "I think this is the most God-forsaken country I ever saw; a crow would starve to death flying over it." [Laughter.] We finally reached Mays Landing, however, despite our troubles.

I was asked, a few years ago, to go to almost the exact spot where these remarks were made. It is the place where Hammonton is now built, and I had occasion to make a little talk there before the Agricultural Society, and this was at a place within probably a few hundred yards of the spot where we were compelled to leave the stage. While there a Mr. Rogers told me just before I went into the meeting that he had twenty-five acres of land he had bought since the railroad was built, and that on that twenty-five acres of sandy ground he had, after supporting his family, cleared the last year $1,500 in actual profits. He could have done nothing with that ground if the railroad had not been built, but it afforded him facilities for getting his crops to market, and if he had good wagon roads he would have still greater advantages, and other land now practically worthless would be brought within reach of the market. I do not mean it is necessary they should have stone roads, nor do I mean to say that gravel

would answer the same purpose as stone, but, to a certain extent, it would be a great advantage, and would open up new lands for market.

The construction of that railroad through what is now Hammonton, through that barren sand, has increased the value of those lands many fold. I could have bought every acre of that land within ten miles of the railroad for $10 per acre. Mr. Rogers had bought twenty-five acres of that land, and by using peat, out of the neighboring swamps, he had cleared a profit of $1,500 a year out of it. Good roads enable you to get your products to market, and in proportion to your facilities for getting your products to market will be the demand for your farm lands. Situated, as I have said before, near the great cities, with these large populations on every hand, if you put your roads in good condition there is no climate anywhere east of the Allegheny mountains better than New Jersey. Even here in the pines you have Lakewood, where hundreds and thousands of people from the cities go to live; then you have Atlantic City and the other shore towns, so largely peopled by these city people. You have many advantages, and with good roads your property must double in value. You are building up everywhere; your towns are growing and improving, and you must improve your roads also, for as you do this your lands will become more valuable in every way. I cannot say too much to impress this upon you, seeing and knowing what I do.

Mr. McBride—I would like to add a little further testimony to what has been said by my friend, Mr. Dudley, and by my friend from Union county, in reference to the increase in the value of property by reason of good roads. Before the roads of Union county were built Essex county came with her good roads within a mile of Springfield. The result was that whenever there were bad roads in Union county the farmers in all that section of the county, instead of going to Elizabeth, four or five miles distant, cut across to the Millburn road, to Essex county, with every pound of their products. They went there when the roads were bad, and they took everything they could from Elizabeth, because they had better roads. Now that the roads are good to Elizabeth, the farmers come there, and get more money than they did formerly, and, what is still better, stick to their own markets, instead of going to another market, and the result is beneficial in both ways.

Now, as to the increased value of property in Union county. There are three roads out of Elizabeth—to Rahway, five miles; to Plain-

field, twelve miles, and to Summit, twelve miles. On the road from Elizabeth to Rahway, about two miles from the city line, was a tract of 300 to 400 acres, which was owned in 1875 by a syndicate, of which Andrew Carnegie was one. That land was of so little value in the opinion of the owners that Carnegie allowed it to be sold at Sheriff's sale for $18,000. Within the last six months that land has been sold to a gentleman from Brooklyn for $120,000, because the improved roads have made that tract of land accessible, and for no other reason. [Applause.] On the road to Plainfield, within one mile of the city line, is a farm that has never been considered very valuable until these roads were built there, but within the past month, to my certain knowledge, the owner has been offered, and has refused, $1,500 an acre for his land. Less than a mile from that is a place that has been named "Loraine." It was unsalable before the roads were improved, and within the past year that land has been taken hold of by a syndicate and cut up into 700 or 800 lots, which have been selling for $150 and upwards. The lots are only 25x100, or twelve lots to the acre. About a mile farther on that road is another place which has been taken hold of by a syndicate, and where precisely the same thing has occurred. I cannot give you the number of lots, but the number is very large. Between Plainfield and Westfield is another tract, where the same process is now going on. On the road to Summit there is a small farm of about forty acres, which has been sold within the past month for $18,000, for the same purpose. Why? Because it has been made accessible by these improved highways. [Applause.] They have been made accessible for carriages, and this has made their market. I could go on giving you other instances similar to these, but those given will suffice to make my point. In addition to this, it has had another good effect. Farmers are putting their buildings in order, because it pays them to do so, and their property is coming into a market. The whole thing is right here—if your farms are worth a certain price now, with mud roads between you and the centers of business, and you build good roads in place of the mud roads, reducing the distance in time between you and those business centers, your values are increased just so much. You all know you may have an excellent farm, able to raise large crops, but if you are away off from the market you cannot make them pay, and their value is correspondingly less. That is the theory of good roads, from beginning to end. This is what we have done in Union county—we

have brought our farms nearer the market, by improving the roads leading from the farm to the market. Union county farmers would not do without these roads under any consideration, for they have learned their value. I have saved my taxes in the saving of harness, and I say those roads have increased the value of the lands 50 and in some cases 100 per cent. [Applause.]

Mr. Burrough—We have heard so much of the benefits of these stone roads, let me give you an instance under my own personal observation. I live within two or three miles of a stone road, and you will recollect I called your attention to the difference in power required in moving my loads from the stone road to my farm, and from the farm to the stone road. In that one instance the saving in my manure bill amounted to $100 in moving it that distance. Now, in regard to the advance in the value of property. On that same road was a farm of 155 acres, which was sold three years ago for $50 per acre. I have a neighbor adjoining me, a hard-working, industrious farmer, who has saved some money. He has some four or five thousand dollars. He has been trying to locate a farm for the last eighteen months, and he saw this farm I have referred to, right under his nose, for several years, but he was afraid to take hold of it. Adjoining was another farm that came into the market, which sold for $70 an acre, and still another, a very nice little farm, was sold for $90 an acre. I asked him why he did not buy one of these farms. He said he could not afford to buy a farm off a stone road; that he had lived along a stone road ever since it was built, and he could not afford to move off it. I have been trying to locate a farm for him having some of these advantages, but I have failed to do it. Now that there is a prospect of a stone road being built past one of these farms, he has been kicking himself because he did not buy when he might. He wants to find out whether any one of the three buyers of those farms wants to sell; but they do not, for they know there is a prospect of a stone road being built there. Gentlemen, this is a condition, and not a theory. What is true in that instance is true in others. I have a mile of road front, and am within two miles of the stone road, but I cannot afford to stay there any longer if I want to compete with other farmers. I want that stone road there, and I have worked for forty years to get it, and it is going to come, unless something unforeseen occurs.

Another matter in regard to this stone road. I have a friend away

up in the other end of the township, six miles from the stone road. He came to me and said he was afraid of our stone road project, and he had a notion to oppose it. He has been looking into it since—and on account of the situation with our Board of Freeholders he has had plenty of time to look into it—and now he says, after thinking it over, it costs him $30 a year for toll on the road from Haddonfield to Camden, six miles. He thinks we should bond the county of Camden, if necessary, for $500,000, and put down these roads with stone, and it won't increase his taxes as much as the $30 he pays for toll. Yet, one year ago, he was in the same condition of mind as Mr. Fowler. [Laughter.]

Mr. Ege—I appreciate all that has been said in favor of stone roads. I am in favor of stone roads wherever they can afford to build them. I have built stone roads, and I have been an Overseer for thirty years. I had a mile and a half of road to keep in repair for the princely sum of $26 a year, and during the time I have been Overseer I have stoned a very large portion of this piece of road, and I know what it costs. Eight hundred and eighty yards of stone will put down a good road, nine feet in width and six inches in depth, one mile long, and I can put it down for $1,000, and make money at it. [Applause.] We know what it costs where the stone are available; the carting and the labor are what you have to pay for outside of the stone.

In regard to the values of land, I know a farm on the line of our turnpike which, twenty-eight years ago, sold for $150 an acre, goes begging to-day at $50 an acre, and I could name other instances in the same line. Stone roads won't do it all, gentlemen. People look at the value of the product they can sell. We only know the value of a plant—no matter whether farm, manufactory or bank—by the dividends it pays on the capital invested. If it will not pay 6 per cent. on $10,000, will it pay 6 per cent. on $5,000, or, if not that, then on $3,000? That is what tells the story. If it only pays 6 per cent. on $3,000, then that is the value of the land.

A few years ago I built a piece of road in front of my premises; I drained it thoroughly and put it up in shape, and it is a good road to-day, although only a dirt road, and it has not cost fifty cents a year to keep it in repair. I still maintain we can have good roads of dirt if properly built, and at much less cost than with stone, and it is the only road many of us will have for years to come. You and I who

live off the public highways will have a dirt road to travel on the balance of our lives. I am not opposed to stone roads, but stone roads will not double the value of our farms at a distance from the main thoroughfares, or fifteen or twenty miles from town. Those of you who live near the suburbs of the large cities can get large prices for your lands, because they are wanted for suburban residences, and nothing else. If we can sell our farms for $1,000 an acre, then give us stone roads, and the sooner the better. [Laughter.] If you can pay for stone roads, have them by all means.

Mr. Harrison—Much has been said about not being able to afford these roads. Let me ask you can you afford not to have them?

Mr. Appelget—I ought to agree with my neighbor from Mercer, but I am afraid I cannot. I recollect very distinctly my grandfather telling me how bitterly he opposed the building of the Camden and Amboy railroad. He said: "We only get $40 a head for horses now from the stage companies, and if the railroad is built they won't buy the horses at any price." [Laughter.] And now we hear of one of our farmers selling one horse for $5,000, and still another for $3,000, and that is the kind of argument I was brought up on, so I cannot agree with my neighbor on this stone road question. We need them as highways of travel, and we must have them. We cannot afford to do without them, and this whole matter should be pressed forward, and our roads improved as rapidly as possible.

On motion, adjourned until 7 P. M.

EVENING SESSION.

Mr. Isaac B. Potter, Secretary of the New York State Road Improvement Association, was introduced by the Chair, and spoke as follows:

PROGRESS OF THE MOVEMENT FOR BETTER ROADS.

ADDRESS BY ISAAC B. POTTER.

Gentlemen of the Convention—When I was invited to come here and read a paper on the subject assigned to me, I very gladly assented, notwithstanding the fact that my duties are so exacting as to consume all of my time. Since I came here and have listened to the remarks

that have been made in the convention, I feel that the benefit is all on my side, and that I am the gainer more than you may be from listening to my address. I feel I can scarcely say anything that will be of interest to you, though I have prepared a paper at the invitation of your Secretary.

It is now nearly three-quarters of a century since Macadam began to declaim against the mud roads of Great Britain, and to contend that much of the misery and poverty which his countrymen endured was due to their want of suitable means of communication. He was reviled by ignorant and thoughtless, yet well-meaning people, and if the words of abuse and opposition which he and his co-laborers had to endure could be spread upon the public records of the day, he would be seen to exemplify the old saying, that the fanatic of one age is the philosopher of the next. But his persistence and final success give force also to that other saying, that one man in the right will some day become a majority, and to-day the name of Macadam holds brilliant place in one of the proudest pages of England's industrial history.

But the people of one country are slow to learn from the experience of another, and though the countries of Europe have for many years supplied undoubted examples of the value of improved roads to the industrial and social developmemt of a State, the people of the United States have been slow to investigate these benefits or to take up the work of improvement which they suggested.

The Statute Road laws in most of our States were borrowed from the old law-books of England; they were adopted at a time when the country was barely emerging from its colonial period, and were suited to answer the purposes of a country where the towns were small and widely separated, and where the internal development of the States had not so far proceeded as to suggest that any other or better system of road maintenance might be of benefit to the State at large. And so the States went on, one following the example and adopting the laws of another, till the general system of working out the road tax—a system borrowed from the feudal methods of an ignorant age, and never suited for the purposes of a free and progressive republic—became the accepted custom of the people. It was a dangerous, and to the American States it has been an expensive and damaging custom, not only for the endless waste which it has entailed in the management of our common-road trade, but because it has fixed upon our people a

habit which inspires a vicious opposition to its removal, and offers a resistance to the work for better Road laws, which all the powers of argument and persuasion are sometimes unable to overturn. "In the great majority of things," says John Foster, "habit is a greater plague than ever afflicted Egypt."

But modern means of communication and the boundless influence of the modern press have quickened and encouraged the work for road reform in the United States, and within the last three years the public attention has been so fully aroused that the era of road reform may be fairly said to be upon us. The forces working in the several States have been combined, or at least brought to work in harmonious directions; the attention of our statesmen has been enlisted; the great commercial and agricultural bodies of the country have held formal meetings for the sole discussion of the road question; the daily newspapers, and all classes of popular periodical literature, have devoted great space for the publication of text and pictorial illustration in their arguments for the improvement of the common highways, and several of the States have passed laws looking to the same end. Among the New England States, with the possible exception of Maine and New Hampshire, popular sentiment is tending so strongly in the right direction that an early reform in the Road laws of these States may be fairly regarded as certain. In New York the efforts for road legislation have been growing stronger from year to year, and the friends of the movement have multiplied from month to month, till the only question remaining is not whether a new Road law shall be adopted, but rather what form of law is best suited to the conditions presented.

I need not speak here of the great strides made by the movement in your own State of New Jersey. She stands easily at the head of all the States in the accomplishment of practical work. Her Road law provides a feasible plan for permanent and systematic work, and for an equitable distribution of the expense. Her work thus far done is a monument of success, and proves the wisdom of its projectors. It proves, also, that the money spent for the making of a good road is an investment, rather than a tax, and that the permanent advantage gained by a county in the construction of roads under the New Jersey law is worth many times the assessment required to pay for the improvement. It has attracted the attention of all other States in the Union, and to New Jersey must belong the honor of supplying

a standard of excellence in road law and road work which will do more to stimulate the improvement in other States than would any amount of abstract argument and computation. The American citizen is in the last degree practical. His fierce money-making instinct gives him little time for the pursuit of theories in the management of public affairs, and nothing short of a practical demonstration of benefits, such as those offered by the excellent roads of New Jersey, will impress him to the proper degree.

Among other States on the Atlantic border, Pennsylvania, Delaware, Maryland, Virginia and North Carolina have awakened to the demands of the new reform. In the last-named State, a Road Congress, convened under direction of the Governor, is now actively at work, and within the last week I have had the pleasure of sending to the State officers of North Carolina, in answer to their request, a large quantity of American road literature, compiled within the last year and treating of all branches of the American movement.

In the West, Illinois, Iowa, Ohio, Missouri and Minnesota are the most active of the North-Central States, and State Road Conventions are becoming of frequent occurrence; while the general subject of road improvement is discussed by the farmers of nearly every county at their stated meetings. Governors Altgeld, of Illinois; McKinley, of Ohio, and Boies, of Iowa, are pronounced strongly in favor of new Road laws for their several States, and a careful canvass of the members of their several Legislatures shows that the same feeling prevails among the law-making bodies in which the necessary enactments must first be made. On the extreme western border the same feeling is manifested. California, and even the new State of Washington, will carry on an active campaign for the improvement of the common roads during the present year; and in the former State a kind of reform has already been instituted, which may well attract the attention of some of the older States, and which might even supplement with good advantage the excellent Road laws of New Jersey.

I refer to the method adopted by the county of Contra-Costa for numbering and naming the houses and roads outside the city limits, in a well-devised and systematic way, so that a resident of the country may be found by a few simple directions almost as easily as the city directory enables one to find a given resident in the city of Trenton.

My time and space are insufficient to describe here the Contra-Costa plan, or, as it is sometimes called, "The ten-block system," but

I now have in course of preparation a descriptive article in which this plan is fully exploited, and shall publish it for general distribution at an early day.

It would perhaps be unfair not to note also the splendid work that is now going on in Rhode Island, where the officers of the State Govment have joined hands with the old-time agitators with so much enthusiasm that the passage of a suitable Road law in that State seems certain to be accomplished. Special mention should also be made of the progress attained by our friends in Tennesssee, and the excellent work of the Road Convention in that State.

With all this record of progress, carried on in a country where the States are often very widely separated, and by persons more or less influenced by varying conditions, it is scarcely probable that any fixed rule of procedure will attain a general adoption, and yet it may be interesting to note here the prevailing sentiment among thoughful and influential citizens, according to returns from various States received within the last sixty days. To ascertain this sentiment, and at the same time to gain a more intimate knowledge of the roads lying in the neighborhood of important towns, I sent a formal letter to a prominent citizen in each of the several hundred towns in New York and Massachusetts, and am now preparing a similar letter for use in the State of New Jersey. This letter contains a list of questions relating, first, to the business relations between each town and the surrounding country; second, to the general condition of the country roads during wet seasons of the year; third, to the effect which the deep mud of spring and fall has upon the price of farm produce; fourth, whether the business of merchants in town is affected by bad roads, and if so, to what degree; fifth, whether the bank obligations of merchants and farmers are affected by slack business during the seasons of spring and fall, and sixth, whether farm values have increased or decreased within reasonable distance of the town during the last ten years; seventh (in cases where road improvement has been affected), whether the improvement of the roads has improved the business, financial or social conditions of the town or the value of real estate; eighth, whether any other facts exist which may be recorded as pertinent to the road question within the county under consideration.

As may be easily imagined, the answers to these questions are quite uniformly in condemnation of the mud road, and give strong evidence

of its retarding effect upon the growth of each community. With almost absolute uniformity the returns thus far received declare that while large sums of money and great labor have been bestowed to maintain the dirt roads of the county, they have been spent to no avail, simply because the road officers have been mostly selected for political reasons, and have done their work in an ignorant, slovenly and inefficient way.

In the progress of road improvement, then, an important matter is not only to provide for the expenditure of sufficient means to properly make and maintain the public roads, but also to enact such laws as will, as far as possible, insure the expenditure of all road appropriations in an intelligent and systematic way, and to provide against the decay of well-done work by separating the Road Master from the realm of politics and making him understand that his business must be performed in a business-like way—not as the creature or dependent of a political party, but as the servant of the entire commonwealth.

When this is accomplished we may confidently expect that the work of road reform will have attained a permanent good, and that the years of labor performed by the agitators of this day will not suffer by the ignorance or the indifference of coming generations.

It has seemed to me that the discussion, so far as it has reached my ears, has taken the ground that the cost of building these new roads is a tax. It is not a tax, it is an investment, and this fact has not been properly instilled in the minds of the people of New Jersey. When I came in here my able friend from Camden was speaking, and I was glad there was some one here who could tell you about the good roads in Europe. When we realize that France, with a less population per square mile than Massachusetts or Rhode Island, with an area four times as big as New York, is expending $18,000,000 every year to maintain roads already constructed—and she has about 130,000 miles of roads almost as smooth as this floor—when we realize that they are doing this we can but believe that such a system is commendable, else these thrifty people would not maintain these roads at such an enormous cost. The question is not what the good roads cost, but what the bad roads cost. It has seemed to me sometimes, in talking to the farmers of my own State, that they are so wedded to the familiar old dirt roads that they don't want anything better, because their fathers never had anything better, and it is almost useless to try to prove to them that anything better exists.

This old method, so much in vogue, of working out the road taxes, has been borrowed from feudal times; a method borrowed from the times when the peasantry worked for their human lords and masters; it is a relic of barbarism. How many reflect that the only two classes of people who render manual labor in settlement of their obligations to the State are the farmers, who work on the common roads, and the criminals, who work in the common prisons? It is not pleasant to think of, but it is so.

There is no farmer so poor but can well afford to pay an increased tax for good roads throughout the State, for the valuation of farm land would increase more rapidly than his taxes would increase, and the advantage of good roads would be twenty times the increased taxes. This natural increase in the values of farm lands would more than pay for all the improved roads New Jersey will want to build in the next fifty years. I do not know that I can say anything more on this subject. I cannot conceive that any material difference in conditions exist in New Jersey, different from any other State. You have thousands of miles of bad roads, and you have sufficient road material in this State for the entire United States, and you have intelligent engineers; you have the wealth—seven or eight hundred millions of value—and you have thriving towns in your State, and are adjacent to the largest cities in the Union. With these advantages you should have the best roads in the Union—one hundred times as many as you have now. [Applause.] There should be a good road reaching every farming district within forty miles of these large cities. If you build one such road in each county the rest will come, for the one road would be an object lesson which the community would be quick to absorb. Good roads are an investment of the highest kind, and you cannot afford to do without them.

I thank you, gentlemen, for your attention.

On motion, a vote of thanks was tendered Mr. Potter for his interesting address.

Mr. Conrow—Can you give us any information with regard to the Road laws of Massachusetts? I understand it is foremost in road improvement.

Mr. Potter—Massachusetts has no general State law which provides for any uniform method of road-building throughout the State. There is now at work a State Road Commission, appointed by the

Governor under an act of the Legislature of last year. This Commission is now going over the State, examining into the road question, and I understand they are in favor of giving the farmer State aid in improving the roads, the conditions being much as in New Jersey, where the value of the property is not sufficient to carry out the improvements. That Commission will make its report at an early day.

I have in my hand for publication in a magazine which I edit, an article by Governor Russell, and by each member of the Commission, one by the Master of the State Grange of Massachusetts, one by the Secretary of the State Board of Agriculture, and other eminent men. I will be glad to send a copy of the magazine to any one wanting it.

Mr. Allen—I think the speaker has stated in his paper that $2 an acre would cover the cost of all improved roads likely to be built. I find that amount would be something like $10,000,000. Professor Smock has said that 1,500 miles would be all that would be needed in this State, and this would give something over $7,500 per mile for building these roads. It is a very satisfactory way to look at it, and I am glad to hear this brought out.

The Chair—I have here a very interesting letter from a friend in Camden, who has been making quite an extended tour in Europe. It bears on this subject, and you may wish to hear it:

"CAMDEN, N. J., 1mo. 17th, 1893.

"*Edward Burrough, President New Jersey State Road Improvement Association:*

"ESTEEMED FRIEND—Herewith I give briefly some observations on roads made during a somewhat extended tour through portions of Great Britain and the Continent of Europe during the past summer.

"The most noticeable feature of the roads of England and Scotland is their uniformly even, smooth surface—entirely free from ruts—not a well-defined rut was seen in any regular public roads in England in driving over them for some weeks. The stone used for *repairs*, and for the *upper sections in construction*, was almost universally about one and one-half inches in size. Piles of this stone (hand-broken) could be seen, about 100 yards apart, on the roadsides throughout the country.

"All character of rock appeared to be used, such as the neighborhood afforded, principally igneous rock, limestone, quartz and, in a few instances, broken cobblestones.

"Repairing is done in the fall or winter, that the wet weather may

assist in packing the stone. The width of the road-beds was from twelve to twenty feet, probably averaging sixteen feet. The road-sides were well drained, and mostly neatly trimmed, and in many places edged, presenting a very attractive appearance.

"On some roads near Edinburgh a side track with longitudinal slabs for the wheels of heavy teams is laid, but it did not appear to be much used, the other part of the road being excellent.

"On the Continent the construction and repairs of the roads seem much the same as in England, but they were not in such *universally* fine condition, possibly because the season was dry, while in the British Islands frequent rains kept the worn dust cemented, as it were, on the surface. Another reason may be, that in many parts of Europe rock is not abundant, and has to be taken long distances. In some places where solid rock cannot be obtained stones were screened from the earth of the hill and mountain sides and broken up for road-making.

"Excepting in and about Paris, no travel was noticed as heavy as that to which the turnpikes leading into Camden are subjected. For heavy carting, wheels of from four to six-inch face are generally used.

"Probably the finest highway in Europe is the 'Simplon' road, extending from Geneva to Brieg, in Switzerland, then crossing the Alps and leading from Domo d'Ossola to Milan, in Italy. Its width is about twenty feet, and the surface is perfect. It was very difficult of construction, having to pass both under and over streams and through many tunnels, and is a monument to the energy and genius of Napoleon, under whose orders it was built in 1806. Although the Italians have many fine roadways, they say none of them are equal to this.

"My observations lead me to the conclusion that nothing but stone roads of the very best construction will stand the heavy travel of this part of our State, and I hope that great care will be exercised in putting them down, and in keeping them in repair afterward. This will no doubt be the truest economy.

"Sincerely thy friend,

"ALEX. C. WOOD."

Mr. Wood—I had the privilege of traveling by coach several hundred miles through England, Scotland and Switzerland, and I have wondered whether we have learned how to build these stone roads here. There the repairs are made, as stated in the letter, with stone one and one-half inches in diameter, or perhaps one and three-fourths, and never of any other size. The finish of the roads was entirely satisfactory, and this coarse stone was reduced by the travel over it. It was not rolled. I have noticed on the new roads put down in my

neighborhood that much smaller stone were used, being covered with one or two inches of fine material, which has no wearing quality whatever, in my estimation. We know that a heavy wagon in running over these one-and one-half-inch stone will break them. The road will wear out fast enough, and I think it is a mistake to use this fine stuff. When I came home they were about finishing a good many roads in our neighborhood. One day I came across a piece of road which was not finished, and where the stone were about as large as my fist. My attention was at once riveted; I saw that the stone were largely flat; they were about an inch and a half thick and three inches wide, and it had not occurred to me until I saw those stones that all stones were not cubical in shape. It struck me that these stones would break up very readily with heavy travel, and the lighter stuff would be blown away. It seems to me, therefore, entirely unnecessary to put this fine stone on, as it has no wearing quality, and as the larger stones wear down, the fine stuff will fill in between the larger ones, after it has done its duty.

It occurred to me that possibly the reason these stone I have referred to were flat was because they were crushed by machinery, and possibly this is the only kind of fracture the machinery is capable of making. These stone may be all very well when placed in the bottom of the roads, but not when placed on top, where the wear will come; better have cubical stone for finishing, about one and one-half inches in diameter, even if broken by hand, for the last surfacing.

Mr. Owens—I would just like to say that the size of stone agreed upon by nearly all road-builders is the one-and-one-half-inch size. The cost of this dust is about $200 per mile, and if we do away with this the saving in the cost of the road is very material. In Essex county, some ten or twelve years ago, I started to repair a number of roads without these screenings, with very good results, and with considerable saving.

In regard to the shape of the stone the gentleman has referred to, there is no difficulty in cracking one-and-one-half-inch stone by machinery, but the trouble is in dollars and cents. To get these various sizes the stone are run through a screen, and there are certain proportions of dust and of large stone, and the delivery of these sizes is regulated by the market. It is not so much the material as it is the selection of the sizes, and the insistment that the stone shall be uniform in size. The shape of the stone is dependent on the character of the rock; the granite will break out cubically.

Mr. Borton—The reading of this letter has brought out this discussion, which has been very interesting, and I therefore move the letter be published in the minutes.

The motion was agreed to.

Mr. E. G. Harrison, of Asbury Park, was introduced by the Chair, and spoke as follows:

ANNUAL COST OF DIRT ROADS IN NEW JERSEY.

ADDRESS BY E. G. HARRISON.

Mr. President and Gentlemen of the Convention—There has been assigned to me the subject, "The dirt roads of New Jersey and their cost." Yes, we have dirt roads, and we are in the closing days of the nineteenth century. But who wants them? And not wanting them, why should we tolerate them, or humbly suffer ourselves to be heavily taxed to maintain them? The limited time since the assignment of the subject prevented me from getting the data I would like to present to this Convention, so you will have to be content with the little I have obtained and the estimates I have made.

The State Comptroller's report for 1892 shows the reports of the various townships in the State, which state the cost of repairs of roads to be $583,930. This does not include cost of repairs to streets in cities and incorporated districts. Over a half million spent in the State on our sand and mud roads. And what have we for it? The same old dirt roads. The average no better than they were half a century ago.

This, to say the least of it, is very provoking, and certainly not at all creditable to us, in a business point of view. But the story is not half told. We not only pay for this undesirable state of affairs, but are paying to add more serious burdens on ourselves.

Let us see what it costs on other lines. Mr. Isaac B. Potter, an excellent authority on roads, presents facts and figures worthy of the serious attention of our agriculturalists and all whose business requires the use of teams.

"The number of draft animals—horses, mules and oxen—in the United States is 53,393,888," Mr. Potter says. Making the most liberal allowance in favor of the farmers of this country, they are keeping at least 2,000,000 horses more than would be necessary to do

the hauling between farm and markets if the roads were in good condition. If you assume that each of these horses is fed the ordinary army ration of hay and oats, it requires 14,000 tons of hay or fodder and 750,000 bushels of oats per day to feed these unnecessary animals, which themselves would have a money value of $140,000,000.

The value of the hay and oats fed per day is about $300,000, valuing hay at $10 per ton and oats at 23 cents per bushel, or something like $114,000,000 per year.

In the foregoing, Mr. Potter has allowed nothing for interest on the investments, nor for capital sunk when the animals die and are replaced; nor is there any account taken for wear and tear and renewal of extra wagons, harness, men to drive and care for extra stock. Now, to this add the loss of time and delays, the loss frequently of obtaining good prices for grain, when it is impossible to market or deliver produce on account of these dirt roads being impassable. We will have an amount that is simply appalling.

The data above given apply to the whole of the United States, but, when they are apportioned properly among the States, New Jersey's share will be a large one, as we are one of the richest States in agriculture and have also the greatest amount of soft dirt roads from the natural character of the soil.

Aside from this, let us see what the land-owner's loss is by not having good roads. It is a well-known fact that farms over four or five miles distant from railroads have greatly depreciated in value, say from 50 to 75 per cent. Many farms so situate will not sell to-day for more than the cost of the buildings.

Let us look at the rentals. Farms on good, hard roads, within forty miles of a market town, will rent from 20 to 25 per cent. more than those on soft dirt roads. It is a fact that many farms not on good roads and at a considerable distance from railroads will not rent at all, and some are practically abandoned. Here is a comparison of the cost of transportation on different kinds of roads:

Iron track	1
Asphalt	3
Stone block	5
Telford or Macadam	6
Cobblestone	8
Hard gravel	10
Dirt, owing to kind, dry sand, wet clay	12 to 20

Traffic by railroad and water transportation have largely increased, and freight rates greatly reduced, yet the same old dirt roads keep the cost to those who transport over and through them at the same figures they were a hundred years ago, and which cost more than ten times the cost by rail; and it must be borne in mind that the traffic carried over our dirt roads far exceeds the tonnage of freight by railroads. This adds *cost* to the consumer and lessens the *profit* of the producer.

I have only spoken thus far of the *cost* connected with the use of teams for hauling. There is still another side, namely, the cost, damage and inconvenience in a social way, which cannot well be reckoned in dollars and cents—the difficulty at some seasons of the year, in consequence of bad dirt roads, in getting from home, to meet with family relations and friends, to attend churches, meetings, lectures, conventions, schools, &c., &c. While these matters do not enter into the business part of the farmer's affairs to any great extent, they nevertheless are of too much importance in this enlightened day to be overlooked.

I have thus briefly pointed out some of the costs and disadvantages of dirt roads. It is a matter of astonishment that many of those who most use the common dirt roads are content with them at such great cost, and, in many instances, oppose all efforts used for their improvement. Is it any wonder that the value of farm land not near railroads and on common dirt roads has so greatly decreased, and agricultural interests are so much depressed, when the costs and disadvantages of dirt roads are duly considered and compared with better roads and modes of transportation which lessen the cost?

On motion, a vote of thanks was tendered Mr. Harrison for his able paper.

The Secretary—Mr. Harrison has made quite a strong showing, and the table giving the cost of transportation is timely. He asks, referring to dirt roads, "Who wants them? And not wanting them, why should we tolerate them or humbly suffer ourselves to be taxed to maintain them?"

He assumes we do not want them. There must have been a demand for such roads or they would not have been laid out and maintained, as some of them have been, for more than a century.

We allow ourselves to be taxed for them because we can't afford anything better, and this is one of the strong business reasons for

getting along as best we may with the old and antiquated until we can afford the new and modern.

I went over this subject quite thoroughly in 1888, and made an address on it in Morris county. I then found that the cost of repairing our common roads in the State, exclusive of snow bills, county bridges, city and borough streets and new roads, was something over $340,000 for the year 1887.

In that estimate I endeavored to be conservative, and it is better to be within actual facts in matters of this kind than to throw out statements that are not warranted by the records of experience. Mr. Harrison does not, as I understand his estimate, exclude snow bills and county bridges. Even with these included the amount for road-repairing in the State, according to his figures, must have increased within five years from the time my estimate was made to an enormous amount. But why should not snow bills and the cost of *all* bridges, whether county or less costly ones, be excluded from an estimate of the cost of road repairs? Will these be less needed with a stone roadway than they are now on our dirt roads? Most assuredly not. If, then, we deduct the cost of all bridges, the removal of snow when roads are impassable, the cost of opening new roads, and also the cost of repairs to streets in cities and in incorporated districts, we will find the figures *very much reduced.*

But do not stone roads need repairing constantly? That they do is admitted by all experienced in their use, and this cost is annually very large, and it is perpetual, just as much as is the case with dirt roads. The annual cost of repairing dirt roads, therefore, brought forward as an argument in favor of stone roads with a view to less expense for repairs on the latter, loses its force. The figures presented, however, suggest to us the possibility of improved dirt roads far beyond anything hitherto experienced in much of our State, *providing the money is judiciously expended.* If our dirt roads were graded, drained, constructed and maintained as stone roads are supposed to be, the demands for the latter would be confined to the most traveled thoroughfares in our richest and most populous counties.

It seems to me this should be one of the chief aims of this Association and of the State Board of Agriculture—to devise some system by which our dirt roads shall be put under more intelligent management. Skilled road supervisors, working with the Township Committee, under our new Township law, would soon revolutionize the

roads of a township. Public sentiment is needed and the reform will come.

What Mr. Ege has accomplished with such a small amount as $20 per mile at his disposal can be done elsewhere throughout the State, with unselfish, intelligent management.

Referring to Mr. Potter's calculations, it seems to me he starts out with a wrong premise, on which his subsequent arguments are based, when he says: "The farmers of this country are keeping at least 2,000,000 horses more than would be necessary to do the hauling between farm and market if the roads were in good condition." Farmers as a rule do not keep horses primarily to cart their produce to market. Usually the number of working horses and mules on the farm is regulated by the number of acres and the crops to be tilled. Carting quite generally is done "between times" or in winter. Milkmen and truck farmers, indeed, who retail their goods in near-by towns, do need extra teams for this purpose above the number required for farm tillage. If I am right, the extra tax of $114,000,000 a year for the maintenance of *a surplus* of horses made necessary by bad roads, to haul the farmers' produce to market, may be *very materially* reduced.

That good roads are an advantage to farmers must be admitted, and we hope the agitation of the road question will hasten the day when they will be more general and at such cost as we can easily bear. But the argument that the condition of our roads is the cause of present agricultural depression cannot be sustained in this State at least.

Heavy hauling over and through bad roads does shorten the lives of teams, harness and vehicles, and is an expense we would do well to avoid if we could, and we can do it by keeping our roads in better condition, but I believe the additional expense of the cost of construction and maintenance of stone roads would more than overbalance this, even if hard roads would tend to prolong the life of either, and this is not certain.

If, as is claimed, stone roads add so much to the value of properties adjoining them, then, in my judgment, the per cent. to be paid by property-holders along the line of road to be improved should be more than it is in our "State Aid" law—that is, if that law is to continue in force. So far as "State aid" for road-building in this State is concerned, it is a wise provision, and the amount might well

be increased for the reason that this money is appropriated from corporation taxes.

This is one way the farmers may secure a benefit from this annual State income. Railroads, too, may well cheapen the cost of transportation of stone for road-building, as good roads leading from stations will greatly increase population and travel. Stone roads are a luxury, and they who use them most should pay the most, so as greatly to lighten the burden of tax for their construction to those in a county who may seldom use them. But if built entirely by taxation, then all roads must be stoned if we would be just to all taxpayers, as is the case in Union county. But the conditions of population, taxable property, needs of travel, abundance of suitable stone and demands of wealthy residents for solid driveways, differ so widely throughout the State that what may be easy, safe and even profitable in one section might be most ruinous in another.

Let those localities build stone roads that are able to do so, but in view of the *increasing burdens of local taxation* we should, I am sure, be very cautious and considerate in what we recommend.

Mr. Ward—I have a set of resolutions to offer.

"*Resolved*, That the thanks of this Convention be and they are hereby extended to the Executive Committee of the State Board for securing the very efficient act entitled 'An act for the more permanent improvement of the roads of this State,' passed 1891, and the supplement thereto, passed 1892, and also to the President of the State Board of Agriculture for the valuable aid he has rendered in putting the law into practical operation.

"*Resolved*, That the Executive Committee is authorized and directed to use their best endeavors to prevent any material alterations or amendments to the said act.

"*Resolved*, That we hereby pledge our support and hearty co-operation in any effort they may use to improve the highways of the State."

On motion, adopted.

REMARKS OF GEN. JAMES F. RUSLING.

I was to address the State Road Convention at its annual meeting, but was unable to be present. By request of Secretary Dye, I now submit a few remarks as follows: My topic was to have been

"Necessary requirements of taxable property and of population for the construction of stone roads."

I am not sure that I know much about this, but I am very sure that I am heartily in favor of stone roads or other good roads. In remote districts where the population is small and the value of property low they may not be practicable, but in all, or nearly all, parts of middle and northern New Jersey, and in the more thickly-settled parts of southern New Jersey, I see no reason why we should not begin to build such roads. Our first roads in New Jersey a century or a century and a half ago, of course, were poor, as a rule. They followed the old Indian trails, and were only connecting avenues from one chief point to another. Our people were poor, the amount of travel was small, and almost anything sufficed for a road. Then with the growth of population and business and more frequent communication there grew up a demand for better roads, and in due time this was answered by the construction of great turnpikes that presently took possession of our leading thoroughfares. These, as a rule, were only dirt roads, but they were constructed with much intelligence and skill, and were a decided advance on all previous roads in New Jersey. They were built on the best grades possible, without much real grading, and the best materials were used that were then accessible. They were well drained and well bridged, and gravel was used instead of clay and sand where possible, and many of these turnpikes were for years a credit to the State. Many of them still continue so, especially in the sandy portions of New Jersey. I was recently down at Toms River and other portions of Ocean county, in the midst of the "Jersey Pines," and was surprised to see what excellent gravel roads they had, extending from the county seat in all the chief directions; and the same is true through much of the sandy region in all southern Jersey. Of course, there are sand roads there that are almost impassable in summer, and a reproach to the State, but there are many roads and turnpikes there that suffice yet for all the travel that exists, and, as a rule, they have been so well graded and built, and the grades are naturally so easy, that the construction of stone roads or other better roads there would be comparatively easy. The only trouble with "stone roads" there would be the cost of the stone, as the stone is absent from much of that region, and the taxable value of the lands in many parts there would hardly pay for stone roads or other costly

roads now, but good gravel and bog-iron ore and other like materials exist there, and these would suffice to make good roads until the population and taxable value of the country increase.

When you get up to Mercer and Monmouth counties, however, and from there north, our turnpikes, as a rule, have fallen into "innocuous desuetude," and their condition to-day is not so good as it was forty years ago. The turnpike from Long Branch to Freehold is a pretty good one, except in spots where they have used too soft materials, but the most of it is a good, hard, graveled turnpike, and it is a pleasure and delight to drive over it. The turnpike from Freehold to Farmingdale is worse than nothing, as a rule—no better than a country dirt road. The turnpike from Freehold to Hightstown is mostly of the same character. It is fairly well graded and drained, but it never was properly graveled, and the materials were so near akin to sand that it is intolerable to pay toll for traveling over it, as a whole. From Freehold to Allentown is a dirt road that is good in spots where gravel exists or has been used, but much of it is very sandy and unfit for public use much of the year. It is amazing how the farmers through there ever endure it. The land is valuable and the population dense, and there is no reason why they should not have a first-class road. So, the old broad turnpike, or Queen's Highway, from Bordentown to Amboy, has mostly become a nuisance, because of the want of proper grading and materials. There is plenty of good, hard gravel all through that region, and it might readily be made a superb drive and way of transportation at moderate cost. The property and the population would both bear this readily, and the total cost would soon be more than reimbursed by the increased valuation of property. So, there used to be a fine turnpike from Trenton north to Flemington, Washington and Belvidere, but this also, as a whole, has fallen into "innocuous desuetude," and the same is true of most of the former "pikes" through northern New Jersey. This is especially true of the turnpikes from Trenton to New Brunswick, Trenton to Princeton, Trenton to Allentown and Trenton to Crosswicks. Thirty years ago these "pikes" around Trenton were well made and kept and were admirable driveways, but they have been allowed to go to pieces, have but poor attention paid to them, and they grow worse and worse year by year. Trenton feels this especially, because two-thirds or three-fourths of the country around

here is of a sandy soil, and hence in the summer these roads are detestable from sand, and in the winter almost impassable from mud.

The chief reason for the decay of all these fine "pikes," of course, is the increase and multiplication of our railroads. These ramify through all parts of the State, from Trenton north, and have taken so much travel from the "pikes" that they no longer pay handsome dividends, and therefore, of course, their directors cannot afford to keep them in as good condition as formerly. But, nevertheless, through all this region there has been a very great increase in population and in the taxable values, and this will continue to go on in the future. In my own time I have seen Trenton grow from a city of 5,000 people to nearly 75,000, and other towns and cities in northern New Jersey in proportion, and while our farm lands have not advanced proportionably, yet, take the whole taxable value of New Jersey, from Trenton north, there has been a remarkable growth in values as well as population the last thirty years, and there is every reason to believe that the advance for the next thirty years will be quite as large if not larger. It looks now as if the next step will be electric roads, connecting all the smaller towns with the larger ones, and binding our whole population together, and while these will be of very great service in their way, yet they can nowhere do away with the absolute necessity for first-class country roads. Now, through all this region, from Trenton north, there are abundant materials for first-class roads everywhere, or nearly everywhere. As stone abounds in our hills—and where it is not found near by, our railroads are so numerous that they can bring it at small cost to whatever point is desired—the problem, therefore, of building stone roads is comparatively a simple one through all this region, and I believe it to be for the best interests of all this section of the State to enter at once upon a reformation and improvement of our public roads, and no part of the State is more interested in this than Mercer county, where population and taxable values are rapidly increasing and are surely able to bear all that is necessary to make our roads first-class in every respect.

Wherever a road shall be improved the price of land will go up, and buildings will multiply and population increase, and thus we shall get the cost of our better roads back again half a dozen times over. Our new Road law, indeed, has its defects, but these can readily be amended, and, as a whole, it is by far the best Road law we have yet seen in New Jersey. It provides that all the land bor-

dering on the new road shall pay one-tenth of the cost of the road, then the State itself pays one-third, or about 43 per cent. is thus provided for, and the balance of 57 per cent. falls upon the county and township. Of this balance, at least 50 per cent. falls upon the cities and large towns, so that the amount that would really be taxable against the farm property is comparatively small, though the good roads resulting would be largely for the benefit of our farmers. Of course, they would help the cities and towns some, but the chief good and especial benefit would be to our farming classes. They would reduce the cost of transportation; they would multiply communication between farming districts; they would enable our farmers to use the roads at all seasons of the year. Why, they would soon make a new county of Mercer county, and a new State of New Jersey, and would invite population from abroad, and line our new roads with villas and country sites. They would soon double our population and taxable values, and bring New Jersey to the very forefront of American civilization. I can think of nothing of more service to Mercer county than good roads. It is just what we need in all our region here. There should be first-class roads radiating from Trenton, like the spokes of a wheel, in all directions, but especially to Crosswicks, to Allentown, to Hamilton Square, to New Brunswick, to Princeton, to Pennington, to Titusville, &c. Of course, we cannot build all these roads immediately, but we can select the chief ones and improve these, and then point to these as object lessons for all the rest. Of course, the chief ones are the ones over which we have the most travel. No one of these has so much travel as the road from Trenton to Crosswicks and Bordentown, or the old White Horse road. I am told that, by actual count, twice the number of wagons, or more, pass over this every day, as a rule, than over any other road leading out of Trenton. Next in importance, I consider the road leading to Hamilton Square. Next, the road to Pennington, and next, the road to Birmingham, &c. The road to Princeton is important, because of the school at Lawrenceville, but there is no such travel over this road as over those I have indicated.

Now all these, in my judgment, should be taken possession of by the Freeholders and improved in the quickest time at the least cost possible. They should look all around the situation and see what it demands. They should not be moved by petty or personal or local considerations, but should consider what is best for the general good

of the whole county, and then proceed to work intelligently and wisely to bring these roads up to the highest standard of modern roads. This will surely be done in the near future, and the sooner it is done the better for all concerned. Mercer county needs this particularly, because in all her length and breadth she has not a single piece of decent road anywhere, except a little speck of it up at Cadwalader Place, made so chiefly by private enterprise, but this is a mere "speck" and only a specimen of what can be done in Mercer county if we really put our hands to the job. I cannot speak advisedly of the rest of the State, but I know that here in Mercer county we are ready for good roads and plenty of them, and I earnestly urge upon our Freeholders to take hold of this business and push it accordingly. I believe the people would heartily indorse such action, and I urge it upon them from every public consideration. Good roads are the first and the last test of modern civilization. They are the price that barbarism pays to civilization. They are the stepping-stones to progress; the homage man pays to reform. What the telegraph and the telephone are to our cities, good roads are to our farmers and more. If Rome could build them everywhere in her day, and found her profit in doing so, is it not time New Jersey awoke to their importance, and will she not be wise in securing them speedily? If we have not the money to pay for them immediately, let us issue bonds on long time, the interest of which would be more than met by the cost of our present dirt roads, and then we would get something good and lasting, whereas now we get only miserable mud and dust and "dirt roads" to the end of the chapter. So, turnpikes are antiquated and antediluvian—"before the flood"—a relic of barbarism. What we want are good county roads, and they must come soon and come to stay.

The Chair—I think the session of to-day has been a season of profit to us all. I want to say I have entered upon my duties with reluctance, but I was compelled to act as I was desired or the law would have been a failure. I say to-night that the law is a better one than we had anticipated; we did not know it was as good as it is. I am gratified that my actions have met your approval, and I am very thankful for the aid I have received in my duties.

Dr. Ward, for the Committee on Nomination of Officers, reported the nominations. (See list of officers, page 467.)

On motion, the report was adopted and the choice of the committee ratified unanimously.

The Delegates then made the nominations for Advisory Committee, one from each county represented. (See list, page 467.)

On motion, the nominations were confirmed.

A Member—It occurred to me when the resolution of thanks was passed that we were as much indebted to Hon. B. E. Tine for the passage of that Road law as to any other living man, and if you wil allow me I would move to insert his name in the resolution of thanks.

The Chair—I want to second that proposition. It affords me grea pleasure in making the announcement that during the term of Mr. Tine we have had the most able, active, energetic and vigilant advocate in the interest of farmers we have ever had in my recollection. During the three years before he became a member of the Assembly we had utterly failed to get our road resolution in favorable shape before the Assembly; now, by his efforts and his timely advice, we have been enabled to do so and to act at the right time. I second the amendment most cheerfully, and want to thank him personally at the same time.

The motion was unanimously agreed to.

Mr. Tine—I do not think I ever did any more than I ought to have done. I was elected to look after the interests of the people, and do not deserve any thanks for doing my duty.

The Chair—I hope the members will not cease their labors at the close of this session. Let us consider we are just commencing the struggle for good roads, and let us endeavor to advance these interests, and do all we can to help the matter along for 1893. We have been threatened that this Convention would be taken from our hands, and all our actions repudiated; we have been told that the first blow will be the repeal of the law giving State aid in the improvement of the public roads. We must not permit this, and we must scrutinize every amendment that is offered in the Legislature, for in opening the door for amendments we may destroy the whole superstructure. In case we may find it necessary to take a stand to hold on to this law, we may need assistance from you all—short, sharp and decisive. What I mean by that is that when we get word from our Legislative Committee that that law is in danger, and we ask for petitions or memorials, act promptly, and do all you can to aid us. We must have aid, or we may fail.

I hope we will all live to see success crown our efforts to get better roads, across the State, at least, without such heroic measures as were proposed by Dr. Ripley last year. [Laughter.]

I thank you, gentlemen, for your consideration and for your efforts.

On motion, adjourned *sine die*.

FRANKLIN DYE,
Secretary.

APPENDIX.

A

REPORT ON ABANDONED FARM INVESTIGATION.

On the 14th of July, 1891, I received a letter from a gentleman in Jersey City, calling my attention to a newspaper article in which it was stated there were 313 abandoned farms in New Jersey, with a total of between nineteen and twenty thousand acres, and asking me to give him the location of some such farms, as he wished to lay the same before a London, England, syndicate, who contemplated purchasing such lands for colonization purposes. About the same time I received a letter from the President of this Board, calling my attention to the subject and requesting me to investigate and, if possible, locate auch farms. Soon after this, Governor Abbett's attention being directed to the same matter, he expressed a desire that I make some inquiry in relation to the subject; whereupon, communications were sent to farmers' organizations and leading farmers throughout the State, to ascertain, if possible, whether any such farms were known to exist in any of their several neighborhoods. Later, however, I was directed by the Governor to make an investigation of the subject. As the newspaper article in question contained figures gathered from the then forthcoming report of the Bureau of Labor and Statistics, the Chief of the Bureau, Hon. James Bishop, was also directed by the Governor to turn the subject of abandoned farm investigation over to the State Board of Agriculture. On the 9th of November, 1891, the papers containing the investigation and report of the Bureau of Statistics were delivered to the Secretary of the State Board. The time between that date and the annual meeting of the State Board was too short to make such further inquiry as was directed to be made by the Governor, and with his permission it was carried over into 1892.

The question naturally arises, What is an abandoned farm? and

the answer as to the number of such farms will depend largely upon the latitude given to the word "abandoned."

Land that has passed out of the sphere of agricultural uses to that of the higher value of building lots, and is now held for speculation, cannot be classed as abandoned farms. Furthermore, farms may be unoccupied for a year or more for good local reasons; or farm buildings are occupied by tenants and the land not worked, except in a very limited sense; or the land is worked in whole or part by surrounding farmers, while the buildings are tenantless; such changes are going on every year. But is it just to class all such as abandoned farms? Then, too, there are large tracts of pine and brush-land that have never been cleared of wood nor brought into cultivation; as in one township in Ocean county 1,619 acres were reported to me as "abandoned farms," and only 224 of them are cleared up and cultivated; and a personal investigation revealed the fact that many of the smaller divisions of these 1,619 acres are occupied by tenants and cultivated to some extent, while others are used for summer residences by their city owners. This latter is the case in other counties also. In my view it is an injustice to the sound farming lands of the State, if not also to the land named, to class all such as are indicated above, abandoned farms. It seems to me "temporarily unoccupied" would better express the true idea according to the actual condition. But if farms that are temporarily tenantless and partially or wholly uncultivated for a period of shorter or longer duration, owing to local causes, can be justly classed as "abandoned," then there are such farms, but their number is so limited and the time of vacation so short that they do not affect the general progressive character of the agriculture of the State. The report of the Bureau of Statistics, after speaking of the very small per cent., &c., of (so-called) abandoned farms found in this State according to the Bureau's investigation, well says, "These facts seem to point to the conclusion that the abandoned-farm movement has not yet set in strongly in New Jersey." In endeavoring to pursue the investigation over the same territory covered by the Bureau of Statistics, three lines have been followed, the first one of which is first named above, by correspondence with farmers' organizations and leading farmers; the second, after the papers of the Bureau were turned over to me, by correspondence with the Assessors in the townships where abandoned farms were reported to exist, and third by visiting and inspecting said farms. Replies of Assessors, as far as

heard from, under head of "Statement," and extracts from letters received, with such explanations as may have resulted from personal investigation, are presented in the following pages.

The investigations of the Bureau practically covered the whole State, as only eleven townships are missing, outside of Hudson, Essex and Union counties, which, owing to their strongly-marked urban character, were omitted.

In following up this investigation in 1891 and 1892 less than one hundred farms (?) are reported to me as not being under full cultivation, for nearly all that are reported have tenants for a part or all of the year. Some are occupied as summer homes by their city owners, and others are cultivated by adjoining farmers or are managed for the pasture and hay. Those along the sea-shore are used as homes for fishermen, who find the sea more profitable for the present than the land, although a garden is cultivated. Those in the pines and southern woods, mere lots in many cases, are used by berry and cranberry-pickers generally. In this latter section the changes made in the mode as well as the lines of travel have left some properties that were once valuable as public houses for the accommodation of stages and the traveling public tenantless, and old-time centers are given up for those being formed along the railroads.

There are a few similar properties in other parts of the State which the advent of the railroad has left without patronage. Again, there are properties well located and that would pay for cultivation, but the original owners being dead and having left the estate to several children, to be divided when the youngest becomes of age, and no one of them choosing to live on and keep up the property until the time for division, such properties are running down. I found a number of such in different parts of the State. Then, too, parties owning want more rent than possible tenants are willing to give, or the buildings are in a dilapidated condition and occupants will not remain unless repairs are made, and owners are unwilling to do this without an increase of rent, which sometimes brings about a separation. Changes of this kind are going on every year. But there is no such thing as general abandonment of farms or farm land in the State, and the properties, the address of whose owner is not known and on which annual taxes are not paid, are very few. Out of a possible 9,000 acres of land reported to me in the State, similar to and some of which is located as above described, I find less than 400 acres on

which taxes are not paid, and some of that not paid, the Assessors write, is collectible. The assessed valuation of this is about $6,000, which, at the usually low tax rate for such property, will not amount to a very large sum. Much of the land included in the above total has never been cleared up nor brought under cultivation, as has been stated, but lies in the same condition in which nature left it. To report such as "abandoned *farm* land" is, to say the least, misleading. The investigations of the Bureau, I have no doubt, were honestly undertaken and for the purpose of comparison were of value. But when a significance was attached to the investigation conveying the idea that *farms* in New Jersey were being *abandoned*, and that agriculture had become a non-profitable industry, as was conveyed to the public in the first newspaper article on the above report, an erroneous impression was created. Conversely to this subject, it is encouraging to say that fertile lands throughout the State are being cultivated and improved, increased crops are raised year after year by our enterprising farmers, thousands of acres of new lands, particularly in the southern counties, are being cleared up and built upon, and farms that have been temporarily vacated are soon occupied again.

FRANKLIN DYE,
Secretary.

The Governor indicated the following line of inquiry:

1. Number of farms reported abandoned, or partially uncultivated.
2. Name of owner, post-office address and location.
3. Number of acres and kind of land.
4. What formerly used for.
5. What used for now.
6. Amount of assessment.
7. Amount of tax.
8. Is tax paid?

CORRESPONDENCE OF ASSESSORS AND OTHERS.

ATLANTIC COUNTY.

Buena Vista Township.

STATEMENT.—The farmers in this township seem to be in a prosperous condition, and each year seems to add greatly to the value of the real estate, which has increased double in the last five years. While

corn, wheat and potatoes can be raised at a good profit, yet truck and small fruits pay much better, owing to the easy access to the best markets, and our farmers are giving their attention to raising sweet potatoes, strawberries, raspberries, blackberries, which seem to pay them well, and what seemed to be a wilderness a few years ago is now becoming cleared up, and in some localities assumes a garden-like appearance.

Most of our cheap lands are being bought up by the Russian Jews, and in this township there is but little property standing idle at present.

1. Number of farms reported—Three.

2. Name of owner of each and P. O. address, also location and description—T. W. Mathis, Oak Road, P. O. Buena Vista; David Pancoast, deceased, near Downston; John Helyer, Buena Vista.

3. Number of acres and kind of land—Twenty acres, 30 acres, 10 acres; medium clay loam.

4. What formerly used for—Rotation of crops.

5. What used for now—Not under cultivation.

6. Amount of assessment—About $10 per acre.

7. Amount of tax—Tax rate $1.14 for township.

8. Is tax paid?—No.

Galloway Township.

1. Number reported—Seventeen. All have tenants except 7, 8, 10 and 11.

2. Name of owner, &c.—Farm No. 1, Ezra Bowen, Leeds Point, near Smithville; farm No. 2, Chalkley Bowen's heirs, Absecon, near Port Republic; farm No. 3, Joshua H. Brown, Atlantic, has tenant, Leeds Point; farm No. 4, Lida Johnson, Leeds Point; farm No. 5, Do not know acreage, as I failed to assess this year, think over 100 acres, Leeds Point; farm No. 6, Chas. P. Conover, Atlantic City, near Oceanville (farmed in part); farm No. 7, Martin Gilison, Oceanville; farm No. 8, Jonathan Reed, Absecon, near Oceanville; farm No. 9, Richard Risley, Atlantic City, has tenant, Leeds Point; farm No. 10, Mark Reed's heirs, Absecon, has tenant, Leeds Point; farm No. 11, C. N. Rape, Mays Landing, has tenant, between Leeds Point and Oceanville; farm No. 12, Josiah Smith, Brigantine, has tenant, Smithville; farm No. 13, Adam Strickland, Leeds Point, has tenant, between Leeds Point and Oceanville; farm No. 14, Sophia S.

Jones, Hightstown, has tenant, Smithville, running down; farm No. 15, Rhoda Lickle, Port Republic, has tenant, Port Republic, owner lives on it now; farm No. 16, Clayton Highbee, Absecon, has tenant, Highbeetown; farm No. 17, M. Stutzbach, Egg Harbor City, has tenant, two miles from Pomona.

3. Number of acres and kind of land.

(Follow the farm numbers under question 2.)

1. 50 acres, part meadow; 2. 100 acres, part meadow; 3. 19 acres; 4. 60 acres, part meadow; 5. Over 100 acres, belongs to the State Sinking Fund; 6. 21 acres; 7. 15 acres; 8. 100 acres, a part woodland; 9. 100 acres, part meadow; 10. 73 acres; 11. 40 acres; 12. 14 acres; 13. 95 acres, part meadow; 14. 50 acres, part meadow; 15. 57 acres; 16. 35 acres; 17. 20 acres, two miles from Pomerania.

4. What formerly used for—Mostly trucking.

5. What used for now—Nothing except cases where there are tenants.

6. Amount of assessment. (Follow farm numbers.) 1. $250; 2. $1,000; 3. $400; 4. $1,000; 5. (See question 5 above); 6. $250; 7. $200; 8. $800; 9. $700; 10. $300; 11. $400; 12. $250; 13. $1,200; 14. $1,000; 15. $800; 16. $300; 17. $100.

7. Amount of tax. (Follow farm numbers.) 1. $4.05; 2. $6.18; 3. $6.48; 4. $16.18; 5. Not stated; 6. Soldier, not taxed; 7. $3.24; 8. $12.95; 9. $11.34; 10. $4.85; 11. $6.48; 12. $4.04; 13. $19.40; 14. $16.18; 15. $12.95; 16. $4.85; 17. $1.62.

8. Is the tax paid?—All paid.

Weymouth Township.

1. Number of farms reported abandoned or partially uncultivated—Thirteen.

2. Name of owner and post-office address—1. John Wallace, Tuckahoe, near Tuckerton; 2. Daniel Stewart, Bridgeton, near Hawkinsville; 3. John W. Ingersoll, Philadelphia, near Hawkinsville; 4. Henry Campbell's heirs, Philadelphia, near Hawkinsville; 5. Robert Campbell's heirs, Philadelphia, near Hawkinsville; 6. Wm. Newell, Millville, near Estellville; 7. H. Shaw's heirs, English Creek, near Estellville; 8. James See, Mays Landing, near Hawkinsville; 9. James Ingersoll, Dividing Creek, near Hawkinsville; 10.

Superior and Ventrilic, New York, near Hawkinsville; 11. Mary Walker, New York, near Walker's Forge; 12. Edmund Scull, Millville, near Estellville; 13. Peter Murdock, Ocean City, near Estellville.

3. Number of acres and kind of land. (Follow farm numbers.) 1. 500 acres, 20 cleared, balance bush-land; 2. 50 acres, 14 cleared, balance bush-land; 3. 25 acres, 20 cleared, balance bush-land; 4. 100 acres, 12 cleared, balance bush-land; 5. 50 acres, 20 cleared, balance bush-land; 6. 12 acres, all cleared; 7. 4 acres, all cleared; 8. 50 acres, 25 cleared, balance bush-land; 9. 80 acres, 30 cleared, balance bush-land; 10. 100 acres, 20 cleared, balance bush-land; 11. 2,500 acres, 30 cleared, balance bush-land; 12. 25 acres, all cleared; 13. 40 acres, 30 cleared, balance bush-land.

4. What formerly used for—Farming and lumbering.

5. What used for now—No. 7 pasturage, all the others nothing, not under cultivation.

6. Amount of assessment. (Follow farm numbers.) No. 1. $1,200; 2. $700; 3. $200; 4. $500; 5. $300; 6. $500; 7. $100; 8. $150; 9. $225; 10. $100; 11. $4,000; 12. $225; 13. $500.

7. Amount of tax. (Follow farm numbers.) No. 1. $15.84; 2. $9.24; 3. $2.64; 4. $6.60; 5. $3.96; 6. $6.60; 7. $1.32; 8. $1.98; 9. $2.96; 10. $1.32; 11. $52.80; 12. $2.96; 13. $6.60.

8. Is tax paid?—Taxes paid on all except No. 6.

NOTE.—The farms above reported for Weymouth township comprise a total acreage of 3,536 acres, of which only 262 are cleared land. And the taxes are paid on all except 12 acres.

BERGEN COUNTY.

Hohokus and Midland Townships.

None abandoned. From Ridgewood township the following is received:

"DEAR SIR—Your questions about abandoned farms received. In reply will say that there are no farms in Ridgewood township at the present time that properly belong to that class. Farming is abandoned, not the farms, which are held for speculative purposes and not farming."

Another writes: "Will say the farms you have reference to are

held at too high a price to make farming pay. Most of these farms are held by insurance companies, estates and non-residents, and have been allowed to lie idle, growing up with weeds and brush, and are run down. The assessed value of such lands is from fifty to one hundred and fifty dollars per acre, but it is probable could not be bought for that price. Are not worked because the returns are not great enough to produce a profit over labor and fertilizers to owner. These lands are held for their future value."

BURLINGTON COUNTY.

Randolph Township.

1. Number of farms reported—Six.

2. Name of owner, &c.—1. Nathaniel Sooy, Batsto, railroad station Shamong, twelve miles distance, nearest village and P. O. Harrisia, three miles; 2. Joseph Wharton, agent George Wright, Batsto; 3. Nathaniel Sooy, Batsto, nearest railroad station Egg Harbor City, P. O. Lower Bank; 4. James Snow, Tabernacle, near Shamong station, P. O. Harrisia; 5. Patrick Sheridan, agent George McCambridge, Harrisia, near Shamong station; 6. Wm. Malwell, Atlantic City, railroad station Egg Harbor City, twelve miles, P. O. Wading River, one mile.

3. Number of acres and kind of land. (Follow farm numbers.) No. 1. 34 acres, light loamy ground; No. 2. 60 acres; No. 3. 60 acres, sandy and loamy ground; No. 4. 25 acres, sandy and loamy ground; No. 5. 60 acres, sandy and loamy ground; No. 6. 500 acres, part swamp-land, pine, cedar and meadow-land.

4. What formerly used for—For fruit, corn and trucking.

5. What used for now—Not cultivated. No. 6 used for marsh-haying.

6. Amount of assessment. (Follow farm numbers.) No. 1. $300; 2. $500; 3. $500; 4. $500; 5. $400; 6. $2,000.

7. Amount of tax. (Follow farm numbers.) No. 1. $4.59; 2. Not stated; 3. $7.50; 4. $7.50; 5. $6.12; 6. $18.

8. Is tax paid?—Taxes all paid. The Assessor writes "It is not purchasers that is wanted, but better railroad facilities and markets for our produce."

Shamong Township.

1. Number of farms reported—Thirteen.

2. Name of owner, &c.—1. W. G. P. Brinckloe, Eden, Bucks county, Pa., farm near Atsion railroad station; 2. Rebecca Clark, P. O. unknown, near same station; 3. Rebecca Miller, Vincentown, farm near Tabernacle; 4. George Gaskill, P. O. unknown, farm near Atsion station; 5. Charles Jones, P. O. unknown, near same station; 6. R. Margerum, Mount Holly, farm near Tabernacle; 7. Fred. Owens, Mount Holly, near Atsion; 8. Thomas Stiles, Atsion P. O., same station; 9. Patience Wells, Tabernacle P. O., farm near Tabernacle; 10. Wm. Colton, P. O. unknown, near Atsion; 11. Susanna Colton, P. O. unknown, near same station.

3. Number of acres and kind of land. (Follow farm numbers.) 1. 40 acres; 2. 35 acres; 3. 18 acres; 4. 23 acres; 5. 20 acres; 6. 113 acres; 7. 20 acres; 8. 38 acres; 9. 24 acres; 10. 20 acres; 11. 40 acres; 12. 50 acres; 13. 132 acres. All sandy.

4. What formerly used for—Have been used for growing fruit, berries and other kinds of farming.

5. What used for now—Some are vacant, some are occupied by tenants.

6. Amount of assessment. (Follow farm numbers.) No. 1. $300; 2. $350; 3. $100; 4. 150; 5. $200; 6. $800; 7. $25; 8. $325; 9. $200; 10. $100; 11. $200; 12. $275; 13. $1,175.

7. Amount of tax. (Follow farm numbers.) 1. $4.05; 2. $4.73; 3. $1.35; 4. $2.03; 5. $2.70; 6. $10.80; 7. $0.34; 8. $4.39; 9. $2.70; 10. $1.35; 11. $1.35; 12. $2.70; 13. $3.72.

8. Is tax paid?—Taxes are paid on all except No. 4.

New Hanover Township.

None abandoned. All farms are in use.

Burlington Township.

STATEMENT.—There are no such farms in my township to my knowledge.

Woodland Township.

No such farms in this township.

CAPE MAY COUNTY.

Lower Township.

STATEMENT.—When I canvassed the township as Assessor, I did not find any farms that could be called abandoned, for the owners of each and every farm in the township value them at some price, and often two or three times as much as they would bring at public sale.

I have again, since the receipt of your last letter, made a thorough search, and cannot find any such farms. The Collector of Taxes for the township says, when he presents the tax bills he does not find any so-called "abandoned farms."

I do not know of any part of the State where the soil will yield a better pay for time and manure than it will in Cape May. It is a natural soil for clover, all kinds of fruit and berries thrive and do well, grapes generally do well when they are not destroyed by rose bugs or mould.

With our railroad, sail-vessels and steamboat facilities to ship our surplus, and so many summer resorts to market our vegetables in, I do not see why Cape May should not lead Vineland in fruits and vegetables.

If I can assist you in any way to place Cape May in its true color, or bring it out with its capabilities, I will be happy to do it.

Middle Township.

1. Number of farms reported—One.
2. Name of owner, &c.—Cole, Hand & Cole; property undivided; farm three miles south of Cape May Court House, one-eighth mile from Burleigh station, Five-Mile Beach Branch railroad.
3. Number of acres and kind of land—60 acres, sandy land.
4. What formerly used for—For corn and truck.
5. What used for now—No use is made of it now.
6. Amount of assessment—Assessed for $1,000.
7. Amount of tax—Tax $11.
8. Is tax paid?—Tax is paid.

STATEMENT.—This farm could have been tenanted if the owners were disposed to rent it. Other farms not tenanted are cultivated by outside parties.

CAMDEN COUNTY.

Gloucester Township.

1. Number of farms reported—One.
2. Name of owner, &c.—Not given; situated in the upper end of township.
3. Number of acres and kind of land—10 acres, very poor and sandy, unfit for cultivation.
4. What formerly used for—Not stated.
5. What used for now—Not cultivated.
6. Amount of assessment—Assessed for $100.
7. Amount of tax—Not answered.
8. Is tax paid?—Not answered.

STATEMENT.—I can recall but one tract of cleared land in the township with buildings that is not occupied (acreage, &c., stated above). The building is a small, cheap house of poor construction. The land also is very poor, and the occupant showed more sense in vacating than he did in settling there. Several farms, a few fine ones, have been vacated and sold to land companies for town sites, along railroads, but sold at inducing figures, of course, and not abandoned.

CUMBERLAND COUNTY.

Downe Township.

1. Number of farms reported—One.
2. Name of owner, &c.—J. O. Lummis, Cedarville, located Fortesque road, three miles from Newport station, New Jersey Southern railroad.
3. Number of acres and kind of land—60 acres farmable, 240 swamp and marsh.
4. What formerly used for—General farming.
5. What used for now—Not used.
6. Amount of assessment—Assessed at $2,000.
7. Amount of tax—$23.
8. Is tax paid?—Tax is paid.

STATEMENT.—The buildings are nearly all down and unfit for use; most of the land is growing up in underbrush and is not very valuable; owner is a non-resident.

Landis Township.

1. Number of farms reported—Five.

2. Name of owner, &c. (Follow farm numbers.) 1. Lawrence Cake (heirs), address unknown, non-resident, three and one-half miles from railroad station Vineland; 2. John L. Mason, P. O. unknown, non-resident, one mile from west of North Vineland station; 3. James Astle, P. O. address unknown, non-resident, two miles from Vineland and railroad station; 4. John J. Lewis, non-resident, address unknown, two miles from South Vineland and railroad station; 5. Jacob Detwiler, address unknown, non-resident, land is divided into seven sections, located from one mile to one and a half miles from Vineland station, West Jersey railroad.

3. Number of acres and kind of land. (Follow farm questions.) 1. 50 acres, bush-land, no buildings; 2. 9 acres, land unimproved, no buildings; 3. 5 acres, cedar swamp; 4. 30 acres, partly cleared, no buildings, neglected; 5. Divided as follows: 5 acres, partly cleared and neglected, no buildings; 25 acres, cleared farm land, no buildings; 12 acres, farm land, neglected; 20 acres, cleared farm land, buildings burned, land neglected; 15 acres, farm land, neglected, no buildings; 5 acres, unimproved, no buildings; 6 acres, partly cleared, no buildings.

4. What formerly used for—Where cultivation was begun these lands were used for general farm crops.

5. What used for now—Are not cultivated now.

6. Amount of assessment. (Follow farm questions.) 1. $300; 2. $200; 3. $75; 4. $350; 5. $500, $225, $500, $275, $75, $100, respectively.

7. Amount of tax—1. $6.36; 2. $5.51; 3. $3 84; 4. $8.20; 5. $4.23, $7.40, $5.64, $9.10, $6.34, $3.84, $3.84, respectively.

8. Is tax paid?—Tax is not paid on any of the above properties.

STATEMENT.—I have made as thorough an investigation as I could with the time I have had. I am positive there are not five farms in the township abandoned. The farms reported abandoned are in most

instances owned by non-residents, who have rented them and the buildings have been burned down and have not been rebuilt. There are a few very poor, sandy places, too poor and sandy for farming, where some have planted vineyards, and the grape rot compelled them to give up grape culture. I don't class them as abandoned farms. There are several small farms in litigation, and estates that are not settled, but this is no fault of the land if intelligently cultivated.

GLOUCESTER COUNTY.

Clayton Township.

1. Nnmber of farms reported—One.
2. Name of owner, &c.—James Fisher, Clayton, farm located one-quarter mile south of Clayton station.
3. Number of acres and kind of land—49½ acres.
4. What formerly used for—General farming.
5. What used for now—Not used.
6. Amount of assessment—$2,000.
7. Amount of tax—$29.50.
8. Is tax paid?—Tax is paid.

Monroe Township.

1. Number of farms reported—Two.
2. Name of owner, &c.—Not stated.
3. Number of acres and kind of land—1. 134 acres, about 20 cleared, balance in brush, sandy; 2. 200 acres, 40 cleared, balance in brush, sandy.
4. What formerly used for—Not answered.
5. What used for now—Not answered.
6. Amount of assessment—Not answered.
7. Amount of tax—Not answered.
8. Is tax paid?—Taxes are paid.

STATEMENT.—The above farms are 6 to 7 miles from railroad station.

Farms seemed to be more in demand last spring than for a long time before.

HUNTERDON COUNTY.

West Amwell Township.

1. Number of farms reported—Three.

2. Name of owner, &c.—1. Jeremiah Tobin, Lambertville, farm four miles east of Lambertville; 2. Josephine Todd, same address and location; 3. Peter Bodine, P. O. address, Lambertville, farm two and a half miles from Lambertville, on York road.

3. Number of acres and kind of land. (Follow farm numbers.) 1. 73 acres, 40 farm land, good quality, but much run down, the remainder pasture and woodland; 2. 60 acres, farm and pasture-land, quite rocky and stony; 3. 74 acres, mostly farm-land.

4. What formerly used for—All were formerly used for raising grain, fruit and pasture.

5. What used for now—1. Not used; 2 and 3. Hay was gathered.

6. Amount of assessment—1. $1,500; 2. $650; 3. $3,000.

7. Amount of tax—1. $16.80; 2. $7.28; 3. $33.60.

8. Is tax paid?—I think so.

STATEMENT.—The houses on two of the farms are rented to laboring men.

MIDDLESEX COUNTY.

North Brunswick Township.

1. Number of farms reported—Three abandoned and three partially.

2. Name of owner, &c.—1. Mr. Linder, Brooklyn, N. Y., farm near Franklin Park station on Pennsylvania railroad; 2. Mr. Edward, Rahway, estate, Brooklyn, N. Y., farm near same station; 3. Mutual Life Insurance Company, farm near New Brunswick; 4. Same owner, farm near Franklin Park; 5. George F. Martin, Jr., N. Y., near Franklin Park station; 6. Mr. Wilson, New Brunswick, same location.

3. Number of acres and kind of land—1. 72 acres, mostly low and wet; 2. 40 acres, same character; 3. 53 acres, gravelly; 4. 100 acres; 5. 76 acres, low, wet, cold; 6. 50 acres, gravelly.

4. What formerly used for—General farming.

5. What used for now—1 and 2. Not used; 3 and 4. Family occupies the house; 5. Used for pasture; 6. Family lives in house, but land not used.

6. Amount of assessment—1. $1,260; 2. $825; 3. $2,650; 4. $3,200; 5. $2,300; 6. $1,000.

7. Amount of tax—1. $17.29; 2. $13.03; 3. $35.38; 4. $43.90; 5. $29.90; 6. $13.

8. Is tax paid?—Tax is mostly paid promptly, except No. 2, which is two years in arrears.

South Brunswick Township.

1. Number of farms reported—Five.

2. Name of owner, &c.—1. N. B. Ackerman, Paskack, farm near Kingston, on Straight turnpike; 2. Mrs. Henry Johnston, Kingston, same location; 3. C. W. Morris, Dean's, near Fresh Ponds; 4. John S. Voorhees (estate), Franklin Park, on turnpike near Kingston; 5. M. Cone, Newark, near Franklin Park.

3. Number of acres and kind of land—1. 75 acres, kind of land not stated; 2. 60 acres, kind of land not stated; 3. 90 acres, kind of land not stated; 4. 22 acres, kind of land not stated; 5. 8 acres, kind of land not stated.

4. What formerly used for—General farming in each case.

5. What used for now—Pasture, hay, and some partly cultivated.

6. Amount of assessment—1. $1,000; 2. $700; 3. $800; 4. $400; 5. $200.

7. Amount of tax—1. $11.80; 2. $8.26; 3. $9.46; 4. $4.72; 5. $2.36.

8. Is tax paid?—Taxes paid hitherto.

Madison Township.

STATEMENT OF ASSESSOR.—I know of no such farms in this township, and in fact there are no abandoned farms to my knowledge. There is a farm here owned by parties in New York (45 acres, assessed at $1,800), but they use it as a summer residence and hire a man to look after it in winter.

MONMOUTH COUNTY.

Manalapan Township.

1. Number of farms reported—One.
2. Name of owner, &c.—Rev. Charles T. Haley, No. 81 Roseville Ave., Newark, farm located five miles from Englishtown station, Freehold and Jamesburg railroad, and seven miles from Matawan.
3. Number of acres and kind of land—100 acres, loose sandy soil.
4. What formerly used for—General crops, grain, &c.
5. What used for now—Not used, growing up in bushes.
6. Amount of assessment—About $400.
7. Amount of tax—About $4.
8. Is tax paid?—Tax is paid.

STATEMENT.—The above property is entailed and cannot be sold. The buildings, both house and barn, have rotted down. As the owner is rich the farm is neglected.

Neptune Township.

STATEMENT.—We have no abandoned farms in Neptune township.

Marlboro Township.

No return.

MORRIS COUNTY.

Mendham Township.

1. Number of farms reported—One.
2. Name of owner, &c.—James Rendell, P. O. address not stated, farm three miles from Mendham.
3. Number of acres and kind of land—50 acres, kind of land not stated.
4. What formerly used for—General farming.
5. What used for now—Not stated.
6. Amount of assessment—$1,500.
7. Amount of tax—$15.
8. Is tax paid?—Tax is paid.

Passaic Township.

1. Number of farms reported—Two.

2. Name of owner, &c.—Not given, except that one owner resides in Morristown and the other in Plainfield.

3. Number of acres and kind of land—64 and 20, gravelly and meadow.

4. What formerly used for—General farming.

5. What used for now—Used for pasturage and hay.

6. Amount of assessment—Assessed at $45 and $90, each, per acre.

7. Amount of tax—Not stated. See question 6.

8. Is tax paid?—Yes.

STATEMENT.—One of these farms belongs to an estate which is being settled up. The other was taken under foreclosure by a life insurance company. I do not consider them abandoned by any means. Taxes are always paid promptly.

OCEAN COUNTY.

Berkeley Township.

1. Number of farms reported—One abandoned, three improved in part.

2. Name of owner, &c.—1. A. Grant's estate, no address given; 2. Mr. Merrit, non-resident; 3. Phillips' estate, house on, non-resident; 4. Mr. Perry, a non-resident, house and barn on farm.

3. Number of acres and kind of land—1. 80 acres; 2. 90 acres; 3. 58 acres; 4. 7 acres. Land sandy, with some admixture of gravel and loam.

4. What formerly used for—All used for farming, small gardens and pasture.

5. What used for now—All used for farming, small gardens and pasture.

6. Amount of assessment—Assessed at from $10 to $25 per acre.

7. Amount of tax—Assessed at from $10 to $25 per acre.

8. Is tax paid?—See statement. Can be located by addressing Assessor of township.

STATEMENT.—These places, and other similar ones, are all assessed and the tax is usually paid, and what is not paid is collectible. They are not abandoned. Many of them have families living on them, but have ceased to be profitable for farming purposes.

Stafford Township.

1. Number of farms reported—Two.
2. Name of owner, &c.—1. Ceamore C. Peterson (estate), located near Manahawkin; 2. Mrs. J. L. Hanks, Meriden, Conn., located near Staffordville.
3. Number of acres and kind of soil—1. 10 acres, sandy soil; 2. 20 acres, light sandy soil.
4. What formerly used for—Trucking.
5. What used for now—Not cultivated.
6. Amount of assessment—Assessed for $200 each.
7. Amount of tax—1. $3.20; 2. $3.
8. Is tax paid?—On 1 not paid, 2 paid.

Manchester Township.

STATEMENT OF ASSESSOR.—This is practically not a farming community. The land is poor, and some farms are abandoned because their owners were careless and poor managers.

Little Egg Harbor Township.

STATEMENT.—I know of no abandoned farms in this township; I have assessed none such. If there are any such farms I don't know where they are.

Eagleswood Township.

STATEMENT.—We have no such farms in this township.

SUSSEX COUNTY.

Sandyston Township.

STATEMENT.—There are no abandoned farms in this township at the present time, only a few mountain farms, land that never should

have been cultivated. A year or two ago there were several, but they have since been taken up.

Sparta Township.

STATEMENT.—There are no abandoned farms in this township. There is a lot of 80 acres on West mountain, of which 50 acres have been plowed. It is owned and held now for minerals only. It is not farming land. Another tract on East mountain is owned by Cooper & Hewitt, and purchased for the wood and minerals on it. It is not farming land. There is a house on it, which is occupied.

Vernon Township.

STATEMENT.—There are no abandoned farms in Vernon township.

WARREN COUNTY.

Hope Township.

1. Number of farms reported—One.
2. Name of owner, &c.—Mrs. M. P. Dodge, Scranton, Pa., located two and one-half miles east of Hope.
3. Number of acres and kind of land—33 acres tillable, 35 stone and wood.
4. What formerly used for—Formerly used for general farming.
5. What used for now—Nothing.
6. Amount of assessment—Assessed $1,000.
7. Amount of tax—$8.
8. Is tax paid?—Tax is paid.

Independence Township.

1. Number of farms reported—Two.
2. Name of owner, &c.—Thomas Wellwood, A. W. Humphrey, addresses not known.
3. Number of acres and kind of land—Wellwood's farm, 186 acres, sand and muck-land; Humphrey's, 205 acres, mountain and muck-land.

4. What formerly used for—Farming and dairying.

5. What used for now—Not used; not occupied.

6. Amount of assessment—Humphrey's, $2,200; Wellwood's, $3,500.

7. Amount of tax—(Due) $18.70 and $29.75.

8. Is tax paid?—Answered under 7.

STATEMENT.—Wellwood's farm is known as Young's island. It is located in "Great Meadows," and is suitable for trucking and dairying. Humphrey's is situated on north side of "Great Meadows." It is mountain and woodland. Fair sets of buildings on both properties. Railroad station three miles distant.

Oxford Township.

1. Number of farms reported—One.

2. Name of owner, &c.—Moses Wolverton, Broadway; farm located about three miles from Belvidere.

3. Number of acres and kind of land—175 acres, 100 of which are woodland, 75 cleared.

4. What formerly used for—General farming.

5. What used for now—Nothing.

6. Amount of assessment—Assessed $3,000.

7. Amount of tax—$21.36.

8. Is tax paid?—Tax is paid.

Mercer, Passaic and Somerset counties were covered in the first general investigation, and as the replies of Assessors and others so generally state the absence of abandoned farms in those counties, further detailed inquiries were not made.

In Mercer county the Assessors say those that were reported as abandoned were tenantless only for a short time and that they are now occupied and farmed.

Passaic county correspondence. I have endeavored to find out what I could in regard to the subject. I have written several letters to leading men whom I thought could give me any information. I have also inquired among farmers of the several townships if they knew of any such farms. I also have a little knowledge of Passaic county myself, having lived here for 45 years, but to the present time *I am unable to locate a single farm such as you refer to.* It is true that some out-

of-the-way mountain farm may be found, such as no one wants, but I think that the statement that 1,284 acres are in Passaic abandoned, as farms, is erroneous. As a general rule, land is too valuable in Passaic county to be abandoned.

Another writes: Have made inquiries about question asked about abandoned farms in Passaic county and can say there are none in the township I live in (Acquackanonk); there may be a few in the northern part of the county but they are of the kind the more you own the poorer you are, and I do not consider them farms, as they cannot possibly support a living.

The following are replies of Assessors received from Somerset county in 1891, in which sixty farms, with a total acreage of 2,000, were reported by the Bureau as abandoned:

Bound Brook. "I do not know of one actually abandoned farm in the township, unless you call farms taken by insurance companies or other creditors, abandoned farms."

East Millstone. "No abandoned farms in North Plainfield that I know of. No such farms have come under my observation. There are two or three, owned by non-residents, which have no regular tenants upon them but are worked on shares by residents of the neighborhood."

South Branch. "I know of no abandoned farms nor land of any kind in this township. I also doubt the statement as published."

Harlingen. "In 1890, when the census was taken, there were probably about six farms that the enumerator could not get any returns from, but I consider only one of the six was an abandoned farm. Farm No. 1 was not cultivated in 1891; the owner gave it up to the mortgagee and moved off of it; about 96 acres.

"Farm No. 2, 50 acres, owned by an old widow lady, has got very poor for the reason she has not put anything on it in years and does not cultivate it, but lives on it, so it is not abandoned. Nos. 3, 4, 5 and 6 are owned by non-residents; they are farms clear of debt. The owners did not have any tenants that year, consequently no return was received from them. All are properly cultivated to-day except No. 2."

Bedminster Township. "We have no farms in our township, by reason of heavy mortgage or other indebtedness, abandoned; every farm is occupied by owner or lessee."

Blackwell's Mills. "I know of no such land in Hillsborough township. There have been some farms given up to the mortgagees, but they have either sold them or rented them profitably, so I do not think they come in under that head; so I think I can truthfully say there are no abandoned farms in old Hillsborough."

Warrenville. "There are no abandoned farms in Warren township."

The Bureau of Statistics, in 1890, tabulated abandoned farms for the counties named, as follows:

Atlantic	55	farms,	acreage	2,755
Bergen	20	"	"	536
Burlington	32	"	"	*993
Camden	4	"	"	Not reported
Cape May	15	"	"	2,000
Cumberland	24	"	"	570
Gloucester	3	"	"	†150
Hunterdon	1	"	"	73
Mercer	10	"	"	‡688
Middlesex	12	"	"	456
Monmouth	5	"	"	†215
Morris	5	"	"	1,270
Ocean	16	"	"	916
Passaic	10	"	"	1,284
Somerset	60	"	"	2,090
Sussex	33	"	"	3,238
Warren	8	"	"	953

The townships in which the above farms are located are named in order in the preceding detailed report.

In any comparison of returns, the difference in the time of the investigations should be borne in mind.

*Six farms not reported, Little Egg Harbor township. †One farm not reported.
‡Three farms not reported.

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