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QUARTERLY REPORTS

OF THE

PENNSYLVANIA

BOARD OF AGRICULTURE,

OCTOBER, NOVEMBER & DECEMBER, 1885,

JANUARY, FEBRUARY & MARCH, 1886.

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TWENTY-NINTH AND THIRTIETH QUARTERLY REPORT
OF THE
PENNSYLVANIA BOARD OF AGRICULTURE.

PENNSYLVANIA BOARD OF AGRICULTURE, 1886.

Members Ex-Officio.

Hon. R. E. Pattison, *Governor.*
 Hon. J. S. Africa, *Secretary of Internal Affairs.*
 Hon. J. B. Niles, *Auditor General.*
 Dr. E. E. Higbee, *Superintendent of Public Instruction.*
 Dr. G. W. Atherton, *President Pennsylvania State College.*

Appointed by the Governor.

	Term expires.
Col. V. E. Piollet,	1887
Col. James Young,	1888
Dr. John P. Edge,	1889

Elected by County Agricultural Societies.

	Term expires.
Adams,	1888
Armstrong,	1889
Beaver,	1887
Bedford,	1889
Berks,	1889
Bradford,	1887
Bucks,	1888
Butler,	1888
Centre,	1887
Chester,	1888
Clarion,	1888
Clinton,	1887
Columbia,	1888
Crawford,	1889
Cumberland,	1888
Dauphin,	1888
Delaware,	1889
Erie,	1889
Indiana,	1887
Jefferson,	1888
Juniata,	1888
Lackawanna,	1889
Lancaster,	1888
Lebanon,	1887
Lehigh,	1888
Luzerne,	1888
Lycoming,	1887
Mercer,	1889
Montour,	1888
Northampton,	1888
Northumberland,	1889
Somerset,	1887
Schuylkill,	1888
Sullivan,	1889
Susquehanna,	1889
Tioga,	1887
Union,	1889
Venango,	1889
Warren,	1887
Washington,	1889
Westmoreland,	1889
Wayne,	1889
York,	1889

OFFICIAL LIST.

President.

Hon. R. E. Pattison.

Vice Presidents.

M. W. Oliver,

D. Wilson,

Dr. J. P. Edge.

Executive Committee.

Hon. R. E. Pattison,

J. A. Herr,

J. P. Barnes,

H. M. Engle,

G. Hiester,

E. Reeder,

R. McKee,

J. McDowell,

T. J. Edge, *Secretary.**Advisory Committee.*

H. M. Engle,

G. Hiester,

J. P. Barnes,

T. J. Edge, *Secretary.**Secretary.*

Thos. J. Edge, Harrisburg.

Botanist.

Thos. Meehan, Germantown.

Pomologist.

E. Satterthwaite, Jenkintown.

Chemist.

Dr. F. A. Genth, University of Pennsylvania.

Consulting Veterinary Surgeon.

Prof. R. S. Huidekoper, University of Pennsylvania.

Veterinary Surgeon.

Dr. F. Bridge, West Philadelphia.

Microscopists, Hygienists, and Food Inspectors.

Dr. H. Leffman, Philadelphia,

Prof. C. B. Cochran, West Chester.

Entomologist.

Prof. W. A. Buckhout, State College.

Ornithologist.

Dr. B. Harry Warren, West Chester.

Meteorologists.

Prof. I. T. Osmond, State College,

J. L. Heacock, Quakertown.

Mineralogist.

Col. Jos. Wilcox, Philadelphia.

Geologist.

Prof. J. P. Lesley, Philadelphia.

Stenographer.

Col. H. C. Demming, Harrisburg.

MINUTES OF THE WINTER MEETING OF THE
BOARD OF AGRICULTURE.*Held at Bloomsburg, Pa., December 2 and 3, 1885.*

WEDNESDAY, December 2, 1885.

Board called to order at 9.30, A. M., by Hon. R. E. Pattison in the chair.

By a call of the roll of members, the following were found present: Hon. R. E. Pattison, Dr. J. P. Edge, Col. V. E. Piollet, and Messrs. Garretson, Patterson, Zerr, Reeder, Herr, Eves, Oliver, Hiester, Colvin, Engle, Barnes, Smith, Foresman, McKee, Sechler, Shimer, Musselman, Keller, Frederick, Gates, Underwood, and Secretary. Later in the session, Messrs. Atherton, Hicks, McDowell, and Speaker were present.

The CHAIR named Messrs. Dr. Edge, Reeder, and Barnes, a committee to receive and report upon the credentials of members and delegates.

Reports of standing and special committees having been called for, Mr. REEDER of Bucks, on behalf of the special committee appointed to represent the State at the twelfth annual convention of the National Cheese, Butter, and Egg Association, at Chicago, presented a full report of the proceedings of that body; on motion of Mr. SMITH, seconded by Mr. MUSSELMAN, the report was accepted, and ordered entered on the minutes as a portion of the proceedings of the meeting.

The Committee on Credentials presented the following report:

We find that the following delegates are present with proper credentials: *Light Street Grange, No. 31.*—Joshua Hartzel, J. H. Hartzel, Samuel Hartzel, David Stroub, and Elizabeth Brown.

Valley Grange, No. 52.—Ezra Eves, P. B. Eves, T. C. Wilson, F. B. Masters, and Rachel Young.

Sugar Loaf Grange, No. 105.—W. L. Harlinger, C. A. White, and C. L. Kite.

Rohrsburg Grange, No. 103.—Charles Kester and W. W. Parker.

Columbia County Pomona Grange, No. 5.—R. G. F. Khink and F. E. Brockway.

Montour Grange, No. 792.—D. P. Deil and Michael Breakbill.

Catawissa Grange, No. 216.—M. Hartman, Samuel Fisher, and Susan Martin.

Bloomsburg Grange, No. 322.—Eli Barton, John Yerdon, and B. F. Gardner.

North Abington and Glenburn Farmers' Club.—J. W. Tiffany and H. W. Northup.

Columbia County Agricultural Society.—Freas Fowler, C. L. Sands, and Baltis Sterling.

Pleasant Valley Farmers' Club.—John Hoffa.

Pomona Grange, No. 5.—J. B. Patton, G. W. Supplee, and W. J. Martin.

The committee also reported that F. Y. Clopper presented the proper credentials as a member of the Board from Westmoreland county, and that he was entitled to his seat as such.

A number of other delegates were present without credentials.

On behalf of the Columbia County Agricultural Society and the citizens of Bloomsburg, Rev. D. J. Waller welcomed the Board as follows:

It becomes my very pleasant duty, sir, and my privilege, in the name of my fellow-citizens of Bloomsburg and of Columbia county, to express to the members of this Board, especially to His Excellency, the Governor of the Commonwealth of Pennsylvania, president, *ex-officio*, of the State Board of Agriculture, and to say that we cordially welcome them as representatives of the Commonwealth of Pennsylvania to this classic ground. Campbell wrote:

"On Susquehanna's side fair Wyoming," &c.

I do not know how thoroughly all the members of the Board may be acquainted, or perhaps some of the younger generation of our own citizens, with the fact that we are in that Wyoming. The forty-first parallel of latitude falls just across the river south of the town, and this was part of the original township of Wyoming. The water of the Susquehanna flows through a large extent of that valley, but the geographical boundaries have been changed.

It may be an interesting fact to state that Charles Miner, in his history of Wyoming, states that Colonel James McClure, who was born within sight of the place where we now are, was one of the first three white children born in Wyoming.

We are, sir, upon one of the great highways of the warriors of the ancient times. Fishing creek, emptying from the north into the Susquehanna, and Catawissa creek, emptying from the south, the two only a mile apart upon this north branch of the Susquehanna, constituted, in the early time, one of the great highways of Indian travel from the Great Lakes towards the great shores of the mighty ocean; and the indications of their travel are still found, and the evidences of their sojourn along the banks of these streams are abundant. Some of them have been gathered, and they are yet to be found.

And this, as the county seat of Columbia county, is now a place of great interest to the people dwelling in it, as I believe every other place in Pennsylvania is, as a progressive and as an improving community. It is a peaceful community—but there was a time long ago, and long ago forgotten, when it was far otherwise. We are just upon the borders of that valley which was a ground of strife between two nationalities. How many of our own people have heard of the old enmity and Yankee war, in which not only strife but bloodshed indicated the earnest contention of the New England settler with the claim of those under the grant of Penn, who would assert their authority over the whole territory finally made to the State of Pennsylvania?

We are sorry, your Excellency, that we cannot present the town of Bloomsburg, at the present time, in its best clothes. One of the evidences of its progress you have doubtless seen in the condition of our streets. But it is in the line of progress, and an electric light and steam-heating company is in possession here, and in possession lawfully—for we are a law-abiding people—by the direction of the town authorities. They are preparing us for the enjoyment of more light, and of more genial warmth. Had your meeting been in a more favorable season of the year, we would show you, sir, that we are not only interested in manufactures, but that we are largely interested in all of the subjects that belong to the province of your association.

A few years ago, one of the editors of the *American Agriculturist* came to Bloomsburg, and, calling upon me with a letter of introduction, de-

sired to know something of Pennsylvania modes of farming. As I had just then entered into the fraternity of farmers, after a full generation's period of exclusive devotion to preaching of the Gospel, I was happy to meet him, and explained to him, at his request, the rotation of crops in Pennsylvania, and showed him the process of making and applying lime to the soil as one of the agents of fertilization; and took him over some of the lands of the country here, and gave him letters of introduction to agricultural men further west in the State. How creditable to the other States visited I am not prepared to say, but it was very pleasant to me to receive a letter from him, after his return to New York from a journey of some two thousand miles, when he said that after leaving this region of Pennsylvania he had gone to two or three or four of the Western States, that he had seen larger fields of growing grain, and far more extensive, but he had seen nothing in the way of agriculture that was, to him, so interesting and so instructive as that which he had seen in this portion of Pennsylvania.

We are here, sir, among the foot-hills of the Alleghenies, and while you see the hills arising around you, it may be well to remember that this country is not all a very rough country; for when the citizens of Bloomsburg desired to obtain a supply of pure water for drinking and other purposes, they could find no elevation within six miles of Bloomsburg that would afford sufficient fall to give them a supply of water, and a down flow to raise it into the upper stories of their houses. I desire to say this because of the impression upon those who may not have been here before, sir, and of my brethren in this Society. I belong, not to the State Board of Agriculture, but to the Agricultural Society of Pennsylvania; and those with whom I have been acquainted in that association have said to me that they have never been here before. I desire them to understand that, under more favorable circumstances, the impression made upon them would be far different than the first glance of this territory now would cause them to make up their minds to. We have here, in addition to the north branch of the Susquehanna, streams coming in from several directions; and to those who can afford time we can show some of the most varied valleys in the Commonwealth, or the broad Union.

There is one thing that deserves notice here: that there is no portion of the whole United States in which I have ever been that presents, through a larger portion of the year, roads so inviting, so smooth, so well constructed; and yet I know not of a single turnpike gate within thirty miles of Bloomsburg. You will not be called upon to put your hand in your pocket on a cold day, after pulling off your glove, to get a half dime, or a dime, or a quarter to pay for your road way; you get it free, and it is one of those things in which we here rejoice. But our people here are so accustomed to it that I do not feel they half appreciate it.

But, sir, as I would not occupy the time that I know is valuable, and interfere with the proceedings of this Society, I would simply call attention to the fact that the people of Bloomsburg are a moral, religious, and largely an intelligent people, and we hope, very earnestly, that the members of this Association may allow themselves time enough not only to discharge their direct duties for which they are gathered here, but to intermingle with our people.

In regard to our churches, we have a variety, according to the tastes and religious proclivities of our people. We have some nine or ten well-organized churches, and, I believe, all well supported. An educational institution exists in our town that, perhaps, has some claim, as a State institution, upon the attention of the members of this Board who are officers of

the Commonwealth. It was our privilege to welcome here a predecessor of your Excellency, the Governor of the State of Pennsylvania, some fifteen years or more ago, to lay the foundation of the normal school of the Sixth district of the State of Pennsylvania; and very few persons come into Bloomsburg who do not discover that there are ample buildings for the accommodation of such an institution, and for the training of pupils, under the control and legislation of the State of Pennsylvania, for the education of the teachers of the common schools of the State of Pennsylvania. We hope that the officers of this Society will acquaint themselves with the workings of this institution. We have the visits, annually, of the members of the school-board here, who give their attention as officers of the State directly appointed for that duty; and all who are interested in the affairs of the State are certainly interested in the progress and development and success of these great institutions of learning, and especially the institutions of learning that are calculated to reach down and mold the primary instruction of the youngest of the children that attend the schools of the Commonwealth.

We hope, Mr. President, that the meetings of your Board will continue to interest the people of Bloomsburg; and, according to the intimations given, that they will consider themselves invited to attend the sessions, and to listen with attention, and those who are members of agricultural associations of any kind, as I understand, are invited to participate in the discussions that arise in this meeting. We trust that your attendance will not only be profitable to us, but that it will be satisfactory and pleasing to yourselves. Our people understand, especially by the interesting report that has been read here this morning, that it is not simply the turning of the furrow, that it is not the swinging of the cradle, or even the reign of the modern improvement that has superseded the cradle, that it is not the simple planting and gathering of our crops that belong to the Agricultural Board of the State of Pennsylvania, but that they have a legal control, to a certain extent, over all that enters into elevating the health, happiness, and the progress of our people.

We, therefore, are deeply interested in all the subjects that may come before this Board; and when we are told here something about the fearful adulterations of food, and perhaps here, before we are through, something of the more fearful adulteration of the drugs that are administered to us, and of the nostrums that are spread before us, we can understand that we are interested as individuals and as a community in furthering the interests of this Association, that are committed by the laws of the Commonwealth especially to its care and studious attention under the direction and management of the Supreme Executive of the State of Pennsylvania. [Applause.]

On behalf of the Board, Governor R. E. PATISON replied as follows:

DR. WALLER, CITIZENS OF BLOOMSBURG, AND MEMBERS OF THE AGRICULTURAL SOCIETY OF COLUMBIA COUNTY: There was once a Governor of a Western State who, in commenting upon the relation of the public officer to the people, declared that all public officers are servants of the people. And he held that the Governor is the "principal servant." I stand somewhat in that relation to the State Board of Agriculture of Pennsylvania. I am called upon to do their bidding on such pleasant occasions as the present. If I am the "principal servant," then I must see to it that I set the example of obedience to the commands of the Board, and, however much I may be inclined to excuse myself, submission to their will, as the example of obedience, must always command me.

On behalf of the Board, I gladly return thanks to the citizens of this

place for the kind words of welcome with which we have been greeted. I only voice their sentiments when I say that the Board rejoices in the abundant marks of progress, and in the growth of this community so evident around us. I refer not only to the material prosperity that is presented to view in the buildings adjoining your town—your churches, school-houses, public edifices, stores, and residences—but also to the fact that in intelligence and public spirit there are evidences here of a greater and more permanent growth—a building for the future—for as you have taken the place of your fathers, so your children will come after you, and as a foundation was laid for you, so you are broadening that foundation for them. The development of mind is an eternal thing. What is evolved is lasting in its influence. It is like a building "not made with hands." And so we sincerely rejoice with you in that kind of mental development which distinguishes the people of this section of our State.

I am impressed with the fact that the Indian made no mistake when he selected for his favorite hunting grounds the beautiful Wyoming valley. In looking over the history of the State, I discovered what had not occurred to my mind before, that wherever the Indian planted his wigwam and marked off his hunting ground, there was not only fertility of soil, but there was the richest and healthiest of sections. Truly, he was wise in his day and generation. Over in the valleys of Bedford county, comparatively short and narrow, yet opulent in soil and rich in productiveness, the Indian discovered the famous waters of that region a hundred years ago, and thither thousands have gone during all these subsequent generations to enjoy them. There he gathered with his fellows and derived the benefits which those waters yield, and there are still to be seen a variety of herbs and nuts and other vegetation taken there from many points of our common country by the Indian. And so the Indian, with his natural foresight, settled in this section of the State where we stand to-day. This county, reaching from the Susquehanna over to the counties of Lycoming and Sullivan, is rich and fertile to this day. Doubtless, this feature may have been one of the causes of the many sanguinary conflicts which occurred between the tribes and others for its possession.

Here, too, if I recollect aright, lived Tammany, the great Indian chief, who gathered his tribe of Leni-Lenapes and marshalled his warriors. That was an organization of the primitive times, which has since been distinguished by a powerful political society of our own day in assuming as its title the name of "Tammany." It has its branches in many parts of the country, and on the roll of the original society appears the names of some of the descendants of these same Indians. The brave Logan, another prominent chief, was once a resident of this section. Here he pitched his tent and pursued his game. Logan was distinguished as one of the most remarkable of natural orators, and many of his eloquent utterances are still preserved in the literature of the schools. It was here, also, that there lived a woman who combined in herself a mystic character. I refer to the celebrated Madam Montour, after whom Montour county is named. Her individuality appears to have been confounded with that of two other women; but she is recalled as one of the most interesting persons connected with the history of Pennsylvania. She was well known and highly appreciated by the best social circles of old Philadelphia. There she was a welcome and frequent guest, and many reminiscences of her life are related in the families by which she was entertained in the olden time. Her judgment and tact was far above ordinary. Familiar with the red man's language, she often acted as interpreter between him and his white brother,

and, by her great influence over the savage nature of the one, she frequently saved the other from the deadly knife and murderous tomahawk.

Many other interesting events connected with the history of this section might take up our time to our profit; but we are here for other purposes. While these matters are pleasant to recall, yet we must say that in the hearty welcome which has been extended to us to-day, we see that which is greater than anything the history of the past offers. We stand in the midst of modern intelligence and prosperity, and we rejoice in the faith that the future holds in its embrace, for you and your children, a still higher civilization.

The agricultural board bears a close relation to you, for this is an agricultural region, as well as one devoted to mining and manufactures. As you have said, sir, the line of industry this Board represents lies at the very foundation of our general welfare. The food we eat, the clothes we wear, and the comforts we enjoy, may be traced directly to it. The Board is composed of gentlemen from all parts of the State. They come from the north, south, east, and west. And they come not only for the transaction of their regular business, but to impart to you, through their proceedings, such information as you will do well to heed. They do not bring you mere book knowledge. That is within your reach as well as theirs. But they come with the practical knowledge that is obtained at the plow, in the field, and amid the rich gatherings of the harvest. They come from the laboratory, the workshop, and the market, and while they present the fruitage of their observation and study, they will be anxious to learn from you whatever it may be in your power to contribute toward the great object they have in view, that is, the higher advancement of the agricultural interests of Pennsylvania. I sincerely trust, sir, that when our session ends, it will be found that on both sides we have pitched our common tent "a day's march nearer home."

Again, sir, on behalf of the State Agricultural Board, I tender their thanks for the kindly welcome you have extended in the name of the citizens of Bloomsburg and the Columbia County Agricultural Society. [Applause.]

On motion of Dr. J. P. EDGE, it was resolved that, at this session, no member should speak more than five minutes at one time, nor more than once upon the same topic, until all wishing to speak had an opportunity to do so.

On motion, J. R. TOWNSEND of Bloomsburg then read an essay on "Grapes for the Farm Garden," the subject-matter of which was discussed by Messrs. Piollet, Townsend, Engle, Herr, Hiester, Smith, and Keller.

On motion of Mr. SMITH, seconded by Mr. FREDERICK, Dr. JAMES CALDER then read an essay on "Quince Culture," which was discussed by Messrs. Smith, Oliver, Engle, and others.

Mr. HIESTER, member from Dauphin, then read an essay on "Fruits for Family Use," which drew out discussion from Messrs. McDowell, Hiester, Walter, Herr, and Zerr.

On motion of Mr. ENGLE, seconded by Mr. CLOPPER, adjourned until 2, P. M.

WEDNESDAY AFTERNOON, *December 2, 1885.*

Board called to order at 2, P. M., by Hon. R. E. Pattison in the chair. Discussion of Mr. Hiester's essay on "Fruits for Family Use" resumed, and participated in by Messrs. Dr. Edge, Piollet, Barnes, Engle, Hiester, Herr, and Frederick.

On motion, WILLIAM FAIRWEATHER, of McLane, Erie county, read an essay on "The Best Breed of Dairy Cattle," which was listened to with more than usual interest, and was discussed by Messrs. Piollet, Reeder, Oliver, Fairweather, Smith, Northup, Engle, Dr. Edge, Musselman, Hicks, Harvey, McDowell, Colvin, Keller, and Secretary.

A telegram having been received from Colonel Jameson to the effect that he was unable to be present with his essay on "Pure Bred Horses," on motion of Mr. EVES, Dr. Harvey, member from Delaware, was invited to address the meeting upon the same topic. Dr. Harvey's address was listened to with interest and called out much discussion.

On motion, M. P. LUTZ then read an essay on "Poultry for Profit and Pleasure," which called out discussion from Messrs. McDowell, Tewksbury, Lutz, Harvey, Barnes, Zerr, Smith, Oliver, and Engle.

H. H. BROWN, of Light Street, then read an essay on "Bee Keeping," when, on motion of Mr. ENGLE, adjourned until 8, P. M.

WEDNESDAY EVENING, *December 2, 1885.*

Board called to order at 8, P. M.

Prof. W. A. BUCKHOUT, Entomologist of the Board, delivered an address on "The Life and Habits of Insects." The lecture was illustrated by large diagrams and drawings, which served to make it plain to all present. This lecture was listened to by one of the largest audiences which has yet greeted the Board.

THURSDAY MORNING, *December 3, 1885.*

Board called to order at 9, A. M., by Hon. R. E. Pattison, President, in the chair.

On motion, the essay of M. W. Oliver, "Experiments in Farming," left over from the afternoon session of the preceding day, was then read, and its subject-matter discussed by Messrs. Barnes, Engle, Underwood, Keller, Little, Smith, Musselman, Foresman, and Secretary.

An essay on "Farmers' Mistakes" was then read by E. M. TEWKSBURY, and was followed by a general discussion of the points of the essay.

By a vote of twelve to ten, it was decided to call up essay No. 3 of the printed programme, and, in accordance with this decision, A. Z. SCHOCH, Esq., then read an essay on "The Best Wheat from the Miller's Standpoint."

On motion of Dr. HARVEY, the regular order of the programme was then taken up, and an essay upon "The Insurance of Farm Buildings" read by SAMUEL NEYHARD of Bloomsburg.

Mr. SMITH then called up essay No. 5 of the programme, and Dr. J. P. EDGE of Chester read an essay entitled "The Answer to the Prophecy," upon which discussion was deferred until the afternoon session.

On motion, adjourned until 2, P. M.

THURSDAY AFTERNOON, *December 3, 1885.*

Board called to order at 2, P. M., by Hon. C. C. Musselman in the chair. Discussion of Dr. Edge's essay, "The Answer to the Prophecy," resumed and concluded.

(Governor Pattison then took the chair).

On motion of Mr. SMITH, A. P. YOUNG, Esq., of Millville, read an essay on "How to Bring up a Worn-out Farm."

Mr. FREDERICK of Union presented the following resolution, which was referred to the Committee on Legislation:

WHEREAS, The winter meeting of the Pennsylvania State Board of Agriculture has been called and the same published in the *Farmer's Friend*, recognized Grange paper;

And whereas, The Patrons of Husbandry of Union county take interest in the current agricultural questions and agricultural progress of these times; therefore,

Be it by this body of representative farmers unanimously resolved, That, as we look to the duly constituted State Board for redress of grievance and pioneer effort to correct abuses, we hereby respectfully suggest that the secretary of this convention of delegates to the Union County Council, P. of H., request our county member of the said Board, Mr. Philip Frederick, to bear in kindest greeting and present at the aforesaid Board meeting our friendliest acknowledgments of its very valuable labors in the past and our reliant and hopeful waiting in relation to the future, and as all history of reform progress confirms the fact of necessitous tardiness, sacrifice, and step-by-step accomplishment, we, therefore,

Resolve, secondly, That the said Frederick be and hereby is delegated as the bearer of the unanimous wish of our convention that some efficient mode of enforcing the statutory laws regulating the manufacture and sale of commercial fertilizers be as speedily as possible secured, and that such legislation be asked for by the Pennsylvania State Board of Agriculture as shall require the phosphate manufacturers to give the source from which nitrogen in their goods is obtained, and so mark their packages as not to subvert the objects for which the present government in the trade was instituted; and, further, the importance of cotton seed and linseed meal to our farmers justly demands, at the hands of our "law-makers," such statutory protective provisions as will compel manufacturers, venders, and agents to mark the package, barrel, or sack so as to give the purchaser clear and definite knowledge of the rate per cent. of ammonia and phosphoric acid contained in the said agricultural goods.

(Signed,)

E. SHORKLEY, Secretary.

S. G. GROVE,
Worthy Master.

On motion of Mr. EVES, seconded by Mr. SMITH, it was resolved that the time for the commencement of the evening meeting, as announced in the printed programme, be changed from 8, P. M., to 7.30, P. M.

Mrs. F. M. EVES of Millville then read an essay on "The Farmer's Family—Past, Present, and Future."

On motion of Dr. HARVEY, Mrs. MARY V. BOWMAN of Berwick read an essay on "The Education of Farmers' Sons and Daughters." These two essays attracted an unusual amount of interest, from the fact that they were the first in the history of the Board presented by lady essayists, and they were listened to with marked attention.

D. J. WALLER, junior, then read an essay on "Industrial Education," which was discussed by a number of members and delegates present.

Col. V. E. PIOLLET presented the following resolution, which, after partial discussion, was, on motion of Mr. OLIVER, seconded by Dr. EDGE, referred to the Committee on Legislation:

Resolved, That this Board recommend the farmers of the State to memorialize Congress, in any adjudication of taxation upon imports, to give due consideration to the interests of agriculture, and particularly to avoid all discrimination against agriculture in favor of manufacturing or other

interests not more meritorious or deserving of the attention and favor of Government. That it is the opinion of this Board that, along with duties on manufactures, reasonable, but substantial, duties should be imposed upon wool, hides, eggs, and ores.

On behalf of the Committee on Work of the Board, Dr. G. W. ATHERTON, chairman, presented the following report:

"This committee, in accordance with the instructions of the Board, at its meeting, October 1, 1885, respectfully submits the following report on the standing committees, and the subjects to be submitted to them:

The list, as given in the last annual report of the Board, with the subjects and the respective chairmen, in the order there given, is as follows:

Legislation.—J. D. Hicks.

Work of the Board.—G. W. Atherton.

Silk and Silk Culture.—John P. Edge.

Fruit and Fruit Culture.—H. M. Engle.

Grass and Grasses of Pennsylvania.—N. F. Underwood.

Forests and Forestry.—W. S. Roland.

Apiary and Bee Culture.—M. W. Oliver.

Dairy and Dairy Products.—E. Reeder.

Useful Birds.—C. C. Musselman.

Cereal Crops.—D. H. Foresman.

Roads.—J. W. Mather.

Wool and Textile Fibers.—J. McDowell.

Fences and Fence Laws.—

(The last-named committee was elected by vote of the Board at the Lancaster meeting, but no chairman was appointed.)

The committee have carefully considered the foregoing list of subjects, and, while it seems already more extended than has proved practically useful for working purposes, they are not prepared to recommend the omission of any of the topics named, without the direct instruction of the Board. On the contrary, they suggest the addition of two important subjects not now expressly provided for, viz: Farm implements and machinery, and farm animals."

Any objection to the present arrangement of standing committees that may prevail among members of the Board is not to be removed by a mere redistribution of subjects. It must be met rather by the adoption of more definite and binding regulations respecting the duties of committees, especially in the matter of making reports. As a practical and practicable beginning in this direction, the committee respectfully submit the following recommendations:

1. That the Executive Committee be required to announce the chairmen of the several committees at some time during the first session of the annual meeting of the Board, and each chairman so appointed to announce the other members of his committee before the close of the meeting.

2. That, in the failure of such action by either the Executive Committee or the respective chairmen, the then existing membership of the committee continue for the succeeding year.

3. That every committee be required to report in writing at least once a year, unless excused by express action of the Board, and that, in order to avoid undue multiplication of reports at any one meeting, the committees be divided into three groups, corresponding to the annual, the summer, and the autumn meetings, and the groups required to report at these respective meetings.

4. That the following distribution of groups be adopted at present, with the changes indicated in one instance, in the title of the committee:

Annual meeting.—Legislation, Work of the Board, Roads and Road Laws, Fences and Fencing, and Farm Machinery and Implements.

Summer meeting.—Silk and Silk Culture, Forests and Forestry, Useful Birds, Farm Animals, and Wool and Textile Fibers.

Autumn meeting.—Grasses and Fodders, Apiary and Bee Culture, Dairy and Dairy Products, Cereal Crops, and Fruit and Fruit Culture.

5. The committee also recommend a thorough revision of the rules of the Board.

(Signed)

GEORGE W. ATHERTON,
J. P. BARNES,
D. H. FORESMAN,
E. REEDER,
WILLIAM GATES,
THOMAS J. EDGE, *Secretary.*"

December 2, 1885.

Mr. BARNES of Lehigh then offered the following, which was unanimously adopted:

"In consideration of the aid and assistance bestowed to our comfort and advantage while sitting here during the time of holding the meetings of the State Board of Agriculture; therefore,

Be it resolved, That we hereby tender our heartfelt thanks to the local member, Chandlee Eves, for his untiring efforts in behalf of the arrangements made for the comfort of the members of the Board during our agreeable stay at Bloomsburg.

To the county commissioners for all privileges conferred to the advantage of the Board.

To the county agricultural society and to the citizens of Bloomsburg for procuring the opera house in which to hold our meetings.

To the editors of the respective newspapers published here for their favorable notices of the time and place of holding our meetings, and for publishing the proceedings of the same.

To the delegates of the agricultural societies, granges, and farmers' clubs, so numerous represented, who so closely and continuously attended and took part in our discussions and proceedings.

To our host and hostess for their kind attention and ample provisions made for the inner man, and for comforts provided while staying here.

To the essayists of Bloomsburg and vicinity for the valuable assistance in providing and reading interesting and instructive essays, which proved such a help to the success of the meeting.

To the ladies who, for the first time since the organization of this Board, have contributed essays which were listened to with marked attention, and to the ladies and gentlemen in general for their constant attendance, thereby encouraging the Board in its work, thus helping to advance the cause of agriculture."

On motion, adjourned to meet in Harrisburg, the fourth Wednesday in January, as provided by law.

MINUTES OF THE ANNUAL MEETING.

Held at Harrisburg, Pa., January 27 and 28, 1886.

Board called to order at 10.30, A. M., by Governor R. E. PATTISON in the chair.

Present, Governor Pattison, Secretary J. S. Africa, and Messrs. Piollet of Bradford, Reeder of Bucks, Hiester of Dauphin, Wilson of Juniata, Colvin of Lackawanna, Barnes of Lehigh, Smith of Luzerne, McKee of Mercer, Keller of Schuylkill, Speaker of Sullivan, Frederick of Union, McDowell of Washington, Underwood of Wayne, and Secretary. At a later period in the session. Superintendent Higbee and Messrs. Young of Dauphin, Garretson of Adams, Hale of Centre, Eves of Columbia, Mullin of Cumberland, Lantz of Lebanon, Foresman of Lycoming, and Herr of Clinton were present.

The SECRETARY announced that the terms of membership of the members from the counties of Armstrong, Bedford, Berks, Blair, Bradford, Crawford, Delaware, Erie, Indiana, Lancaster, Montour, Somerset, Susquehanna, Venango, Warren, and York had expired, and hence the names of these members were not called.

The CHAIR named Messrs. Reeder of Bucks, Herr of Clinton, and Barnes of Lehigh, a committee to receive and report upon the credentials of newly-elected members, and of delegates from local agricultural organizations.

On motion of Mr. FREDERICK, a recess was then taken to permit the Committee on Credentials to examine the certificates offered, and to make their report.

The Committee on Credentials reported that credentials in proper form were presented by the following members: J. C. Thornton of Erie, W. C. Gordon, of Indiana, M. W. Oliver of Crawford, H. L. Scott of Bradford, R. S. Searle of Susquehanna, H. M. Engle of Lancaster, J. G. Zerr of Berks, F. R. Miller of Warren, W. S. Roland of York, Thomas L. Clapp of Montour, and C. C. Musselman of Somerset, and that they recommended that these gentleman be granted membership as the proper representatives from their respective counties. They also reported the following delegates present with proper credentials: Chester County Agricultural Society, Alfred Sharpless, W. P. Hazard, and Edward Brinton; Columbia County Agricultural Society, Freas Fowler, C. L. Sands, and H. V. White; Union County Agricultural Society, E. Pontius; Lancaster County Agricultural Society, J. H. Landis, Johnson Miller, Joseph F. Whitmer, and W. S. Clark; Union County Council, P. of H., E. Shorkley; Grange No. 645, P. of H., George West; Pomona Grange, No. 22, P. of H., J. B. Kirkbride; Pomona Grange, No. 5, P. of H., E. H. Little; Penn Grange, No. 596, P. of H., H. G. App; Huntingdon County Pomona Grange, P. of H., A. P. White; Farmers' Association of Adams County, Amos W. Griest; Guernsey Breeders' Association, Henry Palmer, W. P. Hazard, and Silas Betts; Farmers' and House-keepers' Association, Elwood Conard; Philadelphia Produce Exchange, George E. Paul, William C. Barker, and John J. Habecker; Goshen Grange, No. 121, P. of H., E. J. Durnell; South Abington Farmers' Club, A. J. Ackerly; Solebury Farmers' Club, Alfred Paschall.

The committee also reported that credentials of W. L. Archer as member-elect from the Burgettstown Agricultural Society of Washington county, and of R. G. Kshinka as member-elect from the Northern Columbia and Southern Luzerne Agricultural Society, had been presented to them, but as no vacancies existed in the representation of either of these counties, they recommended that the seats should not be granted. Report of the committee accepted, and ordered to be placed on file.

On motion of Mr. SMITH, seconded by Mr. KELLER, the Board then proceeded to the election of officers for 1886.

Nominations for Vice Presidents having been called for by the President, Mr. McKEE nominated M. W. Oliver of Crawford, Mr. HERR nominated David Wilson of Juniata, and Mr. HIESTER nominated Dr. J. P. Edge of Chester. On motion, nominations closed, and the Secretary directed to cast the ballot of the meeting for the three nominees, who were accordingly declared elected.

Nominations for seven members of the Executive Committee having been called for, Messrs. Engle of Lancaster, McKee of Mercer, Herr of Clinton, Hiester of Dauphin, McDowell of Washington, Reeder of Bucks, and Barnes of Lehigh were named, and, on motion of Mr. SMITH, the nominations were closed, and the Secretary directed to cast the ballot of the Board for the nominees, who were declared elected.

Mr. HERR of Clinton nominated Thomas J. Edge for Secretary, and, the nominations having been closed, the Chair was directed to cast the ballot for the nominee, who was declared elected.

The minutes of the preceding meeting were read by Mr. HIESTER, and, on motion of Mr. SMITH, approved as read.

On behalf of the Committee on Legislation, N. F. UNDERWOOD, chairman, made a report as follows: "Upon the subject of the matter submitted to the State Board of Agriculture by the Patrons of Husbandry of Union county, in relation to the use of 'leather scrap' as a source of nitrogen in the manufacture of commercial fertilizers, which subject was referred by the Board to the Committee on Legislation, we report that, according to information received from Prof. Genth, Chemist of the Board, he has made an analyses of some fifteen hundred samples of commercial fertilizers, and has only found leather scrap in one sample, and in that only to a limited extent. Under these circumstances, your committee do not see the necessity for further legislation upon the subject.

"In relation to the resolution offered at the Bloomsburg meeting by Colonel Piollet, we would recommend its passage, with the following amendments:

"*Resolved*, That this Board recommend that in any adjudication of taxation upon imports, due consideration should be given to the interests of agriculture, and particularly to avoid all discrimination against agriculture in favor of manufacturing and other interests not more meritorious or deserving of the attention and favor of the National Government, and that it is further the opinion of this Board that, along with the duties upon manufacturers, reasonable but substantial duties should be imposed upon all raw materials and products that come in competition with our agricultural industries."

The committee would also report for adoption the following additional resolution:

"*Resolved*, That the present depressed condition of sheep husbandry is entirely owing to the unfortunate and unwise changes in the tariff laws in the act of March 3, 1883, and that nothing short of the rates of 1867 on imported wool, or its equivalent, will be satisfactory to the flock-master.

Report of the committee adopted.

The Executive Committee reported the following as chairmen of the respective standing committees for the ensuing year:

Legislation.—John P. Edge.

Silk and Silk Culture.—J. P. Barnes.

Fruit and Fruit Culture.—G. Hiester.

Grasses and Fodders.—N. F. Underwood.

Forests and Forestry.—W. Gates.

Apiary and Bee Culture.—M. W. Oliver.

Dairy and Dairy Products.—E. Reeder.

Useful Birds.—C. C. Musselman.

Cereal Crops.—Joel A. Herr.

Wool and Textile Fibers.—John McDowell.

Fences and Fencing.—Chandlee Eves.

Farm Implements and Machinery.—I. Garretson.

Farm Stock.—Dr. E. W. Hale.

The committee also recommend that the Committee on the Work of the Board be dropped from the list of standing committees, as its work properly belongs to the Executive Committee.

Report adopted.

The Executive Committee presented the following financial statement as the result of an audit of the accounts of the Secretary by the Advisory Committee:

Expenses of members.

Expenses of Towanda meeting, June 17 and 18, 1885,	\$343 08
Expenses of Lancaster meeting, September 30, 1885,	372 48
Expenses of Bloomsburg meeting, December 2 and 3, 1885,	423 06
Amount yet available for annual meeting, 1886,	361 38
Total appropriation,	<u>\$1,500 00</u>

Expenses of local institutes.

Amount expended to date of annual meeting, 1886,	\$410 36
Amount yet available for institutes to June 1, 1886,	539 64
Total amount of appropriation,	<u>\$1,000 00</u>

Investigation of disease of domestic animals.

Amount expended to date of annual meeting, 1886,	\$148 15
Amount yet available up to June 1, 1886,	101 85
Total amount of appropriation,	<u>\$250 00</u>

Office expenses.

Amount expended up to date of annual meeting, 1886,	\$392 84
Amount yet available up to June 1, 1886,	357 16
Total amount of appropriation,	<u>\$750 00</u>

Report of the committee accepted, and ordered to be incorporated in the proceedings of the meeting.

The Executive Committee reported the following list of honorary officers of the Board:

Botanist.—Thomas Meehan, Germantown, Pa.

Pomologist.—E. Satterthwaite, Jenkintown, Pa.

Chemist.—Dr. F. A. Genth, University of Pennsylvania, West Philadelphia, Pa.

Consulting Veterinary Surgeon.—Prof. R. S. Huidekoper, University of Pennsylvania, West Philadelphia, Pa.

Veterinary Surgeon.—Dr. F. Bridge, West Philadelphia, Pa.

Entomologist.—Prof. W. A. Buckhout, State College, Pa.

Microscopists.—Dr. H. Lettmann, Philadelphia, and Prof. C. B. Cochran, West Chester, Pa.

Ornithologist.—B. Harry Warren, West Chester, Pa.

Meteorologists.—Prof. I. T. Osmond, State College, and J. L. Heacock, Quakertown, Pa.

Mineralogist.—Col. James Wilcox, Philadelphia.

Geologist.—Prof. J. P. Lesley, State Geologist, Philadelphia, Pa.

Stenographer.—Col. H. C. Demming, Harrisburg, Pa.

On motion of Mr. FREDERICK, the list of honorary officers, as presented by the Executive Committee, was elected.

On motion of the SECRETARY, the revision of the by-laws, as recommended by the Committee of Work of the Board, was then taken up, and, after discussion by Messrs. Foresman, Wilson, Hiester, Keller, Smith, Garretson, Engle, McDowell, Searle, and Secretary, the old by-laws were again adopted without any material change.

Mr. SEARLE of Susquehanna then offered the following, which was adopted:

Resolved, That a standing committee on water-supply for farm buildings, and farm stock and irrigation, to embrace the whole subject of water-supply, be appointed and instructed to prepare a report on the subject, to be presented and read at the next meeting.

The CHAIR then named R. S. Searle as chairman of the committee, with power to name the members.

The SECRETARY then presented the invitation of the Philadelphia Produce Exchange to the members of the Board, to cooperate with them in an endeavor to induce the National Butter, Cheese, and Egg Association to hold their next annual meeting and exhibition in Philadelphia. After extended discussion by Messrs. Piollet, Barker, Harbecker, Oliver, and Smith, it was, on motion of Mr. OLIVER, resolved that the Chair be authorized to name a committee of three to confer with the committee of the Philadelphia Produce Exchange, and report to the Board as soon as possible.

The CHAIR named Messrs. Oliver, Scott, and Reeder as said committee of conference.

The SECRETARY presented a request from the Secretary of the American Agricultural Congress that the Board would appoint delegates to attend the annual meeting of the Association in New York, February 13, 1886.

The CHAIR, having been authorized to appoint three delegates, named Messrs. Oliver of Crawford, Piollet of Bradford, and Reeder of Bucks.

On motion, adjourned until 2, P. M.

WEDNESDAY AFTERNOON, *January 27, 1886.*

Board called to order at 2, P. M., by Hon. R. E. PATTISON in the chair.

In accordance with the request of the Executive Committee, the chairmen of the respective standing committees announced the members of their committees as follows:

Legislation.—J. P. Edge, J. D. Hicks, J. McDowell, M. W. Oliver, C. C. Musselman, N. F. Underwood, and W. Gates.

Silk and Silk Culture.—J. P. Barnes, W. S. Roland, J. P. Edge, David Wilson, and R. S. Searle.

Grasses and Fodders.—N. F. Underwood, E. Reeder, J. McDowell, P. Frederick, W. R. Shel mire, J. A. Herr, Thomas Meehan, and J. C. Thornton.

Forests and Forestry.—W. Gates, D. H. Foresman, R. S. Searle, F. R. Miller, A. J. Ackerly, W. C. Gordan, I. Garretson, H. M. Engle, and E. W. Hale.

Cereal Crops.—J. A. Herr, M. W. Oliver, J. C. Thornton, J. McCracken, Jr., L. B. Speaker, W. C. Gordon, P. Frederick, J. G. Zerr, Col. J. Young, and C. C. Musselman.

Useful Birds.—C. C. Musselman, W. S. Roland, J. S. Keller, B. Harry Warren, J. P. Barnes, M. W. Oliver, A. D. Shimer, and G. Hiester.

Farm Implements and Machinery.—I. Garretson, J. A. Herr, M. W. Oliver, A. W. Griest, Chandlee Eves, C. C. Musselman, and N. F. Underwood.

Wool and Textile Fibers.—J. McDowell, M. W. Oliver, John R. Miller, John McNary, John M. Stockdale, and J. W. Axtel.

Farm Stock.—E. W. Hale, C. C. Musselman, I. Garretson, Col. J. Young, M. W. Oliver, and H. L. Scott.

Fruit and Fruit Culture.—G. Hiester, H. M. Engle, D. Wilson, I. Garretson, C. C. Musselman, M. W. Oliver, W. S. Roland, N. F. Underwood, J. S. Keller, J. A. Herr, J. McDowell, and E. Satterthwaite.

Dairy and Dairy Products.—E. Reeder, M. W. Oliver, C. C. Musselman, I. Garretson, H. L. Scott, and Chandlee Eves.

Roads.—J. W. Mather, J. D. Hicks, D. G. Foresman, H. L. Scott, J. McDowell, C. C. Musselman, J. E. Noble, I. Garretson, J. A. Woodward, J. A. Herr, and Thos. J. Edge, Secretary.

Fences and Fencing.—Chandlee Eves, N. F. Underwood, L. B. Speaker, M. W. Oliver, J. D. Hicks, and Thos. J. Edge, Secretary.

Apiary and Bee Culture.—M. W. Oliver, I. Garretson, William Gates, J. Shallcross, Arthur Todd, Mrs. M. L. Thomas, G. Prizer, W. Hottenslein, and H. H. Brown.

Water Supply to Farms.—R. S. Searle, J. C. Thornton, Dr. J. P. Edge.

On motion of the SECRETARY, the Board then proceeded to select a place for the spring meeting, when Mr. COLVIN named Dalton, Mr. FREDERICK named Lewisburg, and Mr. GATES named Franklin; after discussion, Mr. COLVIN withdrew the name of Dalton and substituted that of Scranton, and Mr. GATES withdrew Franklin. A vote was then taken, resulting in the choice of Scranton by a majority of thirteen votes.

On motion of Mr. KELLER, the last week in May was suggested as the time. Not agreed to. When, on motion of Mr. SMITH, the time of the meeting was left to the Advisory Committee and the resident member of the Board, Mr. Colvin. Motion discussed by Messrs. Colvin, Searle, Wilson, Keller, Dr. Edge, Smith, Frederick, Herr, Gates, and Secretary.

The SECRETARY presented an official invitation from the managers and stockholders of the Chester County Agricultural Society for the Board to hold its autumn or winter meeting at West Chester, which was, on motion of Mr. BARNES, placed on file for reference at a future meeting.

Essays and discussions having been called for by Mr. KELLER, Mr. MUSSELMAN of Somerset, on motion of Mr. OLIVER, read an essay on "Book Farming," which was discussed by Messrs. Smith, McDowell, Young, Garretson, Governor Pattison, Searle, Wilson, Musselman, Piollet, and Keller, when, on motion of Mr. HIESTER, the discussion was closed.

H. H. COLVIN, member from Lackawanna, then read an essay on "Ex-

pectations and Experience," which elicited discussion upon the part of Messrs. Hazard, McDowell, Keller, and Gates.

Mr. UNDERWOOD, member from Wayne, read an essay upon "Boundary Lines," the subject-matter of which was discussed by Messrs. Searle, Zerr, Oliver, and Dr. Edge.

Dr. J. CALDER, Lecturer of the Pennsylvania State Grange, P. of H., read an essay on "The Rights and Duties of Farmers," which called out remarks from Messrs. Musselman, Piollet, Keller, Wilson, Calder, and others.

"Questions and Answers" then being in order, Mr. KELLER of Schuylkill asked whether any one present knew of the following: "Is there any stock upon which the apple can be worked which is borer-proof?" Messrs. Engle, Hiester, Oliver, and others all gave a negative answer, or to the effect that any such stock would dwarf the tree.

On motion, adjourned until 7.30, P. M.

WEDNESDAY EVENING, *January 27, 1886.*

Board called to order at 7.45, P. M., by Hon. R. E. PATTISON in the chair.

Dr. E. W. HALE, member from Centre county, presented an invitation, from Dr. G. W. Atherton and himself, for the Board to hold a meeting at Bellefonte, with one day's session at the Pennsylvania State College.

On motion, referred to the Secretary to be placed on file for future reference.

On motion of Mr. FORESMAN of Lycoming, W. P. HAZARD of West Chester read an essay in answer to the question, "Can Women find Profitable Employment in the Dairy, and in Raising Thorough-Bred Stock?" Its subject-matter was discussed by Messrs. Searle, Hazard, Zerr, Barnes, Carter, Colvin, Kshinka, Dr. Edge, Piollet, and Secretary.

Dr. E. W. HALE, member from Centre, read an essay upon "What I Saw in Europe," which was discussed by Messrs. Foresman, Landis, Searle, Hazard, Dr. Edge, Wilson, and Keller.

After the transaction of several items of miscellaneous business, on motion, adjourned until 9, A. M., January 23.

THURSDAY MORNING, *January 28, 1886.*

Board called to order at 9, A. M., by Hon. R. E. PATTISON, President, in the chair.

Mr. FREDERICK, member from Union, read an essay on "Progress in Methods and Results in Agriculture."

Committee on Credentials presented the credentials of J. D. Hicks, member-elect from Blair, which, not being in the form adopted by the Board, were referred to the Secretary, with instructions to return them to Mr. Hicks with the blank form adopted by the Board.

Mr. KSHINKA, who was elected by the Northern Columbia and Southern Luzerne Agricultural Society, then stated his case, as directed by his society; when, after discussion by His Excellency the Governor and Messrs. Barnes, Keller, Oliver, Hiester, and others, it was decided that the Board had no choice in the premises, but must be governed in its decisions by the law under which it was constituted.

The committee appointed to confer with a committee of the Philadelphia Produce Exchange reported that a conference had taken place, and that they were of the opinion that the Board would not be authorized in ex-

tending a promise of pecuniary assistance, as it had no funds appropriated for such a purpose. The committee recommended that the Board should cooperate with the Produce Exchange committee in any possible way. Report accepted, and the committee continued, with instructions to assist the Produce Exchange in any possible way within the limits of the instructions of the Board, and the law forming it.

On motion of Mr. FORESMAN, it was decided that it was best to omit the lecture arranged for the evening session, and the Secretary was directed to so inform the lecturer.

On motion of Mr. SMITH, the regular order of essays was then resumed, and Hon. GEORGE W. HOOD of the State Senate read an essay on "Fence Laws of Pennsylvania," which was listened to with unusual attention.

On motion of Mr. FORESMAN of Lycoming, the discussion of Mr. Hood's essay was deferred until after the reading of the next two, upon similar topics, on the programme.

Mr. REEDER of Bucks then read an essay on "Wooden Fences—Their Cost and Durability," and was followed by one by John I. Carter of Chester county, on "Wire Fences." At the request of His Excellency the Governor, Col. JAMES YOUNG of Dauphin addressed the Board upon the subject of "Stone Walls." After which the discussion ranged over the whole subject, as covered by the four essays, and was participated in by Messrs. Barnes, Brosius, Garretson, Searle, Secretary, Thornton, Wilson, Engle, Keller, Kshinka, Hall, Little, Governor Pattison, Musselman, Whitmer, Shorkley, Gates, White, Calder, Colvin, Hiester, and Foresman.

On motion of Mr. BARNES, the Board then took a recess in order to permit of the presentation to Governor Pattison of a cane, from the members of the Board, as a testimonial of their esteem and regard for him as the President of the Board.

On behalf of the Board, Mr. McDOWELL of Washington presented the cane in the following language:

GOVERNOR: The act establishing the Board of Agriculture has brought representatives from almost every county in this great Commonwealth to meet in sessions to deliberate and devise by discussions and essays such methods, and give such results from practical tests, as will help on and further develop the interests of agriculture in all of its features.

The act also wisely provides that the Executive of the Commonwealth shall be its presiding officer. As members of the Board, it gives us great pleasure to see you, at each and every meeting, enter on and continue in your part of the work with us with so much zeal, earnestness, impartiality, and fidelity. You have, thereby, infused into its members the spirit of progress, and a willingness to work. "As iron sharpeneth iron, so doth man the countenance of his friend." We no longer rock in sleepy ease in the cradle of our infancy; we have grown up; you have had much to do with making this Board a power in developing the agricultural resources of this State. The science of agriculture will, however, be the study of ages to come; we are progressing; we think that we are not claiming too much when we assert that the agricultural interests of this State, through this Board and other valuable aids, are equal to, if not in advance of, that of any other State in our Union.

As members of this Board, we cannot too highly appreciate your valuable services, as its presiding officer, in guiding us in all of our transactions; therefore, at this, the last annual meeting of your term of office, we, the members of the Board, present you with this gold-headed cane inscribed, "Presented to Governor R. E. Pattison by the members of the State Board of Agriculture of Pennsylvania, January 28th, 1886," which we

most willingly do as a testimonial of our appreciation of your faithful, able, and efficient service as our presiding officer, and when you retire from office and you lean upon this staff, or stand it in its place, may it revive in your memory old associations of warm friends, never to be forgotten.

Governor PATTISON replied as follows:

Mr. McDOWELL AND MEMBERS OF THE BOARD: I fully appreciate this pleasant evidence of the feeling you entertain for me as your presiding officer. This is my fourth and last year of official association with you in this Board, and I wish to say that our acquaintance has been exceedingly agreeable to me. These years have been fraught with much information, which I value highly. I have not only been favored with the pleasure of your society, but I have been instructed through your numerous papers and discussions. And what you have been to me you have been to the people of the Commonwealth, for the results of your work here have been distributed, generally, over the State. I have watched, with great satisfaction, the progress of your good work, and I am sure that I am not in error when I say there is a growing interest in it among the people. They are cooperating to a considerable extent, and, as the Board may extend its field and widen its influence, the results to the people will be correspondingly greater. Permit me to say that I am much indebted to you; that I am grateful for your kindness, and that I appreciate the nature and importance of your work. Our paths diverge to-day, and we return to our homes. If any of us should not meet again in annual session, I trust we shall meet in that country where all are neighbors, and where all neighbors are friends. Gentlemen, again I thank you. [Applause.]

The Board having again come to order, the following questions were taken from the question box: "Are there any Pennsylvania farmers who believe that wheat will turn to chess or cheat?" The discussion, which was confined entirely to the negative side of the question, was participated in by Messrs. Keller, Searle, Smith, Musselman, Whitmer, Landis, and Secretary.

Mr. ENGLE of Lancaster asked: "What is the proper season of the year to cut timber to be the most durable?" The discussion of the answer to this question was participated in by Messrs. Speaker, Smith, McDowell, Zerr, Engle, Barnes, Brosius, Musselman, Palmer, Wilson, and Miller. The substance of the discussion indicated that the majority preferred August or early September.

On motion of Mr. BARNES, adjourned until 2, P. M.

THURSDAY AFTERNOON, *January 28, 1886.*

Board called to order at 2, P. M., by Hon. R. E. PATTISON in the chair.

ELWOOD CONARD, delegate from the West Grove, Chester county, Farmers' and House-keepers' Club, asked for an expression of opinion from the Board in answer to the following question: "What are the practical advantages of crushing the corn-stalk for provender for cows over the ordinary method of cutting it from one to two inches in length?" Answers in various forms were given by Col. Young and Messrs. Conard, Little, Searle, Whitmer, Engle, Zerr, Oliver, Thornton, and Secretary; all agreeing that the only advantage which could possibly be claimed was that of a saving of labor to the cow. This discussion brought out the opinion that the portion of corn-fodder below the husk had but little food value except as a means of distension, and that this small value was due to a small percentage of sugar which remained in the spongy center of the stalk, and the flinty covering or envelope had not food-value at all.

Hon. JOHN A. WOODWARD of Centre county then read an essay in answer to the question, "What Does the Farmer Most Want to Know?"

W. P. HAZARD of West Chester read an essay on "Raising Grapes," which was listened to with marked attention, and which caused considerable discussion.

Hon. W. GATES, member from Venango, read an essay in answer to the question, "How to Bring Up a Worn-Out Farm?" The subject-matter of which was discussed by Messrs. Young, Whitmer, McDowell, Piollet, and Secretary.

Col. PIOLLET then addressed the Board on the subject of taxation, when, on motion of Mr. SEARLE, seconded by Mr. GATES, the Board adjourned, subject to the call of the Advisory Committee.

ESSAYS AND DISCUSSIONS.

ADDRESS.

By Hon. A. N. PERRIN, *at the Local Farmers' Institute.*

Held at Titusville, Pa., December 22 and 23, 1885.

I have looked forward to this day with feelings of pleasure. I have been very anxious that this Farmers' Institute should be a success, and that our meeting together might result in profit to us all.

I esteem it an honor to address a few words of welcome to our friends, whose presence with us to-day is an assurance that all that we had anticipated of good is about to be realized. This is the first Farmers' Institute held under a provision of the Legislature of this Commonwealth, made at its last session, placing a fund at the disposal of the State Board of Agriculture for "the actual and necessary expenses of conducting local farmers' institutes."

In assemblies of this nature, where men come together for mutual benefit, it is most important that the greatest freedom be enjoyed by all. That all may feel at perfect liberty, I wish first to say to our friends in the city, and to those from near and from far, that a general and a universal invitation is extended to them, not only to listen, but to participate in the proceedings and discussion of this institute—all are welcome.

Again, representing the Oil Creek Valley Agricultural Association, I desire especially to extend an earnest welcome to our friends from abroad, who have come here in our interest, to speak words of wisdom and counsel in order to educate and advance us in the arts and sciences of rural and agricultural life.

For the time allotted us in this world this is our chosen walk and calling, both for usefulness and support, and desiring as we do to make the most and the best of life, we gladly receive and welcome you to aid us in the accomplishment of this purpose.

I trust it will not be considered out of place for me to make brief mention of the early, continued, and indispensable aid rendered us in bringing about this meeting by the most energetic and efficient Secretary of the State Board of Agriculture, Mr. Thomas J. Edge. He first called my attention to the act of the Legislature making the appropriation, and advised us to put in an early application for an institute to be held in Titus-

ville. From that time until now, nothing has been withheld or left undone on his part to secure the grand opportunity we enjoy to-day. You will be greatly disappointed to learn that he cannot, on account of serious illness, be present with us at this meeting. It was his purpose to have been here, and it was not until yesterday that he informed us, finally, by telegraph that he must give up, and remain in quiet at home.

While we are deprived of both the pleasure and benefit of his personal presence, the essays are here prepared by him, and will be presented in their regular order.

My friends, I hardly know what further to say in the few moments of your time I shall occupy. As often in the past, so now again, I assure you that I feel a deep interest in the cause we have met to promote. In the country, on a farm, was the place of my birth. It was the calling of my father to be a tiller of the soil, and that calling I followed until I passed my majority. I have never lost that interest, nor ceased to love the fields and the herds, and what I enjoy and love affords me pleasure to see perfected and possessed by my fellows. While it is twenty years since I left the old home and took up my abode with you, I can say that I experience no hours of greater comfort than when roaming over the fields still retained by us, and made sacred by the remembrance of the toil and saving of a father for his children.

Quite a number of farmers' sons—young men—have been in regular attendance at the monthly meetings of the Oil Creek Valley Agricultural Association, during the year just closing, and some of them are present here to-day. They are thrice welcome. They have some evidence of my interest in young men. I have experienced and passed through all the struggles of which they are now in the midst. I know almost every hope and throb of their hearts. Desiring as I do their prosperity and happiness, I have been inclined to speak as I have, hoping to strengthen and inspire them to an increasing love and respect for the place of their childhood, and the avocation of their fathers. I will not take your time by arraying facts and figures to prove the wonderful magnitude and importance of the ancient and honorable calling of agriculture, and its bearing and influence upon all the employments and engagements of man. This has been done from time immemorial, and the evidence of it is recorded everywhere. The best, the purest, and often the wisest, men of all ages have found comfort and happiness in the quiet pursuits of agriculture. As it was the first, so it *must* be the last industry to engage the human race. It has had its ebb and flow in all the centuries past, keeping measure with the advances and declines of the inhabitants of the earth. Somewhat in this regard, we have a peculiar history of our own in this part of the State, and I want to speak a word in reference thereto. While we, as a community, have to acknowledge our happy and prosperous condition as having been produced by various causes, we owe much of our present security, and our hope in its continuance for the future, to development of the agricultural interests about us. Our forefathers were not planted in the Garden of Eden. Naturally, our soil was not over-generous in yielding its fruits in response to the tiller's hand, and limited in means, as early settlers usually are, it took long years of patient, self-sacrificing toil to show much improvement.

Something less than one hundred years ago, this country, then an almost unbroken wilderness, was penetrated by sturdy men. The Kerr's, Curry's, Ridgeway's, Titus', Gilson's, Stewart's, Irwin's, and Hancox's; together with many other honorable names, were the first representatives occupying the hills and the valleys about us for permanent homes. Originally, there was a great wealth of timber here, but when made ready, for use and for

market it brought but little money, while the lack of near consumers, and the want of transportation, postponed the day of prosperity. But that day has come, and while the father-heroes sleep, I see before me their children and their children's children in the full enjoyment of the prizes they fought to win. But this is not all of our story. As you have come here to help us, we want you to know a little more of what we have done for ourselves, and the time we have had to do it in. It was not until within about twenty-five years that the first material change appeared in the condition of the country, and that change was as disastrous to agriculture as the fires and the floods. Its cause and history are so familiar to you all that I will not speak of it, excepting in brief, as it had an influence and bearing on the subject we have met to consider. The breaking out of the oil excitement in this country, in the years of 1859 to 1861, opened new channels, and altered the course of all our affairs. For five to seven years, over a large area, there was almost a perfect cessation of all efforts to cultivate or produce anything from the soil. Hence there was not only no progress made, but much that had been accomplished in the years that were passed was swept away and lost, the earth alone being left. Every farmer was looking for a customer for his lands, and, sooner or later, he found him. Thus there was a change of possession and ownership, either by lease or sale, of nearly all the farms for miles about us. Then a second change came, and as the lands proved either unproductive for oil, or became exhausted of the rich treasure, our thought turned back to the old ways, and many came into possession of their old homes again, and the process of rebuilding commenced.

This has been going on for fifteen or twenty years. The results for the time given have been marvelous. Meanwhile, railroads were built, this beautiful city sprang up, and our agricultural society was organized, all of which afforded ways and means for the advantageous and profitable development of the country about us. Taking all things into consideration, I do not know of a more progressive agricultural community than the one assembled to day to receive your counsels.

In contemplation of our improved condition, and the blessings we enjoy to-day, we must not forget the debt of gratitude we owe to one who has passed from our midst. A useful man in all the affairs of life, our constant friend and helper, the Hon. M. C. Beebe did more than all of us to establish the society that has done so much to stimulate our thought, and put forces in motion to develop the agricultural interests of this section. He was known all over the State, through his connection with the State Board of Agriculture, and the many valuable contributions he made at the meetings of that body. Besides all else, he was to me, as to many others present, a warm, true, personal friend. Blessed be his memory, and honor be to his name, while we will all join in respect and sympathy for his family. But we must go on and occupy, giving heed to the living questions of the day.

Because we are farmers, we should not be limited in our researches or accomplishments. While it is necessary to be especially informed in the line of individual pursuits, we also realize the importance and the advantage of a broad and a general education. We want to know equally as much to be a good farmer as we do to be successful in any other calling or profession. It is not what a man needs to know simply to be a farmer, a physician, or even a teacher of other men, but rather his needs to become a *man*, broad, intelligent, wise, useful, and helpful in the world, and then whatever he may choose to engage his faculties, he will, by his force and power, bend events to his own improvement, and command success.

As we have already made our choice, the theme of greatest interest to us is agriculture, and how to produce and enjoy its full and legitimate profits and benefits. Knowledge is power, hence we need not only to know how to produce the most and best, but, after having done that, we need to know how to retain and protect the fruits of our labor. It is a fact, as it has been stated, that of all the great fortunes owned by so many American citizens, not one has been made directly by agriculture. All of them have been made in one way or another by the handling of the products of the earth after deducting a scanty support for existence by the patient, toiling millions who sow the seed and gather the harvest, who blast the rocks and smelt the ores.

Our labors and anxieties cease not with the producing. We must find a market, and here enters in the great problem of commerce and exchange, the legitimate fruits of which have rarely, if ever, come in full to the rightful owners. I will not attempt to discuss the question at this time, but, by simple reference, direct your attention to what seems to me to be one of the most important and difficult problems for American statesmanship to solve: "What shall the tolls be over the bridge spanning between the producer and the consumer, and how shall they be regulated in equity and justice to all concerned?" It seems to me certainly not "all the traffic will bear," particularly and especially where the privileges are secured by the development of rights obtained by concessions or grants by the many to the few, called the "imperial right of eminent domain." There seems to be a limit beyond which there is a reserve to the State, and the people are the State. The various means resorted to to defeat justice, and deprive the producer of his fair share in the good things of a bountiful Providence, are all indefensible, and I earnestly hope to see the evil, in a great measure, corrected.

I have taken the liberty, which, I believe, is usually conceded on such occasions, to refer, in a very general way, to the subject under the call. We have gentlemen present with us who, by essay and speech, will ably instruct in the way we should go, and in the things we should do to make our calling and election sure. Again, and finally, I say welcome, for our free latch-string never was drawn in against any child of Adam's kin.

Please accept my thanks for your kind attention.

THE KIND OF FARMING ADAPTED TO OUR VICINITY.

By Hon. W. B. BENEDICT, *Enterprise, Penna.*

Read at Titusville Farmers' Institute, December 22, 1885.

It is a matter of great importance to agriculturists that they carefully study their soil and climate, that they may be qualified to judge intelligently of what is to them an essential element to their success. Have we, members of the Oil Creek Valley Agricultural Association, made the question of adaptability of soil and climate for certain kinds of farming a thoughtful one? Have we carefully studied what our soil is best adapted to producing with a profit for our capital and labor? Have not some of us been fighting old Dame Nature for many years by attempting to raise crops for which neither soil nor climate are adapted, and have not some of us been badly worsted in the combat? And after the defeat, has there not been much growling and grumbling and fault-finding, attributing all failures and mishaps and disappointments to the dear old lady? This class

of farmers continue in the same way, year after year, and acquire no wisdom by experience. Experience is said to be a good but expensive teacher, but some farmers will not profit by the teacher, even if the tuition is free. That class of men remind me of the "log-chopper's" dog. They won't see anything until they are smashed by their own heedlessness. It does seem that this class of farmers would learn what crops or stock succeeded best in their vicinity, and be governed in selections and cultivation by the experience of their neighbors, if their own has availed them nothing.

To those who have thoughtfully and wisely observed, it is indisputably the fact that this vicinity is peculiarly adapted to the growth of grasses. Our native grasses are white clover, red top, and June grass; all of which grow spontaneously wherever the rays of the sun penetrate. Each of these natural grasses are very nutritious, and furnish the best of pasturage. How frequently we hear it remarked that young cattle running in the woods and highways become fat much earlier in the season than those inclosed in pastures. This is a fact, and the reason for it is, that they have access to these succulent and nourishing grasses in all their freshness and sweetness, as they grow by the side of the cool, shaded brooks, and in the wooded openings where once waved the towering plumes of the original monarchs of the forest, which had been removed by the axeman, who did not spare. Our section of the country is naturally adapted to the growth of grasses. There are no better grass lands, outside of the blue-grass regions, than those of this locality. Timothy and clover can be, and indeed are, grown here equal to that of any locality in the continent. Then with a country ordained by nature for a particular kind of agriculture, with a natural soil and climate adapted to the growth of all the superior grasses that cannot be excelled for pasturage and fodder, why should we not utilize this lavish gift of nature's hand to our profit and comfort, and to the material advancement of our loved country? The plow is an important and useful implement of agriculture, but in our cold, clay soil it must be used with judgment, tempered with a goodly supply of discretion.

Too much plow has been the bane of many a farmer in this locality, and we have many striking examples of this in the worn-out and impoverished farms of many of our early settlers. Our lands, once well and richly seeded to grass, can be kept in fertile meadows as long as man lives to attend them by frequent top-dressing.

I firmly believe that a great and serious mistake has been, and is being, made every year, by trying to produce certain grains for which the soil or climate of this vicinity is very far from being adapted; for instance, wheat and corn. How much profit is there in growing these grains in this section? To be sure, once in a while, a man who has fertilized liberally and heavily, with an exceptionally favorable season, will get a fair crop of one or both of these cereals; but how much more frequently he fails to secure a paying crop of either. The same amount of fertilizing and labor will bring more money in grass, five years out of six.

We have a country especially adapted for grazing. If I can read the signs of nature correctly, she would have us devote our energies and labor to the proper utilization of our grasses. She would have us cover our hills and valleys with flocks and herds, and by so doing partially compensate her for her generosity. Our county is among the best watered ones of the world. Sweet, soft water flowing from almost every crevice in the rocks, as pure as the air, and as cold as if from an Arctic fountain, added to the rich and nutritious grasses, can but give me the strong and firm impression that we have a section that has superior advantages for a first-class dairy country. Why not so? Is there any other locality better

adapted for dairying than ours? Has Herkimer, Onondaga, or Chautauqua any better grasses or water than ours? Has Chester or Montgomery any superior advantages for dairies to those of ours, except those of market facilities? Dairy farming or stock-raising does not deplete and impoverish our soil as does grain-raising, or grass-growing either, where all is sold off the farm and nothing returned to earth for compensation.

I hope to live to see the day when, in our valleys and on our hill tops, there will be creameries and cheese factories by the score, and dairy farmers enough to amply supply them with pure and unadulterated milk made from the sweet and juicy grasses that grow in their midst.

Sheep-raising can be made a profitable part of our agriculture, and should be an important part of our stock-raising, for our lands are high and dry, with good pasturage, and a home market for the wool and mutton.

Those who have a love for the most noble of all domesticated animals—the horse—can breed them here with a profit, if they pay proper attention to their business, and use care and discretion in selecting their sires and dams, which is essential in the breeding of all live stock. It is a source of great satisfaction to me to observe the marked improvement that has been made, during the last decade, in the live stock of our section, and I am firmly convinced that the thoughtful and intelligent part of our farmers will agree with me when I say that our section is well adapted to stock-raising and dairying, and those that have been, and are, engaged in either of the two will bear me witness that their farms have improved under that system, and that those farmers who have grown grain exclusively have impoverished their land, with only a few exceptions of a number—not many, however—who have been so highly favored as to have easy access to the barn-yards of the good citizens of Titusville. I would not be understood as recommending the abandonment of all grain-growing in this vicinity, but I would have all farmers study what they can, and do, grow to a profit. Oats do well upon our soil, if properly sown and cared for. So do buckwheat and potatoes. All of the vegetables that are incident to this latitude do well here, and many of them are cultivated and grown to a profit. What I would have the farmers of this vicinity do, is to study the component parts of their soil, and, by so doing, learn what part or branch of agriculture their own farms are best adapted for, and I would also have them analyze themselves as well as the soils, for unless they adapt themselves to their avocation, they have failed to obey that oft-repeated proverb, "Man, know thyself."

THE JERSEY—THE DAIRY AND FAMILY COW OF THE FUTURE.

By J. C. SIBBLEY, Esq., *Franklin, Penna.*

Read at Titusville Local Farmers' Institute, December 22, 1885.

Neither my education nor calling in life is such as to qualify me to make you an address which will tickle the ear or please the fancy. There are those among my fellow Jersey breeders who are not only successful as breeders, but charming speakers as well; and I regret that you might not have the pleasure of listening to such a one to-day. However, my subject is one that enlists my whole heart, and I shall speak as well as I know how. The most hopeful sign of the times to the agriculturist and dairyman is such a gathering as this one. Here we can work together to draw truth

from the bottom of the well, where she is said to lie hidden, and by the interchange of thought, the gentle friction of one's ideas and experiments with another's, we shall do much toward perfecting and polishing the setting which encircles the precious gem.

Another and most hopeful sign is the agricultural press of to-day. The one hundred and upwards of agricultural papers published, most of them of high order of merit, and, presumably, financially successful, are indicative of the fact that the American farmer of the present is keeping posted on what pertains to his vocation. Some one asked one of the old master artists with what he mixed his colors to produce such grand effects. "I mix them with my brain," came the ready response. The farmer of to-day is not, necessarily, any longer a mere drudge. He is mixing the labors of his hands and brain. Some great statesman, years ago, spoke of the great future of this country because the school-master was abroad in the land. The agricultural press, the great educator, is abroad in the land, and he who neglects the advantages to be derived from reading some of the papers will do so, not alone at an intellectual loss, but a pecuniary loss as well. As well may the would-be statesman refuse to read history; the lawyer, Blackstone and Chitty; the politician, current politics; as the farmer, the latest achievements, the records of the successes and failures of his brethren. Experience is a dear school; and he who can profit by the experience of another is the truly wise man. I do not say for you to believe all you hear and read in the agricultural papers; but I do say that he who cannot, by taking two or three of the leading papers of the country, get out of their columns, in dollars and cents, ten times their cost, is the man who is blind either in his eyes or his understanding.

As I have before remarked in public, the time has gone by when the fool of the family is made the farmer. He is now reserved to be the speculator and the politician. The farmer who would succeed must keep step with the music, and near the van of the procession. There has come into the mind of the Eastern farmer owning high-priced lands the question how to compete with the cheap and fertile lands of the great West. Clearly, he cannot compete in their specialties, and, therefore, must school himself to the new order of things.

He must make one acre of land produce double what it did before. He cannot grow beef as cheaply as it can be done upon the great grass ranges and the fertile corn-fields of the West; but he can produce an animal which will give him twice the quantity of milk, butter, and cheese that his scrub cow has been yielding for him. Thousands of carefully conducted experiments, always with similar results, covering a period of over a century in this country, clearly prove that the Jersey cow can perform this self-same task of doubling the products of the dairy. This is a matter of vital importance to all thoughtful and prudent men, and I trust will command your attention, while I go into it in detail. The early history of the Jersey breed is obscure. From their delicate shadings, large and mild eye, and fawn-like appearance, arose, no doubt, the tradition, which is still cherished on the Island of Jersey, that the breed originated through a union of the cow and the deer. It at least remains, as their history, that over one thousand years ago their peculiar qualities were such as to excite among writers the presumption that they originally came from Normandy, as many of the characteristics of the breed are observable in the cattle of Normandy and Brittany. The difference existing to-day is, doubtless, owing to the difference in climate, care, and surroundings. It may be of interest to some if I give a slight history of the home of these cattle. The Channel Islands are four: Jersey, Guernsey, Alderney, and Sark. They have been part of

the possessions of England since the days of William the Conqueror. They are in the English Channel, sixteen miles from the coast of France.

These islands, washed as they are by the Gulf Stream, possess, perhaps, the finest climate in the world, with the fruits of the tropics and the far north. The Island of Jersey, the largest of the Channel Islands, is but seven miles wide by eleven miles long. The total amount of tillable land is but twenty-five thousand acres, and the population, sixty thousand; or upwards of two persons to each acre of land; and one cow to each one and a half acres of land. This may seem like close farming. Nevertheless, these islands produce sufficient for their own needs, and these people, *per capita*, are the richest agricultural community in the world. Necessarily, the cultivation of this land must be of the highest order, and the available product of each foot of land carefully considered. Within the limits of this address it will be impossible to state the methods of rotation and tillage. Such as are interested, I would refer to the Encyclopedia Britannica, or to an admirable essay by Col. George W. Waring, published by the A. J. C. C. Suffice to say that the rich and succulent forage, long continued, has been, no doubt, a great factor in the development of this marvelous butter breed. Another aid in the development of this distinct species is that of inbreeding. For generations, so highly has the Jersey man prized his cow, that their most ancient laws enact the most severe punishment for the importation of any cattle to these islands, even a ship for landing such animals being subject to confiscation. So much for the original home of this cow.

The history of the Jersey cow in America covers but a comparatively brief period, the first importation having been made in 1850. These animals were bought more for beauty than for any belief in their dairy capabilities; but one gentleman, Hon. Thomas Motley, was so impressed with the earnest protestations of the Islanders upon the richness of the breed, that he was, in 1853, induced to set the milk of one of his cows separate for one year. The result was five hundred and eleven pounds of butter, considered in those days a marvelous yield, but since then, over and over again, greatly exceeded. The attention of the public was not called to these cattle, to any extent, until the formation of the A. J. C. C., in 1868. From that date until within the last six or seven years, the Jersey cow was still considered more in the light of a luxury and an ornament for the rich, although remarkable butter tests were being, from time to time, reported. Some of these run from fourteen to nineteen pounds in seven days, on grass alone; and some, with a moderate grain allowance, at the rate of twenty-eight pounds per week. Some few years since, Peter C. Kellogg, under the *nom de plume* of Hark Comstock, wrote several articles under the heading, "Look into the Churn." The result was that Jersey breeders commenced looking into the churn.

The owner of Jersey Belle of Scituate looked into his churn, and found that his cow gave him twenty-five pounds three ounces of butter in seven days, and seven hundred and five pounds in a year. The owner of Euratas looked into the churn, and found his cow gave twenty-two pounds in seven days, and seven hundred and seventy-eight pounds in a year, and dropped a live calf; the highest grain feed for any one day, during her whole year, having been eight quarts. The owner of Mary Ann of St. Lambert looked into his churn, and found that, on pasture and five quarts of ground oats, daily, his cow gave one hundred and six pounds in one month, and eight hundred and sixty-seven pounds fourteen and three quarter ounces in eleven months and five days. She has since tested thirty-six pounds twelve and one half ounces in seven days. Ida of St.

Lambert gave thirty pounds two and one half ounces in seven days; and Princess 2nd, forty-six pounds twelve and one half ounces in seven days. Oxford Kate gave thirty-nine pounds twelve ounces in seven days. There have been separately tested something over fifteen hundred cows that have produced from fourteen pounds to forty-six pounds twelve and one half ounces in seven days; and right here allow me to state, that all these greater tests have been officially conducted by committees appointed by the A. J. C. C.; by agricultural societies, and by those, in many instances, who were loudest in their criticisms. The rules providing for the official test of cows are so stringent that there could be no deception, were the owners ever so anxious. I do not wish to be considered as boasting in referring to our own herd, for we recognize the fact that there are many herds equal in butter production, and I merely refer to it as showing the uniform butter-producing power of this breed. Last season, we set separate the milk of nineteen cows, and but two of the nineteen failed to give from two to four pounds of butter per day.

These tests have been on moderate feed, not on the high-pressure plan of risking the life of the cow to make a great test. We wish to be distinctly understood. We have some poor cows in our herd; but we want it also to be understood that no man can pick out of our herd two cows, excepting only some very aged or injured animals kept only for breeding, that cannot make over three hundred and sixty-five pounds of butter in one year. This statement is made in absolute confidence in its correctness, and we think it is under, rather than over, stated; and we doubt if there is a herd of average excellence that cannot do as much or more.

It is a matter of some extra trouble to set the milk of cows separately, for long periods, and churn each by itself, but many of our cows, by tests for shorter periods, have indicated a capacity of over six hundred pounds of butter per year. We have one cow, Matilda 4th, that, for the present twelve months, we expect will make between nine hundred and one thousand pounds, without forcing. For the eight months to December first, the lowest possible estimate on her production is six hundred and fifty-six and one quarter pounds. Her milk was set by itself for periods from one day to seven days in May, June, July, September, and November. For all the time prior to October, each day was estimated at less than her lowest tested day. Since that time, she has been estimated, daily, by the average yield in the subsequent tests. Her feed has been precisely the same, both in amount and kind, on the days when her milk was churned by itself, as when it was churned along with that of the other cows in the herd.

But it is urged against the Jersey cow that she is small, and of no value for beef. Allow me to repeat what I have stated on previous occasions: that as yet I have to find the owner of a Jersey cow who is desirous of converting her into beef. So long as she will breed, she is more valuable for other purposes.

But let me be clearly understood in the following statement, that give me a Jersey cow dry—if it be possible to dry her off—and I will make beef cheaper and quicker than with any other breed with which I am familiar; and that beef will be of as delicious quality as man ever put into his mouth. We grew tired of hearing the claim that the Jersey cow was no use for beef, and gave it a practical test, worth at any time a ton of theory. We took a cow which was no longer a regular breeder, and, on a feed of three hundred and fifty pounds cornmeal, increased her live weight two hundred pounds in eight weeks. Now that I have shown you the fact, I will give you the theory, which is this: The Jersey cow excels all others

as a butter producer, because of her perfect organs of digestion and assimilation, which extract the fat from her food and deposit it as butter in her udder. That which, in the ordinary breeds is laid on the carcass, is in the Jersey put into the churn. When the Jersey cow is dry, you have to reduce her allowance, and use the greatest care in the interval before calving that she does not become too fat for safety in calving. That which she put into the churn when milking, she is, when dry, putting on her carcass. When a cow that makes nearly seven pounds of butter per day goes dry, she places that fat on her ribs; and I guess she does it as quickly and as cheaply, pound for pound, as any cow in the world. Pardon my digression, for I am not advocating the Jersey cow for a beef breed. The first cost is too high. The cow is worth more for other purposes; and the East, with high-priced lands, cannot compete with the plains of Kansas, Colorado, and Texas in the production of beef. And yet the average dairyman says he don't want the Jersey cow because she can't make beef. What does he want? He is not in the beef business. What would you think of the man who would say he would never buy a sulky hay-rake, but would stick to the wooden hand-rake, because when it was worn out it would make a mop handle? But it is said that while the milk of the Jersey cow is rich, she gives but little in quantity.

We will grant that there are some larger records in other breeds, but it must be borne in mind that very little attention has been paid hitherto to the amount of milk that Jerseys would give, the interest having been centered, principally, in the amount of butter that they would make. Nevertheless, we believe that Jerseys are far above the average, even in the amount of milk yield. The following are some of the yields in our herd: One cow has given sixty-seven pounds of milk per day, and averaged over sixty-five pounds of milk per day for a week. Another has given sixty pounds of milk per day, and averaged over fifty-seven pounds of milk per day for a week; another has given fifty-six pounds per day, and averaged fifty-three pounds for a week. Many of our cows have given from forty to forty-eight pounds per day. All our milk is weighed just as soon as milked, and all the records kept of every cow. Here are some of the yields: Matilda 4th, 11,167 $\frac{1}{4}$ pounds for the eight months to December first. Will probably yield over 16,000 pounds for the twelve months, without forcing. La Petite Mere 2d, 10,329 pounds in one year, on ordinary feed, in calf seven months of the year; with a little extra feed we believe this cow capable of yielding 15,000 pounds per year. Fawn of St. Lambert, 10,101 $\frac{1}{2}$ pounds with her first calf, in twelve months ending before three years old; had extra feed for four months only. Queensboro, 8,622 pounds in eleven months; in calf eight months. Cill, of Glen Rouge, 7,003 pounds in one year, with first calf on ordinary dairy feed. Duchess of Darlington, 7,936 pounds in twelve months; ordinary feed; in calf eight months. Butterfly, 7,806 pounds in eleven months, ordinary feed; in calf eight months. Mary of Pleasant View, 7,655 $\frac{1}{2}$ pounds in ten months; in calf seven months. Silverstraw, 7,461 pounds in eleven months; in calf eight months. Golden Zoe, as a ten-year-old cow, 7,227 pounds in eleven months; in calf seven months. Nerissa of Nyack, 7,136 pounds in ten months; in calf seven months. Goldstraw 3d, 7,036 $\frac{1}{2}$ pounds in eight and a half months; four and a half months in calf. Our cow, Ida of St. Lambert, who has milked sixty-seven pounds per day, and has averaged sixty-five pounds per day for a week, gives indications of yielding for the year between eighteen and twenty thousand pounds. I will promise you beforehand, too, that she shall not be fed one drop of milk, or have any stimulant, tonic, or drug of any nature, for the purpose of creating an abnormal

appetite, or flow of milk. I do not wish to throw discredit on the performances of other breeds, but it is nevertheless current statement that the highest records in some breeds have been obtained by feeding milk in large quantities, and by abnormally stimulating the appetite. In the public prints, time and again Jersey breeders have called upon the owners of some of these great yielders to state what articles the animals were fed, and so far have not been favored with replies.

The Jersey cow is a persistent milker from one calf to another, and it is generally necessary to force her dry. Many we find it impossible to dry at all. The diminution in their flow of milk does not seem to imply a corresponding loss of butter. It is often found the case that a cow giving twelve quarts per day is making more butter than when she was giving sixteen quarts per day. But there are those who tell us that if they were to feed their cattle of other breeds as highly as Jerseys are fed, they would make as much butter. Well, my friend, you try it and see. I predict that you will not have as much butter within a great many pounds, and you will probably have a dead cow if you feed one half as much as some of these Jerseys have eaten, one cow during an official test having been fed as high as fifty quarts of grain in a single day. The Jersey cow, with her perfect organs of assimilation and digestion, will take care of such a quantity of grain as would kill the average cow. High feeding to this extent is not to be commended. But many of the largest tests have been made on ordinary dairy feed. The high feeding only shows the powers of the cow to assimilate a vast amount of feed and convert it into butter-fat.

To return to the question of whether it is the breed or the feed which makes the butter cow, I beg to quote from Professor Jordan's address to the State Dairymen's Association, February 12, 1885: "Experience is the test of theory, however, and on the point under consideration careful and extended investigations are not wanting. I know that the verdicts of German investigations have been much criticised, and even their correctness has been doubted; but I feel sure that some of this criticism and distrust has resulted from a misunderstanding of the facts as they really are. I have noticed, within a few weeks, in two of our agricultural papers, statements to the effect that the German experimenters claim that the milk is not influenced by the food. Nothing can be farther from the truth. The results of these searching and elaborate investigations declare, if they declare anything, that while in certain respects a cow has certain fixed characteristics which are beyond the influence of food, in other respects it may be greatly modified by the kind and quality of the food. There is no farmer of ordinary intelligence who does not know that some foods produce milk richer in fat than is the case when other kinds of material are fed. It would be useless to claim that one hundred pounds of milk from a cow well fed contains no more fat than one hundred pounds of milk from the same cow poorly fed, for all experience would deny the claim. The following are conclusions which the German investigations certainly warrant: 1. The percentage of total solids in milk is greater with a rich ration than with a poor ration. 2. The composition of milk solids is, on the other hand, little influenced by the amount and character of the food. In other words, if these solids are one fifth fat when the cow is poorly fed, they will be one fifth fat when well fed, although the total quantity of the fat will be greater in the latter case because the total quantity of solids is greater. Let me illustrate. My cow gives milk with twelve pounds of solids to the hundred when I feed her on timothy and roots, but when I begin to give her a liberal amount of a mixture of corn-meal and cotton-seed-meal the percentage of solids increases until one hundred pounds of milk con-

tains fifteen pounds of solids. The solids were one fifth fat in the first instance, and all previous experiments give me no reason to suppose that they will vary in composition under the influence of the richer ration. But one fifth of twelve is two and one half, while one fifth of fifteen is three, so that the liberal feeding has caused an increase of one half pound of butter-fat to each one hundred pounds of milk.

This hypothetical case illustrates exactly what takes place in actual practice. A cow produces more milk when well fed than when kept on short allowance, but this is not because the solids in the milk change in composition, but because there is more of them. When one constituent of the milk solids increases, they all increase in about the same proportion. I do not mean to say that there is absolutely no change in the composition of the milk solids under the influence of different kinds and qualities of food, but I do mean to say that the food is unable to overcome, to any great extent, the fixed constitutional habits of the animal. You cannot by any manner of feeding obtain Jersey milk from a Shorthorn cow." Such evidence as Professor Jordan's is well worth your attention. It simply gives facts without bias as to breeds. It will never do to train Maud S. for a draught mare; nor a Clydesdale for a trotter. Each has its sphere of excellence, outside of which it is as worthless as the veriest scrub. He is a wise man who can accept accomplished facts. Suppose you were to say "My native horse can trot as fast as a Hambletonian," or some of the other families of horses that are recognized as carrying speed in their blood; and upon that theory you would commence training Pete and old Dolly. How long will it take you to breed a family of trotters from that train? Why, my friend, you would lose the last nickel in the venture, and in the end your horse will not be able to trot fast enough to keep you ahead of the sheriff. But some wise and prudent farmers say that Jerseys are held at fancy figures, and that no man can get his money out of them for the dairy. Let us make some computations. The scrub cow costing thirty dollars, and making one hundred and fifty pounds of butter per year, will make in ten years, fifteen hundred pounds, which, at twenty-five cents per pound, equals three hundred and seventy-five dollars. Will drop, in ten years, ten calves worth, when two months old, three dollars each, equal to thirty dollars. She will herself sell for thirty dollars. Total received, four hundred and thirty-five dollars. At thirty-five dollars per year for keep, the cow will cost in ten years three hundred and fifty dollars. The first cost of the cow, thirty dollars. Total paid out, three hundred and eighty dollars, leaving a profit, on thirty dollars, of fifty-five dollars, or one dollar in the same has brought in one dollar and eighty-three cents.

The Jersey cow costing two hundred and fifty dollars, and making four hundred pounds of butter per year, will make in ten years four thousand pounds, which, at twenty-five cents per pound, equals one thousand dollars. In ten years will drop five heifers worth, when two months old, one hundred and fifty dollars each. In ten years will drop five bulls worth, when two months old, twenty-five dollars each. Will herself sell for beef for twenty-five dollars. Total received, one thousand nine hundred dollars. At thirty-five dollars per year for keep, in ten years amounts to three hundred and fifty dollars. Original cost of cow, two hundred and fifty dollars; total expended, six hundred dollars, leaving a profit of two hundred and fifty dollars of one thousand three hundred dollars. Every one dollar invested in Jersey has cleared five dollars and twenty cents. This calculation, although making a showing for the Jersey far preferable to the scrub, is, nevertheless, unjust to the Jersey in placing the same price on the butter, which is of a high quality, as on that of the scrub, which is

of a bad quality. As a matter of fact, in any large market, the Jersey butter will bring anywhere from five to fifteen cents per pound more than scrub butter. Taking, however, this lowest amount of five cents per pound difference, and reckoning as before, we shall have as a showing of a profit for the ten years for the Jersey cow six dollars for every dollar invested in her, as against the one dollar and eighty-three cents profit to the dollar invested in the scrub. If interest be reckoned in each case, which is the more fair method, the result will be strikingly more favorable to the high-priced Jersey. If the females in each case be retained in the herd until the end of the ten years, and interest reckoned on the butter-product each year, the results would be so amazingly in favor of the high-priced Jersey that I fear none of my hearers would believe my figures to be true until verified by actual computation. But it is said by some that the Jersey is delicate and must have warm barns, etc. Well, let me say, I have ever yet to see the breed of cattle that would be profitable in the dairy if their only winter shelter was the south side of a straw stack or a fence corner. The Jersey, at least, is not that kind of a cow; but she has shown that Nova Scotia, Province of Quebec, and Province of Ontario, of Canada, with fair farmers' stabling, have produced some of the largest tests, and that with the thermometer twenty degrees below zero. She seems to do as well in Montreal as in Mobile; as well in Maine as in Maryland and Virginia. It is said, "Well, they may be good enough, but they are so small." Well, do you want a Jumbo? Among men David was small, Napoleon is small; but size is not always the true measure of value. A diamond is smaller than a cobble-stone. I attended a fair last fall, and on the grounds was a steer that, by long feeding, had been made to weigh over two thousand pounds. On the same grounds was a little Jersey cow making within one half ounce of four pounds of butter per day. More people went to see the fat ox, at an admission fee, than looked at and examined the marvelous dairy cow free of cost; and, I suppose, one hundred coveted the possession of the fat ox where one coveted the cow. The one had neither pride of ancestry or hopes of posterity. From the womb of the latter may come many whose descendants shall enrich the land. But it is further said by some that they will wait; prices will be down. That may be. I, for one, hope so. Prices may go down to one third what they are now, and yet we will make more out of Jerseys than a like investment will yield in any other legitimate business with which I am familiar. However, it is not to be considered within the probabilities that prices will grow much lower. Let us look at some statistics:

The American Jersey Cattle Club Herd Register was established in 1868, seventeen years ago. At its establishment many animals of extreme age were entered; also, many dead animals have been entered to complete pedigrees. At present, not far from 33,000 females appear as registered. Is it not fair to presume that about one hundred and twelve of these animals are dead or non-breeders at this time? leaving but, say, 17,000 living females. The number of milch cows in the United States, as per the census of 1880, was nearly 15,000,000. These cows produced, in that year, 1,300,000,000 pounds of butter and 450,000,000 pounds of cheese.

The value of the butter, at twenty cents per pound, would	
be	\$260,000,000
The value of the cheese, at eight cents per pound, would be	36,000,000

Aggregate value,	\$296,000,000
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The value of the butter produced exceeded the value of the cheese as seven to one, showing that it is the butter cow rather than the cheese cow

that is in demand. We ask: Is it not fair to presume that, as the merits of the Jersey cow come to be better understood, she will, within the next twenty-five years, displace and replace at least twenty-five per cent. of the scrub cows? To do this, the 15,000 Jerseys of to-day must increase to 8,000,000 in order to bear the same proportion to the 100,000,000 of residents of the United States in the year 1905. While prices on Jerseys may not rule fabulously high, yet we confidently believe that, for the next twenty-five years, the business of their breeding and development will prove both a pleasant and lucrative branch of agriculture. That for the family and for butter, the Jersey cow is preëminently the animal, I cannot doubt. I believe in the Hereford and Shorthorn for beef. In the scrub cow to help us on to poverty; but as the choicest morsel to the eye, of all the bovine tribe, for milk for children and invalids, delicious butter and cheese for the table, and for money in my pocket, the little Jersey cow, first, last, and all the time.

Thanking you for your kind attention and patience, and assuring whoever may visit our herd a hearty welcome, I close the stable doors of eloquence to allow you to carry out such as have been talked to death, and those yet living to see how much the winter wheat has grown since I commenced.

WHAT I DON'T KNOW ABOUT FARMING.

By J. H. COGGSWELL, Esq., Titusville, Pa.

Read at the Titusville Local Farmers' Institute, December 22, 1885.

When Byron D. Benson, Andrew N. Perrin, Jesse Smith, and myself were good little boys, we were instructed in biblical lore, at least so far as to answer the questions, "Who was the strongest man?" "Who the meekest man?" "Who the most patient man?" and "Who the wisest man?" We answered glibly, no doubt, but if we had been requested to tell why Solomon was the wisest of all men we could only have instanced the way by which he discovered which was the true or real parent of the child claimed by two mothers, for we had read the picture that told all about it. But since we have older grown, other evidences of Solomon's wisdom have been found out. Perhaps I should speak of myself only, as I am not sure that the other three have "searched the Scriptures" much lately. Byron is now president of a pipe line to the ocean, Andrew is president of an agricultural association, Jesse is vice president of a bank or two, but for myself, I can aver that I came upon one of the great king of Judah's nuggets of wisdom lately, and it is this: "*In all labor there is profit, but the talk of the lips tendeth to penury.*" If my pastor, Rev. J. A. Maxwell, should take the latter part of this proverb for his text some Sunday, I know he would advise us not to take the time of an audience to utter words merely—not to attempt to speak till we were sure we had something to say, and much more and better to the same effect. The street arab, the gamin, as he is sometimes called, oft astonishes us by his quaint and sharp sayings, driving right to the point, without any circumlocution, and, in his peculiar vernacular, he has embodied this same truth enunciated by Solomon three thousand years ago, for when he hears a person using words for the sake of filling up the time, he is quite apt to tell him to "stop talking with his mouth!" If there be one of those sharp critics in the audience at present, I hope he will not interrupt me, but let me enjoy the pleasant

delusion that the words of my lips this evening will not tend to the impoverishing of any, but rather that some may be benefited.

At the risk of being called a plagiarist, I can say most truthfully that what I don't know about farming and farmers would fill a book as large as Webster's Unabridged, Encyclopedia Britannica, American Cyclopaedia, and several other works of equal magnitude rolled into one. Had President Perrin allotted to me the task of telling what I *do* know about farming and farmers, both you and I would have gotten off easily. By this time I should have subsided and you would be enjoying the remarks of the gentleman who is to follow me and who will tell you about mending your ways. It is only about a year since the members of the Oil Creek Valley Agricultural Association elected a certain gentleman of this city president, and how they could reëlect him, as they did a few weeks ago, is a mystery. He is such a tyrant, so determined on having his own way that I, for one, am growing restive. Let me give you an instance of his autocratic way. He decides that this Farmers' Institute and convention shall hold a meeting in Titusville, and then steps up to a man and says, "We want a speech or an essay from you!" It is of no earthly use to make excuses, to say "I can't," or "get somebody else;" you have got to do it or die in the attempt. When he approached me on this matter I thought to shake him off, but it was of no use. The "old man of the sea" was on my shoulders. I told him finally that I "would see him again"—"see him later." Well, I did see him again, or rather he saw me—not only later, but earlier—and often, and ere I was aware he had me yoked up with Willis Benedict, Prof. Streeter, Capt. Emery, S. W. Stewart, and others, and here we are. I shudder to think of our fate should we try to "turn the yoke." If ever I vote for him again to be our President, and find no amendment in his ways, I will set to work and organize a revolution at once, like a South American Republic. I don't think he would have been so successful with me but for the nice and easy way in which he put the case: "Only a *ten* minute speech," he urged, and I yielded; but when I came to my senses, if I had any, the dilemma in which I found myself was appalling. To think of boiling down and sugaring off a speech—an essay—a paper in a ten-minute limit! That is only a little more time than Hon. William M. Evarts wants for one of his single sentences! President Perrin, in his estimate of my ability, reminds me (but to look at him you would hardly suppose it) of a certain gushing and beautiful school-girl I once heard of, and the story runs in this way. The young lady was attending a large party, and when supper was announced, it accidentally fell to her lot to be escorted by a celebrated college professor, whose chair was that of ancient and modern history, and as she took his arm she exclaimed, "How fortunate! I am going to graduate in a few weeks and have got to write an essay on history; won't you tell me all about the history of the world as we are at supper?" My task, as the length, breadth, height, and depth of the subject of what I don't know about farming and farmers, looming up before me with its elaboration confined to a ten-minute limit, seems as formidable as no doubt the professor's task did to him when asked to give an account of the events of six thousand years in the supper hour.

It is not my intention to tell farmers how to plow, when to sow, how to hoe, or when to mow; or to tell farmers' wives how to make bread, butter, or cheese, how best to make roses, pansies, or chrysanthemums flourish, nor am I going to bestride my favorite hobby, yecept "fruit-culture," and charge down on you Sancho Panza-like, with lance at rest, till you will all agree, under pain of extermination, to select, plant, and care for apple trees according to the rules laid down in my talk to you at our winter exhibition

of fruit last February. I shall not discuss rotation of crops, ensilage and silos or under-draining, nor will I invade the domain of the house-wife and descant upon pickles, jams, jellies, or crazy quilts. Perhaps at this moment some of you are mentally inquiring, "Then what are you going to bore us with?" I can only reply, "What I don't know about farmers and farming."

I don't know why there are so many farmers who apparently take so little pride in their occupation, the oldest, noblest, and best work men ever engaged in. I don't know why so many of them seem to deprecate their calling and act as though because they labored hard in the hot sun, browning their faces and tanning their hands, that somehow for that reason they were less the peers of the men who pore over law-books, address judge and jury, and just before election make your school-house walls ring with their fervid eloquence, "proving this side all right—the other stark naught."

I don't see why there are so many farmers who seem to act as though selling their own farm products of fruit, vegetables, grain, butter, and cheese in bushel or pound quantities made them less the equals of the man who weighs out a pound of nails, sells them a hand-rake or a whetstone, measures them off sheetings and jeans, or counts out a dozen seamless bags.

I don't know why there are so many farmers who seem to consider that all the daylight hours they pass away from their farms—all the hours not spent in actual toil, the results of which are evident—must be called lost time, never to be recovered.

I do not know why so many farmers neglect the cultivation of the garden, giving as a reason therefor that "it don't pay," when it can easily be demonstrated that from a comparatively small amount of time well bestowed in April and May, and occasionally through the summer months in the garden, better results can be obtained, and a higher percentage of profit to cost be secured than is ever realized from broad acres of grain, the average meadow, or full crops of potatoes. I want to see the time come when all the farmers of this Association can look with pity upon us town folks who have to put up with wilted vegetables, mussed-up strawberries, picked-before-ripe-and-brought-from-a-distance tomatoes, while they are regaling themselves with all these and many other luxuries, crisp, fresh, and luscious from their own gardens.

I do not know why there are so many farmers' boys who dislike farming, and embrace the first opportunity offered for work in some other employment, unless it is because they are treated differently than General Grant says in his memoirs he was. I quote his words: "When about eleven years of age I was strong enough to hold a plow. From that time until seventeen I did all the work done with the horses, such as breaking up the land, furrowing, plowing corn and potatoes, bringing in the crops when harvested, hauling all the wood, besides tending two or three horses, a cow or two, and sawing wood for the stove, etc., while still attending school. For this I was compensated," (and I wish every father and mother present to let this go deep into their minds,) "by the fact that there never was any scolding or punishing by my parents; no objection to rational enjoyments such as fishing, going to the creek a mile away to swim in summer, taking a horse and visiting my grandparents fifteen miles off in an adjoining county, skating on the ice in the winter, or taking a horse and sleigh when there was snow on the ground."

Or it may be that some boys find their farm life irksome, and hence get away from it because their experience is epitomized in the story of the farmer and his boy which, if I remember right, was this: The boy:

"Father, can't I go and see the circus this afternoon, all the other boys are going, and it only costs a quarter?" Father: "No, my son; but if you will hurry up and get your 'stent' done, I'll take you to see your grandmother's grave, while the mare is being shod." "All work and no play makes Jack a dull boy," runs the old saw. The bow continually bent loses its elasticity. When you give your son a holiday, or concede to his desires for recreation, do it not grudgingly, but with a hearty good-will, and you will double his pleasures; and when he again takes hold of the plow, it will be with the determination to better win and secure your praise.

I don't know why the farmer, soliloquizing, should not say as did Roderick Dhu, when describing the condition of the Highlanders, (of course, bearing in mind to make the sentiment jibe, that the sword has been beaten into a ploughshare.)—

"I give you shelter in my breast,
Your own good blades must win the rest."

Or, in other words, "My lot is cast upon the farm upon which the dews descend and the gentle rain! To me has been given not only a strong arm, but a mind to study and comprehend the many and subtle influences that cluster around the germination, growth, and fruitage of the seed from the hour I hide it in the well-prepared soil till the glorious harvest time! My farm is my realm! My willing subjects are earth, air, water, and fertilizers! They shall acknowledge my kingship and yield homage to my scepter, an implement of agriculture, as I may yield it industriously and intelligently. My realm shall not only win for me good crops by the skillful application of labor at the right time and in the right way, but it shall afford me some leisure hours for reading and study, and, perhaps, some time for travel! Chautauqua's opportunity shall not all be lost to me, or the lectures in my vicinity. While recognizing the truth of the saying that 'he is a public benefactor who makes two blades of grass grow where but one grew before,' I will not be content with success in that direction only. I shall feel that I am not living up to my privileges, am not properly filling my niche, if I am not conscious within myself, as I pass the milestones of life, that I am intellectually, aye, and morally, a better man than I was but awhile before!"

Mr. President, I do not know but that I have gone beyond my ten minutes limit, and I will trespass on your patience and that of my auditors but little longer. I am confident that I have demonstrated how little I know about farming, and I am profoundly thankful to all who have so kindly given me their attention thus far, and will add, as a parting shot, that if I have started a train of thought in the mind of but one of my auditors in the direction of any of my random flings, which shall result in any good, I shall feel amply repaid.

More than two thousand years ago a writer said: "*How can he get wisdom that holdeth the plow, and that glorifieth in the goad, that driveth oxen, and is occupied in their labors, and whose talk is of bullocks?*"

But that must not be said of the farmers of to-day. The crooked stick, making hardly more than a mark in the ground, has given place to the most improved steel plow: the heavy spreading bush that I used to see dragged over the ground fifty years ago, has given place to the ingeniously-concocted harrow, mellowing the soil as never before; the slow-cutting scythe, with a back-breaking snathe, has given place to the machine so deftly constructed and admirably adapted to its purpose; the sickle, cutting but a hand-grasp of wheat at once, has given place to the wondrous reaper; the ancient flail, which made the barn floor resound all winter long, has given place to the thresher and separator, which asks now only wood and water,

as it turns into the bag a bushel of grain or more per minute; the native grade of cattle is fast giving place to the Durham, the Devon, the Holstein, the Jersey, or the Alderney; the horse with large head and narrow chest is being superseded by the best strains of the Norman, the Morgan, the Clydesdale and the Messenger; the very long-nosed, razor-backed porcine is no more, but, in his place, is found the Berkshire, the Suffolk, the Poland China or the Chester White; the sour apple tree, with its tasteless, unpalatable, thick-skinned, puckering fruit, has been grafted or supplanted with the Baldwin, the King, the Greening, or the Spy; the big wheel, with its monotonous, droning hum, and the unsightly loom appear only at "The Loan," while ten thousand spindles and flying shuttles in the great factories give better and cheaper fabrics; the stitch, stitch, stitch, all day long, and far into the night, making literally true the remark that "a woman's work is never done," recognizes the superiority of the needle with the eye in the point. Shall not the farmer in dealing with his soil take advantage of all the light that chemistry has revealed unto others and may unto him? A tyro in the painter's art once visited the studio of a master, and, as he beheld the beautiful work upon the easel, asked: "Will you tell me, sir, what you mix your paints with to produce such beautiful colors?" The reply was: "Brains, sir; brains!"

I do not know why the farmer may not cultivate his farm with so much skill, genius, and intelligence that when some visitor, admiring his bountiful crops, asks what fertilizers he uses to bring about such splendid results, may not receive the same reply: "Brains, sir; brains!"

HOW TO BRING UP A WORN-OUT FARM.

By WILLIAM GATES, *Oil City, Pa.*

Read at Titusville Farmers' Institute, December 22, 1885.

It has been a serious problem with many farmers to know how to restore land that has been exhausted by a bad system of tillage. The pioneers of this section of the country were poor people, and to make homes in the wilderness was no easy task. Scientific investigation and book farming were not known. Suitable implements to cultivate the soil were not to be had, and a system of double cropping and pasturing continued until nothing more could grow, and then abandoned to briars and weeds until it could recuperate by rest and natural causes. To restore worn-out land, the first step should be to remove all obstructions, take down the old worn rail fences and replace with straight fences, made of post and rails, or boards, or wire. By so doing, sixty perches of land will be added to tillage on a ten-acre field, and saved to clear out the old fence corners of noxious weeds and useless brush and briars. The next step: All wet land should be underdrained: this can be done cheaply, thus—Dig a ditch two and a half to three feet deep and eighteen inches wide from the spring, or source of supply, and place a stone about one foot high against one side, and another stone eighteen inches on the other side to lean over against the first stone, to serve as a brace to hold the first stone in position; this will leave a cavity to convey the spring water, then fill in small stones to level up, and you will have a drain that will not only convey the water from the spring but also the surface water. By using the stone in this way, you make two points at the same time: First, by removing an incumbrance from your land, and, second, by placing them out of the way and

making a good and efficient drain. But if you do not have the stone on your premises, buy tile, or use any other material that will bridge a cavity to conduct the water from the land you intend to cultivate. It will not pay to cultivate land that is constantly saturated with spring water. After drainage has been made, plow neatly the depth of the soil, (and, if available at reasonable cost, apply one hundred bushels of slacked lime per acre, to neutralize the acid in the ground and prepare the soil to feed a growing crop); plant to corn or sow to oats or barley; if to oats or barley, sow mammoth clover. Let clover stand till ripe; cut the top for seed, with reaper; plow under the clover stubble, pulverize thoroughly, top dress with manure, and sow to wheat or rye; follow with corn, plow late, pulverize thoroughly, check-row three and a half feet each way, drop three grains in a hill, cover with a hoe, (if early, four inches deep, if late, two inches deep,) work the corn early and thoroughly, follow with oats or barley, plowing two inches deep in the fall, to deepen the soil and bring to the surface a clay sub-soil that will prevent too rank growth of oats or barley. The clover seed that was plowed under with the stubble will probably seed the ground sufficiently; if so, let it stand until next season, and cut the seed as before, and top dress with manure or commercial fertilizer, and sow to wheat or rye. By following this course of rotation of crops, you can secure a crop every year, and your land increases in fertility, provided, always, that you do not let any stock run over it and tramp the life out of the soil. It is useless to spend time and seed in cultivating land in a careless manner and expect remunerative crops. Thorough cultivation is required, on the best of lands, to insure large results. No hay, straw, or feed grain should be sold from the farm, but should be fed to the stock that will pay to keep and feed, and the products of the farm converted into live stock, dairy products, poultry, wheat, and meat. Horace Greeley, in his lifetime, told a great deal of what he knew about farming, and, among other things, said that the best farmer was the one that made the most manure. A great loss is sustained by many farmers by letting their manure lie in the barnyard for months, and sometimes for years, and when it is carted to the field there is nothing left but the fiber. Manures should be carefully collected and kept under cover; care should be taken to keep it from burning while decomposing; water should be applied with a hose or otherwise, to wet it, but not enough to leach it. By close attention to it in this way, the liquid will be absorbed and the ammonia retained. The man who sells hay, straw, and coarse grain off his farm may accumulate money while times are easy, and while his farm has so much of the richness of the virgin soil left that it can endure a few years of absolute starvation without immediately giving evidence of the extraordinary strain that is being put upon its resources, but sooner or later the day of reckoning must come to the farm that is systematically starved in this way. Clovers of all varieties are the best green crops to plow under for fertilizing the land, but too many farmers deceive themselves and cheat their farms by sowing clover to fertilize their land, and when haying time comes cut the clover, make it into hay, and sell it off the farm; and still worse, turn in their stock to eat the blade and tramp the ground as hard as a board, and wonder why their land won't produce good crops. It seems to be the prevailing opinion that timothy is an impoverisher of land, but your writer is not of that opinion; it is a tender plant, more easily killed than wheat by late frost. We seeded four acres with timothy and mammoth clover, as they mature at the same time, excepting that in two or three years the clover would be killed out and disappear, but close observation taught me a lesson. In a warm-growing season and no late frost, the grass was nearly all timothy, and when the

season was dry and late frosts, the grass was nearly all clover. This lot was not pastured by any stock except sheep in early winter. After cutting a good crop of grass for eleven years, I plowed down the sod, top-dressed with manure, sowed to wheat, had a good crop, followed with corn; sowed clover the last time the corn was cultivated; catch was good; the next season the clover and other green stuff was so heavy that it was difficult to plow under; sowed to wheat, had heavy crop, followed with corn, etc., etc. You must feed your land if you want it to feed you, and the cheapest way to do this is with manure and green crops. It will not do to depend on ground lime, or even slacked lime, for neither possesses plant-food. Nor will it do to depend on commercial fertilizers. It is true that they will stimulate and help the plant to start and increase the crop, but they cost too much, and can be supplied with other material more lasting on the farm. Recapitulation: Take off all obstructions, underdrain all wet land, apply lime to neutralize acidity in the land, plow well, harrow well, top dress with manure or commercial fertilizer; sow wheat, rye, oats, or barley, and seed to clover to plow under when ripe; follow wheat and rye with corn; follow corn with oats or barley; after oats and barley, wheat. By following the above rotation, you can get a crop every year provided that you do not pasture any stock on the land, you cultivate in field crops, and your land will increase in fertility.

LIFE AND HABITS OF INSECTS.

Abstract of a lecture delivered by Prof. W. A. BUCKHOUT, Entomologist of the Board, at Bloomsburg, Pa., December 2, 1885.

It has seemed to me that at a meeting of this kind the consideration of the general life history of insects will be of more value than the consideration of special cases, for there is much popular misapprehension as regards insects, what they were, how they live, how they may be destroyed, &c. Moreover, upon the facts as derived from a study of the life history of insects are based the special means employed in individual cases whereby noxious kinds are destroyed and useful ones protected. Insects are found very widely scattered over the earth wherever the climate conditions are favorable to their developments and sustenance. It is scarcely necessary to more than mention the fact that they are frequently present in enormous numbers. It is not so well known that there are also enormous numbers of kinds and species. A single family, like the beetles, contains not hundreds but thousands of species which have been, to some extent at least, studied and collected. Although so numerous in both species and individuals there are certain characters in which they are alike, substantially, though ranging greatly in minor details. Insects are relatively small animals, and have bodies which, in the adult state, are divided into three well marked regions, head, thorax, and abdomen; they have also jointed legs and one or two pairs of wings, except in occasional instances. Of more value than anything else, however, is the metamorphosis, which is more or less conspicuous in all this class of animals.

All insects, with very few and significant exceptions, are reproduced from eggs. The eggs of insects are necessarily small, but they vary very much in number, shape, size, and markings. When many are placed together they are generally compressed, and covered by a glutinous substance which protects them from moisture. The eggs are not laid promiscuously, but

are placed with considerable care, and for this purpose the female insect has generally peculiar or special appendages at the posterior end of the body of such shape and general structure that as the eggs issue from the oviduct they slide easily into the designed place. The inposing apparatus varies from a simple one used only for guiding and placing eggs in regular rows to a very complicated one where hard material, even the hardest of wood, is perforated, in order that in it or perhaps beyond it the eggs may be placed. In common with the instinctive and inherited methods of egg-laying, all insects make abundant provision for their young, either by providing food for them before hand or by placing the eggs in such positions that the young can easily reach the food fitted for them. Pausing to note whatever of practical value can be derived from the general life history of insects the question is at once suggested to what extent, if any, can injurious species of insects be held in check by destroying their eggs. Where eggs are rendered somewhat conspicuous, either by reason of their size or the manner in which they are grouped together, it may be practicable to collect and destroy them. A number of the moths, whose caterpillars draw the leaves from fruit trees, lay their eggs closely together, covering them with a thin coat of varnish to protect them from the weather. From small trees such egg-masses can be collected, particularly after the leaves have fallen, and it is unnecessary to say that small trees are the ones which feel the ravages of such insects most sincerely. The little white tree cricket lays its eggs in the stems of various trees and shrubs, particularly such as have a large pith. The affected branches are seen quite easily and can be cut off and burned. Were all fruit-growers to do this the injury produced by this insect would be reduced to a minimum.

The hatching of the egg gives rise to a young form which is technically known as the larvæ. In most cases the animal is worm like, and the common name worm state is often applied to larvæ. However unlike their parent these larvæ may be, they are their natural progeny, and the worm-like appearance is merely superficial, since this state is but a transitory one, giving rise to the adult form in due course of time, and hence, bearing to it the same relation which infancy bears to manhood. These larvæ have a remarkably good development of some organs, while others are but poorly represented, if at all. The respiratory system is well developed. Along the side of the body are small mouths which communicate with tubes running inward, then lead to larger tubes running lengthwise of the body, which divide up into smaller and smaller tubes, which are hollow and so extensive that they make a fine net-work running through the whole body. In order that a liberal supply of air may be conveyed, these tubes are everywhere held open by a delicate, spirally wound filament of horny matter. Their breathing is not done through a single mouth at the end of the head, but through these lateral mouths and into their communicating fine tubes. Equally well developed is the digestive system of the larvæ. It is capacious and well fitted for disposing of large quantities of food at frequent intervals. To say that larvæ are possessed of enormous appetites and are gross feeders is but poorly stating the case. Some larvæ are fitted for living upon soft, juicy material, only their mouth parts being very simple, and unable to make use of food of any other description; others readily eat and masticate ordinary cellular tissue as found in leaves and fruits, but are unable to use hard, woody tissue of stems and roots. Still others find wholesome food in the hardest parts of tree trunks, through which they cut with ease, and upon the nutritious parts of which they live. Details of structure differ so much in larvæ that they call for individual description, and can be considered best by taking up individual cases. Since

a large share of the injuries done by insects are done by them while they are in the larvæ state, it is then that some means of destruction is called for. When it is at all practicable nothing can be more effectual than picking and destroying by hand. It may excite a smile to speak of trying to exterminate insects by hand, but there are frequent cases where it is not only the best, but the only practicable course. The oft-repeated case of the apple-tree borer is precisely in point. Here we have often but a single larva in a tree, definitely located at or near the base of the trunk, in a burrow whose position is marked by the discolored dust which the worm is constantly pushing forth. Since the burrow runs for the most part upward and, moreover, is more or less clogged by the wood fibres and saw dust which the knowing worm has displaced, it is useless to attempt to disturb him by throwing any corrosive substance into the burrow. It cannot reach him. You must cut open the burrow, thrust into the enlarged opening an iron wire bent into a hook at the end, and draw the worm out to be crushed under foot. No better means have ever been devised, and, so long as no preventative measures are taken, this must stand as the most effectual means of ridding our trees of this formidable enemy.

The use of such substances as Paris green, whale oil soap, lye, &c., is founded on their well known corrosive effect, and as larvæ, are generally very tender skinned; a comparatively small quantity or weak solution of such substances may be quickly fatal. In practice, the difficulty of applying or projecting these materials so that they shall accomplish the desired result, is the most serious one, since so many larvæ are shielded by living on the under sides of leaves and beneath projecting scales, that it is not always easy to reach them. The application must be determined by the circumstances in each case. Of late there has come into use a substance long known and employed in eastern countries—pyrethrum powder. It is obtained by grinding the flower heads of pyrethrum—a plant not unlike our common ox-eye daisy. When this dust is drawn into the breathing tubes it proves a very great irritant; and most insects are seriously affected by even a small quantity of it. Fortunately, it has no injurious effect upon other forms of life, and hence can be used without fear of injury to anything except the insects. The drawbacks to its more frequent use are its cost, its liability to deteriorate with age, and to being adulterated by dealers. So many insect larvæ are found living in the ground, and sometimes so many are found hibernating there, that it has been a common recommendation, where cut-worms have become bad, for instance, to plow late in the fall, so that the worms would be upturned, and being thus exposed, would be destroyed by the frost of winter. The idea appears reasonable, but, unfortunately, such experiments as have been made, do not seem to verify it. In other words, insect larvæ are able to withstand a degree of cold much greater than ordinarily supposed.

Resuming the matter of general life history we find that, should the larvæ live out their allotted time, which varies greatly in different species, they pass gradually into a second or pupa state. In some cases this is acquired without any marked change in habit or actions, but in the majority of cases, their is formed about the body a special case or covering, either of something picked up and built about the body, or of something which is secreted by the larva itself, and exuding from the body, forms a silken cocoon which enwraps it. The protection of the body seems to be the use of these coverings. Within them the larva gradually becomes changed; the body shortens, the true legs, wings, antennæ, and other parts appear. At the same time the internal organs become correspondingly mortified, and the whole character of the insect becomes changed, whereby it is no

longer fitted for life, habit, &c., of a worm; but for those of an adult insect. Through all these changes the cocoon serves as a most efficient protection from the weather and from the attacks of enemies. However, cocoons sometimes betray the presence of a pupa, when it would otherwise escape notice; and there are some instances where a ready means of destroying injurious insects is found in collecting the cocoons and burning them. It is, however, true, that many of our largest and most conspicuous cocoons are of harmless species, or of those which have never been known to be present in so great numbers as to be specially injurious. Should pupæ not meet with any serious obstacle in their growth, they will, in time, become full grown adults; which are technically known as imagoes, thus completing the triple existence which insect economy illustrates. Adults show the highest development of bodily structure, and upon them devolves the process of reproduction of their kind. Indeed, this seems to be the chief function possessed by them; and in many cases the whole time and energy of imago life are spent in making provision for the construction of the species—no food being taken at all, or only that of the amplest kind; so soon as pairing and egg-laying have ceased, they die. For the most part it is the shortest period of insect life. It is no uncommon thing to find the first or larva life running over several years, the pupa as many months, while the imago lasts only as many days.

Thus have been sketched in a familiar way the life-history of our common insects, simple enough to one whose study and attention have been frequently rewarded by seeing with his own eyes these different forms, but ever a source of wonder, not unmixed with incredulity, from those whose observation has been slight, and whose attention has been engrossed by other things.

Realizing the difficulties in the way of a good understanding of this method of metamorphosis, which is the key-note of all insect-life history, I shall ask your indulgence while I try to illustrate it again and in a somewhat different way, namely, by taking examples from the principal families of insects and explaining them somewhat in detail. The simplest classification of insects groups them into seven great families, each of which is named after some character of the wings. They are Neuroptera (nerve-winged insects,) Orthoptera (straight-winged,) Hemiptera (half-winged,) Coleoptera (shield-winged,) Diptera, (two-winged,) Hymenoptera (joined-winged.) Examples of each of these families were then considered and explained by the use of diagrams, injurious species being, for the most part, chosen.

INSURANCE OF FARM PROPERTY.

By SAMUEL NEYHARD, Esq., *Bloomsburg, Penna.*

Read at the meeting at Bloomsburg, Pa., December 3, 1885.

The business of insurance of property against fire has so grown in proportions during the past one hundred years, that it is now considered by a majority of property-owners a necessary and ordinary incident in the expense account of property-ownership.

Insurance of property is that system of guarding against unforeseen and possible loss, by paying a certain sum for a specified period, as the price of indemnity in case the loss should occur. In effect, it consists in taking the aggregate loss of property in general, and, by comparing the loss with the

total value of property considered, we find the percentage of danger. By adding to this percentage the probable percentage of cost in the management of the business, we get a basis for determining the probable cost of insurance. There are two general systems by which the business of insurance is carried on. One plan is known as the stock plan, and the other as the mutual plan.

In the stock plan a fund is raised, or supposed to be raised, as a capital, by those interested, and they assuming, as a matter of business, the indemnification for losses, agree to reimburse those who insure with them upon their paying a specified sum, which is based upon the percentages above mentioned, and to which is added such further sum as by experience may be necessary to cover the risks of capital and the profits desired or attainable on carrying on the business.

In the mutual plan, there being no capital involved, and the risk of loss being mutually undertaken by all who are seeking insurance, only a small sum is charged, in the first place primarily to meet the incidental expenses, and, secondarily, to be used toward the payment of losses. The losses, however, are over and above what the small first payment affords, made up by assessments *pro rata* among those who have, by their connection with the association, become mutually liable, one to the other, for the losses as they may occur.

Each of these systems have their advantages and disadvantages. I will only remark here that, on the one hand, the insurers in mutual companies, being really the owners and controllers of the affairs of the company, and being widely scattered, it is claimed can never give its affairs that close and careful attention that stock-holders do who have their money invested in the stock, and looking to their capital for profit, must necessarily attend closely to its management in order to protect themselves. On the other hand, it is claimed that this very matter of seeking large profits from capital invested, necessitates the laying of high cash premiums, and that, unless the stock companies do get in a revenue much larger than the actual risk, they become unsound, and are swept away by any unusual contingency.

If a mutual company is carefully and properly managed, the saving in profits on capital, and the greater amount of security by having all the insured property liable for each particular fire or loss, is certainly a great advantage. This is a great consideration for the farmer, whose small profits at his business makes the slightest gain at any point important.

With reference to the risk, farm property is much more desirable than town or city property, notwithstanding the great danger to farm property from lightning, and the want of facilities for putting out fires in isolated buildings when started, and the inflammability of much of a farmer's personal property. yet, in a town, incendiarism and nearness to other buildings, with the aggregate carelessness of many people, as well as the various more dangerous vocations carried on in towns and cities, makes the risk in town property, as has been shown, far in excess of that on farms. It has been shown that in cities one third of the fires are caused by incendiarism.

There is another element of difference in safety that I will mention here, and that is the temptation occasioned by business losses and hard times. This, in towns and cities, affects not only those who are moved by such temptations, but the property of innocent owners, who are affected by the burning or destruction of their neighbor's property. The farmer, however, is seldom the gainer by such fires; his buildings are generally too valuable to the farm itself to be sacrificed for their own intrinsic value, and the inconvenience of being out of house and home, or shelter for stock, as well

as the danger of losses to uninsured and uninsurable property, go a great ways to prevent the offer of any temptation to get out of financial difficulty by incendiarism on the part of the insured.

If the farmers can have a well-conducted mutual company of their own, they can certainly insure each other much better than by any union of operations with town or city property-owners. But herein comes the difficulty to be met, their very business separating them over a wide extent of territory and tying them closely at home, is in the way against careful and prudent management, and makes them liable to being misled by professional sharpers, who organize for their own pockets, and soon lose sight of the interest of their patrons.

Yet if farmers can unite and find a way of close supervision over their business, they can, by mutual companies conducted entirely among themselves, make insurance safer and more economical than by paying stock companies large profits, or joining miscellaneous property owners. One way of accomplishing this object is to join an intelligent farmers' association or order, and unite in the discussion of subjects there brought up; such an association gives you a better acquaintance with your neighboring farmers, gives you a wider acquaintance, and opens your eyes to a great many advantages to be derived in your business that you would not think of otherwise; it also trains your own powers of thought and observation, and enables you to see the ins and outs of a great many things. Then if you find that those with whom you are associated are live, active, thinking men, you can join with them, either in organizing a mutual insurance company, or in going into one already organized, but have no great unwieldy affair, that depends on some central management of a large and boundless extent of territory.

The company should not extend any farther than the intelligent management can personally oversee without neglect of their farm duties; for example, suppose a company organized with a central management chosen by the whole body of insurers and the insurers in a small section, say one or more townships had the right to vote for the selection of the agent for that district, all subject to the approval of the central organization. give no percentage to agents to stimulate them to take large amounts, perhaps beyond the capacity of the property, but pay them for their work the same price on each policy, big or little, and let their pay be about what they could make on their farm if not called away to attend to your application, and you will find that you can wonderfully simplify the subject of insurance, know more about what you are doing, take less risk, and pay less for your insurance; such at least are some of the results accomplished heretofore, by pursuing such a policy.

Too large an insurance company, like too large a farm, is dangerous to the farmer. In insurance of farm property, like farming itself, the more he gives it his own personal attention, and the more convenient he has it for his own personal attention, the better he will be satisfied with results. On this basis farmers have been enabled to insure their property for ten years at an average cost of less than six dollars per thousand dollars of insurance on each five-year policy, or a little over one dollar a year on the thousand dollars. This has been done by farmers and by farmers alone, and it can, without any doubt, be done again; it shields you from professional sharpers, because you do not have any such to deal with; it protects you from putting too much insurance on the property, because you have a greater opportunity to know or learn of the value of property in the districts you insure; you can know also who all in your neighborhood are insured, and equally liable with you, and you know that the same policy pur-

sued in the various districts in which your company are working, are supervised with equal care as in your own.

Organize your own companies, and in such a way that you have your own supervision, and do not leave that supervision to well paid officers, whose main object in the business is to make money, and you will find that you are greatly the gainers as far as insurance is concerned.

GRAPES FOR THE FARM GARDEN.

By J. R. TOWNSEND, Esq., *Bloomsburg, Penna.*

Read at Bloomsburg meeting.

I do not propose to give a long, or attempt to give a learned, essay on this subject. I do not propose to trace the origin of the grape, as we all know it is one of great antiquity, and a fruit that is, at present, extensively grown throughout the civilized portion of the world, and there is, probably, no branch of horticulture, at the present time, in the United States which is receiving so much attention as the cultivation of native grapes, while the large increase of acreage in some of our States shows that the cultivation of the grape is fast becoming a source of great wealth, and it is one of the principal features of this essay to draw the attention of my farming friends to the advantage that may be derived from the cultivation of grapes in the farm garden. I simply propose to give the result of several years of experimenting with different varieties of the grape, in order that varieties of grapes may be planted that are suited to our county, and that my friends may plant grape vines that they can rely will produce fruit to perfection. On many occasions, while traveling through our county, I have frequently observed a very much neglected portion of some well-cultivated farms and that portion was the farm garden, a part of the farm that is so closely connected with the domestic part of the farm that it should by no means be so neglected.

I will not attempt a description of the usual farm garden, but only state that, from frequent observation, I have noticed the entire absence of grape vines, and when, by chance, they are found in the farm garden they are mostly of an inferior variety, or in a very neglected state, producing very little fruit, and being, in fact, of no profit to the farmer.

During a period of several years, I have devoted my leisure time in cultivating grapes, and I have obtained considerable practical information, from repeated experiments with different varieties of grapes, until I think I am in a position to tell my friends what varieties of the grape are most profitable and suitable to our county. At our county fair I had on exhibition nine varieties of grapes, each one, or all, of which I can confidently recommend as being profitable to raise, and for the benefit of my friends I will give the names of the different varieties. For early grapes, I find "The Early Brighton" and "Moore's Early" are unsurpassed, both of them being thrifty growers and prolific bearers of fruit. I have also grown and tested several of "Rogers' Hybrids;" they are strong growers and not subject to mildew like the slow-growing varieties. I find the "Agwam," or "No. 15," excellent, and for beauty of cluster and flavor of berries can hardly be excelled; while the "Salem," a hybrid between the native and "Black Hamburg," is pronounced by the best of judges, who have tried it, to have no equal among the numerous varieties now before

the public. There are many other varieties of "Rogers' Hybrids," all of a different flavor, and each possessing merits the others do not.

The "Hartford Prolific" I find very good, vines are vigorous and exceedingly productive. The "Martha," a pale, yellow berry, a seedling of the "Concord," but ripening earlier, and better in flavor, I have grown with great success; and last, but not least, the "Concord." Of all grapes I do not know of any that can equal the "Concord." It is a sure and safe bearer, easy of growth, hardy, vigorous, and productive, and less disposed to mildew than any other grape I have grown. Suitable for the table, or as a wine grape, it may lack in flavor, but, as a prolific bearer, I have never grown a grape to equal it. When some other of my varieties may fail, I can always rely on the "Concord" for grapes. As wine grapes, I find the "Bacchus" and the "Clinton" are among the best, being extremely prolific, and making an excellent wine.

While the grapes mentioned by me are varieties that are noted for their excellent qualities, I do not wish to detract from the merits of many of our new varieties that are constantly being introduced by our grape-growers, such as the "Jefferson," "Lady Washington," "Niagara," and many others.

My farming friends may tell me they have no time to spare on grape vines. Let me tell them there is very little time required to grow grapes; almost any soil is suitable, if not too wet, and there are few fruits that require so little care, and that gives such widespread enjoyment as does the grape. Vines can be grown within half a foot of a fence or building, and many a corner and unsightly spot can be made to produce grapes, and the little attention that is necessary is at a season of the year when the farmer can do very little farm work, while the summer care of grape vines is one of the most pleasant occupations for ladies or other persons who cannot perform the heavier duties of the farm.

Hygeinists agree in pronouncing grapes as among the best of fruits. The grape possesses several rare qualities; it is one of the most nutritious of fruits for those in health, while physicians frequently prescribe it to the invalid. Let me assure my farming friends that grapes should be on the table as often as they can be procured through the season, and not merely on special occasions, but as an article of food that is wholesome and nourishing.

I have now told you what to plant in the farm garden, but time will not permit me, on this occasion, to enter into any details as to pruning and training the vine, or as to the merits of the different systems adopted by grape growers. In conclusion, let me urge my hearers to plant out a couple of dozen grape vines in the coming spring, and I think you will find that, with care, this delicious and healthful fruit will amply repay for the outlay in the farm garden.

POULTRY FOR PROFIT AND PLEASURE.

By M. P. LUTZ, *Bloomsburg, Penn'a.*

Read at Bloomsburg Meeting.

Nobody knows when or by whom fowls were first domesticated. There are at most only two or three allusions to them in the Old Testament, and these are of doubtful import. However, in the time of Aristotle, who wrote three hundred and fifty years before Christ, they were evidently com-

mon, for he speaks of them as familiarly as a naturalist of the present day. The wild origin of our domestic fowl is entirely unknown. The race is probably extinct. The domestic turkey is not so far removed from the wild state as the domestic chicken. There is no dispute about his origin, the wild turkey not being yet extinct, and not differing so widely from the tenants of our barn-yards as to give room for doubt on that point. In fact, if kept in the neighborhood of large forests they will often stroll thither, without any desire to return, such is the natural wildness of their species. The domestic goose has acknowledged the sway of man for ages, perhaps since the days of Noah. Homer mentions them where Penelope, relating her dream, says: "I have twenty geese at home that eat wheat out of water, and I am delighted with them." Their cackling, it will be remembered, saved Rome from the Gauls three hundred and eighty-eight years before Christ. Their wild origin is unknown, the wild geese of the present day being of a different species. The origin of the tame duck is not a well settled point. Dixon supposes it to have been imported to England from India and China in or about the year 1493.

We can hardly suppose that man has cared for poultry for over two thousand years, and yet not be fully satisfied that they are either a profit or a pleasure. Yet this question is so often asked, and by so many different kinds of people, that to answer it intelligently requires some explanation. As facts are abundant I need not offer theories. Some people condemn theories *in toto*, and when anyone is bold enough to advance a new one they go for him with a vim which nearly frightens him out of his wits and theories alike. What a great mistake to thus condemn theory, for it is one of the best things, when properly used, which the Creator has endowed us with. What is successful practice but theory practically demonstrated? Theory must always precede practice, and all our discoveries, both great and small, are the result of theory successfully carried out, and one is intimately connected and dependent upon the other. What we learn may be taught us by some one who in turn was taught by some one else, but if we trace it back far enough we will find that some one with brains, having tried the old way so long, thought there ought to be a better way. Straightway theory came into play and by working out the theories carefully, new methods and plans were developed and then put into general practice. Theory is only distasteful and objectionable, as well as pernicious, when it has no foundation and where there is neither opportunity or inclination to develop it into facts; but, as I have said, facts are abundant, and I shall not indulge in many, if any, theories. I believe I am safe in saying that in no other department of the farm has there been such advancement of late years as in the poultry yard, for one reason, that in no other department has there been such neglect and abuse, and another is that there has been a general awakening among the people to the interest of poultry—commonly called the hen fever—the result of which has been to give her a higher place. It has been quite a common idea for a long time that poultry needed but little or no care, and the idea was fully carried out in practice, insuitable arrangements and wanton neglect characterized the general farm management of the chickens. It is thought by many that any old shed which will not answer for a pig-pen, cow-stable, or dog-house, is plenty good enough for fowls, and the fowls often show their better sense in choosing the fences and apple trees outside, rather than accept the palatial homes offered. This style of houses is not such as will tend to make the keeping of fowls either pleasant or profitable.

Poultry keeping is no exception to the general principal in all business, that neglect is very expensive. I speak with assurance on this subject, for,

as a boy, on the old farm I saw the results of the faulty management. Later I have reaped the fruit of a better system. Nor was my father's management of the poorest; I doubt if there was a better in the vicinity. He gave the chickens a warm house and always had them well fed, faultless roost poles were in position, and cosy nests were arranged to tempt the egg laying, but for a good part of the year it was only this and nothing more. Cleaning from under the roosts, except at corn planting, giving warm drink in winter or any drink at any season, feeding meat or vegetable food in winter, or making the house light with ample sunny windows—all this was never thought of. We got abundant eggs in summer when eggs were almost worthless except to aid in pastry and add a relish to the table, and had the chicken stew, the roast, or the famous chicken pie whenever desired, and, all ignorant that more was possible, we learned wherewith to be content. I would not say, nay, I am of the contrary opinion, that even with such care chickens are not a desirable addition to every farmer's home, but would say, and emphasize the truth, that there is a better way. Under the old system poultry on the farm is, in some sense, a convenience and a luxury; but under a better system the convenience is increased, the luxury augmented, and there is also a considerable profit. The poultry and agricultural press of the country are doing much good by calling the attention of the farming community to their especial interests. But farmers are very slow to abandon old usages and methods in keeping a breeding domestic stock. No class of men have better facilities for raising poultry. Ample runs, orchards, meadows and grain fields to roam in and pick up what is left after the plow and reaper, and to feast on the grubs, insects and worms that infest the vegetation and fruit trees of the homestead.

Now, if it pays to keep cows, sheep and swine, most assuredly it will pay to keep good fowls. I know that on a farm a bushel of grain will feed a hen a year and I know that it don't cost the farmer over fifty or sixty cents at most. I know also that any of our modern improved varieties will with care lay at least ten dozen eggs during the year, these at twenty cents a dozen gives the farmer a net profit of about one dollar and fifty cents for each hen. Many of the failures and bitter disappointments in poultry raising, as well as in other branches of human industry, can be directly traced to not starting right. If you do not take the right road you will never reach the desired point, no matter how hard you may push your way along. The first step to success is to procure some prime fowls though they may cost more than dunghills and mongrels. There are so many different breeds of fowls that there is certainly an opportunity for all lovers of poultry to suit their fancy. The Asiatics are best fitted for limited runs in cold and wet weather. They are good winter layers, well-behaved, quiet and kind mothers. The Plymouth Rocks would doubtless suit many; they possess a happy medium between the Mongolians and the non-setting breeds, they are good layers, good table fowls and hardy. The Leghorns, Hamburg, Polish, and Spanish dispute the superiority of the others, and ask for a fair trial of their merits to prove that they are equal to the best. The Houdan shakes her tufted crest in derision of such selection, and reminds you that they have no plebian blood in their veins. I might go on and review every variety and find excellent qualities to recommend them. The best breeds are those which return to the owner the most money for the labor and food expended. It is not necessary that the poultry-house should be elaborately finished, either inside or out, nor any particular style of architecture. A snug warm place in winter with glass windows fronting the eastern and southern sides of the building; a box of road dust, in which sulphur and insect powder are mixed, dry leaves, short straw,

or chaff strewn on the floor, a box of gravel, slacked lime, old mortar, broken bones, crushed oyster shells, and some charcoal or charred corn constitute the chief articles needed for a winter poultry-house, or where fowls are confined during other seasons. Nothing expensive or hard to procure. A year's subscription to a good poultry paper or magazine should be added, and yet the bill is not large. The dust box should be placed where the warm rays of the sun will heat it.

Small grain thrown among the leaves, or other litter on the floor, give the fowls exercise, and keep them busy during the cold days that they are not allowed their freedom. Exercise is essential to good health, it promotes a healthy action in the whole fowl economy, gives a natural warmth to the body, thereby stimulating the egg functions to generous activity. This is not all, do not crowd too many into one house; keep the place clean. The horse and cow stables are cleaned every day, why should not the hen-house? Wash the roosts frequently with kerosene oil and whitewash all the wood-work. An absolute necessity is a supply of good fresh water at all seasons of the year, they should have it fresh daily, which can only be insured by making it a point to furnish it regularly as the feed is given. When that plan is once established it becomes a part of the regular routine and is not neglected. Have some arrangement for watering, so that the young chicks will not be tempted to drown themselves in the water-trough where the horses drink. I presume some of my hearers will shrug their tired shoulders at what I have presented, and with the thoughts of an already irksome life, will mutter "too much work." But it will pay. To expect that hens will lay well in winter, when egg sare most desired on account of high prices, without a correspondingly liberal amount of food and care, would be folly in the extreme. Every year we see a constantly increasing demand for fresh eggs, for they enter more largely into the cooking arrangements of every household than any other thing we can name. I do not ask you to engage in an enterprise that is already crowded, as we never hear of over-production in the poultry business.

The supply is far short of the demand. The imports of eggs for 1884, amounted to sixteen millions two hundred and eighty-seven thousand and two hundred and four dozen, valued at two million six hundred and seventy-seven thousand and three hundred and sixty dollars. Must we continue to use the cheap labor of foreign bennerage, or shall we send a delegation to Washington to secure the passage of an "Anti-Foreign Hen Fruit Bill?" While the lobby is getting in its work let us press every available hen and pullet into service and persuade them, by good care and feeding, to do their best to increase the domestic egg supply. The egg trade of the country is immense. It is estimated that the inhabitants of the United States consume forty-five millions per day. New York alone consumes forty million dozen annually. The question, "Does poultry keeping pay?" can be answered much more to your satisfaction when I can point to particular instances where care is repaid by profit. From reliable experimental records, kept by ten farmers one year, I find an average profit of one dollar and ninety-six cents for each hen, the first cost of the hens being fifty cents each. Here is about four hundred per cent. profit. If ten farmers can realize as above, why should not ten thousand do the same thing? The egg supply of this country, as already shown, is over sixteen million dozen short. To make up the deficiency we need about one million five hundred thousand industrious pullets in addition to the present supply. So I feel safe in saying that there will be a handsome profit for those who devote more time to the care of poultry. Poultry culture is also an ennobling industrial pursuit. It gives permanent pleasure and recreation from its in-

ciency to its termination. It refines the grosser part of our nature, it aids us to appreciate their usefulness and to see with clearer mind and eye those lovely objects plumed in the most varied and transcendent gorgeousness. If we only have our hearts fully in accord with our work we can find real genuine pleasure in the pursuit of any calling or business, and breeding poultry is certainly no exception. If a person does not find any pleasure in feeding his fowls and caring for their wants and needs he had better give them up entirely, for the fowls are sure of being more or less neglected sooner or later, and neglect or carelessness effectually checks profit. Breeding fowls for profit is not incompatible with breeding them for pleasure too, and things generally go hand in hand. If you go at it to make a profitable business of it and find no pleasure in your labor other than that brought by dollars and cents realized, you stand a fair chance of failure. As a means of recreation for the hard-worked business man it affords rest as well as diversion. A change of scene or occupation to the man of care and business is a relief, a soothing balm to his burdened mind. Like unto the tired and thirsty traveler who falters on the arid waste of the Lybian desert, sighs for an oasis wherein he may rest his wearied limbs and cool his parched lips. The man of care finds a pleasing relief after the wear and tear of every-day life, to muse and look awhile on the varied objects of nature. We see him now returning from his place of business and he becomes as if he were a child again, gazing at this bud or flower, or listening to the song of some caged bird. But what a change awaits him at home! There on the green sward stands his flock of feathered favorites waiting his approach.

They see him come and instinctively know he is wearied and out of sorts by the furtive glance he casts aside. Cheerful creatures, they are nowise selfish. The presiding chanticleer, like a faithful sentinel on the watch tower, gives one of those peculiar screams of warning, they rise on foot and wing and flutter around his feet. The mind of our care-worn man receives a new impulse. The labors of the day are forgotten, and the thousand and one odds and ends of business which weigh on his brain like an incubus, are lulled to rest as if by magic. Cold selfishness gives place to sympathy and kindness, and worthy aspirations bow in humility to the Creator's works before him. What a change! The groveling and speculative man who, a few hours before, thought of nothing save the manipulation of stocks or a corner in some speculative enterprise; see him now in the midst of his pets talking to this or that bird like a child; see him stroke the glossy plumage of his Leghorn pullet, and hear him interrogate her on the number of eggs she has laid thus far; see him smile when the consequential Bantam, with trailing wings and on tip-toe, steps in front to receive his caress; see him yield to the gentle pressure of the hand, how pleased he seems when he hears his master say, "that Seabright is a clever fellow." One by one they pass before him in review. He examines the comb of this one to see that it describes a perfect arch, or the lobes of another if they are free from spots and wrinkles; see him now balance the Langshan in his hands, and hear him mutter to himself, "This fellow, if he keeps on, will beat Jumbo yet." The coquettish Houdan hen peers from behind her turbaned veil like a Moorish maiden and bides her time. She is recognized by her ornamental dress, and is dismissed with the words, "Good layers, those Houdans." The sprightly Hamburg, moving like a clipper ship in full sail, receives well-merited praise for its beauty and productiveness, while specimens of lesser note file along the smooth turf in their best appearance awaiting a kind word from the care-worn man. But the shades of evening are drawing nigh, and as the birds depart to their accustomed roosting place, a serene

smile seems to play on the man's face as he enters his mansion with a lighter heart and lighter step for being in company with his fowls, and forgetting for awhile the cares of life.

BEE-KEEPING.

By H. H. BROWN, Esq., *Light Street, Penn'a.*

Read at Bloomsburg meeting.

Bee-keeping is a pleasant and profitable pursuit to those who determine to make it a success, by devoting time and labor in becoming fully acquainted in all the details of its management. And I feel assured that millions of dollars worth of honey is lost every year, of which the farmers of this country might avail themselves to a great extent, and for their trouble and expense receive from twenty to one hundred per cent. profit on the investment. It needs but little capital to begin with, and they can be kept on a very small space of ground, for many are kept, profitably, on roofs in large cities.

And farmers can keep a few colonies, and, by giving them the proper attention, and, at the proper time, can secure from the blossoms and flowers, which are to be found in abundance in rural districts, secreted with honey ready for the bee's visit to gather for its own and keeper's use.

The farmer will not only be the gainer by the honey gathered, but also by the visits of the bees to the blossoms of his orchards and fields, as it is necessary for some insects to carry the pollen from the male to the female blossom to fertilize them, or otherwise they would be barren, or nearly so. If at the time of the blooming of our apple or cherry trees we should have a week of cold, stormy weather, so that the bees or other insects cannot work on the blossoms to assist in the work of fertilizing, we will not have a full crop of fruit. And again, if the bloom of the buckwheat contains much of a secretion of honey, the bees will work daily upon it, and the result will be the blossoms will become fully fertilized, and there will be a large yield of buckwheat. The white and alsike clover have very short blossoms, and they secrete large quantities of honey, and the bees work on it from morning till night, and by this becoming fertilized are well filled with seed. It is not so with the red clover, as the blossoms of the first crop are deep and very narrow, so much so that the bee's tongue is too short to reach the honey there secreted. And as the much-abused humble bees at that season of the year are very scarce, as it is the only bee that has a tongue long enough to reach the honey, there are but few blossoms fertilized, and the heads are barren.

And thus it plainly shows that the bee was created for the purpose of assisting the fertilization of the different plants, and that the honey was secreted to induce the bee to visit the flowers to gather the honey and pollen, and thus we secure through the bee the delicious honey.

The location does not so much depend on the successful keeping of bees as the manner in which they are kept. Many farmers keep their bees in such a way that you conclude they are either too indolent or ignorant to make them a success. The kind of farmers who can keep bees—at least colonies enough to furnish honey for their own families, if not to sell, are the ones who have the sense to prepare their ground and plant their crops in the proper season, instead of waiting until the moon gets in the right sign. To be successful you should have a love for bee-keeping, and you

should do the right thing, and at the right time, and that requires knowledge. And you can acquire that by reading some standard work on bees, and by the use of practical observation. Where bees are kept on the principle that it is a business, and that it requires some energy to care for them, they will conclude that for pleasure, health, and profit it will compensate them well for the time and attention given to them. Bee-keeping seems especially adapted to women, as it requires patience and attention rather than strength. There are many women to-day engaged in bee-keeping, and they have not only made it pay, but have gained much useful knowledge, besides enjoying a pleasant out-door exercise by caring for their bees. Many, with limited means, can procure a few colonies of bees and, with the proper care, can make quite a profit with a small outlay, and also have a supply of pure honey for their table. Mrs. L. Harrison, one of the most noted writers of agriculture, whose health, at one time, was so reduced that her physicians said she could not live, but apiculture did for her what her physicians could not do, restored her health, and gave her such vigor that she has been able to work a large apiary for years. Mrs. L. B. Baker, of Lansing, Mich., who has kept bees successfully for quite a number of years, says: She has tried both keeping boarding-house and apiculture, and she gives bee-keeping the preference as more profitable, healthful, independent, and enjoyable.

The fear of that terrible bee sting, which every bee seems to know so well how to use in self defense, and in protecting its stores, may prevent many from bee-keeping. But by the use of a bellows smoker, and a bee veil, you need have but little fear of being stung.

Wax is one of the products of the bee, and is produced by the bees consuming about twenty pounds of honey to make one pound of wax. The wax exudes from the under side of the bee's abdomen in thin flakes. And then the bees, with their mandibles, press and work it in the comb to store their honey, and rear their brood in. Wax is used by the bee-keeper in foundation for starters in the brood frames and surplus section. It is made by running thin sheets of wax through a machine consisting of two rollers, and it forms the base of the cells and slight side walls, thus enabling the bee-keeper to secure straight combs by its use. A colony of bees consists of the queen, workers, and, at certain times of the year, drones.

The queen's place in the colony is simply to lay eggs, and she is capable of laying from two to three thousand a day, and she can, at her will, lay either worker or drone eggs. The life of a queen is from three to five years, and the life of a worker is only from three to six weeks in the honey gathering season, and a colony contains from thirty to forty thousand bees. It plainly shows, to meet the great loss of workers, the queen must be a prolific layer. The queen can be hatched from any egg if not over six days old, that would have produced a worker bee, in twenty-one days by enlarging the cell containing the egg and supplying it with food called royal jelly. The queen, six to eight days after hatching, will leave the hive on a pleasant day on her marriage flight, and, if successfully mated, she will begin to lay about the second day after her return, after which she will not again leave the hive unless to accompany a swarm. The worker bee will hatch in twenty-one days from the egg, and their labor for the first two weeks is in the hive, to care for the feeding of the larvæ, sealing of the cells, and receiving honey from the bees as they come in loaded, and deposit it in the cells, and seal them up when the honey is properly ripened, after which time they become honey gatherers. The drone, or male bee, lives on the labor of the worker, and is only of use to fertilize the young

queen, and as soon as the honey flow slackens, the workers drive them out of the hive and kill them, as they are only considered as consumers. It has always been a query how the bees could store their honey in the cells and have it remain there without running out. The past season I observed a bee begin storing honey, in a cell next to the observation glass, in one of my hives, and I found, on close examination, that the bee had covered the base of the cell with a thin, tenacious film, and when the bee wished to store its load of honey it inserted its tongue through and under the coating and injected the honey beneath, and, as the cell filled the film, moved outwards, and thus held the honey in place until the cell was filled and ready to cap over.

In starting to keep bees it is necessary to adopt a hive with movable frames, and the least fixtures you can have in constructing it the better it will be. And of the kind of bees to have, after having the black, Italian, Holy Land, Cyprian and Albino bees, I prefer the leather-colored Italian for all purposes. An inexperienced person should not begin with more than one or two colonies, as they will increase in numbers perhaps as fast as his experience and knowledge increases. The best time to purchase is in the month of May, and then do select on account of weight as to quantity of bees the colony contains. For, at that season of the year, it is best to have the colony strong; for, if you have plenty of bees, you may expect early strong swarms and surplus honey. The swarming season is one of much interest, and it is thus the bee-keeper secures his increase of colonies. When the first swarm issues it is accompanied with the old queen, and the bee-keeper should be in readiness with a hive, and, as soon as they have clustered, they should be hived and put on the stand which they are to occupy. In eight or twelve days after the first swarm issues, you may, by holding your ear to the side of the hive, hear a peculiar peeping; for the first queen that emerges from a cell will go to roving through the hive, and attempt to destroy the cells that remain, and, if the bees guard them, the queen will make a noise something like "peep, peep," and the queens in the cells will answer "quit, quit;" and they keep that up until about the time the next queen is ready to swarm from the cell, when the bees will cast a swarm, termed the second swarm, accompanied by the queen that first hatched. If it is the desire to have surplus instead of increase then, eight days after the issuing of the first swarm the hive should be opened and all the cells removed except one, and that will prevent any further swarming. The best time, if the colonies are strong, to put on section-boxes for surplus, is about the time the apple-trees are in bloom; for then, if the bees do not swarm, as it is the case some seasons, you will be sure, if there is a flow of honey, to get some surplus. As soon as one set of boxes are partly capped, you should raise them up and place another case of section beneath the other, and the bees will at once occupy them and begin building comb and storing in them. When the honey season is over the boxes should be removed, or the bees moving over them will soil it. The great difficulty in bee-keeping has been the wintering of them safely. It is safe to say that the average loss in wintering the bees in the northern States has been from twenty to fifty per cent. Bees, if properly packed in chaff, and have wintered at a loss not exceeding ten per cent. The past two winters I have not lost a colony wintered in boxes or clamps sixteen feet long, two feet wide, and fifteen inches high at the rear, and thirty inches at the front. Remove the caps, and, after placing an inch of chaff on the bottom, set the hive on it, about two inches apart, and then fill up all the spaces and on the top with chaff, and put on a good roof that will not leak. Have the hives all

facing one way, and have a tunnel from each entrance, so the bees may fly out whenever they desire; and so you can remove the entrance-block and remove all dead bees during the winter. I prefer no upward ventilation, but cut a winter small passage through the combs, about two inches below the top-bar, so the bees can get from the outer combs to the cluster. Do not let the entrance become clogged with dead bees or you will lose them by smothering. In conclusion, "the number of colonies in the United States in 1881 was three million, and the honey produced for that year more than two hundred million, and the cash value was sixty million dollars. And this nectar would all go to waste if it was not for the bee-keeper and his bees. They thus save to the country that which would otherwise be lost. Apiculture is thus adding immensely to the productive capital of the country, and should receive the fostering care of the State."

EDUCATION OF FARMERS' SONS AND DAUGHTERS.

By Mrs. MARY V. BOWMAN, *Berwick, Pa.*

My desire to see farmers' sons and daughters educated into fine types of broad-minded, strong-natured manhood and womanhood, influenced me to accept your courteous invitation to write a paper for this occasion on the "Education of Farmers' Sons and Daughters."

Proteus, the story goes, could assume many shapes to escape the interviewer. His many sons and daughters no doubt inherited his propensities, and passed them on to succeeding generations. When members of the family first came to America is not clearly ascertained. Perhaps with the great navigator, whom they may have granted to be now Colombo, and, again, Colon, or Columbus, and to lie buried at the same time in two different places, for a perplexity to the archaeologist. However that may be, here they have been found in increasing numbers ever since, assuming forms, corporeal and incorporeal, as multiform and elusive as their great original.

According to all accounts, Proteus must have been a most exasperating person, and certainly his descendants have proved, like him, a perplexity and a plague. That they should be such to the rest of mankind is not surprising; for, like the dwellers in Plato's cave, they are for the most part satisfied with the shadow, ignorant, or indifferent if there be a reality beside.

Strange to say the foes which baffle us are often of our own household and among closest friends. You have a suspicion that all is not honest about them, and that they are but the shadows of some cunningly devised scheme of wrong and conceal their identity. With the best motives, however, we may well consider whether the gain resultant can compensate for the loss and confusion which are likely to arise.

Hence, we must take humans at their face value, and regard them as what they claim to be, and do that which seems best in view of the peculiar circumstances in each individual. But, while my sympathies are enlisted in the best interests of farmers' sons and daughters, yet I am tempted to make this short and pithy quotation from St. Anthony's sermon to the fishes:

"The pikes went on stealing,
The eels went on eeling,
Much delighted were they,
But preferred the old way."

On reflection, however, there is advanced thought among farmers regarding the education of their sons and daughters, and many think, as a wise old book says: "The world is saved by the breath of school children," and desire to make this breath of life sane, strong, and pure. He was prudent who, in answer to the can't about not prejudicing a child's mind, replied that he would prefer to 'prejudice' his garden plot in favor of strawberries than leave it to chance of purslain.

It seems to me education is commenced at the wrong time. It should begin in the cradle, and that presupposes educated mothers. It requires years of study and preparation to fit persons for success in secular trade or profession, if they set up in business without careful preparation, we would wonder at their audacity. Yet, how many parents are ignorant of their duties, and have not given ample time to preparation for a life work requiring such a diversity of gifts, and involving so much responsibility in spiritual and secular things. The best men and women of the past and present are those who have had educated mothers, truly, "the hand that rocks the cradle moves the world."

Mothers do not discriminate, do not observe the different treatment necessary in educating the vigorous and the weak child, many have not informed themselves at what age education should commence; and that the powers of growth must not be interfered with, but observe cases commencing earlier with some and later with others, and not allow time to pass by to make good and useful impressions if it can be done with perfect safety to the general health, and that the mother education consists in developing the articulate capacity, in cultivating an interested observation of surrounding persons and things, (for the activity of the eye is very early,) and the child should be taught to connect names with the various objects, and mothers should realize fully that the further they advance a child in these three branches the better is it fitted for the more methodical instruction of the school. But, say mothers, "Oh, it takes so much time." Why just think of it; they are rearing men and women who are to live through time and eternity. They should not let their children be left to the chances of unreasoning custom, impulse, fancy, and the suggestions of ignorant nurses and prejudicial counsel of grandmothers. Parents should get nearer to their work, away with doing it by proxy. "Every man is a debtor to his profession," and in no position in life is it more true than in mothers and fathers, their personal influence, where does it end? It has been well said: "It is only the educator who can appreciate the influences which have gone before his own, which are running parallel with them, and will come after them, that is in a position to judge of the course to be pursued."

And now, the only hope of improving our schools is by improving our teachers. Here is the first step for the advancement of popular education. Good schools, through the administration of ignorant and unskilled teachers, are impossibilities. You cannot get good teachers for small pay, and school directors and others should take for their consideration the reply of a certain irate domestic to her remonstrating domestic: "You can't expect a good cook and all the christian virtues for two dollars a week." The personal equation of the teacher may easily become the exponent of the power and influences going out of the school, and what an inspiration it is to that well-qualified teacher and mother if there is a chain, and every day an added link, from the home to the school. Farmers have on their table agricultural newspapers and magazines in which they glean how best to raise cattle, and are their children not of greater value? and is it not as necessary to have educational journals also on their table and therein study well, how best to rear their sons and daughters?

Let us glance at a few definitions of education. We find the ideal of the founders of the Prussian national system is given shortly as "the harmonious and equable evolution of the human powers." James Mills says: "The end of education is 'to render the individual, as much as possible, an instrument of happiness first to himself and next to other beings.'"

From the farmers' families of the present, in possession of a rich inheritance from the past, we will pass to the farmers' families of the future; from this age of invention, to the age of culture, and draw aside the mystical veil, and invade this ideal realm of the future, to find that the possibilities of the past and present will, in the future, become realities. Without recapitulating we will remind the farmers present of unperformed duties. Surely the wisdom of the generation we have just passed from, will protect the farmers' families, by wholesome laws that will control or subdue the awful traffic of intoxicating liquors, that blasts the hopes of so many families, and casts a shadow over every heart. The culture of the tobacco plant will also be prohibited by law. Its pernicious use will no longer impair the physical and dwarf the intellectual powers of those upon whom the burden of maintaining this government must rest.

The question of the inferiority of women will no longer be mooted. Time, women, and intelligent men will have grappled with and settled it. In her true sphere, she will, in the future, be the acknowledged equal of man, in religious, domestic, and civil affairs, and in all of the reform movements and lawful avocations of life.

Compulsory laws will exist in regard to attendance at public schools, where industrial training will form the true basis of all teaching. This kind of training will help all to become self-supporting, and thus suppress vagrancy and crime in this favored era. Protection to the sanctity of the homes scattered over this great prairies of the west, on pleasant hillsides, and lovely valleys of the east will be secured. Then, indeed, will the farmer's family become the bulwark of the great republic. His will be an Arcadian life, such as inspired the poet Longfellow, and we will all aspire to that "true grandeur of nations," of which the gifted Charles Sumner had prophetic visions, and, freed from the harassing cares and anxiety of city life, will form such home centres that no member will ever wander from their over-shadowing arch.

"No cherished good has earth,
So dear to man as home, wife, children. All
It holds beside, to him is little worth,
If these he may not call
His own, by right divine.
And woman loved, whatever else she lack,
With husband, children, gathered at her shrine,
Wins the lost Eden back.

FRUITS FOR FAMILY USE.

By G. HIESTER, *member from Dauphin.*

Read at Bloomsburg meeting.

In my former papers on fruit culture presented to the Board, I have treated the subject as viewed entirely from a business stand-point, and have urged the growing of fruit as a pleasant and profitable occupation. I now propose to make a few suggestions as to the importance of planting fruit in the garden, and its use as an article of every-day diet for the farmer.

It has always been a matter of surprise to me, in traveling over the country, to see so many farms that are almost entirely destitute of fruit trees, and to see large families of children raised on bread and molasses, their diet being varied occasionally with salt pork and salt beef, the only fruit they ever taste being such wild berries as they can gather in the woods and along neglected fence rows; and this, too, in a country where an abundance of choice fruit for a large family can be had the whole year round for less cost than is required to raise and fatten one hog fit for the butcher.

In the general distribution of labor on the face of the earth, a great deal of hard, unpleasant, and not very remunerative work has fallen to the lot of the farmer. It is generally admitted that even with the best of management he cannot expect to make any large money gain as compared with many other vocations. At the same time he is obliged to suffer many privations by reason of his comparative isolation from society, and many disappointments and losses from unfavorable seasons; but to counterbalance these disadvantages, a kind Providence has placed within his easy reach the choicest fruits in almost endless variety, and, ripening at all seasons of the year, we cannot help but know that they were given for his own special use, and to compensate him in a measure for the many disagreeable tasks he is obliged to perform.

Who has a better right to the choicest of Nature's stores than the class of men who, by their unceasing toil, force the earth to yield food for their entire race? Who, by careful study of Nature's laws, have acquired the knowledge that enables them to multiply varieties at will, so that from a few wild fruits given as a start, they have created thousands of varieties, beautiful to the eye and delicious to the taste. I claim that the best of everything raised on the farm is not too good for the use of the farmer himself.

It is a duty that every man owes to his family, to make his home as comfortable and attractive as possible, to surround himself with every luxury that his means will admit of, or his farm be made to produce.

As my topic is fruit, I will confine myself to that one item, although there are others, equally important, that are as much neglected in many localities.

It is unnecessary for me to take up valuable time now trying to prove that ripe fruit is wholesome; this is a fact long since admitted by every one, as is also the fact that a diet composed largely of fruit is the most comfortable and healthful that can be adopted, especially in warm weather.

Besides, there is nothing more convenient to have in the house; it is capable of being served up in so many ways, and presented in so many different forms, that it is quite a relief to the lady of the house, in planning the great number of meals she is obliged to prepare each year, if she can have her pantry well stocked with canned and dried fruit that is out of season, and the garden constantly yielding its supply fresh from the vine and tree. And, as often happens, a friend will call just at dinner time on a busy day, when, to save time, a very plain meal has been prepared, now, by simply adding a nice dish of preserves and a can or two of peaches, or pears, smothered in cream, if berries are out of season, this plain meal is turned into a lunch fit for a king, and no apology is necessary. Your friends will enjoy their meal and the farmer's wife will enjoy their visit, with nothing to regret or be ashamed of.

Take away the fruit and you take away one of the chief attractions of a country home—you turn a paradise into a barren waste, and make a home that wife and children will long to get away from. Give your children plenty of fruit, and they will always cherish the memory of their child-

hood's home—they will leave it with regret, if they leave it at all—and it will always remain a green spot in their memory.

Every well-regulated farm should have a kitchen garden, fenced in handy to the house, which will vary in size, according to the size of the family and nature of the crops raised on the farm. In this a bed, at least thirty feet square, should be devoted to strawberries. Two hundred plants will be required to start it, if planted in rows of three feet apart and one foot apart in the row, and should contain one hundred of a good early variety, such as Triumph of Cumberland, or Crescent Seedling, and one hundred of a late variety, Kentucky, or Glendale. After the bed is once planted, you can always get plants to start a new one when desired, and this bed thirty feet square, if properly handled, will yield enough fruit to give a large family a nice dish of berries each day during the entire season, besides a few jars of jam, for use during the rest of the year. A row of currant bushes can be planted in a border along the north, east, or west fence, the room will never be missed, while the jelly made therefrom will be very grateful along with a nice fat duck in the winter, or a leg of spring lamb in the summer.

Two rows of raspberries, thirty feet long and six feet apart, one Black Cap, and the other any good red variety, will yield all the raspberries required for table use and preserving, and will require two dozen plants for a start.

On a trellis thirty feet long, running north and south, you can plant four grape vines, two Concord, one Salem, one Pocklington, while around the kitchen porch, or on arbors alongside of the out-buildings, can be planted a few more Concord vines; remember that with grapes, as with everything else that we grow, a few vines well cared for will give a greater yield of good fruit than a larger number if neglected.

In addition to the space taken from the garden, which is thirty feet by fifty-five feet, occupied by small fruits, an acre of land should be fenced off at some place convenient to the house for an orchard, in this can be planted ten apple trees, forty feet apart; we will say, one Early Harvest, one Red Astrachan, two Summer Rambo, two Smokehouse, two Baldwin, two York Imperial; ten pear trees, twenty feet apart, we will say, one Tyson, two Bartlett, one Seckel, two Howell, two Beurre d' Anjou, two Lawrence; ten cherry trees, twenty feet apart, three Black Tartarian, three Early Richmond, four common sour-pie cherries; eleven peach trees, eighteen feet apart, two Early York, two Early Crawford, four Late Crawford, three Smock; eleven plum trees, eighteen feet apart, four wild goose, three green gage, three German prune; eleven quince trees, eighteen feet apart, six Orange, and five Rea's Mammoth; and, in addition to these, it would be well to plant two or three dwarf Duchess pear trees in the door-yard, where they will be useful as well as ornamental.

I have mentioned the above varieties not because I believe them to be the highest-flavored, finest-grained, and in every way the choicest fruit that grows, but because they are all good hardy varieties, that succeed well in almost every part of Pennsylvania, and have given me the best satisfaction of any that I have tried, besides they give a succession of fruit during the entire season. The list can be varied to suit any locality or the tastes of any individual. Just here, while on the subject of varieties, let me say I believe the leading cause of failure in fruit culture among our farmers is the planting of untried sorts. They all want to have the last and the best new fruit. The tree agent comes around with a book full of fine pictures, and tells wonderful tales about the hardiness and productiveness of his new varieties, and the result is he buys the trees or vines represented by

the highest colored pictures and also the highest price. After waiting three or four years for them to fruit he finds that he has made a mistake, his trees do not bear the same kind of fruit when planted in the ground as in the agent's book, whereas if he had bought the same number of trees of some old and well-tried sort, he would have saved money by the operation, and would now be gathering fruit from them, both pleasing to the eye and grateful to the palate.

The varieties of fruit that I have named above, will furnish strawberries from about the 1st to the 25th of June; raspberries from the middle of June to the middle of July; cherries in July; peaches from the middle of August to the middle of October; plums from the last of July to the last of September; grapes all through September and October; pears from the last of August until March; apples all the year round, from the 1st of July until the last of the following June, besides dried, canned, and preserved fruits in abundance the year round.

The first cost of the trees, plants, and vines for this plantation, including freight charges to any part of the State, will not exceed twenty-seven dollars; when properly planted and cared for no additional outlay will be needed for at least ten years, so that the cost would be in reality two dollars and seventy cents per year; add to this ten dollars for rent of land, and we have twelve dollars and sixty-nine cents per year, cost of growing all the fruit used in a large family. What farmer is so poor that he could not afford to spend so small an amount for this grand luxury even if nothing was saved by its use?

I leave you to draw your own conclusions on the subject.

BEST BREEDS OF DAIRY CATTLE.

By WM. FAIRWEATHER, *McLane, Erie county, Pa.*

Read at Bloomsburg Meeting.

We find the question often asked in agricultural papers, Which is the best breed of dairy cattle? In these days of strongly competitive dairying, the ambitious and progressive farmer is anxious to know what kind of cows will yield him the largest returns for the least possible outlay. To answer this question satisfactorily, it would be necessary to know the locality, circumstances, and surroundings of the prospective investor, and in what manner he proposed to utilize the milk, whether for butter, or for cheese, or for family use.

In this paper I propose to lay before you the merits and demerits of the most popular dairy breeds and their suitability to special and general dairying.

The best known breeds of dairy cattle in this country are the Ayrshires, the Holsteins, and the Jerseys. The latter are the most numerous and represent the greatest amount of wealth invested. The Jersey may well be termed the rich man's cow, for it requires a small fortune to get a good one.

Jerseys are chiefly noted for their butter-producing qualities. They give a moderate amount of milk, rich in butter fat, and individual animals have produced more butter from a given quantity of milk than cows of any other breed. The Jersey is strictly a butter cow, and her usefulness is limited to that peculiarity. Her milk is not as suitable as some others for family use, on account of the rapid rising of the cream globules and their

rapid concentration into a tough, leathery mass which will not again easily mix with the milk, and Jersey skim-milk is a thin, blue, and not particularly appetizing-looking compound. Another peculiarity of Jersey milk, and one which is a source of great trouble to breeders, is the effect it has on young calves, causing them to scour nearly all the time during which it is furnished them for food. Anyone who is familiar with Jersey calves will have noticed the unthrifty appearance which they present while being fed on the milk of their kind. I will here relate a little incident about a Jersey calf. A friend of mine had one shipped to him from the neighborhood of Philadelphia. On getting it home he was very much disappointed with it on account of its unthrifty appearance, and mildly wrote to the shipper, asking what he fed his calves on, or whether he fed them at all. The characteristic reply came back, that Jersey calves were always thin, it was a peculiarity of the breed. My friend decided to try if he could cure this "peculiarity," as far as this particular calf was concerned, and put it on an Ayrshire cow. In a few weeks it was as plump and sleek as anything in his barn. This idea has not, I believe, been patented, and Jersey breeders are at liberty to use it freely.

The breed next the Jersey in numerical strength is the Holstein. They are a large, heavy-boned animal, and, on account of their size, have filled the popular eye. The qualities of the Holstein, with one exception, may be summed up under the heading of the adjective large. She is a large cow, with large bones, a large milker, and a large feeder. The exception to which I have reference is her butter-producing qualities, which are *small*. But, as there is a place for everything, there is a place for the Holstein. There is no doubt but that her native home of Holland is the most congenial to her wants, and that, wading in the luxuriant grasses of that country, she is a more profitable animal to her owner than she can ever hope to be in this country, with its dry, hot summers and sunburnt pastures. Yet, in the Western States, where grazing is free and corn is so cheap that they use it for fuel, she may be made profitable, for she has, without doubt, an enormous milk-yielding capacity, but it requires heavy feeding to sustain it. Notwithstanding that individual animals of the Holstein family have made good butter yields, the fact still remains the same, that, as a breed, they are poor butter producers. Their position in that respect being the lowest among the dairy breeds. Samples of Holstein milk, from cows exhibited at the dairy shows, Islington, London, from 1879 to 1883, showed, by analyses, an average of 2.96 per cent. butter fat and 11.8 solids. The average quality of milk sold by the Aylesbury Dairy Company, of London, as determined by daily analysis, was 3.74 per cent. of fat and 12.96 per cent. of solids.

In this paper, I have carefully avoided giving private milk or butter records, for the reason that I consider them of no value in determining the position of the breeds. I have, instead, given the most reliable tests, by competent and disinterested authorities, which I could obtain. There are exceptions to every rule, and it would not seem a difficult matter for the owner of five hundred head of cattle, to pick out half a dozen, or even a dozen cows, feed them high, and get returns out of all proportion to the average yield of the breed. He then unfurls his flag to the breeze with the legend inscribed—*The largest milk and butter producers on earth*. Such has been done, and many have been deceived thereby. It will, therefore, behoove the wise farmer to make careful inquiries into the true inwardness of such loud-sounding statements.

The average farmer's idea of a milch cow is a large animal, something that, after he has milked her for eight or ten years, he can, at considerable

expense, make into fourth-class quality beef, the question of feeding several hundred pounds of unprofitable carcass, during the period of her milking career, never entering his head. Just think of a farmer, when buying a mowing-machine, selecting one of the heaviest and most cumbersome make, simply because there will be so much more old iron in it when it is worn out as a mower and he has to dispose of it to the scrap merchant, or, think of a man buying a twenty horse-power engine to do the work of a ten. It will consume more fuel to do the same work, take up more room, and be more expensive generally. Broad-gauge railroads were found to be less profitable than narrow ones, and so it is with big cows in the dairy. Large cattle for dairy purposes are a grand mistake, and the form of the profitable beef producer is not the form of the economical milker.

We now come to the least numerous and yet most profitable of the three milk breeds, viz: The Ayrshire. This breed of cattle originated in the County of Ayr, in Scotland, and has been carefully bred for more than a century by the thrifty and painstaking Scottish farmer, as a model dairy cow. The Ayrshire occupies a middle position between the two extremes of Jersey and Holstein. She is a cow of medium size and economical build. She yields milk in good quantity and of most excellent quality, it being well fitted for either the milk retailer, or for the production of butter or cheese. I will not tax the patience or the credulity of this audience by giving a long list of milk and butter records to substantiate the value of this breed. It is unnecessary, for the testimony of the best authorities on dairy matters, goes to show that for the amount of food consumed, the Ayrshire is the most profitable breed of dairy cattle. The Ayrshire breeder is not dismayed at the enormous milk yields claimed for the Holstein, nor at the abnormal butter records credited to the Jersey. He has no ambition to emulate such yields, why? Because there is no money in them, they do not pay, and those who are engaged in breeding Ayrshires have neither the time nor the disposition to engage in this milk record fabrication. Ayrshires have not as yet been degraded into being used as the pampered pets of the wealthy speculator, who expects to get his returns out of his cattle on the strength of fabulous milk and butter yields, by selling the descendants or relations of the wonderful prodigies at enormous prices. On the other hand the Ayrshire is the poor man's cow, and is principally owned by intelligent and industrious practical farmers and dairymen, who expect to make a living out of the legitimate products of their dairies. In the southern part of Scotland, the milk of the Ayrshire is used almost exclusively in cheese dairying, and occupies the entire field.

The cheese produced from Ayrshire milk is so much superior to the product of the mixed milk of this country, that it retails generally at about four cents a pound higher. It can also be produced at less cost, the milk containing a large percentage of cheese-producing elements. The cheese dairies in Ayrshire yield an average of five hundred pounds of cheese to the cow for the season, and such an experienced authority as Robert McAdam, now of Rome, N. Y., says, that during twenty-seven years dairying, with Ayrshire cows, the average yield of cheese (excepting one year) was over five hundred and twenty pounds per cow per annum. Compare that with the general yield of the factories in New York State, where three hundred pounds of cheese per cow is the average. The milk records of Mr. McAdams' dairy, as shown by the cheese factory returns for one month, were as follows: Sixty-four Ayrshires yielded 66,197 pounds of milk, or $34\frac{1}{2}$ pounds per day for each cow, making 6,421 pounds cured cheese, being at the rate of one pound of cheese to $10\frac{1}{10}$ pounds milk. Having demonstrated the superiority of the Ayrshire as a milk and cheese

producer, let us now examine into her butter-producing qualities. In 1879, at the London dairy show, an Ayrshire cow carried off the prize for richness of milk, and in 1880, stood second on the list, the per cent. of butter fat for the two years being 5.57 and 6.82. Dr. Sturtevant gives as the result of thirteen analyses of Ayrshire milk, an average of 4.33 per cent. of butter fat. Ayrshire milk as analysed by the chemist of the Pennsylvania State Agricultural Society, from cows exhibited at their annual show, at Philadelphia, in 1884, showed 4.58 per cent. butter fat, 4.90 casein, total solids, 14.25. The mixed milk of eleven Holstein cows from a herd in Chester county, for the months of April and May, on dry feed, showed, as per analysis, butter fat, 1.82, casein, 3.75, total solids, 11.46. Tests made by Prof. Brown, of the Ontario (Canada) Experimental Farm, on summer feed, gave an average for the three dairy breeds, as follows:

	Fats.	Solids.
Ayrshire,	6.85	15.25
Jersey,	5.89	13.85
Holstein,	3.90	11.00

But probably the most useful, practical and trust-worthy account of the value of a breed of butter-producers will be found in the following notes of the tour of a model dairy in Scotland. On the 18th day of August, 1884, the Scottish Dairy Association started on a three-months' tour among the farmers in Ayrshire for the purpose of showing the improved methods of making butter. They had a complete outfit of dairy implements, including separator, butter-workers, testing appliances, cream-raising inventions, churns, refrigerators, etc. At one farm for a week it took only two gallons of milk to make a pound of butter. At other farms the quantity varied from two or three gallons of milk to the pound of butter. Thus it will be seen that the average quantity of milk, required for a pound of butter, in the district of Ayrshire (where, I need hardly state, the cows are all Ayrshires.) was about twenty-one pounds of milk for one pound of butter. In the State of New York, it takes over twenty-five pounds of milk, on an average, for a pound of butter, and the comparison is still more striking when we find the average yield of the best dairies of native cows in that State to be under 4,000 pounds of milk, while the general average is under 3,000 pounds. In Ayrshire the general average per cow is 5,000 pounds for the season. Having shown conclusively, and proved by the most reliable authorities on dairy matters, that the Ayrshire excels as a producer of milk, butter, and cheese, what more is there to say in her favor? I can only say, that if you wish to verify what I have said, try her. Ayrshires can be bought to-day for less money than any other class of thorough-breds, and experience will prove to you their value, that they are easy keepers, economical producers, and for all dairy purposes combined, the most profitable breed of cattle.

BEST WHEATS FOR MILLING.

By A. L. SCHOCK, of Bloomsburg, Pa.

Read at the Bloomsburg Meeting.

Wheat has been cultivated from the earliest ages. It is the most valuable and highest esteemed of all the cereals, and is second only to corn in productiveness. The increase of its cultivation and consequent use as a staple article of food, has marked the progress of agriculture and wealth,

and, in no small degree, the civilization of many countries. With this growth of prosperity and refinement has come an increased demand for the best quality of food, and hence the constant inquiry for the highest possible grades of flour. As the miller's success in producing this most important article is as universally praised, as his failures are condemned, it is due him that his wants be supplied by growing the varieties of wheat best adapted to his use. Indeed, so exacting have most consumers become, as to the quality of their flour, that modern milling is said to be no longer a trade, but rather an art. This requires the miller to have a knowledge of the constituent elements of both wheat and flour, that he may be able to select the best materials for his purpose.

Winter wheat (and that alone interests us in this community) has ever been in demand for milling. Beautiful in form, rich and sweet, less susceptible to injury from indifferent milling than its highly-prized competitor of the north-west, it has well been called the ideal wheat of the world. That wheat for milling should be plump, sound, and clean, is admitted; but, as almost every variety may be made to fulfill these conditions, together with the fact that the actual amount of nutritious matter contained in the different kinds does not vary sufficiently to be of serious importance, shows that there must be some other requisite. This essential element is the gluten of wheat. It is that property which gives a sticky consistency to the dough, preventing the escape of the gases formed during fermentation, thereby puffing up the mass, and giving it the cellular, spongy texture, which characterizes fine bread. It also renders flour capable of absorbing a larger proportion of water, thus increasing the quantity of bread produced, and correspondingly enhancing the value of the flour. The quality of this element is equally as important as the percentage contained; it should be elastic and insoluble. There are, also, other conditions affecting the quality of wheat, but of so little importance as compared with the quality and quantity of the gluten found, that this practically becomes the criterion of its milling value. This shows the importance of careful analysis and investigation, and it is to be regretted that so little effort has yet been made in that direction with any practical aim in view.

It would be useless to attempt to name all the desirable milling-wheats adapted to this or similar winter-wheat sections, and we, therefore, will indicate only a few of the leading ones. The long-berries hold the prominent place of distinction among millers.

The most important and well-known of these varieties are Mediterranean, Lancaster, and Shoemaker, all of which are rich in gluten and particularly valuable for roller-milling because of their hardness. They are also well adapted to our soil and climate.

Boughten, Canada White, and White Blue Stem are, perhaps, equally good. They have the strength of the long-berries, and yield a fair quantity of excellent white flour. The great popularity of the long-berry reds has created the erroneous impression here that all white wheats are inferior. This is, doubtless, accounted for by the fact that the only white wheats now grown here are Clawson and Eureka. Both these being weak and deficient in gluten are seriously discredited by millers. Fultz wheat is produced in greater quantity than any other kind in this State. It is a favorite among farmers because it yields somewhat better than the long-berries. The quality, although not really bad, cannot be classed above middling. It produces a soft flour that will not please those accustomed to the better varieties, and is, therefore, not sought after by millers.

All soft wheats are objectionable. The harder the berry the more firm the contents of the grain, provided the bran is tough not brittle, the better.

Weight is also an important factor. In general, as the increase relative weight, so the increased percentage of gluten, provided it is equally dry, as the cause of large specific weight may be due to an excess of water, which deteriorates its value in proportion as it is greater than normal. Care should be exercised in introducing new, though they may be good varieties grown in different soil and under different climatic conditions. These conditions frequently make the characteristics of a variety quite pronounced as compared with those of the same variety grown in different sections of the country. As, for instance, the Lancaster wheat of the north is quite different from the wheat bearing the same name in Virginia and Maryland. The Fultz wheat of Kansas far superior to that of our own State. Equal care should be taken to keep up the grades of the good kinds, as the milling qualities frequently degenerate the longer they are cultivated in the same place. This degeneration can be greatly arrested by selecting the very best seed and changing that grown on one to another and different soil. When changes must be made, and they are sometimes necessary, inferior kinds should be avoided. No permanent advantage is gained by growing poor, because prolific, varieties. The temporary profits are generally overbalanced by the final loss sustained in marketing an undesirable article. We had a conspicuous example of this fact in Michigan some years ago, when Clawson wheat was introduced there. Its beautiful appearance and large yield brought it quickly into great popularity. Very soon comparatively little else was grown. Millers bought it freely, and, before they fully discovered its inferiority, had widely distributed the flour made from it, the low grade of which, in many cases, blasted the reputation of well-established brands, that had required years of care and expense to establish. For a time, the milling industry of that section was seriously crippled, and was only restored when good wheats were secured. Then millers generally refused to use it, and farmers were obliged to sell it at very unsatisfactory prices.

The more closely this matter is investigated the more evident it becomes that the interests of the farmer and miller are identical. The former securing a ready and profitable market for his wheat when he supplies the kinds the latter is obliged to have. To the farmers of this community this fact is particularly applicable. We have an excellent market in the surrounding coal country for good wheat, but for good wheat only, as that alone will produce the high grade flours chiefly consumed there. Our average mixed wheat will not answer their purpose, and can only be used in small quantities, when mixed with better grades, obtained chiefly in the West. These better wheats cost the millers considerably more than what is obtained for our mixed lots, and this difference in price, which, in the aggregate, is very large, is lost to our farmers. If only good milling varieties were cultivated, a local reputation would soon be established, and equally satisfactory prices be obtained. The average quality of the same desirable kinds produced here being equal to those grown in our neighboring western States. The great popularity which their wheats have justly gained is due rather to the quantity of fine milling wheats produced there than any superiority over the limited quantity grown here. They not only grow the best varieties more largely, but usually vie with each other to produce the best of the kind.

The numerous large flouring mills scattered throughout those States are monuments to the wisdom of this course. The flours made by many of their mills have obtained world-wide celebrity for their excellence. Their success has enriched their owners, and, to a certain extent, the surrounding community from which their supplies of wheat were drawn, notwith-

standing the disadvantages in freight under which they labor in delivering their product to the eastern consumer. We have many equally good flouring mills here, equipped with the improved modern machinery and appliances, but their product is not equal to that of their western competitors, when using our average quality of wheat.

If our farmers would supply them with the grades of wheat they require, they could make equally fine flour, enabling them to compete successfully in any market, and command the same remunerative prices. This success of our millers would not fail to contribute materially to the prosperity of our farmers, in securing them the highest price for their product.

HOW TO BRING UP A WORN-OUT FARM.

By A. P. YOUNG, *Millville, Pa.*

Read at Bloomsburg meeting.

Among the means of restoring exhausted land good farming stand pre-eminent, and we will consider this to include, not only plowing and harrowing, but all the various operations of getting the particular soil in hand in the best possible condition to produce a crop. Plowing is the first step. If the soil has been carelessly plowed many spots have never been turned up, or perhaps the plowing has been confined to a very thin layer of the top. In that case it must be gradually worked up to a proper depth. A deep soil being a partial protection against both washing and drouth, taking up and holding much more water and storing it against a time of need, thus preventing much carrying away of soluble soil by excessive rains, and creating a reservoir of moisture for the crops to draw from when the dry time comes.

Our exhausted farm has most likely been always plowed one way—the furrow turned toward the fence; if so, there is an accumulation of soil along the fences that must be turned the other way, so as to get it where it can be used to better advantage.

In deepening a soil fall plowing is permissible that it may get the benefit of the alternate freezing and thawing of the winter to break up and prepare the sub-soil that has been thrown up. Nature will thus make a better preparation than man can. No matter what crop we are preparing for, give the freshly-turned soil a seasoning time to settle before putting in seed. Better be a little late getting in any crop than plant or sow upon freshly-plowed ground. Wet, or spring, if places must be drained it will be useless to attempt to improve such spots, either by better farming or measuring until the surplus water is taken away.

Having properly drained all parts that need it, and having set our ideas right in regard to plowing, and after tillage half the battle is won, and the next step is to manure and stock fast as the resources of the farm will permit. In looking about for fertilizing material we may find about some old building or neglected lane a pile of valuable material awaiting the gathering up. The barn is likely so situated as to pour a flood of water from the largest side of its roof directly on the manure from the stables and accumulating in the yard, whence after every considerable rain a coffee-colored liquid takes its way to the nearest straw, leaving in the yard a residue not much different in comparative value from coffee grounds after they have been steeped and re-steeped until all the soluble part has been removed. No farm can stand *such* drainage long, nor can one already exhausted be

improved much while leakage of this kind exists. Better take the manure directly to the field than allow a state of things like this to exist for a single month. The advisability of thus taking out manure at all times is, however, an open question. Our "worn-out farm" must be stocked, and here much thought and investigation will be well repaid. There is a choice in the animals that may be kept, and in this the farmer should be governed by the use to which he wishes to put them. The trotting horse, as such, is not a necessity, but horses that can trot off to market nimbly as well as draw the plow steadily are the ones to seek.

In cattle there is wide range for selection. For richness of milk and fine quality of butter the Jersey undoubtedly has the lead, while the Guernsey, Ayrshire, Devon, Polled, and latterly, the Holstein, have ardent admirers as milk and butter producers. The Short-Horn, with his great beef carcass, must be remanded to better pastures than is found at present on a "worn-out farm." The point to be insisted on is, select the stock best suited to the locality, and be satisfied with nothing short of the best in the class selected, then improve upon this. No farm, especially a worn-out one, can be completely stocked without a flock of sheep. Of these, get a breed in which is combined, in the highest degree, the two excellencies, wool and mutton, or wool and lamb, for the surplus stock should be sold mostly as lamb, and that early enough to get the best price of the season. For hog stock, medium-sized, early maturing of varieties, will generally prove most remunerative, but even these should be only tolerated as scavengers and workers-up of otherwise waste products. Less *hog* and more *health* for the people.

A considerable source of income to the occupants of a well-ordered farm may be found in a select flock of poultry. Indeed, this, with proper care, may be made the most profitable stock of the farm; largely consuming those waste products that otherwise find their way to the pig-pen and making of it choice meat and healthful eggs in quantity sufficient to make this the best paying disposition of the material. To secure the latter at the season when most profitable especial care is required, for biddy will not cackle her delight over freshly-laid eggs unless the conditions are made very comfortable. She will not roost on the comb of a roof, nor in a tree at the north-west side of a shed, and be in a humor to lay eggs about Christmas time. A comfortable hen-house is demanded on every farm to protect the fowls, save the manure, and secure the resultant advantages.

Having secured as much stock of the various kinds as can be properly managed—no scrubs in any department—the next care should be to feed up to the most profitable point. In high feeding of the animals—including the poultry—and properly caring for the manure, is the least expensive and most certain way of increasing the cropping capacity of the farm. The farm may produce food enough of certain kinds to feed all the stock, and yet it may be profitable to supplement that food with something of a different character, having an eye not only to the food contained therein, but counting also with care the residue to be left as manure. Bran, oil-cake, meal, and cotton-seed-meal are worth more than half what they usually cost, saying nothing of the feeding value. Here, then, we have a cheap source of fertility for the worn-out farm, provided we can handle stock so as to get anything near the value out of these articles as feed. Investment in these should be made liberally; and though it may be best to commence with homeopathic doses of linseed oil or cotton-seed-meal, every animal on the farm should ultimately receive all it can safely and profitably use; for an animal, like most machines, is profitable only when run to its full capacity. But few farmers know the relative value of feed stuffs,

much less of the manure resulting from their use. And yet no one can reach the full measure of success in farming without such knowledge.

So far in this connection nothing has been said of the part that should be played by renovating crops in the problem of improvement. Of these clover stands preëminent. No other crop at present known to our soil and climate, can be taken off and leave the ground in better condition for a succeeding one. Hence, the oftener clover can be brought in the more rapid will be the advancement. In sowing grass-seed for hay, or pasture, remember that clover is an improver, while timothy, and, perhaps, nearly all other grass crops, are exhaustive.

In one of our agricultural journals lately appeared this paragraph: "Estimating the actual value of clover as a fertilizer, the roots are credited with one hundred and eighty-five pounds of nitrogen, two hundred and forty pounds of lime, forty-five pounds of potash, sixteen pounds of soda, twenty-four pounds of sulphur, and seventy pounds of phosphoric acid. At the price given for fertilizers, the cost of these substances would be fifty dollars. Therefore, if a crop of clover is grown and cut for hay, the roots left in the soil are equivalent to the application of fifty dollars' worth of fertilizer per acre. By this process of manuring the land becomes very fertile, but it must be borne in mind that the larger portion of this fertilizing material comes from the soil itself, the clover, by mechanical and chemical action, simply converting inert matter into plant-food." Other crops beside clover are sometimes grown to be turned under for fertilizing purposes; but, at the present stage of agricultural science, it is doubtful whether any of these will pay except where an area too extended to be properly handled otherwise is suddenly acquired. No land should lay idle. The rotation is at fault that allows any field to be without crop or sod for any considerable length of time. Excessive rains and wind carry away much that is valuable from unprotected fields, hence, fall plowing is not to be commended except the character of the soil is such that the ameliorating action of frost is necessary to assist in getting it in condition for the reception of seed. Land that is too poor to take a good catch of clover, may be assisted by some form of artificial fertilizer. These should be cautiously tested, and only those purchased that, in actual use, give the right results. Much is said and written in commendation of *complete* fertilizers—meaning those containing all the ingredients taken up by crops. There application is all right were there is *complete* exhaustion; but why apply more lime to a soil that already contains enough for generations of cropping, and so of any other necessary ingredient? Consequently, if a fertilizer, the chief value of which is in the phosphoric acid it contains, will give as good results as a complete fertilizer costing twice as much, why make the extra outlay? Why add to a soil that which the soil, by actual test, proves is not at present needed?

A proper rotation of crops will do much for improvement. Waldo F. Brown, in a recent work, discourses as follows upon this subject: "The fact is well known to all practical farmers that the continual growing of any particular crop on a field will gradually reduce its productiveness until the point at which it can no longer be profitably cultivated is reached. This period may be longer or shorter, according to the nature of the soil or the character of the crop, but the result will be inevitable. Another fact equally familiar to the farmer is, that a field partially exhausted by one crop will produce some other. Another fact not so easily understood is, that after the second crop has been grown for some years the soil will be found to have regained, to a greater or less extent, the capacity to produce the first.

"The reason is that nature is continually laboring to restore the ravages produced by the hand of reckless man. Locked in the soil, and especially in the sub-soil, are almost inexhaustible sources of fertility which, by the force of chemical decomposition continually going on, are slowly but surely being unlocked and prepared for future use. The rains and dews being needed elements from the air above, and the absorption of the earth is continually gathering them.

"Even while one crop is growing, nature is preparing the soil for another. Thus we see that rotation is a real, though slow, process of fertilization. It is in fact the method by which the farmer may avail himself of nature's recuperative powers. If, in addition to this, the rotation is accompanied by the application of barn-yard or commercial manures, and includes, at frequent intervals, a crop of clover, which is especially adapted to draw from the air above and the earth beneath food needed for other plants, we see how rotation can be made one of the most useful means of fertilization which the judicious farmer can control."

A good rotation, perhaps the best for our section, is corn, oats, wheat, clover. Some objection is made to oats as being exhaustive and not sufficiently remunerative. As indicated before in this essay, there is especial objection to land lying without crop. If desirable to leave out the oat crop, sow clover-seed at the last dressing of the corn, or after the next spring crops are in plow, and sow to buckwheat, this to be turned under when in full bloom, as a preparation for the wheat crop.

A few years ago the writer tested part of a field in this way, giving a light dressing of fertilizer to the buckwheat. The result was a crop of wheat equal to that alongside where a crop of oats was harvested and the ground fairly manured from the yard. The whole field being treated to a similar dose of fertilizer at the sowing of the wheat.

To conclude, there is nothing so essential on a worn-out farm as brains and good judgment. If these essentials are present, the farm may be rapidly improved by more thorough cultivation, by draining the wet places, by keeping the best breeds of stock, feeding liberally, saving carefully, and applying judiciously the resultant fertilizer, together with intelligent rotation of crops, not forgetting that the process can be accelerated by the addition of good commercial fertilizer.

FARMERS' MISTAKES.

By E. M. TEWKSBURY, *Catawissa, Pa.*

Read at the Bloomsburg Meeting.

When the Secretary of the State Board of Agriculture requested me to furnish an essay for this meeting I began to cudgel my brains for a subject, and I concluded there had been a *mistake* made, and I said to myself, *farmers* are continually making mistakes. So I put the two ideas together, and christened it, *Farmers' Mistakes*.

That farmers make mistakes, and very many of them, is patent to the most casual observer, but that he makes *more* mistakes than others in the various avocations of life would be saying too much, perhaps. I shall not attempt a general and detailed discussion of all the mistakes mentioned by me, which are not merely theoretical mistakes, but such as a life of close relationship with the farm and actual occupancy of the same have led me to observe.

First. That of Birth. There seems, generally, a disinclination on the part of most persons to pursue the avocation in which they are born, and, if pursued, a continual desire to change; hence, I observe that in nine tenths of our farmers that it is a mistake that they were born upon the farm. Other scenes are more inviting—other walks of life more pleasant than the hum-drum of the farm; but, as this mistake is an *accident*, I will not dwell upon it, but pass to another mistake.

Second. Educational Mistake. Here the field is so wide that it is with fear we enter, and, being nearly allied in their results with birth, hesitate in making a proposition. If true, that "Tis education forms the common mind, and as the twig is bent the tree's inclined," then especially the early education of the child should be that which will be of the greatest use in after life upon the farm. Just here the great mistake is made. The father says, "John is to be a farmer, he must have the education a farmer needs, he must know how to read, write, and cipher, and these are enough for him to know." Chemistry, philosophy, geology, astronomy, law, and theology are untaught. It is a mistake to presume a man, a farmer, is to occupy a position he is unfitted to fill. It is a mistake to presume a man is fit to make laws who has no knowledge of law, and while *law* is presumed to be common sense codified, yet it requires something besides common sense to put it in codified form. I am supported in this by Folly, Coke, and Blackstone. The ills of which we, as farmers, mourn and complain will have a speedy end when we are fitted, by a proper education, to stand and intelligently combat the evils arrayed against us. That an education which does not fit a man for the practicabilities of life should be given, should be withheld from the youth, is the farmer's great educational mistake.

Third. The next great farmer's mistake is, that of marriage; not that the marital relation is an improper one, but on the contrary one of the most important and honorable. God said in the beginning: "It is not good for man to be alone." Hence, the gift of a wife, to the first farmer, Adam. Had not Eve been the direct gift of God to Adam, I should have supposed it had been a great mistake upon the part of Adam in making the selection. Any farmer makes a mistake that attempts to carry on a farm without a wife. If that is true, then there is great danger of making a mistake in the selection of a wife. Allow me to dwell upon this mistake of farmers at some length, for if a mistake is here made, it is a life mistake. The future weal or woe of life to the farmer, in the main depends upon the selection of a wife. It is a mistake for a farmer to marry a woman who is not fitted for the important sphere upon which she enters. I know most women are *able* to raise *rain*; but, that does not alone fit her for a farmer's wife, more than it did Eve upon the first great farm. The farmer's wife should be one that loves farm life, that enters with zeal into all the minutiae of farm work and management. Must be one that will be a help-meet, as well as a help to eat. It is a mistake for a farmer to marry for appearance only, one that is fitted for dress and dress parade; one whose material only fits her for a belle. The culinary articles of the household are not of *bell* (e) metal. As the farmer's life is one of toil and anxiety, it behooves him to select a life partner, a wife who can aid him in his arduous labors, who can give that sympathy so much needed in his hours of disappointment, grief, and loss. The farmer makes a mistake in marrying a wife for *work* only. The wife should be a *manager*—a *director*—not only of the household, but, if necessary, of the farm. Had Eve attended strictly to the duties of Adams' farm, instead of gossiping with her neighbors, or some fruit tree agent, strolling about the country, his affairs would have gone on more prosperously. It is a mistake for a farmer to

marry a woman, no matter what her qualifications otherwise are, if she be devoid of moral principle. The wise man said: "Who can find a virtuous woman? (wife), for her price is far above rubies. A virtuous woman is a crown to her husband; but she that maketh ashamed, is as rottenness to his bones." It is a mistake to establish a home upon any other foundation than that of virtue, morality, and Christianity. Out from the hearthstone, and the mothers and farmer's wife's influence, has gone the sons that has swayed the destinies of nations. Everywhere we find them, wearing alike the clerical robes, and the judicial ermine, sitting in executive chairs, and moving in legislative halls. The farmer's wife, isolated from the degenerating influences and vices of society, so-called, if a woman of worth is able to impart such instruction to her family as will tell upon the ages following. I will repeat, it is a mistake for a farmer not to marry; and, in my opinion, a great mistake not to marry young; or, rather, it is a mistake for a farmer to wait for *father and mother to die*, and himself settled in the world before he becomes a married man. Speaking of being settled in life leads me to another proposition that farmers make.

Fourth. Mistake in Location. But, if the farmer has been born amid favorable surroundings, such as conduce to a love for farming; has received an education that fits him for a farmer and proper member of society; if he has married early and well, then the location of the farm, if mistaken, may be, to some extent, overcome if properly cared for. Hence, will not dwell upon mistaken locations other than to say that when once located—settled—it is better to stick to the farm—to improve it—than to make the mistake of continually moving. Other things being equal, nothing but unhealthy location should cause him to move.

Fifth. Mistakes of Management. To my mind, the leading mistakes of farmers under this head are four in number, viz: (1) *manuring*, (2) *tillage*, (3) *marketing*, (4) *fencing*. That either of the four mistakes named would be sufficient to base an essay upon, I am fully aware, therefore, shall only call attention to the more general mistakes of each, without a particular discussion of all. The Vermont Yankee, upon his death-bed, called his son John to his bed-side and said: "John, *never*; *no, never*, go in debt." But, I suppose, thinking, perhaps, that he had made a farmer's mistake, modified the injunction by adding: "John, if you go in debt, buy manure." The father certainly made no mistake in saying "buy manure" to the young farmer. It is a mistake for farmers (1st) to pursue the same course of manuring that farmers of years gone by pursued; (2d) to depend solely upon the same manurial sources that the farmers depended upon when the soil was in virgin state. The old and mistaken plan was to depend solely upon barn-yard manure and lime, plowed down *deep* for the roots of plants to work upon. A greater mistake was never made upon the farm than just this—not in applying the *matter*, especially the barn-yard manure, though I do doubt some as to lime, but the *manner* of application. Common sense ought to teach the farmer that it is a mistake in raising most, if not all, farm crops, not to apply the manure to the *plant* rather than to the roots thereof. (Same as applying bread and milk to the child's feet rather than the stomach.) It is a mistake to *purchase* manure when the farmer has a supply at hand that might be made available. Farmers make a mistake in not buying largely of commercial fertilizers, to be used in connection with barn-yard manure or alone; some fertilizer rich in phosphoric acids—plant food. Farmers make a mistake in tillage, or, rather, non-tillage. It is a mistake to drive over a field with team and plow and call it farming; it is a mistake for the farmer to plow but *once*, for fall crop especially; it is a mistake to plow but once, and

then late in seeding season, and sowing immediately thereon. Farmers make a mistake when, by proper manuring and thorough tillage, they have raised a crop, to improperly market it. It is a mistake to rush upon the market the surplus of the farm; it is a mistake of the farmer to market his products *dishonestly*. The farmer makes a mistake in not giving full value in all products sold; it is a mistake not to give full weights and measures, not only to his success as a farmer, but also, for it hath been written: "A false (weight) balance is an abomination unto the Lord, but a just weight is his delight;" it is a mistake for a farmer, in marketing all products of the farm, stock included, to sell it for anything *besides just what it is*. If a horse is vicious, sell it for such; if a cow is a miserable kicking brute, sell her for such. It is a mistake for a farmer to consider it *sharpness* to improperly market his products, when *dishonesty*, downright knavery, is the proper word to use.

I come now to consider the longest, crookedest, and most of it, mistake so far as management is concerned of all the multiplied angular and triangular mistakes of the American farmer, viz: Fencing. It is a mistake for a farmer to have *poor* fences. It is equally a mistake to have *too many* fences upon the farm. The common law presumes that the owner will take care of his own; that he will fence *in* rather than *out*. One of the mistakes made by the farmer is that he fences against "all the world and the rest of mankind," without due regard to his own rights or needs. If the common law presumes each and all to take care of his own then it is certainly a mistake for the farmer to fence against the host of marauding, thieving stock set afloat upon our highways to pasture and pillage. And, also, a great mistake not, only for his own good, but the good of others, that he does not build a good and sufficient fence to hold all such stock and treat them as *strays* under the act of Assembly in such cases made and provided. It is a mistake for the farmer to complain of taxes or tariffs, or lack of tariff, when the most burdensome tax is the fence tax, caused by dividing the farm of, say a hundred acres, into a dozen fields. Less fences, less fields; less fields, less pasturing; more stall and yard feeding, and more barn-yard manure; more manure, more grain crops and stocks; consequently, more cash; and, as "money makes the mare go," so by the farmer having less fences he is able to ride a fast horse if he likes. This leads us to make another proposition.

Sixth. That farmers make a mistake in the kind of stock and quality kept, and manner of its disposal. This proposition I shall not discuss, as it has been so fully considered by others, except as to disposal of surplus stock. The farmer makes a mistake in sending to the *shambles* a superior animal, when, by selling it at the same rate to his brother farmer, he could perpetuate and multiply its species. This may not be a financial mistake to the *stock raiser* and seller, but certainly it is a great moral mistake, as it is a violation of the Golden Rule. It is a mistake for the farmer to withhold from his fellows his surplus at a reasonable compensation rather than hold for speculative purposes.

Seventh. Farmers make mistakes in not coöperating for their mutual benefit—socially, morally, and politically. Coöperation is a subject illy understood by the American farmer. Some faint idea of its import has, of late years, been imparted to the people, but as yet they know nothing of it comparatively. Coöperation, as defined by Webster, "is the act of working or operating together to *one* end; joint operation; concurrent effort of labor." That the farmer does not do that which Webster defines coöperation, is patent to the most casual observer. They make a great mistake in not operating together to one end; no matter whether that be a political,

financial, moral, or educational end. An army united, unbroken in ranks is hard to be routed, but, once divided, it is easy to punish in detail; so, with the American farmer, operating singly, however worthy the object, and however much to the interest of the farmer and the country, his plans are easily thwarted; but, when operating together to one end, they are a power, known and felt.

It is a mistake for farmers not to coöperate in political affairs. It is a mistake for farmers not to be well-posted in the politics of the country, and to make his knowledge known and felt by the political parties of the country. It is a mistake for the farmer to allow himself to be led to the polls, like sheep in the shambles, to do the bidding of the masters and bosses. Let the motto of the American farmer be that, "The spirit of the Puritan fathers still animates their descendants, demanding political and religious liberty to all," and that we may be inspired as was "The Heroes of the Revolution, immortalized at Lexington, Concord, and Bunker Hill, and will inspire their children to resist injustice, monopoly, and wrong." It is a mistake for the farmer to presume that coöperation can be effected by any other means than by *organization*. The world's history is replete with the fact that organization is the key of success.

With an organization coöperation is easy and possible. It is a mistake for farmers to exclude from their organization *all* who are not farmers in the sense generally implied by the word farmer in America. The farmers' organization should take in every element of society that will conduce to the success of agriculture; hence the great mistake of organizations that do not recognize women as a part and parcel of their organization, for women, more, if possible, than man, is interested in that which makes a home, and nowhere can, perhaps, be found a higher type of home life than exists besides the hearth-stones of the farmers of our glorious land.

The last mistake of which I propose to speak of at this meeting is that of diligence. The wise man said, "Seest thou a man diligent in business; he shall stand before (governors) kings, and not before mean men." He that tilleth his land shall have bread, but he that followeth vain persons, &c., shall have poverty enough." Benjamin Franklin said, if a man would have his farm (shop) keep him, he must keep his farm (shop); hence, I argue that it is a mistake for a farmer not to be diligent in his business. The Psalmist had this idea when he said, "Look well to the state of thy flock and herd." What other business more than the farmer's needs the watchful care of the Master?

America's great Solomon—Dr. Franklin—said, "He that by the farm would thrive, must himself hold the plow or drive." These high authorities presume that the husbandman, particularly, shall be a man attending strictly to his business. As the farmer's income is from comparatively obscure objects, it requires close attention to business. Is there a farmer in the sound of my voice but that notes with regret some misspent time, entailing a loss of property? It may be claimed that the Psalmist had *all* businesses in view when he spoke of the "*diligent* man's hand bearing rule," and the "*diligent* man's hand making rich," but he most certainly had the farmer in view when he said, "I went by the *field* of the slothful, and by the vineyard of the man void of understanding, and, lo, it was all grown over with thorns, and nettles had covered the face thereof, and the stone wall thereof was broken down." "Yet a little sleep, a little slumber, a little folding of the hands to sleep, so shall thy poverty come, as one that travaileth; and thy want as an armed man." The American farmer—especially the Pennsylvania farmer—to be successful must be diligent, not slothful, laboring with his own hands, for the promise of the Great Master

is, that "the husbandman who labors shall first be partaker of the fruits." A word by way of explanation and I close.

These thoughts have been arranged hurriedly, and in moments snatched from labor, but not with a view of being captious or fault-finding, "It is human to err—make mistakes." I have always disliked looking upon the dark side of any subject, but as I grow older, I can find we can *best succeed* by making a careful note of our mistakes, and by avoiding them in the future.

If I have made mistakes in treating this subject, treat them as such, I pray you all; and in the future avoid giving him, who has presented this subject, a chance to inflict a farmer's mistake upon you.

GYPSUM AS A FERTILIZER.

By the late Hon. M. C. BEEBE, *Member from Venango.*

Read at the Towanda meeting.

The use of gypsum upon crops to enhance the growth and production has many strenuous advocates. By others it is condemned, not only as useless in itself, but finally absolutely injurious to the land, and tending to impoverish it. These different conclusions have been arrived at by the different methods of use of the articles, and, in my judgment, the latter conclusion has no warrant whatever, but is born of ignorance and thriftless methods in use, not only in relation to the article under discussion, but in the methods of farming generally, which lead to disaster and poverty. And in the use of plaster, these invidious deductions are drawn from the application of fifty or one hundred pounds of plaster to the acre one year, and the expectation that a similar result will be obtained the next year without any further application of the material, or an application where certain existing conditions will render it valueless, such as to old sod-bound meadows, or, in a dry season, at so late a period that the effect is not perceptible on the crop, or other similar reasons.

The principal ways in which plaster affects vegetation are its effects in absorbing ammonia, attracting and holding moisture, and by supplying sulphuric acid—an important ingredient, particularly in seeds of plants—and, perhaps, in combining with some of the salts of the earth, particularly alkali. I have said in my opinion, because all these are, more or less, disputed points, and I do not pretend to be wiser than what others have written, but, at the same time, chronicle my own conclusions from long use of gypsum, and close observation as to its methods, if I may be allowed to use the expression.

Here again I speak from close observation of practical tests, and first among these is its application to clover, either as a new seeding or any period thereafter. That it has often made a successful catch of clover seeding, where otherwise would have been a partial failure, rendering the attempt unprofitable one, I have not a doubt, having solved it by actual experiment on the same field and at the same seeding, as also upon fields already in clover. It has also proved a valuable application to leguminous plants, as well as corn, potatoes, oats, buckwheat, garden vegetables generally, and new meadow. In connection with this, I might here say that by far the most extensive, and, in my opinion, valuable use I make of plaster

is its free and frequent distribution in the stable, and as a valuable adjunct to the manure heap. In addition to the foregoing, I consider plaster valuable as a disinfectant, and a protection from vermin. Therefore, keep a free supply distributed, not only on the manure-floor, but upon the walls of the stable and hennery.

On clover and meadows, one hundred and fifty pounds broadcast sowing is sufficient to the acre, and may be generally applied again to advantage in lesser quantities, say one hundred pounds after sixty days, and in all cases should be applied as soon as the spring leaves start. With the several crops and seeding for meadows, I sow with the seed-drill as a matter of convenience, and believe with as much utility as any other method of application. Apply it on corn by dropping a small handful on the hill. On potatoes, by broadcasting twice during the season, which not only advances the growth, but if sown when the potatoes are wet, will largely preclude the ravages of the potato-bug; but to make sure of the latter, I suggest the admixture of one pound of pure paris green to one hundred pounds of gypsum. I will here add the most marked result of the use of gypsum I ever witnessed. A neighbor purchased a farm near me, which, by thriftlessness, had in part been impoverished till it would produce no crop without manure applied. Of this farm he plowed four acres for buckwheat, with an intent to apply two hundred pounds of phosphate to the acre to get a crop and a catch of clover. His stock of phosphate failed on the third acre, when, to fully test the merits, he sowed a strip without phosphate; then, taking two hundred pounds of plaster, he finished the last acre by drilling in same as the phosphate. Now for the results. He obtained a fair crop of buckwheat and good catch of clover where phosphate was used, and equally as good where plaster was used, and nothing worth harvesting or mentioning where neither were used. This was a test of value both of phosphate and gypsum, but at what a difference in price—the phosphate thirty-eight dollars per ton, the plaster five dollars, delivered in bulk by the car-load.

It may be easily inferred from what I have already written, that my idea of an application to cereal crops is from one hundred to two hundred pounds per acre, unless put in with drill in sowing time, when I would make it from two hundred to two hundred and fifty pounds. I would not deem five hundred to the acre too much if applied twice, as it certainly should be, to potatoes and sowed corn. In short, I believe an ordinary farm—say from one hundred and fifty to two hundred acres—could to advantage use a car-load of gypsum yearly. The average car-load is ten tons. This, of course, includes its use in the stable buildings upon which I have heretofore commented, but would again urge its use in that form as the most valuable.

And this will suggest itself as a matter of as much importance as any part of this article, and, as an illustration, will briefly mention our way at home. We buy by the car-load in bulk, delivered at the nearest railroad station—freight rates secured in advance by the company selling—from which each farmer, on a given day, takes his supply, generally bringing barrels, or coming with a tight box, to take his supply home. This includes buying at wholesale rates, but also includes cash payments. One or more car-loads, according to the demand, are then ordered at a time—never less.

The great hindrance to the more general use of plaster is the freight charges. The railroads might take a note of this to advantage, especially in the time of scarcity of business.

The State Board, by securing the fertilizer law, has benefited the farmers

beyond conception, without an investigation by facts and figures. In my own vicinity, samples of the different kinds, procured at the time of the passage of the law, averaged but twelve and one half per cent. of pure gypsum. It is not at all difficult now to buy stocks that average from eighty to ninety-five per cent. Indeed, none others can now be found in the market, to my knowledge. Let any one make a computation of cost, time, and labor, and apply the result to the average amount of gypsum and phosphates used in the State, and they certainly cannot believe the State Board has been profitless to the interests of the State, or recreant to its trust.

Dr. E. HARVEY of Delaware. I should like to add a few statements, which I believe to be the result of experience. A practical farmer told me, many years ago, that plaster paris had been very popular, and farmers saw great benefits from its use; that it afterwards became unpopular because the theory prevailed—I fear, without proper basis—that it impoverished the soil. He stated that the dust would, by blowing over into the next field, demonstrate that a light application was as beneficial as a heavier one. He further told me that Joseph Pennell, a Chester county farmer, followed up the use of plaster after others had relinquished it, and always obtained good results from it. His plan was to apply the plaster heavily, and let the land lay in grass for a number of years. In Chester county, the Brandywine lands are often left in grass for fifty years, and, in fact, some of them have never been plowed since the memory of those now living. My father stated that he found that reasonable applications of plaster benefited his crops, and that he could readily see by the appearance of the crop, and by the yield, what portion had been plastered and what had not. I have often wondered if farmers could give any good reason for the very general abandonment of the use of ground plaster. Is it any more beneficial to the lands of Chester and Delaware counties than to those of Bradford? Can any one give any good reason why it should not prove as beneficial to crops now as formerly?

J. G. ZERR of Berks. I am myself a great believer in the use of plaster, and I am well satisfied that, taking one year with another, its application has paid me very well, and quite as well as our commercial fertilizers. I use from two hundred to three hundred pounds per acre, and would not approve of any smaller amount. I sowed it at this rate on a twelve-acre field, and left a strip on each side of the field without any application. When mowing time came, the portion of the field to which it had been applied gave a heavy cutting of excellent grass, while that portion without the application did not yield one fourth as much. The naked eye, on the opposite hill, could readily detect the great difference between the two portions, and the line could be distinctly traced through the whole field. My father was a great believer in the use of plaster and taught me to use it, and I have continued to use it up to the present time, with great benefit. I am positive that, on an average, it has paid me one hundred per cent. on the investment and labor of applying it.

Dr. E. HARVEY. Did you ever notice that the application is more beneficial during a wet season than a dry one?

Mr. ZERR. It will always produce more effect during seasons of plenty of moisture, and will show its least results during a dry season. If the latter portion of the season is moist, it will also show good effects upon the second crop of clover.

H. M. ENGLE of Lancaster. I can readily remember when the sowing of plaster was almost universal in my neighborhood, but for some unknown cause it is not now used to any great extent. As soon as our farmers com-

menced the general use of lime, the use of plaster was given up. Lime has now materially fallen out of use, but the use of plaster has not been again resorted to. I know of no reason why it should not prove as beneficial as formerly, but our farmers do not seem to make any use of it recently.

Col. V. E. PIOLLET of Bradford. It is now more than fifty years since I first went to the plaster beds of Cayuga lake, in New York, by sleigh, in winter time. Forty years ago, I sent plaster on a raft to Harrisburg and points down the river. I have used as much as seventy tons of plaster in a year, but we have not limed as they have in Chester, Delaware, and Lancaster counties. I have sent one hundred and fifty miles for it, at a cost of twelve and one half cents per bushel, and I have never seen it applied anywhere that it did not show a beneficial effect. Several years ago, I sent to Dauphin and Lancaster counties several tons of our lake, or blue, plaster, to be tried side by side with that from Nova Scotia. At that time fertilizer manufacturers purchased a considerable amount, but they preferred the lake plaster, because it did not affect the color of their fertilizer as did the white plaster of Nova Scotia. I used to go to Cayuga lake and get a barrel of salt and a ton and a half of plaster at a cost of sixty-two and one half cents. We paid six and one quarter cents for our lodging, and six cents for our horses; sixty-two and one half cents was all the money outlay for that amount of plaster and salt. This will show what was necessary at that time of my life, and I had something to do with the improvement of the county in which I live.

H. N. WILLIAMS of Bradford. I live in Troy township, and have had some experience in the use of plaster. We used to haul as much as thirty tons in a single year. My neighbors did not consider it a paying investment. The farm came into my possession about fifteen years ago, which had previously been rented for about thirteen years. I leased it to another man, and put stock on it. The first year I was compelled to buy ten tons of hay to carry the stock through the winter. My tenant was very slow about laying out money, as many tenants are. I purchased a ton of plaster, which the farmer sowed on one of the worst grass fields. That season we had twelve tons of hay from the field, and I estimated that I obtained one hundred dollars' worth of hay from the effects of that ton of plaster. On the farm on which I now live there is a thirty-acre field, which is divided by a stream of water—one side being of a loamy nature and the other being red shale land. On the clay loam the plaster produced apparently but little effect, but I have never applied it to the other side without excellent effects; nor do I find that it has the same effect upon clover and timothy sod which has been mowed for several years.

Mr. ELSBREE of Bradford. I would like to have the experience of the farmers of Bradford county as to the practical benefit of the use of plaster. Through the kindness of my friend Piollet I last winter purchased fourteen tons of plaster, and distributed it over different portions of my farm, some with the hand and some with a shovel, and I have yet to find that I have been benefited one cent. Whether it is the fault of my land or not I do not know; it is what is known as a hard pan and shale land. The application was made two years ago this summer; I put on fourteen tons, and cannot say that I have received any benefit from it at all.

Dr. E. L. STURTEVANT, New York Experiment Station. There is no agricultural difference between Nova Scotia plaster and that of New York State; the Nova Scotia plaster is white. One theory of the action of plaster is that it releases potash from its chemical combinations in the soil. However, the whole question, in its practical application, has not yet been

determined by science, and we can only say at present that the only way to ascertain what plaster will do for us individually is to try it for ourselves. In one field it may give good results and in another fail; in one section it may be found beneficial and in another it may prove unprofitable. The question is one of those which we cannot discuss profitably, for each one must try it for himself. It is one of those seeming paradoxes which, according to the testimony of men of experience, a small amount of it applied to the acre will show as good results as larger applications. My allusion to the potash theory was not for the purpose of indorsing it, but simply to bring it to your notice.

Col. V. E. PIOLLET. Does not the plaster absorb the nitrogen in the atmosphere?

Dr. E. L. STURTEVANT. We have not definite data by which we are enabled to assert that the plant can absorb one particle of atmospheric nitrogen. We know that the upper portions of the soil are richer in plant-food than the lower portions. We know that nitric acid and its salts are washed through the soil with the soil water. This fact, at first thought, would lead us to think that the lower layers of the soil are richer in nitrogen than the upper portions. The reverse, however, is true, and indicates that nitrogen is being formed in the upper portions of the soil. Something lately ascertained by science is that a bacteria-like organism in the soil takes upon itself the province of converting organic matter into nitrogen compounds accessible to the plant, and some experiments seem to show that when the soil has been sterilized or is barren, or, in other words, that when this organism has been killed, barrenness follows. By and by our papers will be full of accounts of this new theory, and it is possible that our present theories of soil nitrogen and atmospheric nitrogen may have to be reformed under its influence. I will, however, say that dry plaster does not fix ammonia; that chemical action only takes place in the presence of moisture. Dry earth will absorb odors, and for this purpose may replace plaster.

THE BIRDS OF CHESTER COUNTY.

Prepared by C. J. PENNOCK, Kennett Square, Pa.

The accompanying list of birds of Chester county is compiled from the writer's observations and the lists of the late Vincent Barnard, the venerable Ezra Michener, M. D., and that of Dr. H. Warren. It is designed to embrace, as nearly as possible, a complete list of species known to have been found within our limits, a few, as noted, are now extinct; several others noted as stragglers occur so seldom that the ordinary observer will perhaps never meet with them. The notes appended to the species are designed to indicate whether the bird is of value or otherwise to the agriculturist. Aside from the waders and swimmers, herons and sandpipers, ducks and geese, which are of no especial benefit, agriculturally, it is important to note that there are but few species that are *unquestionably* detrimental to the interests of the farmer or horticulturist.

Several species of hawks are destructive to poultry, and yet their food is only made up to a small degree of this diet, mice, rabbits, squirrels, grasshoppers, and smaller insects being their mainstay.

This will not hold good with every species of hawk, however, as some of

them will do more harm in the destruction of small insectivorous birds than is compensated for by their destruction of vermin. In the case of the crows and blackbirds, it is a question whether they do not compensate for destruction of farm crops by the number of grubs and other injurious insects upon which they feed. The investigations started by the Ornithologists' Union, and being at the present time conducted under the charge of the National Department of Agriculture, will, no doubt, do much to increase our knowledge of the food-supply of many of our common birds. The Legislatures in many of the States have passed protective laws for the preservation of insectivorous birds, but so long as the community in general are ignorant of their value, so long will it be impossible to closely enforce such laws.

The notes on the nesting and eggs of our resident and summer-resident species may prove useful in identifying species, although necessarily meager in a list of this kind. The interested reader is referred to the latest work of Dr. Elliott Coues, "Key to North American Birds," for the best text-book and work of reference for identification, &c.

Species in the following list marked B., M., or W., indicate that the observation on its occurrence was by Vincent Barnard, Ezra Michener, M. D., or Dr. Warren, respectively.

Barnard's list appeared in 1860, and comprised one hundred and ninety-one species. Michener's first list, in 1863, did not include aquatic birds, and numbered one hundred and fifteen. His second list comprised two hundred and thirty-two species, several of which he believed *would be found* within our limits; unfortunately, he does not designate which these are.

Dr. Warren's list of 1879 is the most valuable for present reference, as each species has his record or authority for its occurrence. It contains two hundred and eighteen species.

1. *Turdus migratorius*, (robin.) Breeds abundantly, nesting in almost any situation; a few remain all winter; food mainly worms, grubs, and some small fruits.

2. *Turdus mustelinus*, (wood thrush.) Summer resident; common; nests in woods, five feet to twenty feet high; eggs, 4 or 5, pale-blue; food, insects.

3. *Turdus fuscescens*, (Wilson's thrush.) Migrant; common; found along streams and border of woods.

4. *Turdus unalascae nanus*, (eastern hermit thrush.) Migrant; common; insectivorous.

5. *Turdus ustulatus swainsoni*, (olive-backed thrush.) Migrant; not very abundant.

6. *Mimus polyglottus*, (mocking bird.) Rare; summer resident; nest and parent birds taken by the late V. Barnard, one mile east of Kennett Square; a specimen shot near same place, 1872; eggs, 4-5, blue, with reddish-brown spots; food, seeds and insects.

7. *Mimus carolinensis*, (cat bird.) Abundant; summer resident; nests in thickets, bushes, and briars; eggs, 4, dark greenish-blue; food, seeds and small fruits, especially grapes.

8. *Harporhynchus Rufus*, (brown thrush.) Common; summer resident; nest placed on the ground or in a bush, and often quite bulky; frequent hedge-rows along roadside; eggs, 4-5, yellowish-brown, with abundant darker spots; food, insects mainly, grasshoppers, &c.

9. *Sialia sialis*, (blue bird.) Resident, except in coldest winters; nest in holes; eggs, 4-6, pale-blue, rarely pure white; insectivorous.

10. *Regulus calendula*, (ruby-crowned kinglet.) Migrant; quite abundant.

11. *Regulus satrapa*, (golden-crowned kinglet.) Migrant; frequently winter resident.
12. *Polioptila cœrulea*, (blue-gray gnat-catcher.) Migrant. (B. & M.)
13. *Lophophanes bicolor*, (tufted titmouse.) Resident; nests in woods and along streams, in a hole in tree or decayed stump; eggs, 4-6, white or creamy, with reddish spots; food, insects for the most part.
14. *Parus articipillus*, (black-capped chickadee.) An abundant resident; nests in holes; eggs, 6-12, white, with light-red spots; food, largely insectivorous.
15. *Parus carolinensis*, (Carolina chickadee.) Closely resembles the preceding. (B. & W.)
16. *Sitta carolinensis*, (white-bellied nuthatch.) Resident; common; nests in holes on border of woods; eggs, 6-10; same color as those of chickadee.
17. *Sitta canadensis*, (red-bellied nuthatch.) Migrant; rare; given by Barnard as a "resident"—evidently a mistake.
18. *Certhia familiaris*, (brown creeper.) Abundant; migrant, and at times a winter resident; have never met with the nest, but may breed: insectivorous.
19. *Thryothorus ludovicianus*, (Carolina wren.) Resident; not abundant; breeds in holes around houses, mills, and bridges; eggs, 5-6, light ground-work, thickly spotted with reddish-brown; insect-eater almost exclusively.
20. *Thryothorus bewicki*, (Bewick's wren.) "Very rare." (Barnard)—given also by M.
21. *Troglodytes domesticus*, (house wren.) Abundant; summer resident; nests about houses in holes and bird-houses; eggs, 5-8, almost covered with red-brown spots; food, insects.
22. *Anorthura troglodytes biemalis*, (winter wren.) Common; winter resident.
23. *Telmatodytes palustris*, (long-billed marsh wren.) Given by Michener; occurs in summer only, if at all; breeds in marshes near Wilmington and Newport, Delaware, ten miles south of county line.
24. *Cistothorus stellaris*, (short-billed marsh wren.) Rare, if at all. (B. & M.)
25. *Eremophila alpestris*, (shore lark.) Irregular winter visitor; generally appear in flocks.
26. *Anthus ludovicianus*, (titlark.) Winter resident, in flocks; common; fall and spring.
27. *Mniotilta varia*, (black and white creeper.) Migrant; rather common.
28. *Parula americana*, (blue yellow-backed warbler.) Common as a migrant; probably breeds rarely; one was shot in July, 1834, by M. P. Barnard.
29. *Protonotaria citrea*, (prothonotary warbler.) Rare; migrant. (M. & B.)
30. *Helmintherus vermivorus*, (worm-eating warbler.) Rare; summer resident; two or three nests have been taken by Mr. T. H. Jackson, near West Chester; I saw a pair of birds last of June, 1885, evidently with nest; nest on ground in woods.
31. *Helminthophaga pinus*, (blue-winged yellow warbler.) A not uncommon summer resident; nests on ground. This bird, in common with all the other warblers, is almost exclusively an insect-feeder, and their preservation is extremely desirable. The warblers are all small, and but little noticed on account of their short stay with us at time of spring and fall

- migrations. On their journey northward, during April and May, they are found most abundant in orchards, where they scour the limbs and twigs to the tips and inspect every crack, corner, and blossom for minute insects or eggs. In the fall they frequent the woods, and many of them are found only in the tops of the tallest trees incessantly hunting the now half dormant insects or larvæ.
32. *Helminthophaga chrysoptera*, (golden-winged warbler.) Migrant; not abundant.
33. *Helminthophaga ruficapilla*, (Nashville warbler.) Migrant; not common.
34. *Helminthophaga peregrina*, (Tennessee warbler.) Migrant; (B. M. W.)
35. *Dendræca æstiva*, (summer warbler.) Abundant summer resident; nests in bushes; frequents vicinity of streams; eggs, 4-5. The nest of this bird usually contains one or more eggs of the cow bunting. I have found a nest of this species that had been remodeled by the parent birds twice, each time by building the sides higher and putting in a new bottom to cover under an egg of the cow bunting.
36. *Dendræca townsendi*, (Townsend's warbler.) Rare; migrant. "Mr. C. D. Wood, of Philadelphia, killed near Coatesville, Chester county, a male of this species." (Warren.) M and W.
37. *Dendræca cœrulescens*, (black-throated blue warbler.) A common migrant.
38. *Dendræca cœrulea*, (cœrulean warbler.) Rare migrant.
39. *Dendræca coronata*, (yellow-rumped warbler.) One of the most abundant migrants.
40. *Dendræca Blackburnæ*, (Blackburn's warbler.) Common migrant. "Breeds rarely." (Warren.)
41. *Dendræca siriata*, (black-poll warbler.) Common migrant.
42. *Dendræca castanea*, (bay-breasted warbler.) Migrant; not common.
43. *Dendræca pennsylvanica*, (chestnut-sided warbler.) Occurs commonly as a migrant. "I am inclined to think they occasionally breed here." (Warren.)
44. *Dendræca maculosa*, (black and yellow warbler.) Migrant; not abundant.
45. *Dendræca tignira*, (Cape May warbler.) Rare migrant, (M. B. W.)
46. *Dendræca discolor*, (prairie warbler.) Migrant; rare.
47. *Dendræca dominica*, (yellow-throated warbler.) A rare migrant.
48. *Dendræca palmaruni*, (yellow red-poll warbler.) Common migrant.
49. *Dendræca pinus*, (pine-creeping warbler.) Migrant; not abundant.
50. *Siurus auricapillus*, (golden-crowned thrush.) (Common summer resident. Builds a *covered* nest on the ground, hence the name of "oven bird.")
51. *Siurus nævius*, (water thrush.) Rather common as a migrant. Probably a few breed.
52. *Siurus motacilla*, (long-billed water-thrush.) Rare migrant.—(M. B. W.)
53. *Oporornis agilis*, (Connecticut warbler.) Migrant; not very abundant.
54. *Oporornis formosa*, (Kentucky warbler.) Summer resident; rather common; nests on ground; eggs, 4-5; light, with reddish spots at larger end.
55. *Geothlypis trichas*, (Maryland yellow-throat.) Abundant summer resident; rears two or three broods; nests in low, damp places, generally near woods; eggs, 3-4; light, with more or less abundant light spots of pink or reddish color; rarely without spots.

56. *Geothlypis philadelphia*, (morning warbler.) Rare migrant.
57. *Icteria virens*, (yellow-breasted chat.) Summer resident; apparently more abundant than fifteen years ago; nests in thickets; eggs, 4-5; light, with pale brown spots; food, largely insects; a handsome and shy bird.
58. *Myiodioctes mitratus*, (hooded warbler.) Migrant; not very abundant.
59. *Myiodioctes pusillus*, (green, black-capped warbler.) Migrant only; rather common.
60. *Myiodioctes canadensis*, (Canadian fly-catching warbler.) Rather common as a migrant.
61. *Setophago ruticillo*, (red start.) Common migrant. "Probably breeds."—(Warren.)
62. *Pyranga rubra*, (scarlet tanager.) An abundant summer resident; nests in open woods, frequently on border of woods, along roadside; eggs, 3-5; blue, with brown spots; food consists of seeds and insects.
63. *Pyranga aestiva*, (summer tanager.) Straggler from the south.—(M. B. W.)
64. *Hirunda erythrogastra horreorum*, (barn swallow.) An abundant summer resident; nests *inside* barns and sheds, on top or against rafters, &c.; nest open above; eggs, 3-5; light cream or white, with dark spots; food, insects exclusively.
65. *Iridoprocne bicolor*, (white-bellied swallow.) Common migrant. Have never taken a nest in Chester county. Breeds along the Susquehanna river at Peach Bottom, and elsewhere; in adjoining county of Lancaster, nests in hollow trees; eggs, 4-5; pure white; insectivorous.
66. *Petrochelidon lunifrons*, (cliff swallow.) Common; a summer resident; breeds in colonies frequently; nests of mud lined with feathers, on *outside* of barn or shed, and covered, the entrance being through a hole at side; eggs similar to those of the barn swallow; insectivorous entirely.
67. *Cotile riparia*, (bank swallow.) Summer resident; abundant; frequents banks around quarries, along streams, &c.; nest placed at rear of a hole a foot or more deep, excavated for the purpose; eggs pure white, 5-9; insect-eating.
68. *Stelgidopteryx serripennis*, (rough-winged swallow.) According to Dr. Warren, breeds in our own county; not uncommon in spring and fall.
69. *Progne subis*, (purple martin.) An abundant summer resident; breeds generally in boxes about buildings; eggs, 3-5; pure white; feed on insects exclusively.
70. *Ampelis cedrorum*, (cedar bird.) Abundant resident; gregarious in winter and spring; nests in orchards and elsewhere; eggs, 4-5; pale blue, with dark spots; food, fruit, seeds, &c.
71. *Vireo olivaceus*, (red-eyed vireo.) Abundant summer resident; frequents woods, thickets, and vicinity of buildings; nest, round, cup-shaped, pendant from crotch; eggs, 3-4; white, with a few dark spots on larger end; food, mainly of insects.
72. *Vireo gilvus*, (warbling vireo.) Abundant in summer; breeds in orchards and around houses; nest and eggs similar to preceding.
73. *Vireo flavifrons*, (yellow-throated vireo.) Rather rare summer resident; breeds along border of woods and in thickets; nests larger and more handsome than of the other species of vireos, covered generally with hanging lichens attached by cob-webs; eggs, 3-4, with redder spots than those of the red-eyed vireos.
74. *Vireo olivaceus*, (blue-headed vireo.) Rare migrant. (M. B. W.)
75. *Vireo novaboracensis*, (white-eyed vireo.) Rather common as a summer resident; breeds in open woods and thickets; nest similar to those

of the other vireos. The vireo are all valuable birds to the agriculturist, feeding exclusively on insects or their eggs, or larvæ, and several of them are possessed of good voices, full of life and very active.

76. *Lanius borealis*, (great northern shrike.) Winter resident; rather common, but never abundant; usually solitary.

77. *Pinicola enucleator*, (pine grosbeak.) Rare; occurs only as a winter visitor, in severe weather.

78. *Passer domesticus*, ("English sparrow.") Resident; occurs everywhere; pugnacious, hardy, destructive; quarrelsome with his neighbors, and a general nuisance; nests anywhere; food, mainly seeds and grain, during the past season.

79. *Carpodacus purpureus*, (purple finch.) An abundant migrant; a seed-eater.

80. *Loxia leucoptera*, (white-winged crossbill.) Rare straggler from the north; only found in winter.

81. *Loxia curvirostris americana*, (red crossbill.) Rare; only found as occasional winter visitor.

82. *Ægiolais linaria*, (red poll.) Winter resident; not regular; occurs occasionally in large flocks; food, seeds of weeds and grass.

83. *Chrysomitris pinus*, (pine finch.) Only as a winter straggler; rare.

84. *Chrysomitris tristis*, (goldfinch.) Abundant resident; in flocks until April or May; feeds largely on seeds; nests in July and August, along roadside and near houses, in trees; eggs, 4-5, pale blue.

85. *Plectrophanes nivalis*, (snow bunting.) As a winter resident only; it is occasionally found in flocks.

86. *Centropus lapponicus*, (Lapland longspur.) Rare winter straggler. Not given by Barnard, but his cabinet contained a specimen taken in the county after 1860, when his list was published. (M.)

87. *Passerculus sandricensis savana*, (Savannah sparrow.) Migrant; rather common.

88. *Poæetes gramineus*, (bay-winged bunting.) Abundant summer resident; rarely occurs as a winter resident; rears two or three broods; nests on ground in grass fields and elsewhere; eggs, 4-5; food largely of grass-weed seeds.

89. *Melospiza lincolni*, (Lincoln's sparrow.) Probably occurs occasionally. (M.)

90. *Coturniculus passerinus*, (yellow-winged sparrow.) A rather common summer resident; nests similar to bay-winged bunting; eggs, 3-4, lighter, being white, with pale brown spots, mostly on larger end. Food of all the sparrows is mainly seeds of grass, and weeds. These birds are not at all injurious—excepting *P. domesticus*—and destroy a limited amount of injurious insects.

91. *Coturniculus benstowi*, (Henslow's bunting.) Rare. Warren's *Forest and Stream* list gives an instance of its possible occurrence, nesting in Chester county, not in his later list. Given by M. T. B. Probably does not breed.

92. *Melospiza palustris*, (swamp sparrow.) Common migrant; occasionally breeds; a nest, with eggs, taken in this vicinity in 1885; and I noted the birds here late in May.

93. *Melospiza fasciata*, (song sparrow.) Abundant resident; breeds on ground, or in low bushes; rears two or three broods; eggs, 4-5, usually spotted all over with brown spots.

94. *Junco hiemalis*, (snow bird.) Abundant winter resident; occurs in flocks with the tree sparrow.

95. *Spizella monticola*, (tree sparrow.) Winter resident; food, weed-seed largely.

96. *Spizella domestica*, (chipping sparrow.) Summer resident; common; nests around houses; eggs, 3-4; blue, with dark spots.
97. *Spizella agrestis*, (field sparrow.) Abundant summer resident; rears two or three broods; nest placed on ground or in low bush; eggs, 4, pale-green, with brown spots, usually most abundant at larger end.
98. *Zonotrichia albicollis*, (white-throated sparrow.) A common migrant, occasionally as a winter resident.
99. *Zonotrichia leucophrys*, (white-crowned sparrow.) Migrant only; usually rare.
100. *Passerella iliaca*, (fox-colored sparrow.) An abundant migrant; occurs in small flocks.
101. *Spiza americana*, (black-throated bunting.) A not very abundant summer resident; nests in hedge rows, &c.; eggs, 4-5, pale blue.
102. *Spiza townsendi*, (Townsend's bunting.) The only specimen extant was shot in Chester county in 1833; a doubtful specimen of this kind.
103. *Guiraca caerulea*, (blue grosbeak.) Appears on Michener's list; a straggler from the south.
104. *Zamelodia ludoviciana*, (rose-breasted grosbeak.) Not abundant as a migrant; probably breeds rarely. Dr. Warren gives an instance of its breeding in past years.
105. *Passerina cyanea*, (indigo bird.) Abundant summer resident; nests along roadside and in barns; eggs, 3-5, pale blue; food, seeds, grasshoppers, and insects.
106. *Cardinalis virginiana*, (cardinal grosbeak.) Common resident; rears two broods usually; nests in woods and thickets, preferring low ground; eggs, 3-4, sometimes 5, light, with spots of various shades of brown. Food mainly seeds.
107. *Pipilo erythrophthalmus*, (Towhee bunting.) Abundant summer resident. Possibly occurs throughout mild winters to a limited extent; frequents clearings and edge of woods; nests on ground; eggs, 4, light, with numerous brown spots; food, seeds and insects.
108. *Dolichonyx oryzivorus*, (bobolink--reed-bird.) Abundant as a migrant under the above names in spring and fall respectively.
109. *Molothrus ater*, (cow-bird.) Abundant summer resident; eggs probably 4-5, are deposited in the nests of other species, notably those of yellow warbler, golden-crowned thrush, vireos, wood thrush, and scarlet tanager; food, insects and seeds.
110. *Agelaius phoeniceus*, (red-winged blackbird.) Abundant as a summer resident; nest on ground and low bushes along streams, and in marshy localities; eggs, 4-5; pale-green, with dark spots and streaks. This species associates with crow-blackbirds in the spring and fall in large flocks, and are then, at times, quite destructive to crops.
111. *Sturnella magna*, (meadow-lark.) Abundant resident; in flocks except during the breeding season; nests on the ground; eggs, 4-5; white, with reddish spots; food, mainly seeds.
112. *Icterus spurius*, (orchard oriole.) An abundant summer resident; nests in orchards and small shade-trees, in an upright fork, built of green grass, often lined with wool; eggs, 4-6; pale green, with dark lines and spots; food, largely insectivorous.
113. *Icterus galbula*, (Baltimore oriole—"hanging-bird.") A common and well-known summer resident; nest, deep, pendant, constricted at mouth; made of strings, wool, yarn, grass, &c., placed on end of hanging limb; eggs, 4-6; somewhat similar to those of the swamp blackbird; food, largely insectivorous.

The two species of orioles are highly beneficial to the agriculturist.

114. *Scolecophagus ferrugineus*, (rusty blackbird.) Migrant; rather common.
115. *Quiscalus purpureus*, (crow-blackbird.) A common and abundant summer resident; breed mostly in vicinity of dwellings; eggs, 4-5; brown or light-green, with dark spots; congregate in large flocks spring and fall, when they sometimes do considerable damage, especially in the fall on ripening corn; their food during spring and summer is largely insectivorous, particularly grubs and cut-worms from freshly-plowed sod; they undoubtedly destroy some newly-sprouted corn in spring also.
116. *Corvus corax*, (raven.) A very rare straggler, (M. & B.)
117. *Corvus frugiferous*, (crow.) An abundant resident; nests in tall forest trees, or sometimes quite low, even in orchards occasionally; eggs, 4-6; blue, with dark spots. Opinions differ largely as to the value of this bird; from a farmer's stand-point, he will steal young birds and chickens, tear up corn, and break up the nests of young birds; but whether he has enough good traits to overbalance these bad ones, I am not at present assured.
118. *Corvus maritimus*, (fish-crow.) Rare resident, if it occurs at all. (M. B. & W.)
119. *Cyanocitta cristata*, (blue jay.) Common resident; nests generally on border of woods or in thickets; eggs, 4-6; green or drab, with darker spots. This bird bears a bad name, and is supposed to be destructive to smaller species.
120. *Tyrannus carolinensis*, (king bird.) Abundant; a summer resident; nests about farm buildings, frequently selecting an old pear tree; eggs, 4-5, cream with chocolate spots; frequents neighborhood of beehives, and lanches off the inhabitants; food entirely insectivorous. The king bird, pewee, and all the other fly-catchers are among the best friends of the farmer. From their first arrival they are ever on the alert for flying insects, which they capture with a quick dart from a convenient perch, often to return to the same spot to await another victim.
121. *Myiarchus crinitus*, (great-crested fly-catcher.) Rather common summer resident; breeds in holes in trees, fence rails, or occasionally in bird-boxes around the house; eggs, 4-6, almost covered with lines and streaks of dark brown. The nest frequently has a cast-off snake skin at the entrance or about, presumably for protection from marauding vermin. Insectivorous to a valuable degree.
122. *Sayornis fusca*, (pewee.) A common and well known summer resident. In mild winters a few are resident; saw one December 27, 1883, and one January 9, 1884; nest about barns and houses, bridges, and under overhanging banks, &c.; eggs cream white, frequently with fine spots; forty-five in number.
123. *Contopus borealis*, (olive-sided fly-catcher.) Rare migrant. (M. & W.)
124. *Contopus virens*, (wood pewee.) Abundant summer resident; nests on top of a horizontal limb in a fork near end of branch; nest small, and covered artistically with lichens; eggs, 3-4, cream white, with dark spots; food, insects.
125. *Empidonax acadicus*, (Acadian fly-catcher.) Irregularly abundant as a summer resident; frequents open woods, especially beech timber; nests on extreme end of branches, often overhanging water; nest of beech blossoms largely, very slight, placed in a horizontal fork and pendant; eggs, 2-4, usually 3, cream white, with reddish-brown spots on larger end.
126. *Empidonax trailli*, (Traill's fly-catcher.) Rare migrant.
127. *Empidonax minimus*, (least fly-catcher.) Migrant; rather common, although never abundant.

128. *Empidonax flaviventris*, (yellow-bellied fly-catcher.) Migrant; not common. (M. & B.)

129. *Antrostomus vociferus*. (Whip-poor-will.) Not very abundant; a summer resident; nests on ground; eggs, 2, white, or nearly so, with pale lilac or bluish spots; according to Warren bears two broods; strictly insectivorous.

130. *Choroediles popetue*, (night hawk.) Common summer resident; most abundant spring and fall; breeds frequently in colonies; deposits two eggs on bare ground, which are much darker than those of the whip-poor-will. These birds are supposed by many to be identical with the preceding species, but can readily be distinguished when flying by a white spot on the wing of this species not found in the whip-poor-will. The night hawk is frequently seen by day, especially an hour or two before sunset, and on cloudy days, and fly in flocks, circling lazily about, in search of insects. The whip-poor-will is only seen by day when roused from his hiding-place in the deep woods or thicket.

131. *Chætura pelagica*, (chimney bird.) An abundant and well-known summer resident; nests in chimneys exclusively now, formerly built in hollow trees, as they still do in uninhabited parts of the country; nests of sticks, half cup-shaped, of twigs, held together and to walls by adhesive secretion from the bird's throat; eggs, 5-6, pure white; insect feeding entirely.

132. *Trochilus colubris*, (ruby-throated humming-bird.) Common resident during the warmer portions of the year; builds on horizontal limb, in woods, orchard, or shade tree. The nest is a delicate structure made up of cotton, down from plants, and other like soft material, and placed on top of limb or in a fork, covered with lichens held on by spiders' web; eggs, 2; white; food largely insectivorous.

133. *Ceryle alcyon*, (belted kingfisher.) Abundant as a summer resident; rarely remains throughout mild winters; nest in hole in bank along roadside or stream, often six to eight feet deep; eggs, 6-7, pure white, are deposited at rear of excavation on bare ground or on bones of fishes undigested by old bird.

134. *Coccygus erythrophthalmus*, (black-billed cuckoo.) Occurs only as a summer resident; nests in thickets and woods; eggs, 3-5, dark-green or bluish-green. Food of this and succeeding species, insectivorous and largely in season of tent caterpillar.

135. *Coccygus americanus*, (yellow-billed cuckoo.) Quite similar to the preceding; both are called "rain crows." Habits and food same. Eggs of this species larger and generally paler in color. I have found this species much more abundant than the preceding. Dr. Warren found the reverse. Both species should be held in highest esteem by horticulturists on account of their fondness for the tent caterpillar. I have seen them devour the young just after they had left the nest and were beginning to strip the leaves of a fruit tree.

136. *Hylotomus pileatus*, (pileated woodpecker.) Rare; doubtful if it has been observed for several years in our county; breeds and is resident in many portions of the wooded portions of the State; very shy; mainly insectivorous; the king of the northern woodpeckers and a handsome species. A recent southern writer observed this species feeding on grubs, beetles, &c., obtained from the ground by scratching, and dissected one that had eaten "two immense caterpillars." (M. B. W.)

137. *Picus borealis*, (red-cockaded woodpecker.) A straggler from the South. "Accidental, very rare." The above quotation, without the author, appears in Warren's list; not given by B. or M.

138. *Picus villosus*, (hairy woodpecker.) Resident; common, but

never abundant; nests early in April, in a hole, which the birds excavate, usually, in or near a swamp bordering or near a woods; eggs, 4-5, white, like those of all the woodpeckers; food, insects entirely, or mainly.

139. *Picus pubescens*, (downy woodpecker.) An abundant resident; nests in orchards and edge of woods, in holes similar to the other woodpeckers; a very active and industrious species, always on the go, and of great value in ridding trees of injurious borers, &c.

140. *Sphyrapicus varius*, (pellow-bellied woodpecker.) Rarely, as a winter resident; occurs in fall and spring; a true "sapsucker;" the structure of tongue, and its dependent habits, are different from all other of our native species; feeds, to a considerable extent, upon inner bark and sap of trees, often to the detriment of the vegetation.

141. *Centurus carolinus*, (red-bellied woodpecker.) Winter resident; rather rare.

142. *Melanerpes erythrocephalus*, (red-headed woodpecker.) Irregular; sometimes very abundant as a winter resident; often none remain during the winter months; usually common as a summer resident; food, generally insectivorous; fond of fruits and corn in the milk state, but to no harmful degree.

143. *Colaptes auratus*, (flicker.) One of the best known of our woodpeckers; abundant until cold weather; usually a few are resident; nest around farm-houses or in trees, in almost every location; eggs, 6-10, glossy white; a species of inestimable value, and should never be wantonly shot, as is too often the practice; said to be a great ant-eater.

144. *Aluco flammens pratincola*, (barn owl.) Extremely rare or accidental; this species is generally resident where found, and has been captured in our county; given by B. and M.

145. *Bubo virginianus*, (great-horned owl.) Common; resident; rears young in cavities of decayed tree, or in deserted nest of hawk or crow; eggs, 2-4, pure white, nearly as large as those of domestic fowl; food, rabbits, mice, chickens, &c.

146. *Scops asio*, (screech owl.) Well known, and a rather abundant resident; nests in hollow trees, frequently in orchards, especially if marsh or meadow land is near by; eggs, 4-6, white; food, small birds, mice, &c.; in May and June, while the young are being cared for, they are very destructive to numerous small insectivorous birds.

147. *Asio wilsonianus*, (long-eared owl.) Abundant at times in fall, winter, and spring; breeds rarely; eggs, 4-7, white; nest usually of stocks; a deserted crows' nest is sometimes occupied.

148. *Asia accipitrinus*, (short-eared owl.) Winter resident; not uncommon.

149. *Strix nebulosa*, (barred owl.) Resident; not very abundant generally; nest and habits similar to the great-horned owl.

150. *Nyctea scandiaca*, (snowy owl.) Given by Michener as a rare winter resident. I have never met with it.

151. *Nyctala acadica*, (saw-whet owl.) Rare; probably resident, although I know of no instance of the nest having been found in our county. Given by Michener as resident.

152. *Circus cyaneus hudsonius*, (marsh hawk.) Abundant in spring and fall; food consists largely of mice. This bird can be distinguished from other species by its long tail and wings, together with a white patch of feathers on the rump.

153. *Ictinia subcaerulea*, (Mississippi kite.) A southern straggler. The only record of its occurrence in our county, so far as I am informed, is by the late Vincent Barnard, who saw an individual October 20, 1852.

154. *Accipiter fuscus*, (sharp-shinned hawk.) Probably resident, so given by B. M. and W. I have never met with the nest here. A small, active species, quite destructive to small birds, mice, &c.
155. *Accipiter cooperi*, (Cooper's hawk.) Resident; quite abundant. This is the red-tailed hawk, and the two so-called "chicken hawks," and this species in particular, are destructive to poultry. They nest early in May, in woods; eggs, 4-6, bluish white, sometimes speckled with light brown.
156. *Astur atricapillus*, (goshawk.) Winter resident; not unfrequently met with.
157. *Falco islandicus*, (Iceland gyrfalcon.) Given by Dr. Warren as having been taken on one occasion in our county. A straggler from the far north.
158. *Falco peregrinus*, (duck hawk.) Very rare; as a winter resident only.
159. *Falco columbarius*, (pigeon hawk.) A rather rare winter resident.
160. *Falco sparverius*, (sparrow hawk.) Very abundant; breeds in holes in decayed trees, often selecting an isolated chestnut in an open field; eggs, 5, light, covered thickly with brown spots or blotches; food, mice largely.
161. *Buteo borealis*, (red-tailed hawk.) Abundant; a resident; nest of sticks, in woods, early in April; eggs, 2-4, light, with brown splotches; food, rabbits, squirrels, poultry, &c.
162. *Buteo lineatus*, (red-shouldered hawk.) Common as a winter resident; may occur as a summer resident, so given by B. and Dr. W.
163. *Buteo Pennsylvanicus*, (broad-winged hawk.) Resident; not abundant; nest similar to that of Cooper's hawk; eggs smaller, and spotted.
164. *Archibuteo lagopus sancti-johannis*, (black hawk.) A winter resident; rather rare.
165. *Pandion haliaëtus*, (fish hawk.) Abundant in spring and fall. Given by Dr. Warren, in list of 1879, as breeding in the county; not in his later list. I have never found it breeding here, but have heard that a nest was at one time found on the Brandywine in this county.
166. *Aquila chrysaëtus*, (golden eagle.) Very rare; occurs at intervals, spring and fall.
167. *Haliaëtus leucocephalus*, (bald eagle.) Occasional in spring and fall. A nest said to have been found in the county a number of years ago. Food consists of fish, snakes, &c.
168. *Cathartes aura*, (turkey buzzard.) Abundant throughout the year, except in extreme cold weather, when they repair further south. A few build within the limits of our county, annually. Eggs, 2-3, and closely resemble those of the domestic turkey, with spots generally larger and more confined to the larger end. Food consists of carrion, which they discover by sense of sight.
169. *Ectopistes migratorius*, (wild pigeon.) An irregularly abundant spring and fall visitor. Food consists of acorns, beech nuts, berries, insects, and seeds generally.
170. *Zenaidura carolinensis*, (turtle dove.) Very abundant except during colder months. A few remain throughout winter generally. Nest in low trees, in orchards, and along streams. Eggs, 2, white. Occasionally lay in deserted nest of robin or other species. Food, seeds; in fall, resort to freshly sown wheat fields.
171. *Bonasa umbella*, (ruffed grouse—"pheasant.") Resident where found; rather abundant in northern part of the county; rarely found in southern part; nests on the ground beside a bush or log; eggs, 8-12; pale brown; granivorous.

172. *Ortyx virginiana*, (quail—"partridge.") Common resident; eggs laid on ground under brush or along fence; eggs, 8-15, or more; sharply pointed at one end; food, seeds, grain, &c.
173. *Coturnix dactylisonans*, (migratory quail.) An imported species. Several have been shot in our county.
174. *Squatarola helvetica*, (black-bellied plover.) A rare migrant. Given by Michener as a summer resident.
175. *Charadrius dominicus*, (golden plover.) A rare migrant.
176. *Ægialites vociferus*, (kill-deer plover.) Abundant, except in mid-winter; occasionally resident throughout the year; eggs laid on bare ground or old pasture fields, 4 in number, number with dark spots; rears two broods generally; food, insects, largely.
177. *Philobela minor*, (American woodcock.) Common summer resident; sometimes rears two broods, in April and June; nest on the ground in woods or thickets; eggs, 4; pale, spotted with dark-brown or umber, food, worms from damp ground.
178. *Lobipes hyperboreus*, (northern phalarope.) A northern straggler. (M.)
179. *Macrorhamphus griseus*, (red-breasted snipe.) I have never met with this species. Given by Michener.
180. *Gallinago wilsoni*, (Wilson's snipe.) Not uncommon as a migrant; frequents streams and low meadows.
181. *Actodromus maculata*, (pectoral sandpiper.) Given by Michener. Straggler, if at all.
182. *Pelidua alpina americana*, (American dunlin.) A rare straggler. (M.)
183. *Actodromus minutilla*, (least sandpiper.) Migrant; not abundant.
184. *Totanus melanoleucus*, (greater tattler.) As a migrant. (B. & M.)
185. *Totanus flavipes*, (yellow shanks.) Migrant; rare.
186. *Rhyacophilus solitarius*, (solitary sandpiper.) Migrant; not uncommon.
187. *Tringoides macularius*, (spotted sandpiper.) An abundant summer resident; frequents streams and borders of ponds; nests on ground, frequently at a distance from water; eggs, 4; light-brown, with dark spots; food, aquatic and other insects.
188. *Bartramia longicauda*, (field plover.) Rather common; nests in meadow and grass-fields; eggs resemble closely those of the woodcock; food, mainly insects.
189. *Numenius longirostra*, (long-billed curlew.) Rare, if at all. (M.)
190. *Tantalus loculator*, (wood ibis.) A very rare straggler. One specimen was taken a number of years ago by the late Vincent Barnard.
191. *Ardea herodias*, (great blue heron.) Rather common in spring and fall as a migrant; may breed, but I have never met with its nest nearer than the borders of the Delaware river, twenty miles distant.
192. *Herodias egretta*, (great white egret.) Of accidental occurrence. Given by Barnard who says "seldom found." Warren had a specimen taken in adjoining county of Lancaster. I have never seen it here.
193. *Garzetta candidissima*, (snowy heron.) Rare; occurs as a straggler only.
194. *Butorides virescens*, (green heron.) An abundant summer resident; frequently breeds in colonies of six to ten pairs; nest in trees and bushes, a few sticks loosely put together sufficient to hold the three or four pale-blue eggs. Food, fish, frogs, and insects from marsh-land mainly.
195. *Nyctiardea grisea nævia*, (night heron.) Common in spring and fall; probably breeds; nesting similar to that of green heron.

196. *Botaurus mugitans*, (American bittern.) Common in some parts of the country. M. gives it "resident; common." I have found no positive record of its nest having been found, but specimens have been shot throughout the summer months. Warren has a specimen taken December 8, 1879.
197. *Ardetta exilis*, (least bittern.) Given in Michener's later list. Not given by B. or W. Probably of rare occurrence.
198. *Grus canadensis*, (sand-bill crane.) Given by B. and M. Both these records are based on the occurrence, as I am informed, by the venerable Dr. Michener, who tells me that about 1840 a flock of about five individuals passed along the west branch of the White Clay creek, flying northward, and one was shot and wounded by him. This bird was in the doctor's collection for years. Later it went to Swarthmore college and perished in a fire a few years ago.
199. *Rallus virginianus*, (Virginia rail.) Breeds occasionally; two nests have been taken within a mile of Kennett Square, one about 1878, by Asher Palmer; the other by some boys in 1883. Both nests were in swamps near streams. I have an egg in my collection from the latter nest.
200. *Porzana carolina*, (Carolina rail.) Rather common migrant.
201. *Porzana novaboracensis*, (yellow rail.) Given by Michener in his 1831 list. I have never seen this bird in our county.
202. *Gallinula galiata*, (Florida gallinula.) Not common; occurs only as a migrant.
203. *Fulica americana*, (coot.) A rather rare migrant.
204. *Cygnus columbianus*, (whistling swan.) Rare migrant. Given by Michener in later list. Not given by B. or W. I have never seen it in Chester county.
205. *Bernida canadensis*, (Canada goose.) Common in spring and fall flying on its migrations, but rarely stops in our limits.
206. *Anas boscas*, (mallard duck.) A not very common migrant. (M. & W.)
207. *Anas obscura*, (dusky duck.) Given by Barnard as rare. Michener also gives it. Occurs occasionally.
208. *Dafila acuta*, (sprigtail.) Given in 1881 list of Michener.
209. *Mareca americana*, (American widgeon.) A rare migrant. (M.)
210. *Querquedula carolinensis*, (green-winged teal.) Of rare occurrence. (M.)
211. *Spatula clypeata*, (shoveller.) Rare. (B. and M.)
212. *Aix sponsa*, (wood duck.) Rather common on migrations and probably breeds rarely. Barnard says, "Frequent;" Warren, "Occasional," and Michener, "So far as I have been informed, this is the only *wild duck* that has deigned to nest and breed in this county; unlike its kin, it prefers a hollow tree for a nesting place."
213. *Fuligula marila*, (greater black-head.) Occurs occasionally. (M.)
214. *Fuligula affinis*, (lesser black-head.) Rather common on streams and ponds; in small flocks in spring and fall.
215. *Fuligula collaris*, (black-head, ring-neck.) Appears in Michener's list.
216. *Fuligula ferina americana*, (red-head.) "Occasional winter visitant." (Warren.) (M.)
217. *Fuligula vallisueria*, (canvass-back.) Probably a casual visitor on the migrations. (M.)
218. *Clangula glaucium*, (golden-eye.) Given by Michener.
219. *Clangula albeola*, (buffalo head—butter ball.) Frequently met with when migrating.

220. *Harelda glacialis*, (long-tailed duck.) Occurs but rarely. (M.)
221. *Erismatura rubida*, (ruddy duck.) I have known of several instances of the capture of this species in our county. "Rare," (B.) "Frequent," (W.)
222. *Mergus merganser*, (goosander.) Occurs occasionally late fall and early spring along the streams. "Common." (W.)
223. *Mergus serrator*, (red-breasted merganser.) Given in Michener's list.
224. *Mergus cucullatus*, (hooded merganser.) Rarely met with. Barnard says, "Frequent." According to Warren, "Rare."
225. *Chroicocephalus philadelphia*, (Bonaparte's gull.) Several specimens have been taken within our limits.
226. *Sterna hirundo*, (common tern.) According to Dr. Warren, Mr. C. D. Wood has prepared specimens taken in the county.
227. *Sterna fuliginosa*, (sooty tern.) At least three instances of its capture are on record from our county.
228. *Hydrochelidon lariformis*, (black tern.) Dr. Warren records the capture of a male and female.
229. *Cymochorea leucorroha*, (Leach's petrel.) As far as I know, Dr. Warren's record of a single specimen is the only instance of the taking of this bird within the limits of our county.
230. *Puffinus major*, (greater shearwater.) "This powerful bird, despite its strength and endurance of wing, was storm-stranded within our borders and perished during a severe storm of wind, rain, and sleet."—(Michener.)
231. *Colymbus torquatus*, (loon.) Occasionally met with as a migrant.
232. *Podiceps griseigena hollælli*, (red-necked grebe.) A rather rare fall and spring visitor.
233. *Podiceps cornutus*, (horned grebe.) Rarely met with as a migrant.
234. *Podilymbus podicipes*, (pied-billed grebe—"hell-diver.") A rather common migrant.
- To the above list are the following species, or supposed species, that have been accredited to our county:
- Archibuteo lagopus*, (rough-legged hawk.) Same as black hawk.
- Oporornis tepricotis*, (Michener's warbler.) Described years ago by Nuttall from a species taken by Dr. Michener in our county; now believed to be the young of *oporornis agilis*.
- Meleagris galliparo americana*, (wild turkey.) Extinct; said to have formerly occurred.
- Cupidonia cupido*, ("prairie hen"—pinnated grouse.) Extinct.
- Summary of above list:
- | | |
|--|-------|
| Resident, | 38 |
| Summer resident, | 60 |
| Winter visitant, | 24 |
| Migrant, | 95 |
| Straggler, | 17 |
| Extinct, | 2 |
| | <hr/> |
| Total, | 236 |
| | <hr/> |
| Barnard's list, 1860, | 191 |
| Michener's, (partial,) 1863, | 115 |
| Warren's, 1880, | 218 |
| Michener's, 1881, | 232 |
| Warren's list of summer residents, 1885, | 79 |

TABLATED ANALYSES OF COMMERCIAL FERTILIZERS ISSUED BY THE PENNSYLVANIA STATE BOARD OF AGRICULTURE.

From samples selected by the Secretary of the Board, or its agents, in accordance with the provisions of the Act of June 28th, 1879. Analyses by Professor F. A. GENTH, University of Pennsylvania, West Philadelphia, Pa. Valuations are based upon an allowance of 9 cents per pound for soluble and reverted Phosphoric Acid; 5 cents in Mixed Fertilizer 5, and 4 cents in Mixed Fertilizer 8, which derive it mainly from tankage, fish, &c., and 2 cents when derived from S C Rock; 5 cents, and Ammonia, 18 cents per pound.

All correspondence relating to the correctness of the analyses, should be directed to the Chemist, as above; all relating to the correctness of the samples, should be directed to the Secretary of the Board at Harrisburg, Pa. Attention to this will save vexatious delay to correspondents. It should be remembered that the column of "Comparative Commercial Value," is obtained by multiplying the number of pounds of each element in a ton, by the market price per pound in the market at the commencement of the fertilizer year; hence, this amount makes no allowance for freight, commission &c.

Complete Fertilizers.

Record number.	NAME OF FERTILIZER.	NAME AND ADDRESS OF MANUFACTURER.	Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Insoluble Phosphoric Acid.	Potash.	Ammonia.	Comparative Commercial Value, per ton.	Record number.
82	Soluble Flour of Bone.	P. S. Chappell & Son, Baltimore, Md.	6.55	1.72	2.07	1.47	2.10	25.58	82
83	Dissolved Bone	Somerset Fertilizer Co., Somerset, Pa.	4.87	7.50	5.85	0.49	1.56	33.06	83
84	Imperial Ammoniated Phosphate.	do.	4.49	4.96	6.51	0.39	1.90	39.65	84
85	Excelsior Raw Bone Phosphate.	do.	3.34	3.83	7.09	0.99	1.71	25.76	85
86	Acid Superphosphate	do.	3.22	3.64	8.32	..	1.21	23.53	86
87	Superphosphate	Lautenstein & Thomas, Cressonia, Pa.	0.88	3.75	1.66	0.37	1.45	15.25	87
88	Reliance Ammoniated Phosphate.	Walton Whann & Co, Wilmington, Del.	4.94	4.26	3.82	1.68	1.76	26.84	88
89	Favorite Bone Phosphate	Jacob Trahey, Limerick Station, Pa.	6.11	4.37	3.34	1.22	1.78	26.84	89
90	Ravine Bone Phosphate	do.	6.10	3.90	3.23	0.98	0.90	24.16	90
91	Pure Raw Bone Phosphate	do.	6.15	3.24	3.40	0.92	2.16	28.32	91
92	Raw Bone Phosphate.	Allegheny City Fertilizer Company, Allegheny City, Pa.	4.80	3.76	2.65	2.05	5.73	40.21	92
93	Grade City Phosphate	N. W. Fertilizing Company Chicago, Ill.	5.69	4.27	4.67	0.24	2.86	32.21	93
94	National Bone Dust	do.	5.26	4.32	4.36	0.15	2.58	30.17	94
95	Bone Manure	Manufacturer unknown, Lancaster, Pa.	4.69	2.17	2.35	3.93	1.82	24.71	95
96	Dissolved Bone Phosphate	Sharpless & Carpenter, Philadelphia, Pa.	5.29	4.07	2.79	1.61	1.21	25.05	96
97	Acidulated Fish Guano	N. J. Chemical Company, Philadelphia, Pa.	3.95	3.81	2.87	1.72	3.81	28.11	97
98	Super-Phosphate	do.	6.57	3.39	2.94	1.08	2.29	29.55	98
99	Soluble Bone and Potash	do.	8.26	7.79	1.40	3.49	..	38.34	99

117	Good Crop Phosphate	Caldwell, Durham & Co., Williamsport, Pa.	3.59	3.96	2.25	1.18	2.81	26.67	117
118	Economy Bone	Bowker Fertilizing Co., Boston, Mass.	8.40	2.30	1.22	2.53	2.63	25.47	118
119	Hill and Drill Phosphate	Sasquehanna Fertilizer Company, Baltimore, Md.	8.70	3.34	2.38	2.44	1.62	28.60	119
120	Bone Phosphate	E. Frank Coe, New York.	7.25	3.34	2.98	1.33	1.19	27.05	120
121	Alkaline Bone	N. W. Fertilizing Co., Chicago, Ill.	5.05	3.57	4.25	1.44	1.54	26.64	121
122	Ammoniated Dissolved Bone	Zell Guano Co., Baltimore, Md.	7.25	6.24	4.03	1.00	3.65	32.53	122
123	Dissolved Bone Phosphate	Cheapeake Guano Co., Baltimore Md.	4.59	7.49	3.17	1.27	1.91	32.18	123
124	Corn and Oats Fertilizer.	Kirkwood Marl Co., Kirkwood N. J.	4.46	6.74	4.05	0.69	2.78	24.28	124
125	Chesapeake Guano.	Symington Bros. & Co., Baltimore, Md.	8.12	8.11	1.59	0.78	..	34.01	125
126	Grange or 99 cent Fertilizer.	do.	8.81	2.62	0.26	0.82	..	21.63	126
127	Bone and Potash	do.	4.88	4.53	4.85	0.27	2.18	29.45	127
128	Ammoniated Bone	N. W. Fertilizer Co., Chicago, Ills.	9.35	1.84	0.45	2.68	2.73	30.02	128
129	Ralston's Bone Meal	Moro Phillips, Philadelphia, Pa.	8.12	2.09	1.15	1.15	2.89	33.41	129
130	Improved Super-phosphate.	Buffalo Fertilizer Company, Buffalo, N. Y.	8.13	3.29	0.58	2.00	4.04	34.90	130
131	Bone Super-phosphate	L. Yarnall, Media, Pa.	9.07	3.61	3.99	0.71	2.95	33.64	131
132	Bone Phosphate	W. E. Whann, Arglen, Pa.	9.07	6.69	3.29	3.94	3.36	41.17	132
133	Chester Valley Phosphate	M. J. Shoemaker & Co., Philadelphia, Pa.	0.95	3.92	0.91	1.05	0.32	23.60	133
134	Swift Sure Super-phosphate	J. L. Allen's Sons, Philadelphia, Pa.	1.32	3.92	0.86	1.86	2.27	31.47	134
135	Alkaline Phosphate	Lister Bros., Newark, N. J.	7.18	2.03	1.66	1.39	1.93	35.51	135
136	Ammoniated Bone Phosphate.	John Ralston, New York.	7.55	4.16	0.83	1.06	2.05	32.61	136
137	Knickerbocker Ammoniated Phosphate	Jacob Ulmer, Pottsville, Pa.	4.75	3.14	3.14	2.39	1.05	26.61	137
138	Ammoniated Bone Phosphate	Allentown Manufacturing Co., Allentown, Pa.	3.87	3.37	3.66	3.44	1.36	23.15	138
139	Co nplete Bone Phosphate	Read & Co., New York.	1.67	3.37	3.66	3.44	1.89	22.63	139
140	Farmers' Friend Wheat Fertilizer	Li-ter Bros., Newark, N. J.	3.49	4.50	2.41	0.59	1.36	20.33	140
141	U. S. Phosphate	Baugh & Sons, Philadelphia	3.71	1.86	1.39	1.10	1.93	25.25	141
142	Twenty Dollar Phosphate.	Rasin Fertilizer Co., Baltimore, Md.	0.07	1.31	1.39	1.10	4.41	36.22	142
143	Empire Guano	J. L. Crocker & Co., Buffalo, N. Y.	0.07	0.58	0.72	1.05	0.31	5.25	143
144	Honest Buffalo Phosphate	J. L. Amway, Chickies, Pa.	7.85	2.20	0.92	0.73	3.10	13.11	144
145	Peru Phosphate	Home Production	0.31	3.32	1.13	0.58	0.89	33.46	145
146	Poultry Manure	Gliidden & Curtis, Boston, Mass.	4.68	3.27	3.74	2.21	1.87	26.34	146
147	Sol. Pacific Guano	J. T. Orth, Reading, Pa.	4.52	3.05	3.43	2.49	0.83	21.85	147
148	Reading Bone Phosphate	H. F. Hager, Quakertown, Pa.	5.98	4.70	3.95	1.70	1.94	31.06	148
149	Farmers' Favorite Phosphate	Keystone Fertilizer Co., Johnstown, Pa.	6.81	3.11	3.03	1.21	2.71	31.25	149
150	Lion Ammoniated Phosphate	Waring Fertilizer Co., Coloma, Md.	2.27	6.90	1.03	2.62	1.68	26.16	150
151	Q & L Phosphate	J. Richmond, Philadelphia, Pa.	0.10	1.75	0.20	0.18	0.72	6.23	151
152	Ammoniated Bone Phosphate.	Cumberland County Fertilizer, Carlisle, Pa.	7.19	3.68	1.43	0.99	3.94	35.37	152
153	Grade No. 1.	H. G. Smith, Allentown, Pa.	8.00	2.59	1.43	0.78	1.31	27.06	153
154	Smith's Phosphate	L. L. Crocker & Co., Buffalo, N. Y.	7.19	3.68	2.49	0.78	3.30	42.66	154
155	Buffalo Ammoniated Phosphate	L. L. Crocker & Co., Buffalo, Pa.	4.11	1.94	5.32	5.04	3.06	28.34	155
156	Edgewood Phosphate	Grange No. 453, Pineville, Pa.	4.71	1.94	4.22	3.75	2.45	25.09	156
157	Swift Sure Dissolved Bone	M. L. Shoemaker & Co., Philadelphia, Pa.	2.53	4.22	1.23	0.73	1.52	28.31	157
158	High Grade Tobacco Fertilizer	Lancaster Chemical Co., Lancaster, Pa.	7.18	4.56	1.23	0.73	1.89	24.79	158
159	Twenty-Five Dollar Phosphate	do.	8.67	8.21	14.10	0.06	0.41	21.96	159
160	Rising Sun Phosphate	E. K. Bollinger & Co., Seitzland, Pa.	9.30	2.88	0.74	1.00	2.53	32.53	160
161	Ammoniated Bone Phosphate.	L. N. & J. S. Hopkins, Baltimore, Md.	8.62	3.01	0.65	0.84	3.41	34.57	161
162	Carib Guano	Lister Bros., Newark, N. J.	6.49	4.37	0.50	1.55	1.97	28.19	162
163	Ammoniated Dissolved Bone	do.	7.29	3.30	1.10	2.98	2.84	27.64	163
164	Standard Phosphate	C. H. Dempwolf & Co., York, Pa.	1.06	3.30	1.10	2.02	0.14	22.02	164
165	Success Phosphate	Maryland Fertilizing Co., Baltimore, Md.	5.60	5.60	1.86	3.19	0.13	26.38	165
166	Ammoniated Bone Phosphate.	do.	..	..	..	..	..	..	..
167	Linden Phosphate	do.	..	..	..	..	..	..	..
168	Alkaline Bone.	do.	..	..	..	..	..	..	..

Acidulated S. C. Rock.

QUARTERLY REPORT.

Record number.	NAME OF FERTILIZER.	NAME AND ADDRESS OF FERTILIZER.	Soluble Phosphoric Acid.	Reverted Phosphate Acid.	Insoluble Phosphate Acid.	Comparative Commercial Value, per ton.	Record number.
10	Dissolved Phosphate	Maryland Fertilizing Co., Baltimore, Md.	9.85	9.00	1.68	29.20	10
14	Philadelphia Standard Phosphate	United States Chemical Co., Philadelphia, Pa.	7.94	5.75	2.19	25.58	14
21	Dissolved S. C. Rock	Susquehanna Fertilizing Co., Baltimore, Md.	6.96	5.27	4.48	23.80	21
22	Acid Phosphate	W. Kenderline, Lumberville, Pa.	8.80	5.01	3.49	26.26	22
32	Dissolved Phosphate	Ceres Manufacturing Co., Baltimore, Md.	10.62	2.09	2.54	23.90	32
39	Good Luck Acid Phosphate	J. A. Cranston & Co., Newport, Del.	6.44	6.16	4.16	24.34	39
40	Soluble Bone Phosphate	Moro Phillips, Philadelphia, Pa.	10.62	5.48	1.50	29.58	40
47	Dissolved S. C. Bone	E. Suowden, Baltimore, Md.	6.86	5.92	4.66	23.96	47
64	Rasin Acid Phosphate	Rasin Fertilizer Co., Baltimore, Md.	8.49	5.63	1.18	25.89	64
94	Dissolved S. C. Rock	Susquehanna Fertilizer Co., Baltimore, Md.	7.19	5.79	4.37	25.11	94
109	Dissolved S. C. Rock	Sharpless & Carpenter, Philadelphia, Pa.	8.70	4.70	4.94	26.10	109
111	Dissolved S. C. Rock	J. E. Tygert & Co., Philadelphia, Pa.	9.04	8.56	2.30	23.64	111
112	Acidulated Phosphate	N. J. Chemical Co., Philadelphia, Pa.	9.39	4.90	0.45	25.90	112
122	Diamond Sol. Bone	Walton, Whann & Co., Wilmington, Del.	6.17	7.88	2.27	26.20	122
126	Dissolved Bone Phosphate	Chesapeake Guano Co., Baltimore, Md.	5.71	7.35	3.70	24.99	126
131	Yearsley's Sol. Phosphate	U. S. Chemical Co., Philadelphia, Pa.	10.41	3.00	2.20	25.11	131
132	Dissolved S. C. Bone	Dambmann Brothers & Co., Baltimore, Md.	8.48	5.95	2.84	27.11	132
144	Acid Phosphate	J. Richmond, Philadelphia, Pa.	9.40	4.69	2.36	26.30	144
146	Diamond State Sol. Bone	Lord & Polk, Odessa, Del.	5.26	7.96	4.05	25.42	146
147	T. & P. Acid Phosphate	Warling Fertilizer Co., Odessa, Md.	8.58	6.71	2.65	28.58	147
160	Acid Phosphate	N. J. Chemical Co., Philadelphia, Pa.	9.20	6.16	1.23	28.30	160
167	Acidulated S. C. Rock	Baugh & Sons, Philadelphia, Pa.	7.83	5.83	3.61	26.21	167
171	Powell's Dissolved S. C. Bone	Brown Chemical Co., Baltimore, Md.	6.81	7.34	0.54	27.47	171
172	Dissolved Phosphate	Maryland Fertilizing Co., Baltimore, Md.	12.45	4.04	1.32	30.30	172
185	Dissolved S. C. Bone	Shugluff & Co., Baltimore, Md.	9.45	6.38	1.16	29.95	185
201	Acid Phosphate	F. Mehring, Bruceville, Md.	7.85	6.17	4.15	26.90	201
211	Dissolved Bone Phosphate	Glidden & Carlis, Boston, Mass.	7.64	5.59	3.78	25.32	211
219	Dissolved S. C. Bone	Dambman Bros. & Co., Baltimore, Md.	10.64	3.92	2.61	27.25	219
220	Acid Phosphate	Chemical Company of Canton, Baltimore, Md.	7.99	6.24	2.07	26.44	220
223	Soluble Guano	Hubbard & Bros., Easton, Md.	9.20	5.84	3.05	28.20	223
240	Acid Phosphate	Williams, Clark & Co., New York.	9.72	4.04	0.49	24.97	240
244	Dissolved S. C. Rock	Patapoco Guano Co., Baltimore, Md.	9.62	5.06	2.67	27.49	244
257	Philadelphia Standard Phosphate	U. S. Chemical Co., Philadelphia, Pa.	11.23	4.38	2.31	29.38	257
264	Diamond State Sol. S. C. Rock	Lord & Polk, Odessa, Del.	6.91	5.81	3.88	24.45	264
271	Soluble Bone Phosphate	Moro Phillips, Philadelphia, Pa.	9.82	5.75	0.96	28.41	271

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