PRO SCIENTIA
SALUTE
POPULIQUE
LIBRARY OF
THE NEW YORK BOTANICAL GARDEN
By exchange
1908
Septemb 1897
R W. Gibson Invt.

State of Connecticut

PUBLIC DOCUMENT NO. 18

FORTIETH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Connecticut Board of Agriculture

LIBRARY
NEW YORK
BOTANICAL
GARDEN

Compliments of
James F. Brown
Secretary

HARTFORD
PUBLISHED BY THE STATE
1907

State of Connecticut

PUBLIC DOCUMENT NO. 18

FORTIETH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Connecticut Board of Agriculture

1906

LIBRARY
NEW YORK
BOTANICAL
GARDEN

LIBRARY
NEW YORK
BOTANICAL
GARDEN.

PRINTED BY ORDER OF THE LEGISLATURE

HARTFORD
PUBLISHED BY THE STATE
1907

XA
.N 7762
V.40
1906

PUBLICATION
APPROVED BY
THE BOARD OF CONTROL.

PRESS OF THE CASE, LOCKWOOD & BRAINARD COMPANY

LIBRARY
NEW YORK
BOTANICAL
GARDEN.

His Excellency

HENRY ROBERTS,

Governor of Connecticut.

Sir:—

In accordance with the provisions of an act creating the State Board of Agriculture, I have the honor to submit herewith the Report for the year ending December 31, 1906.

Very truly yours,

JAMES F. BROWN,

Secretary.

NORTH STONINGTON, Dec. 31, 1906.

MAY 31 1907

STATE BOARD OF AGRICULTURE.

1905-1906.

His Excellency HENRY ROBERTS, *ex officio.*

APPOINTED BY THE GOVERNOR AND SENATE.

		Term Expires.
Charles L. Tuttle,	Hartford,	July 1, 1909
L. H. Healey,	North Woodstock,	" " 1909
Charles E. Chapman,	Westbrook,	" " 1907
Iverson C. Fanton,	Westport,	" " 1907

APPOINTED BY THE GENERAL ASSEMBLY.

Hartford County,	Edmund Halladay, Suffield,	1909
New Haven County,	D. Walter Patten, North Haven,	1909
New London County,	James B. Palmer, Jewett City,	1909
Fairfield County,	Seaman Mead, Greenwich,	1909
Windham County,	N. G. Williams, Brooklyn,	1907
Litchfield County,	Edwin G. Seeley, Roxbury,	1907
Middlesex County,	W. L. Davis, Durham Center,	1907
Tolland County,	Charles A. Thompson, Melrose,	1907

OFFICERS OF THE BOARD.

Governor Henry Roberts, *President ex officio.*

Edwin G. Seeley,	Roxbury,	*Vice-President.*
James F. Brown,	North Stonington,	*Secretary.*
Chas. A. Thompson,	Melrose,	*Treasurer.*
Dr. E. H. Jenkins,	New Haven,	*Chemist.*
Dr. G. P. Clinton,	New Haven,	*Botanist.*
Dr. W. E. Britton,	New Haven,	*Entomologist.*
N. S. Platt,	New Haven,	*Pomologist.*

Auditors.

Seaman Mead D. Walter Patten Chas. E. Chapman.

FARMERS' INSTITUTES IN 1906.

No State in the Union of equal area has a more diversified agriculture than Connecticut and none is more favorably situated to make that agriculture profitable.

With only one-eighth of our population engaged in rural pursuits, the remaining seven-eighths afford large and profitable local markets for the varied products of the soil, and in addition we have almost on our borders the populous cities of New York and Boston always ready to receive any surplus that may be produced.

Yet these local advantages and diversity of interests instead of simplifying have in reality complicated the problems of successful institute work. The gardener and tobacco grower can rarely be brought to an institute devoted to the interests of the dairyman or fruit grower and these latter equally disregard any subject outside the specialties in which they are engaged. In states where forty to sixty per cent. of the population are engaged in growing wheat or corn it is not difficult to secure large and enthusiastic audiences interested in those subjects, and in several states Railroads have furnished free trains to transport speakers and exhibits for disseminating the latest results of scientific investigation, but the trials of this method in New England have thus far failed of the success that was hoped for.

Another fact which should not be overlooked, and one of which we may be justly proud is this, that the native population of Connecticut stands at the head of the states of the Union, — (but one other state ranking with it) in literacy.

We are a reading people, and the press has very largely supplanted the platform.

The U. S. Department of Agriculture and our State Experiment Stations are issuing bulletins freely to all who care

for them and with these helps in their work many practical farmers have become most effective speakers at our Institutes.

At a recent annual meeting of this Board at which wa a large attendance of representative farmers of Connecticut, one of the speakers asked the audience how many of them read the bulletins they received, and the number of hands that went up in the affirmative was so great as to create instant applause.

Since the organization of this Board in 1866, there have been formed the Pomological Society, The Dairymen's, Tobacco Growers', Sheep Breeders', Bee Keepers', and Poultrymen's Associations, each independent of all the others, and most of them receiving generous appropriations from the state for the promotion of their special interests, by such means as they may deem best.

Between these organizations and this Board the utmost harmony has prevailed and institutes have been held either separately or in connection with each of them in many parts of the state, but the system or lack of it at present existing, it is believed, can be greatly improved and plans are now being formulated to bring all the organizations receiving state aid into closer touch in institute work.

The number of institutes held and the general attendance the past year has been fully up to the average, and in some subjects, notably seed selection and poultry raising, unusual interest has been manifested.

Mr. Shamel of the U. S. Department of Agriculture, has spoken at many institutes in the tobacco belt, and so clearly demonstrated the value of selected seed for this most important crop that many growers are following his suggestions, and Mr. East of the Connecticut Experiment Station is doing similar work to improve the corn crop.

While our farmers are proverbially and of necessity conservative, they are quick to accept and adopt new methods when their advantages have been clearly demonstrated, but they have little use for the speakers who are more anxious to exploit themselves than the interests of improved agriculture.

"ABANDONED FARMS."

The numerous applications received for "abandoned farms" makes it necessary to repeat that "abandoned" is a misnomer when applied to Connecticut farms.

Statistics show that while in 1850 there were 22,445 occupied farms, there were in 1900 on practically the same area, 26,948, an increase in the half century of 4,503, or a little over 20 per cent., while the increase in the total value of farm property for the same time has been over thirty-one millions or 38 per cent., and the annual value of farm products shows a much larger increase.

No one speaks of "abandoned" factories in Connecticut, and yet all over the state are ruined and moss grown mill dams, once the sites of prosperous industries, on streams that now flow unvexed to the sea.

Steam proved to be a cheaper and more reliable power, and the old water wheel was abandoned to decay.

In like manner the farmer found areas unsuited to cultivation with modern machinery, and they were given over to pasturage or allowed to revert to forest, while by intensive cultivation of the more suitable areas he has greatly increased the products of the soil.

The popular idea of the number of farms for sale in Connecticut is, I believe, like Mark Twain's comment on the report of his death, "greatly exaggerated."

The prosperous farmer—and there are such here—is not more anxious to sell his farm than the prosperous merchant to dispose of his business. I think that not more than five to ten per cent. of the farms of the state are pressed for sale, and a majority of these are offered either to settle estates or because the owner, from age or infirmity, is no longer able to conduct them.

AGRICULTURAL CONVENTION AT NEW HAVEN

The Annual Midwinter Meeting of the Board of Agriculture was held in Harmonic Hall, New Haven, Dec. 18, 19 and 20, 1906. An attractive programme, favorable weather, and a large attendance combined to make it one of the most successful meetings of the Board.

All the speakers engaged were present except one detained by illness, and his place was most admirably filled by a substitute.

The substance of the addresses and discussions is embodied in the following report in accordance with the annexed

PROGRAMME.

Tuesday, December 18th.

10.30 A. M. MUSIC.

11.00 A. M. INVOCATION.
Rev. Watson L. Phillips,
New Haven.

ADDRESS OF WELCOME.
By His Honor John P. Studley,
Mayor of New Haven.

RESPONSE BY
Hon. R. L. Woodruff,
Lieut.-Governor.

11.30 A. M. ADDRESS BY
President Arthur T. Hadley,
Yale University.

RECESS.

2.00 P. M. INTRODUCTORY ADDRESS.
By Mr. Charles K. Graham,
Assistant Professor of Poultry Culture, Conn. Agr. College

2.30 P. M. ADDRESS—"Poultry Diseases."
By Dr. P. T. Wood,
Middleton, Mass.

3.00 P. M. ADDRESS—"Twenty Years Experience as a Poultryman.
By Mr. Fred Almy,
Little Compton, R. I.

7.30 P. M. MUSIC.

8.00 P. M. ADDRESSES—"My Friend the Hen."
By Mrs. Mary Thorp Monroe,
Dryden, N. Y.
and Mr. Herbert F. Collingwood,
Editor Rural New Yorker.

Wednesday, December 19th.

10.00 A. M. MUSIC.

10.30 A. M. ADDRESS—"Corn Breeding."
By Mr. E. M. East,
Agronomist Conn. Agr. Exp. Station.

11.30 A. M. ADDRESS—"The Gypsy Moth in Connecticut."
By Dr. W. E. Britton,
State Entomologist.

2.00 P. M. MUSIC.

2.30 P. M. ADDRESS.—"Commercial Methods of Judging Milk and Cream."
By Prof. L. L. Van Slyke,
N. Y. Agr. Exp. Station, Geneva, N. Y.

DISCUSSION.

7.30 P. M. MUSIC.

8.00 P. M. ADDRESS.
By Mrs. Mabel Loomis Todd,
Amherst, Mass.

Thursday, December 20th.

10.00 A. M. MUSIC.

10.30 A. M. ADDRESS—"The Production of Sanitary Milk."
By Mr. F. E. Dawley,
State Director of Farmers' Institutes, Fayetteville, N. Y.

11.30 A. M. ADDRESS—"Most Economical Sources of Nitrogen for Plant Food."
By Mr. L. A. Clinton,
Director Storrs Agr. Exp. Station.

2.00 P. M. ADDRESS—"Sheep Breeding as a Factor in Connecticut Agriculture."
By Mr. Frank D. Ward,
President N. Y. State Sheep Breeders' Association, Batavia, N. Y.

Followed by Discussion, opened
By Mr. F. H. Stadtmueller,
Pres. Conn. Sheep Breeders' Association.

At the close of the session a business meeting of the Connecticut Sheep Breeders' Association will be held in the hall of the Convention.

7.30 P. M. MUSIC.

8.00 P. M. ADDRESS—"The Future of the Small New England Town."
By Rev. John Calvin Goddard.
Salisbury, Conn.

Admission open and free to the public, including ladies, who are especially invited.

All addresses will be followed by discussion, and a Question Box will be provided for the presentation of practical subjects of interest to farmers.

Our hall affords ample facilities for the exhibition of the products of the field and farm, and the liberal prizes offered by the Board on Corn, Potatoes and Apples, warrants the hope that there will be a generous exhibit. Mr. N. S. Platt, Pomologist of the Board, will give his personal attention to this feature of the programme.

Articles for exhibition may be sent, properly labeled, by express, at the expense of the Board, to the Secretary at New Haven, to arrive on Monday, December 17th.

Railroad Arrangements.

The N. Y., N. H. & H. R. R. Co. has provided certificates which, when countersigned by the secretary, will entitle the holder to return over any of its lines at half rates. These certificates must be shown when purchasing tickets at railroad station in New Haven.

Hotel Accommodations.

The headquarters of the Board will be at the Hotel Davenport.

A committee of the Board will be at the Hall to furnish delegates and others such information as may be required.

GOV. HENRY ROBERTS,
EDWIN G. SEELEY,
D. W. PATTEN,
JAMES F. BROWN,
Committee.

NORTH STONINGTON, Dec. 3, 1906.

PROCEEDINGS.

REPORT

OF THE

PROCEEDINGS OF THE CONNECTICUT STATE BOARD OF AGRICULTURE

AT

NEW HAVEN, CONN., DECEMBER 18, 19, AND 20, 1906.

MORNING SESSION.

NEW HAVEN, CONN., December 18, 1906.

Preceding the opening of the Convention a musical program, consisting of vocal selections, was rendered.

Convention called to order at 10.30 A. M., in Harmonie Hall, New Haven, by Secretary James F. Brown.

Secretary BROWN. In accordance with the time-honored custom of this Board, we invite you to unite with the Rev. Dr. Phillips of this city in the invocation.

WATSON L. PHILLIPS, D.D. Let us pray. O God, our Father, we would recognize Thee in all our affairs. We would begin and prosecute all our work under Thy direction and by Thy help. We are dependent upon Thee; in Thee we live and move and have our being. The earth is the Lord's, and the fullness thereof; the sea and all that is therein; the cattle upon a thousand hills, and all the forces and laws and processes of nature. Thou dost care for the grass which today is and tomorrow is cast into the oven. Thou dost feed the ravens when they cry. Thou dost paint the lily in its beauty. Thou givest the early and the later rains. Thou dost guide us in all our plans and assist us in the execution of those plans. And unto Thee we give the glory for all that has been and all that is, for all we are and all we have, and all we hope for in this world and in the world to come.

We are met here in Thy name to consider the interests of that great pursuit which through the ages has been the basis of man's prosperity; that pursuit which has recognized its dependence upon Thee and has felt the need of God's guidance and of God's blessing in all its undertakings. We pray that Thou wilt meet with us and acknowledge our thanksgiving and our expression of dependence, and we pray that Thou wilt lead us in all the deliberations of this congress; that Thou wilt give us wisdom, patience one with the other, sureness in our thinking, and justness in our conclusions, that all that is said and done here may be for the good of the members of this organization and of the commonwealth.

We ask Thy blessing upon these men and women who have come from their homes to engage in this conference. We pray that Thou wilt be near to them and make them conscious of Thyself, that they may rejoice in a personal relation to Thee that sanctifies life and enables them who trust in Thee to do their work bravely and well.

Let Thy blessing be upon this community and upon all the communities of the commonwealth, upon those who are in authority over us, whatever their place or responsibility. We thank Thee for the men of the past, and we thank Thee for the men of the present, and we beseech Thee that Thou wilt guide those servants in such a way that Thy purposes shall be wrought out through them, and the highest good of the people shall be accomplished by all that they purpose and all that they do.

And we pray that Thou wilt help us, whatever our calling or lot in life, to bear ourselves as men, conscious of our divine descent and our glorious heritage, and may the rights and privileges and duties and responsibilities sober us and make us wise, that in all our doing we may show the spirit of those who trust in the living God and seek to do His will.

Listen to us, we beseech Thee, in these our petitions, grant

us Thy forgiveness for all the mistakes of the past, lead us as we venture out into the future, and by-and-by grant unto us the reward of our striving and our trusting, through Jesus Christ our Lord. Amen.

Secretary BROWN. I am sure you will all share with me the deep regret which I feel that his Honor, Mayor Studley, will be unable to be present this morning. I have just received the following note from him, which I will read:

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

At a late hour last night an officer of the superior court served a subpœna upon me as a witness in a damage case which is being tried this morning before Judge Wheeler in the superior court. I have tried to get the attorney to agree to excuse me until after the noon recess, but they expect to call me as a witness at almost any moment this morning. I regret this more than you gentlemen possibly can, because I had looked forward with assurances of personal pleasure to being present, for some of you are friends of mine, and all of you I should be glad to number among my friends. Moreover, I have always, since the early days of my boyhood, been interested in everything that pertained to Connecticut farms and Connecticut farming. I know that I should very much enjoy the papers that will be read and the discussions that will be held before this gathering.

In conclusion, let me say to you, one and all, that I am very glad you have come to New Haven, and that I hope you will come again, and keep coming.

On behalf of the city and its people, I wish to extend a most hearty welcome, and once more expressing my regret at being unable through no fault of my own to be present on this occasion, I am,

Very cordially yours,
JOHN P. STUDLEY,
Mayor.

It is some consolation to us, friends, to know that if we cannot have his Honor, the mayor of New Haven, with us, we

have another distinguished citizen of New Haven, the Governor-elect of Connecticut, who will respond on behalf of His Excellency Governor Roberts to the address of welcome which was to be given by his Honor, Mayor Studley.

I have great pleasure in introducing the Governor-elect, Honorable Rollin S. Woodruff of New Haven. (Applause.)

Hon. Rollin S. Woodruff. In the absence of His Excellency, Governor Roberts, I have been asked, sir, to respond to your generous welcome of the State Board of Agriculture in the city of New Haven.

The matters represented by this board are of such magnitude and consequence to Connecticut that every assistance and encouragement should be given its work.

The things over which this board has supervision are a vital part of our civilization, the very nourishment upon which it feeds — in fact, the mainstay and bulwark of a successful people, without which there can be no progress and no contentment.

The agricultural interest of Connecticut, approximating an annual production of thirty million dollars, entitle this question to a respectful consideration. A large percentage of Connecticut farms are operated by their owners. They represent hay and grain, vegetables, fruits, live stock, dairy produce, tobacco, plants and flowers, nursery products and miscellaneous crops.

The manufacturing interests of Connecticut are important and unusually large, when compared with the population, but all of these things depend upon a flourishing state of agriculture.

The food-producng forces underlie everything else in life and should always be given a first consideration; our State is in a flourishing condition and its future is assured so long as the rights and responsibilities of all the people are the chief

intention of the law — for all success depends upon the sincerity and integrity of our government.

The high type of manhood and womanhood of Connecticut demands a high type of representation in public office. When the character of public men is clean, it has its purifying effect upon all of the people.

Our legislature is instituted as a representative body to carry out the will of their constituents. Its business is to care for the welfare of the people — all the people. When any selfish motive controls its work, the result is rotten politics and a disgusted commonwealth. We must demand the best that men can give, for you may rest assured the people will remove office-holders from places in which their presence is dangerous to the general good.

It will be my endeavor, as Governor of Connecticut, to render every assistance within my power towards the development of that department of our government engaged in the supervision of the agricultural welfare of the State.

In the name of the State Board of Agriculture, we thank you for this reception.

Secretary Brown. One can hardly think of New Haven without thinking of Yale University. Indeed, it is said that (if the Governor will pardon the allusion) that an Englishman described New Haven as a city adjacent to Yale University. When we come here we cannot separate the two in thought, and I felt that it would be highly improper for us to hold a convention here without having Yale University represented upon this programme, and I have great pleasure in introducing to you President Arthur T. Hadley of Yale University.

(As President Hadley was not in the hall at this time, Mr. Brown said: "I supposed that President Hadley was in the hall when I made the remarks which I did. He was to be here." President Hadley then came in, and Mr. Brown continued: "Yale University is never behind time, and I apologize for being a little ahead of time.")

President ARTHUR T. HADLEY. Mr. Chairman and Ladies and Gentlemen: When I was down for an address at 11.30, I find it a little surprising to be all introduced at 11.15. I knew that there was something about farming which inculcated habits of promptitude, but I never supposed that the influence of agricultural science was so great that it made people do everything fifteen minutes ahead of time. (Applause.) Coming in out of the street without a written manuscript, and with only my very informal notes, my first impulse is to say to your secretary, "Oh, Mr. Brown, this is so sudden."

And when I saw the programme and noticed that I was down for an address, it seemed to be making a good deal out of very little. I offered to give a few words of hearty welcome, and this on your programme expands into an address. I can only account for the change by the fact that in so many parts of Connecticut the farmers, if they are to make a living at all, have to make a great deal out of very unpromising material. What I have to say cannot be called exactly an address. There was a man who wrote a book recently, entitled "Charles Dickens. An Appreciation." This is an appreciation rather than an address, for I have spent seven summers on a hilltop in the northern part of Fairfield County, on ground which by hard labor seven days in the week — with apologies to Dr. Phillips — by hard labor seven days in the week is made into the semblance of a farm, and if anybody appreciates what agriculture in Connecticut has to overcome, and what it has overcome by the aid of hard work and intelligent direction, I think I ought to be able to appreciate it. Why, the man who tries to make a farm out of a Fairfield County hilltop has a great deal harder job than President Roosevelt. For instance, for the variety of difficulty for constant effort to overcome different obstacles the conditions of some of our Connecticut farms make the combination of a regiment of negro troops, a diplomat's wife, and a Panama Canal seem ridiculously easy. Possibly some of you heard a lecture that was

delivered some years ago by Mr. Burdette, telling how he and General Grant conducted the campaign in the spring of 1865. His lecture began somewhat as follows: "In the early spring of 1865 General Grant and I, with our respective commands, were stationed south of Richmond, along the Petersburg lines. General Grant's command consisted of the Army of the Potomac, but my command consisted of one horse. And I am persuaded if General Grant's command had given him as much trouble as my command gave me he would have resigned." Something of that sort, I think, can always be said by the man who appreciates agricultural difficulties, when he compares that occupation with many others which are supposed to be more complicated. And it is precisely by reason of these difficulties and the training that they give that in speaking in behalf of Yale University and welcoming you to the city I feel as though I was speaking from one educational institution to another; for if there is anything which is an educational institution, and which I may say represents a type of very high education, if its advantages are properly utilized, it is farming as carried on in Connecticut.

Modern education consists of two parts: technical training to furnish good producers, and ethical training to furnish good citizens. In both of these fields I think that Yale University and the Connecticut Board of Agriculture can join hands as fellow laborers. See how it works first in the technical field, in the education of the producers. We are developing in all of our higher institutions of learning as much technical education as we can. Progressive men today hold that the world will be better off if each boy is trained as well as he can be for the difficulties that he is going to have to face. They are right. But the danger is that in trying to do good technical training we shall specialize too much; the danger that we shall teach a boy how to do one set of things, to use one set of tools, to keep one set of books, to fill out one set of forms; and every intelligent educator has to insist first, last

and all the time that in training people for industrial service, for industrial service of society, you must have a basis of general resourcefulness, general intelligence, gumption, to use an old word; I know of no better. And I will go a step further and say that the next great source of difficulty in modern times is that our boys haven't the training in general resourcefulness, of general intelligence in their heads, general gumption, which life on a farm was eminently fitted to produce if a boy had it in him at all. Of course, there are some boys who are so awkward that they could not use an ax, could not rig up a makeshift to meet an emergency even if they lived eighty years on a farm, but if a boy has any sense at all, if he has any power of developing the resources of hand and brain to meet unexpected emergencies, I know of no better training than the every-day training of hard-working farm life to lay that foundation of education.

I believe in manual training as it is conducted today. I believe in many of the developments of the public school as they are conducted today, but I also think that manual training is sometimes a very poor substitute to give to the city boy for a sort of training that he would get as a matter of course if he grew up on a farm, and that is what I mean by speaking of the farm as an educational institution, and all the better as an educational institution because it was made by the hand of God and not by some act of the legislature or school board. I remember that some one said, in speaking of family discipline, that a baby was a better instrument to make older brothers and sisters unselfish than any system of rules that could ever be adopted, because the children always thought that the rules were arbitrary, that somebody had made them, and could just as well unmake them, but a baby was an obvious and irrevocable fact that had to be taken into account quick. School education is subjected to good rules. It is good method, but farm education, after all, has the advantage that it is full from sunrise to sunset of obvious and irrevocable facts that have to

be taken into account quick. So much for work that the farm does in the education of producers in furnishing a basis for resourcefulness that is going to tell in unexpected emergencies in life, and, by the way, the emergencies are always unexpected in the main. Let me tell you by way of illustration of my point what was said to me by a captain of experience on one of the greatest transatlantic lines. He said, "Our company states" — and in this respect that company was only following what is true, to a large measure, at a large naval school like Annapolis — "our company still believes that the preliminary training of officers for steamships should be in sailing ships. They do not get the specialized knowledge of machinery, but they can get that afterward; and they do not get any certain readiness with some of the complicated instruments in use on the transatlantic liners, but they can get that afterwards. What they do get in the old-fashioned sailing ship training is the habit of meeting with promptitude and judgment any sort of an unexpected emergency. The boy who is trained on a machine is all right if the machine goes right. If the machine goes wrong he may fail to meet an emergency that will make the difference between safety and destruction." And so I say here with regard to farm education and education in resourcefulness that comes in the home, the boy who is trained along that line will work all right as long as the machine works in the way that he expects. The boy who is trained on the farm is trained to take his chance of anything that comes up.

But there is another aspect of country life and country training, if we would make it what it should be, another educational aspect which, in my judgment, is even more important than technical service rendered, that is, the training which it gives in the work of citizenship. Those who observed carefully the course of our Civil War noted that while patriotism was confined to no class and no section, the bulk of the hard fighting was nevertheless done by the country boys. There were some good regiments from the cities and some bad ones.

There were some good regiments of people who had movable property, of every kind or nature, some that had no property at all, and some bad ones; but regiments recruited from the land were recruited from the boys who had a stake in the country. The landowner, whatever the difficulties under which he labors, has a stake in the country. He has to pay his taxes. He may get his valuation down as low as he can, and sometimes he will go very far to get his valuation down, but his land cannot run away. Some share of the burden it has got to pay. The landowner feels that he has an interest in that continuity of law which makes the land his and not somebody else's, and while he may want to have certain laws changed, and may think, rightly or wrongly, that the existing law is hard on him, and does too much for the other fellow nevertheless, when it comes to an issue between law and no law, the landowner, the country landowner, is bound to be on the side of law. As the owner of property which cannot be moved and that will not in general change in value from day to day, he becomes a conservative force.

Now I do not suppose that there was ever more need of conservative force in the country than there is today. With the dazzling and meteoric changes of industry and of commerce and of our views of life in general, the forces which we call progressive, and which may prove under certain circumstances destructive, tend to get too much headway, and anything that will make a man realize that he is a part of the community, anything that can make the one who labors with his hands nevertheless feel that he has a stake in the country, is going to be a force on the right side. It may be a force, but it is a force which at the same time is very much needed. Here, then, is another way in which the University and the Agricultural Association may well join hands as persons working toward a common end. We, too, feel the preëminent need of training men to see their duty as members of a community. We, too, feel the need of teaching people that the work of

maintaining the law is more important than any work that they can do for themselves in making money or getting comfort. And we think that nothing will help those forces of conservatism so strongly as the existence of a large and influential farming class, rich enough to be above the level of penury, yet not to be independent of the hardest kind of work, sympathizing in virtue of that work with the desires of the city laborer and yet feeling, as the city laborer does not, the necessity of continued conservatism if any effective work for the country is to be accomplished.

And so, gentlemen, Yale University welcomes the convention called by the Connecticut Board of Agriculture as being engaged in the kindred work of laying the foundations for effective production and of furnishing the material for good citizenship and respect for law. We welcome you to our collections, to our museums, to our laboratories. You have come at a time when a good deal of the regular work of the institution is, to a large extent, suspended, because of the examinations, which come before the boys go home, but the collections of minerals, of fossils, and of pictures are still open. The laboratories are still open. I believe that in the mining laboratory, a little way north of the general university buildings, to the left of Prospect street as you go up, if you have leisure, will be well worth your inspection. But as to these and any other things, I want you to feel that you are cordially invited as our guests to inspect. If a man comes here and simply wants to know something of what is done in the way of education, it is no less a privilege than a pleasure to us to show it to him, and so, during the time of your stay here, speaking as one educator to another, I bid you welcome. (Applause.)

Secretary Brown. I appeal to you, ladies and gentlemen, whether I was not right in not tying the president of Yale University down to any particular subject. Anything I knew that came from him would be worth your hearing and be stimulating to the work in which we are engaged. I did not

expect, however, that he would accord us the higher honor of being co-workers with him in the great work of educating the people of Connecticut.

You all know that we have just come to the close of one of the most prosperous years of agriculture in the United States. The report of Secretary Wilson, recently published, has been so fully and carefully and wisely summarized in a brief sketch in *Current Events* that I ask your attention while I read a few paragraphs from that report.

RECORD-BREAKING CROPS.

Value is $6,794,000,000, says Secretary Wilson.

REPORT TO CONGRESS SHOWS THE AMERICAN FARMER IS THE GREATEST OF ALL WEALTH-PRODUCERS. OUR FARMS ARE MAKING THIS COUNTRY THE WORLD'S CREDITOR NATION.

The annual report of the Secretary of Agriculture, submitted to Congress, should be of uncommon interest. We Americans are used to large figures expressing the prosperity of our country, but we do not always stop to think where its greatest wealth comes from.

Mines and factories, forests and fisheries, play an important part in producing the nation's wealth. But the farmer is the chief factor in making this country rich and powerful.

We think of the banks, with their vast capital, as great storehouses of concentrated riches. But in a single crop — corn — the American farmer has produced far more wealth in this one year than the combined capital of all the national banks in the United States.

If the American farmers should sell all their 1906 crop at one time all the gold money in the world would not pay the bill.

We wish the young readers of *Current Events* to appreciate what the American farmer is doing.

All that he produces benefits not only himself but his country. He is the chief creator of new wealth.

A man may go into Wall Street and "make a fortune," as we say; but he does not really make it. He only takes what

others lose. He adds nothing to the total wealth of the country.

With the farmer it is different. He is a real producer. His labor and intelligent foresight literally "make" wealth; produce from the earth's surface wealth that but for his exertions would not have existed. He is a public benefactor.

Sometimes city boys will speak rather slightingly of "farmers." That is all wrong. "The farmer feedeth all." But for him we should all starve to death, no matter how much money we might have in our pockets or in the bank. And nowadays successful farming requires a very high order of intelligence.

Here, in round numbers, is Secretary Wilson's estimate of the value of the principal crops raised by the American farmers in the last year:

Corn,	$1,100,000,000
Cotton,	640,000,000
Hay,	600,000,000
Wheat,	450,000,000
Potatoes,	350,000,000
Oats,	300,000,000
Barley,	65,000,000
Tobacco,	59,000,000
Sugar Beets,	31,000,000

The figures make the assets of the Steel Trust look small by comparison. But they are not complete. They do not include the value of the eggs, poultry, milk, butter, cheese, beef, pork, mutton, and garden vegetables. If these were added the total would be increased by many hundreds of millions of dollars. How immense is the total value of these things is shown by Secretary Wilson's statement that if each American hen could be made to lay an extra dozen of eggs in each twelvemonth, it would increase the national wealth by more than fifty million dollars per year.

And Secretary Wilson says that in the last six years the farmers' land, buildings, animals and machinery have increased in value by $8,000,000,000. That increase is about equal to all the gold and silver money in the world. The total value of these things now stands at $28,000,000,000, or more than

enough to pay off all the public and private debts in the United States.

There is another side to the story. The surplus produced by American farmers above what is consumed in this country is sent abroad, and is fast wiping out our debts, making us a creditor instead of a debtor nation.

This surplus pays interest and principal to our foreign creditors. It pays rent to our great absentee landlords like W. W. Astor and the late "Lord" Scully. It offsets the drafts drawn by American heiresses in Europe for the money which their titled husbands squander abroad. It provides the funds from which the poor immigrant sends his little Christmas gift to his mother or sister in Italy or Assyria. It pays for the finery so lavishly imported from Paris to deck our American women.

That is to say, the drafts on America to pay for these things are more than balanced by the drafts on Europe to pay for our agricultural exports. The bankers with whom both sets of drafts are deposited offset one against the other, and only the difference or "balance" is paid in gold.

The balance, thanks to the American farmer, is greatly in our favor. In other words, the farmer makes our country rich enough to squander a great deal of money in Europe and still have plenty left. No less than $976,000,000 worth of American farm products were sent abroad in the last year.

Our programme has been made a little short this morning in order that the Connecticut Poultry Association might have an opportunity to hold a business meeting in this hall before the opening of the afternoon session.

As there is no further business we will take a recess until 2 o'clock.

Convention adjourned until 2 o'clock.

FIRST DAY — AFTERNOON SESSION.

Convention called to order at 2 P.M., Vice-President E. G. Seeley of Roxbury in the chair.

The PRESIDENT. Ladies and Gentlemen: I am very glad indeed to see so many of you here at the first day's session.

While there have been some delays, I think there is no reason now why our programme should not pass on smoothly.

This afternoon we are to take up a topic which is of great interest to us all, namely, poultry. That is a subject in which the State Board of Agriculture has taken a great interest. We are to have some good speakers on that subject this afternoon. It is a very important question. The first speaker, the gentleman first on the programme, is Mr. Charles K. Graham, Assistant Professor of Poultry Culture in the Connecticut Agricultural College. You will now listen to an address by Professor Graham.

INTRODUCTORY ADDRESS

By Mr. CHARLES K. GRAHAM, Assistant Professor of Poultry Culture, Connecticut Agricultural College, Storrs, Conn.

Mr. Chairman and Ladies and Gentlemen: I had intended to give you a short talk on the poultry industry of Connecticut, but we are fortunate in having with us today Mr. Almy of Rhode Island, and also Dr. Wood, who is to give us a talk in place of mine. I mention that so you will not leave the hall. I am going to cut my talk short so as to give him a chance. I was at a grange meeting the other evening where the statement was made that the money expended in poultry equipment and poultry itself, throughout the State of Connecticut, was more than that expended in any other one branch of agriculture in this State. Now I think it is possible that there is room for argument on that. I do not know whether that is so or not. However, I do not intend to defend it, but I feel that we can safely say that there are more people interested in poultry in the State of Connecticut than in any other one branch of agriculture. There are more people who are anxious to get information regarding poultry than ever before, and more than there are, I think, regarding any other one branch. It is a

recognized fact that the dairymen's associations, not only in Connecticut but throughout the United States, have the best organization, and probably the latest, and, in some respects, the most up-to-date organization in the Union. As the result of that organization we find that there are over two hundred thousand dollars being expended by the Washington government in special research work in dairying, or connected with dairy subjects. That is not the regular work that is being done by the experiment stations, but I mean special research work which is being directed from Washington throughout different parts of the Union. In the poultry business, however, there is barely two thousand dollars being used for that same purpose. Now there is no reason to criticise the Washington government for that. It is simply because we have not organized. We have not made the campaign that is necessary in order to get that appropriation or in order to secure the same amount of interest being taken in poultry that has been taken in dairying. The same thing might be said regarding horticulture. But what I wish to mention in particular is with regard to what we have actually done in Connecticut during the last year or two. Speaking for the Connecticut Poultry Association — and I would not for a minute wish the State Board of Agriculture to think that we want all the honor — for we appreciate very much indeed the assistance that the Connecticut State Board of Agriculture has given to us. Not only that, but we must thank them most heartily for that assistance and for their generous treatment of us, and for the liberal way in which they have construed certain matters in a financial line. This is no light talk. We appreciate it, and will endeavor to show our appreciation when the proper time comes. We would like also to have the State Board of Agriculture understand one thing: that up to this time we have been children, weaklings. We have needed a considerable milk diet. We are getting a little stronger and a little older. We want to run around a little more, and we will need a little more sub-

stantial food. I would just like to drop that hint, and we hope that the State Board of Agriculture will recognize it and treat it accordingly the next year.

During this last year we received from the State Board of Agriculture a grant of two hundred dollars. With that money we intended to hold some poultry institutes, and our executive committee had some fine ideas of what could be done, and we had an idea that every person wanted to know something about poultry. So we volunteered our services, but when we came to look the matter up we found not one single poultry association or individual that would invite us to come and give them a poultry day. They were very glad to have us come and give a poultry talk, but 'most always suggested that we bring along the horticultural man, or the dairyman, to help draw the crowd. They seemed to have the idea that we could not get a crowd if the people were asked to come simply to listen to a good chicken talk. Furthermore, a good many of the chicken men did not seem to feel that they would derive very much benefit from hearing local speakers, or that they could afford to pay fifty, seventy-five cents or a dollar to attend such a meeting. In fact, some of them seemed to feel that they could not afford to leave their hens for one day for the sake of getting a little information. So you see that we have some discouragements in our work. At last, however, we did arrange for one meeting at Vernon, and one at the college, where we have had two poultry meetings. We also had a field day meeting at Middletown. In order, however, to get the people whom we wanted, to get the people who felt that they knew something about the poultry business, and who perhaps have felt that they could get all the information that they wanted from poultry journals, we have sought to provide the very best speakers we could find, the very best men available. We paid what some of our critics have called unreasonable figures, and have used what some of them have said was an unreasonable amount of money for those meetings, but it was absolutely

necessary in order to stir up interest, and in order to satisfy that class of people that there were some things about the poultry business that they did not know, and to do that it was necessary to bring in a class of speakers that were able not only to give the average poultryman a good deal of new information, but who were able to teach the best class of poultrymen in the State, so as to get them to come out to the meetings. Now we have had seven meetings during the last six weeks, and we have had a good attendance at each one of those meetings, and we have been able to demonstrate that we have got lots of good talent for speakers right at home, if they will only listen to them. There are any quantity of good men right here in the State of Connecticut who know their business, who have made it a careful study, and from whom the poultrymen of this State can get a great deal of very useful information. No one man knows it all. You may get a good idea from one man here and another idea from another, and in that way build up a fund of useful knowledge.

Now we are not what is known as a chicken state. My ambition is to have Connecticut known, or to have Connecticut poultry known as Connecticut poultry, and not to have it said that we have to sell Connecticut poultry under some other name to get a good market for it. We want to be able to ship poultry into the New York and Boston markets, and get good prices while selling it as Connecticut poultry. When dealers ship good poultry into New York or Boston now they do not feel at liberty to say that it is Connecticut poultry. They now have to say that it is Philadelphia poultry, no matter where it comes from. We want to be able to ship our poultry into those markets and sell it as Connecticut poultry, to build up a reputation for our own poultry, and the only way we can do that is with a campaign of education.

Now just a word or two as to another thing. Colonel Brown said that if we could increase our egg production one dozen eggs per hen per year it would enormously increase the

value of poultry products in Connecticut. That is true, and I will be a little bit disappointed if a majority of the people in this audience do not go away from this meeting with knowledge sufficient to enable them to produce one dozen more eggs from each hen during this coming year than they have this last year. If we can just accomplish that throughout the State, we will do our share towards getting that fifty million dollars. And surely the State should be willing to do its proper share toward helping us to get that money. It is a small investment for a big return.

Now we have with us today some of the practical men who I think can give you that information, if you will simply ask the questions. Do not go out of the hall and criticise the speakers because they have not given you the information that you want. Ask them the questions that will bring out what you want, and get the information for your own good, for the good of yourselves and your neighbors.

I thank you, ladies and gentlemen.

The PRESIDENT. The next speaker upon our programme is Dr. P. T. Wood, who will address you on "Poultry Diseases."

Dr. P. T. WOOD. Mr. Chairman and Ladies and Gentlemen: I see I am down for a talk on poultry diseases, but I am afraid you would find that subject rather dry and uninteresting. We all of us come to know something about diseases as we go through this world, and I think you would rather know something about the prevention of disease. With poultry we have something in our power that does not lie in our power as regards the human race. We human beings are pretty apt to have our own way and then we pay for it, but with our fowls we have absolute control. We can make them healthy and keep them healthy if we try. There is absolutely no need of having any great amount of sickness in the poultry plant. You hear a lot about remedies and cure-alls that are advertised in the poultry papers, and, in fact, in the press all over the country. Personally I have not very much faith in a cure-all

or in medicine, as a whole. We had better let medicine alone if we can get along with something that is better; we do have something that is better. We have fresh air, which is one of the greatest medicines in the world, and we have sunlight. Pure sunshine and pure fresh air — those are the two greatest remedial agencies that we have. The late Doctor Oliver Wendell Holmes, in speaking of the training of children, said that if you want to train the child the way to do is to begin with the grandparents; so in breeding poultry the way to do is to begin with the grandparents. Begin now to grow your chickens so that two or three generations from now you will have healthy poultry. It is easy enough to do that. I have not had a really sick bird on my place in five years. While I have handled a good many sick birds, I should feel ashamed if I had a sick bird on my place. That is, a really sick bird. My birds are all housed at the present time, half of the flock in a fresh air house, and the other half of the flock is in a semi-closed house, one in which the windows have not been closed, that is, all of them, since I moved on to the place. I never intend to close those windows because I believe that fresh air is just as essential for chickens at night as it is in the daytime. Now a good many people say I am radical on that point, but I think I can easily satisfy you in regard to my opinions on fresh air. I maintain that a house in which the air is always fresh, and which always has good ventilation, although the thermometer may register several degrees lower than in a house that is closed tightly, the house is actually warmer for the animals living within that house than you think. You all know that if you go into a barn or outbuilding that is closed tightly you feel that terrible dampness and raw chill that cuts you to the marrow. You do not get that in a fresh air house. I guess there are a good many that have satisfied themselves as to the difference between working in some open shed out of doors, where we have felt pretty comfortable, and where we have gone into a barn or another building that was shut up tight, where the thermometer did not register nearly as low, where we did not feel comfortable. We were chilled. We would not stay there long before we had that creeping, chilly feeling up and down the back. Now a chicken has its overcoat on all the time, but we can take ours off. Now a year ago, in January, I had a notion that I wanted to build two more of these

fresh air houses. Perhaps some of you have seen the plans. The general plan of such a house is that the front is open all the time. At that time we had just had thaw enough so that I could have the post holes dug. I put up two houses, eight by fourteen, with seven and one-half foot studding in the center, about four and one-half to five feet in the rear, and three feet between the sill and the plate in front. On the entire front a space of three by eight is covered with absolutely nothing but wire screen. The roosts are in the back part of the house, and the dropping board almost on a level with the bottom of the front plate. No wind ever gets back on those roosts above that dropping board. I know of perhaps twenty-five or thirty farms where they have adopted that style of a house. When I first commenced to put them up I had some misgivings as to their success. I did not know whether I was going to be able to take a good big dose of my own medicine or not, and, as I say, I had some misgivings as to the effect upon my fowls. They had been kept in a house with an ordinary double-pitched roof, a house with the windows open, one window in each always being open, that of an ordinary twelve-light sash being open. Those houses were pretty warm. I thought that this fresh air house, as we called it, was going to be a good deal colder in spite of all my theorizing. I put my birds out there. I expected to have trouble with those birds, because they had always been kept warm. However, I put them out there, and the day that I put them out there the thermometer went down to about ten below zero, and I went out the next morning expecting to find some of those birds badly frozen. I did not find any, and they appeared as bright and as healthy-looking as ever. Well, it set me to thinking, and I began to watch those birds. I did not find that they stuck their heads under their wings as I expected. I have been watching the same thing in different poultry plants that have adopted these houses, and I have found that the hens on the outer roosts — in the most of the houses there are three roosts, but the hens on the outer roost roost with their backs toward the open front. Now, naturally, from the way that a hen's feathers are put on, if there was much cold or wind coming from the open front they would face it, but you almost always find them with their backs towards the front. Upon going in there, of course, you naturally get a different atmosphere from above your

waist, or it is a different temperature that you get on your hands and your face. The heated air rises, of course. I found those houses very comfortable. That set my mind at rest as to any wind coming in around those fowls. The very fact that they turned their backs towards it satisfied me that they were not uncomfortable. Of course, we all know that cattle and horses will put their backs to a storm. Poultry are not built that way. If hens were to turn their backs to a storm, or a strong wind, they would get chilled right down to the skin.

Last winter we had no trouble at all from those fresh air houses, so that this winter, having liked them so well, I had several more built. The birds in the fresh air houses are laying just as many, if not more eggs than they are in the closed houses, or in the semi-closed houses, because I never close a window. They are all perfectly healthy. I never even see a case of snuffles. I do not believe that hens ever get the snuffles from being kept in a fresh air house. We did find on one plant a man who claimed he had had some difficulty from that source. I asked him to look and see if those fowls went to roost at night. He did look, and he told me about a week or ten days afterwards, he says: "Doctor, you are right on that point. I found those birds underneath the roosts at night. I think they are going to get over it." Right after that came a letter from Professor Brooks — I think it was Professor Brooks of Amherst — in which he said that he had had a whole lot of birds that were roupy, that had had a bad cold, and he was thoroughly disgusted with the results he had obtained from using various cure-alls. Finally he put the birds out in an open shed, and he said that they could live or die. They lived. They cured the roup themselves. Their constitutions were all right, and the result was that they got rid of the disease simply by the application of plenty of fresh air and sunlight. Now I do not claim that you can cure all diseases with fresh air and sunlight, but you can, if you will, keep your fowls pretty close to nature, and if you do, you can be practically sure that you will keep them free from disease. You do not need to have any disease on your poultry plant. It is a disgrace to any man to have a lot of sick chickens unless in some way he is caught with an epidemic. When everything is musty and mouldy, and some filthy poultry plant is started, and the people have carried the infection from that plant to

other plants, and it is finally spread over the whole country. Those things sometimes happen, but not often.

Mr. Graham has said that perhaps you would be interested in the way I feed my birds. My feeding methods are not fixed. I have fed about every ration that ever was proposed, and for the last two years I have not had time to pay any attention to feeding to amount to anything. I have simply followed practically the time-honored custom that was adopted by most all practical poultry men, that of keeping food before the fowls all the time. I do not feed anything but dry grain, usually wheat when it is cheap enough, and hulled corn. When I do not feed wheat I use either oats or barley. They always get corn, and they get pretty close to fifty per cent. corn. In addition to that they get beef scrap, and they also have grits, oyster shells and charcoal. The charcoal, to my mind, is a very necessary item. You can abuse hens almost indefinitely as to food, you can throw them almost any old thing, but if you feed them charcoal they will not get much bowel trouble. That is one of the things to look out for. If you are not careful, you are liable to get it anywhere, no matter whether you are running a fresh air plant or not. The proportions of grain are not fixed. I simply go around and fill up my feed hoppers when I have time, once or twice a week, according as the fowls use it, and they are given cold water once a day. Under that treatment my fowls give me a good yield, and the eggs hatch well, and the hens are fat. I do not believe that any hen will make good eggs, or lay good fertile eggs, unless she is reasonably comfortable and fat. I do not believe in these lean, old, lanky range hens to make eggs, or to make strong chickens. Now we do not get any phenomenal hatches. We do not hatch at my place ninety-five per cent. or one hundred per cent., but we do figure on getting about fifty chicks from every hundred eggs put into the machine, and for home-grown stuff we figure on not over five per cent. of mortality, and frequently not over two per cent. This last season the mortality for home-grown chicks was less than two per cent.

Eggs from outside will give you trouble, and right there I want to say a word about handling your eggs for hatching. There is where a whole lot of trouble comes in. The stock may be all right. It should be all right. Some people, however, put their eggs for hatching alongside of the kitchen

stove, and keep them warm. That is a mistake. As a matter of fact, a temperature of from 55 to 75 degrees for two or three days in succession will pretty nearly ruin the best egg that ever was laid. It changes the makeup of the contents. That is, it becomes more watery. There is a tendency for the white of the egg to spread more or less. The yolk becomes softened, and such an egg does not hatch as well. The less handling your eggs get while you are saving them for hatching the better, and they better be kept in a room where the temperature does not go below forty or above sixty. I should have said before, do not breed from birds that have ever been seriously sick. Do not for one moment do such a thing as that. No matter how good a hen may be, whether she scores ninety-nine and one-half points or not, never breed from her if she has been seriously sick. I mean any serious kind of illness where it has taken from a week to ten days for the birds to get over it. Breed from just as strong, healthy, vigorous specimens as you can get, the stronger the better. A good, aggressive male bird that will fight at the drop of the hat, who wants to pick up trouble with everybody, yourself included. My best male bird resents my coming into the pen. As soon as my back is turned on him, he is right up in my hair. That is the kind of a bird I like to see. A good, scrappy bird. I want the pupils of the eyes to be bright and aggressive looking. When you have an eye that appears to be cut in somehow, and lacking in lustre, there is bound to be something wrong inside of that chicken, and the sooner you get rid of him the better. If you stick to that principle of always breeding from sound, vigorous, healthy specimens, you will get healthy chickens, and those chicks will live. They will not have white diarrhœa and forty eleven other things. But I do not dare to talk about diseases, because if I get started on that subject I will never let up all day. But we settle that question of breeding stock in that way. You must have good breeding stock and you must take good care of your chicks. If you do that then you can expect in the long run much better than fifty chicks from every hundred eggs. I do not care whether you hatch them with a hen or with an incubator; it is practically the same thing, and you will not get over fifty chicks for every hundred eggs. Now when you get those chicks out and perhaps before that, I better say, that if you are running an incubator you better follow the

manufacturer's directions, and then if you do what the manufacturer tells you to do it lies between you and the manufacturer, and you have not got to run around all over the neighborhood to fix the responsibility, but just bear in mind that when you get those chicks hatched, for the first thirty-six or forty-eight hours the chief requirement of young chicks is warmth and rest. They do not want to be milled around. They want to be let alone. They want to be kept quiet and warm. I believe that almost ninety per cent. of the trouble with young chicks comes either from too much handling or chilling, and chiefly from chilling. You hatch these chickens out at a temperature of about 102½ to 103, and it sometimes goes up to 106 before they are all out. Sometimes I have seen it 110 to 112. And then you put them in a brooder where the temperature is 95, and you can see what kind of a drop you are going to give those poor little delicate things. That is a point that should always be borne in mind, keep them warm and do not allow too great a variation in the temperature. Let it be reduced gradually. Then you will be safe. I ran my brooders right out in a snowbank the last of the winter, and the snow was all over the top of them. The chickens lived. I would hate to tell you what the temperature went to sometimes in there, but there are times when I do not hesitate to keep it as high as 110.

DISCUSSION.

Question. What would the temperature be outside when you have it at that point inside?

Dr. Wood. It would not be much more than 75 or 80 in any of the box brooders that were ever built.

Now those chickens should be kept close for the first three days in the brooder, and they should be kept warm and quiet. When I feed them I take the hopper off so as to give everybody a chance. There are always a lot of little weak chickens in there that do not come out to get anything to eat. They have to be looked after. It only takes about twenty-four hours, and sometimes only twelve hours, to put a chicken where he will stay with you about a week or ten days, for unless you

are careful he will get the white diarrhœa and that is the last of him. That is only one of the many different ailments that chickens have. Now those chickens stay in the brooder, in the rear apartment of the brooder, about three days. They are kept moving and active every time I go out there. They are fed perhaps every three hours and they are kept moving while they are feeding. Then the hopper is put on, and the cover is dropped down, but if the brooder is well made it is arranged so that there is always plenty of fresh air. After that period has elapsed, they are then permitted to come down into the exercise department, usually on the fourth day, and by the time they are seven to ten days old they commence to run outdoors. They come out for a few minutes and then go back. The chief trick is to keep them moving, and then they will be more apt to escape those mysterious chicken diseases.

We find about the best food for young chicks is dry food. A sloppy mash will soon get down under foot, and then it is like a doormat instead of food. We use chiefly a commercial chick food. And in addition to that we give them a clover litter or alfalfa litter to scratch in, plenty of cracked corn and plenty of pure water. When we have milk we let them have that to drink. They also get raw vegetables, such as raw beets, raw potatoes, lettuce, if we have it, but seldom cabbage, because cabbage has a loosening effect upon the bowels. With that system of treatment in feeding, we have yet to see any serious trouble. In fact, I do not think the principal trouble is in the feeding. I think it is keeping them warm, giving them plenty of fresh air, and in keeping the quarters clean. Now those chickens when they get up to weaning size, about eight or ten weeks old, are ready to be moved into more permanent quarters. They are taken out of the brooder. Sometimes we run the brooders under cover, sometimes outdoors. Anyway, they go from there into an open front colony coop or into one of these houses. They stay there about as long as it is convenient,

living underneath the house on the ground. Usually there will be two or three scrappy little cockerels that will sit in the doorway, and keep them all out, and they will go under the house and sleep there. We let them do that until about the first of September. Now one of the surprising things about these outdoor chickens is that their feathers will shed water just like a duck. And chickens grown in a fresh air house will never get as wet in a rain as chickens that are kept closed up tight. I had an example of that during this last bad storm that we had in Massachusetts. We had a lot of birds that had been allowed to run out in a field. We did not feel like shutting them up. I save labor all I can. I do all the work with my own chickens that I can. I do not give them any too much time. Those birds, during that last rain, were out scratching around while the neighbors' hens were under cover, and aside from a few wet feathers you would hardly know that they had been out in a rain. We let out a few birds that we had in a closed house, and they had not been out in that rain more than two or three hours before they looked like drowned rats, and their feathers were all rumpled up, and they looked as uncomfortable as wet hens usually do.

Well, perhaps you think I am not giving you much about poultry diseases. The less I talk about poultry diseases the better I like it, and I think you will too, but Mr. Graham tells me that you have had an epidemic in this section of chickenpox. Now chickenpox is said to be purely a germ disease. As a matter of fact it comes from certain parasitic spores. Whenever you get a spell of damp weather of long duration, in which all fungus growth increases, you are apt to have it. When everything gets mouldy, and toadstools and mushrooms spring up around, you can figure that all fungus is going to grow, and in such a season you will get more or less chickenpox. If you use musty and mildewed grain, even though your chickens are in very good health, if they happen to be fed with something of that kind, you will be apt to get the chickenpox started.

It is about the same way with canker. Personally, I have never been able to get a sufficiently powerful microscope to be able to differentiate so as to say positively which is which, or how much is the product of the disease itself. Now with chickenpox the most satisfactory thing that we have tried is to use a solution of hydrogen dioxide, three per cent. with about an equal part of water, and bathe the sores, first removing the scabs, and after that apply an ointment made up of a mixture of one part of finely powdered iodoform, and tewenty parts pure vaseline. Usually that will knock the chickenpox out. Sometimes it is necessary to give a little treatment internally, and for that there is nothing any better than sulphide of calcium. The sulphide of calcium should be given in the drinking water, about as much as will cover an ordinary three-cent piece in a gallon of water, and that will give a gallon of water the smell of a rotten egg. When you have once gotten the chickenpox around your place you should thoroughly disinfect. You want to get all of the dirty, musty litter out of the place. You better not have any litter until you get rid of the disease. Just run them on bare floors.

Professor Graham asked me to say something about cholera. I never saw a genuine case of chicken cholera in this section of the country. I have seen a good many cases of the disease, but not in this section. I have been through one cholera epidemic at Millville, N. J., and that started from an epidemic up the line that we did not know about. We were buying eggs for hatching. We had a plant that carried about four thousand birds for breeding stock, and for several years we bought eggs for hatching, and were running at the time two large size Cypher incubators. Naturally we had a whole lot of infertile eggs to dispose of. The brokers to whom we sold those infertile eggs became prejudiced against them, and they refused to buy our infertile eggs for some reason, so that in order to get rid of them we started in to cook those eggs and to feed them to the stock. And then one of those things happened

which sometimes happen on a large plant: the men thought it was too much bother to cook the eggs, so they just broke them into the mash, and in that way they got rid of a lot of eggs that had come right from where they were having the cholera. And the first thing we knew a lot of our fowls were wobbling around the yard, having convulsions and dying. That is the first thing I noticed. I looked for everything that had cholera. What I looked for was this: I looked for fowls that were weak on their legs, that showed symptoms of rapidly losing strength, that had pale combs and wattles, that were dull looking about the eyes, and with legs that were hot and dry. They would have full crops almost invariably. If you startled them they would fall over on their side, have a convulsion and die almost in a few minutes. Those are the chief symptoms of chicken cholera. You do not get a black comb when the chicken is dead. It is pale and flabby; at least I have never seen a dark comb, but with anthritis and with other bowel troubles you do get a dark comb.

Now perhaps it might be well to say something about the post-mortem appearance of these cholera-infected birds. An examination of the cholera-infected birds shows a very large gall sack, dark green, a real dark greenish-blue bile, the liver large and flabby, and full of dark blood. More or less ulcerations in the intestines, but one of the most prominent and most noticeable things in the post-mortems is the condition of the kidneys and the small ducts leading to the kidneys. Those are usually full of a limey substance, composed chiefly of urates, which are yellowish in color, sometimes yellowish green. That is an almost invariable characteristic of chicken cholera. The kidneys are sometimes full of the same limey concrete. Almost invariably the crop is full, and that is due to the fact that the fowl is paralyzed in the crop muscles and intestinal muscles, so that the food cannot pass on. You see a bird that is almost thin enough to shave with, but with a big, full crop, that a week before was a nice, big, plump, active bird. Now

there is only one thing you can do if you get fowl cholera into the poultry plant, and that is, start right out with a club or axe — and a club is best — and kill off the ones that are the worst. If you spend time trying to cure them, the first thing you know you will have the entire plant sick, and you will not be able to get rid of the disease for some time. The reason I say use a club is that we do not want to let the cholera chicken bleed, if possible to prevent it, on the place. The blood of such a chicken is just as infectious as anything else about the disease. If fowls eat it, they can take the disease. If they eat raw eggs which come from cholera infected fowls they are liable to have the cholera, or even if they eat the flesh of such birds. So if you are careful to eliminate such birds, then when you get through with the epidemic you are through with it.

The first thing, when you discover the presence of the cholera is to get rid of the chickens that are very seriously infected, and then to take all the suspects and get them away from the other fowls that you know are well. Then use a two per cent. solution of sulphuric acid and spray it all over everything except the fowls. Take the litter out, scrape up every floor, clean up the drinking vessels that have been used, and treat them with a good strong solution of pure creolin, two ounces to a gallon of water. After that you better whitewash the buildings, and use a couple of ounces of creolin in making the whitewash. In the drinking water you can use a pretty powerful remedy, and that is mercury bichloride and corrosive sublimate. It is one of the best intestinal remedies and disinfectants we have. I use tablets of one one-thousandth of a grain. You do not want to let the disinfectant stand around where the birds can get at it, or it will kill the whole flock. That remedy should be given at the rate of twelve tablets to a quart of drinking water. If you give it in the way I have described you will not have any trouble, and you will cure the disease in its mild stages, and you will prevent others from having trouble too. And not only that but you will cure a whole lot of bowel trouble.

QUESTION. Tell us something about roup. That is something we have to deal with.

Dr. WOODS. Do you have much of it? It comes largely from breeding roupy stock. I have not seen one genuine case of roup for some time. Roup is a germ disease. Roup is a common name given to almost any kind of a cold that a fowl might have, but when you get right down to roup you get a putrid condition, which is very much akin to diphtheria. Whenever you get roup you get that foul smell that accompanies roup. Now for roup in its first stages, in a mild form, there is nothing any better than to use aconite and bryonia, given in tablets containing one one-hundredth of a grain of each ingredient. That can be used twelve tablets in a pint of drinking water, or it can be given one tablet to each infected bird. If you take it in time, that remedy will usually prove effective.

I do not see anything wrong with most of the roup remedies. They are all more or less effective, but you can do it cheaper by going down to your drug store and buying an ounce of what is called Pearson's Creolin, or even Buffalo roup preparation, or Boston Sanitary Fluid, which are all the same thing. Some cost thirty-five cents a gallon, and the others are boosted up to five dollars a gallon, according to the name. The mixture of creolin in equal parts of water and sprayed into the nostrils of the birds and into the throat, and repeated daily for three or four days will stop almost any case of roup that has not gone so far that no remedy will touch it.

QUESTION. What do you think of kerosene?

Dr. WOOD. The gentleman knows my opinion about it, or perhaps he would not ask me. I do not believe in kerosene. I do not believe in carbolic acid. I believe when a man commences to use kerosene as a remedy on his chickens I do not know where he is going to bring up. I once recommended to a man that he wring out a cloth perfectly dry that had been soaked in kerosene, and then lightly sponge the feathers of his

fowls to get rid of lice. I think he gave the chickens a bath in it, for he told me that the birds all died, and that they were horribly blistered. That is what kerosene will do for you if you are careless with it. I have just gotten a letter from a man out west, who has used kerosene dips to cure roup. He dipped his chickens right down into the water. I suppose he attempted to make a solution, but he did not stop to think that all of that kerosene was floating on the top of the water, and that they got the full strength of the kerosene both going in and coming out of the bath.

QUESTION. Would you advise anyone to try to cure roup except with a hatchet?

Dr. WOOD. Roup is a pretty general term, but it all depends on what the bird has. Any bird which is badly afflicted with roup better be killed. And then another thing, inasmuch as this gentleman is asking about roup, if you keep your birds on the fresh air plan, you will not have it.

If my neighbors' chickens never gave me any more trouble than my own chickens, I would never have any trouble. That is always the way. A woman wrote me the other day, and she said she did wish that the board of health would become interested in poultry. She said her neighbor had a chicken coop which, if it was a hogpen or a cow stable, the board of health would be down there, but as long as it was a chicken coop they did not think it was worth while to pay any attention to it. The result was they were getting the roup, and they were getting it from that one foul pen that probably had not been cleaned out in the last forty years. In all that center, of course, the hucksters come around and gather up the chickens, and then go to a neighbor's, and the first thing the neighbor would know she would have trouble, and that is the way it went all over the neighborhood, and they had about the worst time with roup that anybody ever had. But you can take a roupy chicken, that is, one that is not afflicted with real roup, and you can feed it out in an open shed, and if it is worth saving it will live. Most of them will live.

Now if there is anything else that anyone wants to ask I would be glad to answer. I do not, however, want to stand up here and talk all day.

QUESTION. How about sulphur?

Dr. WOOD. That is simply another name for the creolin preparation. You can buy that article just as cheap under another name, and sometimes cheaper. The Buffalo Sanitary Fluid, which is a creolin solution, can be bought for seventy-five cents, and almost any of these other preparations do not change it a particle. They are all coal tar preparations.

QUESTION. How many chickens do you put in your mother brooder?

Dr. WOOD. Fifty and no more.

QUESTION. What have you to say of the extensive use of lime?

Dr. WOOD. I use lime for a top dressing for land. I have used Nova Scotia land plaster on my dropping boards when I have had opportunity, but the minute you start in to use a finely powdered slaked lime, dust gets into the chickens' nostrils, and into the catarrhal tracts, and then you have trouble. I went down here and saw Frank VanAlstyne. He was using lime on the floors of his breeding coops, also on his dropping boards, and using it in his brooders, and his chickens all had various kinds of catarrhal colds. There was one little flock that had gapes, the rest of them had catarrh from the effects of the lime. Their throats were horribly inflamed, from the constant breathing in of the dust.

Mr. GRAHAM. You say you use wheat?

Dr. WOOD. I prefer red wheat.

Mr. GRAHAM. Why?

Dr. WOOD. Because I can usually buy it cheaper. It is harder and stands up better. I think you can get more for your money than you do with the white wheat. I take any kind of wheat I can get.

The PRESIDENT. How do you like ground feed for a poultry food?

Dr. WOOD. You mean as a dry mash, or for wet mash?

The PRESIDENT. Either or both?

Dr. WOOD. It is very satisfactory. I have not found it necessary to use the mash, as I say, and perhaps for that reason I am not prepared to answer that question. I only keep a few hens. I only keep about 100 to 150, and seldom over 200. I raise about 500 chickens.

The PRESIDENT. Do you feed corn?

Dr. WOOD. Yes, sir. I do not feed ground grain. Life is too short.

QUESTION. What is your idea of hulled corn?

Dr. WOOD. Hulled corn is all right, if you can get fowls so they will like it. Some flocks do not like it. Other flocks that had been accustomed to certain grain wouldn't touch it. My birds do not do as well when we feed it to any considerable extent.

QUESTION. How about feeding it in a proportion of twenty per cent.?

Dr. WOOD. That is not too much.

QUESTION. Do you use gluten or linseed meal?

Dr. WOOD. I do not use ground grains at all.

QUESTION. What about the H-O products?

Dr. WOOD. I do not like to answer a question such as that from the platform. The H-O products are proprietary articles. They are by-products of an oatmeal factory, consisting of what is left after they have taken the best part out of the grain. That is as much as I desire to say on that subject.

QUESTION. How about screenings? What do you think of their value for feeding poultry?

Dr. WOOD. Wheat screenings are very satisfactory if you get a good quality. That is, of course, if you do not have to pay too much for dirt.

QUESTION. I would like to ask in regard to this fresh air house. Do you ever have any difficulty to prevent snow from blowing in and filling up the house, with an open front?

Dr. WOOD. In light storms the fowls eat up a good deal of the snow, and it is rather good for them than otherwise. In heavy storms I can shovel it out in about fifteen or twenty minutes.

QUESTION. In what direction does your house stand?

Dr. WOOD. A little east of south.

QUESTION. Why is it if a fowl is not sensitive to cold she will always huddle in a corner or in front of a window through which the sun shines on a cold day?

Dr. WOOD. Fowls will always huddle together in that manner.

QUESTION. And a fowl will always avoid a driving wind?

Dr. WOOD. She won't always if she can get in the sun.

The PRESIDENT. Gentlemen, our next speaker of the afternoon is Mr. Fred Almy, of Little Compton, R. I.

"TWENTY YEARS EXPERIENCE AS A POULTRYMAN."

BY FRED ALMY, Little Compton, R. I.

Mr. Chairman, Ladies and Gentlemen:

Professor Graham has taken the liberty of putting me down for an address on twenty years' experience in the poultry business. Now I think he must have taken a poet's license, or some other license in putting me down for this subject, for, in the first place, I never made an address in my life, so you can hardly expect me to make one now, and in the second place, I have not been in the poultry business twenty years. I began probably about fourteen years ago to raise chickens in a small way. I was situated as I suppose a good many other young men are, on a farm, at a pretty good distance from a market. I was the only boy in the family, and the tendency of the family decision seemed to be that I was to stay there and run the farm. I had lots of good advice from friends and

neighbors, who advised me to go away from home and to go where there was more money to be made. At one time I thought of doing so. But as I looked over the situation I could not see much money coming in in the future, and I knew that I worked hard enough for anyone. After thinking the matter all over, however, I concluded to try a little experiment on my own account, that of raising chickens. I guess the first year I had about seventy-five, and I put them in flour barrels. That was the best coop that my finances could afford at that time. That fall and winter I went in to teach school so as to raise a little revenue in order to build me a few coops. I think I built two the first year, six by nine. These happened to succeed pretty well, for I did not know anything about the business, and I had some good luck the next year. I increased my flocks, and the flour barrels gave place to more pretentious shoe boxes for chicken-coops. I used to take shoe boxes that cost five cents, and take a couple of boards off the top, and nail one each side in such a way as to give them a little pitch, and put those out. I found that they answered reasonably well. Afterwards, having fairly good luck, I began to increase somewhat, and built a little better form of coop, so that at the present time I have about sixty houses scattered over my plant, the whole thing being run on the colony plan, including about one hundred and seventy-five coops. I do not know whether any of you are familiar with farm poultry. This is a picture of my coops. It is a two pitched coop, about two feet and a half to three feet square, with a window in front and a window light in each end. And these coops are scattered over the field. I find that my chickens grow pretty well. I feel very delicate about speaking at all, especially in the presence of Dr. Wood, because he is an authority on this subject. He has made poultry diseases and poultry culture a study, while I have blundered along imperfectly, and have had to try a thing to find out whether it was good or not before I adopted it. I carry on my business about in this way. I still use hens for hatching nearly altogether, although I have two or three machines, but I still depend principally upon the old hen. We, in our neighborhood, plan to hatch our chicks either about the last half of March, or during April, and perhaps into May, if we have to get out a required number. I hatch, myself, about three thousand, or a trifle better, with the idea wholly, you

understand, of getting pullets as layers. That is what the poultry business is conducted for in our section entirely,— with the idea of making eggs. Of course, we dispose of our surplus cockerels, but that is the main point. Now these chickens, as I say, are placed in these little coops, that I have just mentioned, with the hen, and inside of each little coop I take a cracker box, which is about a foot by eighteen inches, I should say, in dimension, and place the hen inside of the little box, which is in turn placed in the coop, so that she is confined in this little box for a space of two weeks. We then just cover the floor with either oat chaff or hayseed litter, and feed the chicks once a day. A dry food very seldom, but to obtain the proportion, I use a mixture of my own concoction,— plenty of cracked corn, finely cracked, dried bone, bran, grits, and charcoal,— coarse bran. No beef scrap in that. At the end of two weeks we usually let the hen out. I will say right here in regard to the hen, that I have had them lay in three weeks, and even in these little boxes. I simply confine the hen in there for the reason that the chicks are inside part of the time, especially if it is cold, whereas if she was let out, she would be unfit to mother the chicks, and in the box she cannot scratch, but the chicks do the scratching themselves. They are not in the coop, but they run in and out. After two weeks the hen is let out. I gradually begin by feeding the chickens in the morning a cooked mash. In fact, I will say right here that I always feed my hens mash in the morning, and dry grain, dry whole grain. Now this mash, I do not know as it is particularly interesting to you what it is composed of, but I am a good deal of the opinion of Dr. Wood. I do not think that the food is so important as the surroundings. I do not think it is so necessary to be confined to any strict proportion of food as it is to hatch out good healthy chicks, and to keep them from getting chilled, and to give them plenty of fresh air, exercise, and water. My mash, however, is composed of about one-half bran and oat feed, usually. That is, of course, in the winter-time, and I use cut clover, or something of the kind for greens, and about one-fifth to one-sixth scraps. That is a pretty heavy scrap, I suppose. That is in the winter-time, but in the summer I put in about half as much as that, from one-eighth to one-tenth, and a small proportion of corn meal, and for grain, I feed corn, oats, wheat, and barley in the proportion

of one part to three parts corn. One part oats, wheat and barley. That is about the ration for laying hens. And the chicks, as I say, had this in the morning at the first start. And then in perhaps another week, we feed a scalded food at noon, which is about the same proportion as the mash, only it is not cooked, and cracked corn at night, and that is the ration that they get right straight through the season.

We hatched a little better than 3,000 chickens this season and raised, I think — I cannot give you the exact figures, but in the neighborhood of 2,600. Now there is quite a little difference between 2,600 and 3,000, but only a very small proportion of these chickens died from any disease. They were situated quite a little ways from my house, and the hawks got some of them. The rats got quite a number of them. In various ways they dwindled down, but the proportion of mortality from actual disease was quite small, I think. I can say, although it is quite a large statement to make, perhaps, that I have not seen one case of roup or even cold in all those 2,600 chickens that we raised this season. Now my idea of roup is this: that it is caused by crowding and overheating almost entirely, unless you breed it in from your old stock. In order to avoid this our coops are arranged in rows, in an open field. After the chicks get to be six or eight weeks old, we place a trough between every two alternate rows, and perhaps four or five troughs in this row, and then one morning we begin at this corner and feed down to these, and then go down that row and up this, and perhaps the following morning we will just reverse it. In fact, we change around in the feeding just as much as we can, for we do not want the chickens to get the idea that they are to be fed in any one place. If they do, or if they expect it, they are going to be up at that particular corner or place waiting for you. They will soon get in the habit of forgetting to go back again. Those coops will be filled to overflowing, and you will soon have a good case of roup on hand, but by pursuing the other method, and by skipping around in feeding we discourage them from leaving their immediate localities. They soon find out that in these troughs they are bound to get food, and they are not sure to find it if they go anywhere else in the lot, and for that reason they stay there. You will also see that in having a hundred or one hundred and twenty-five coops on about three or four acres of

land they must naturally be pretty close together, so we have to take this precaution in order to keep them from going from one coop to another, whereas if we had only a few to go from one coop to another we would not have to take this precaution. I think, in my own opinion, that this is the main point, and the secret in poultry raising is about this: hatch your chickens out early, keep them growing, and keep them free from disease, if possible. Roup is the worst disease that we have because the climate is damp and the soil is damp. Keep them from crowding, and your chickens will come around all right in the fall, and begin to lay when eggs are worth money.

Now one word in regard to the houses. My houses are similar to all the houses in my neighborhood. They are all simply colony coops made out of plain hemlock boards. The majority of them are only battened on the roof, and some not even that. A great many of them are not battened on the side at all. They are practically open coops, as you might say, or cold houses. I do not think there is any need of having any open fronts. It is all open enough so that they can get all the fresh air they need. I never have had any particular trouble with roup or any disease of the sort. I well remember about five years ago, I think, that we had a very cold snap about the first day of December. I had just put some pullets into some new houses that I had got, and they were not battened at all on the side. The lumber that was used was quite green when the house was put up, so that the cracks were quite wide. We fully intended to put in a little paper just around where the roosts came, and also back of the nests, but this snap coming on so early in the season it had not been done. The pullets in that house were laying pretty well, and we got from eighteen to twenty eggs a day. The next morning I got up feeling pretty sick. I concluded that those birds were done for. That day we went around four or five times to pick up the eggs to keep them from freezing in the nests, and I was very much surprised to find that the birds did not slack up in their laying. They went right along just as though nothing had happened. And we made up our minds that if they could stand that snap they would get along for the rest of the winter. The result was that although we had the expectation of placing a little strip of paper right back of the nests so that they would be reasonably comfortable, they were never fixed at all. Although

most of our houses were built with the expectation of doing this, these have done as well, and I think better than any we had on the place. My houses are very small compared with some people's idea of a house. The first ones that we built I had to cut my coat according to my cloth. Afterwards, I made them a little larger, about eight by twelve, and that is about the limit of anything on my place. In those eight by twelve houses I keep from 40 to 45 hens. I keep Rhode Island Reds. They are a bird pre-eminent, in my opinion, for that section of the country. They are a fowl which is used to living in cold houses, and they are less liable to be affected by changes in the weather.

DISCUSSION.

The PRESIDENT. You do not think that fowls differ very much from people, do you, in respect to their sensitiveness to cold?

Mr. ALMY. I think that they do differ in this way; a fowl cannot put on an extra coat every time he gets cold in order to get warm, so you must keep your temperature so that they will feel as little change as possible in going from indoors to out-of-doors. In our houses it freezes inside when it is cold enough, about as hard as it does outside, but as long as the combs and wattles of the birds do not become frozen, I have never noticed any bad effect upon the birds.

Mr. GRAHAM. Do you give them water or snow in the winter?

Mr. ALMY. We always give them water. We give them water right out of a deep well.

QUESTION. They can help themselves to snow, I suppose, when there is snow?

Mr. ALMY. Yes.

The PRESIDENT. When the snow is deep what do the fowls do then, when the snow is too deep for them to get out? Are they not apt to crowd in the building?

Mr. ALMY. I expected they would do that in these small

houses, but I am glad to say that it is very seldom that we have any depth of snow to last for any length of time. In the last winter I do not think there was a snow storm all winter that gave us over six inches of snow in depth, and that did not stay long. If there was snow that stayed with us for any length of time, we would have to shovel the place out, so that they could get out of doors, but practically the ground is rarely, if ever, covered with snow to a depth sufficient to keep them in.

QUESTION. Are you getting any eggs now?

Mr. ALMY. I am getting a few. I am getting from 35 to 40 dozen a day now.

QUESTION. How many hens have you?

Mr. ALMY. I have 1,800 hens at present, some of which have just been gotten into the houses. Considering the time of year, the yield is very satisfactory, and especially so with the present prices of eggs. Of course, we would be glad to dispose of more at the same price, if we had them.

QUESTION. How high are those 8 x 12 houses?

Mr. ALMY. Those 8 x 12 houses all have six-foot posts.

QUESTION. No floors?

Mr. ALMY. No floors to amount to anything. There are no floors except on the side where we have a covering of dry beach sand.

QUESTION. How many windows do you have in these houses?

Mr. ALMY. All of the first houses we had built had one window which slid to the side for the purpose of ventilation. The houses that we are building now have four sash, or two whole windows, with a scuttle on a line with the front of the house, and a scuttle on the back of the house. The roosts are in the end so that we can drop this half of the sash which is in the front over, and the scuttle on the back side, and have a free circulation of air right through the house, without having any draft on the hens. That is on the two-pitch house. We

also have a few houses with only one pitch that have four sash at the bottom, one sash running clear up to the eaves in front, which slides, and they also have a large scuttle on the back, so that by opening the front window and back scuttle we have a free circulation of air right through.

QUESTION. Do you change the location of these houses at all?

Mr. ALMY. We do sometimes. We have houses, however, that have been on the same location ever since I began to raise chickens. Some of them have been upon the same place about fourteen years.

QUESTION. How often do you remove the droppings?

Mr. ALMY. Usually about three or four times a year.

QUESTION. Is there any difference in the eggs when the hens are running around in the snow?

Mr. ALMY. I do not know that there is. No. If they are confined in the house for more than a couple of weeks they are apt to drop off a little from just going out into the snow.

QUESTION. How much do your Rhode Island fowls weigh on the average, as you breed them?

Mr. ALMY. As I breed them, the females will average about five pounds. I think that is higher, however, than the majority of them run in our section.

QUESTION. You have no dropping board?

Mr. ALMY. No dropping board. The roosts are placed quite a distance from the ground.

QUESTION. I have listened with a good deal of interest to what the speaker has been saying about the distance from the house at which he is keeping these chickens. I would like to ask how he keeps people from stealing them where he keeps them so far away.

Mr. ALMY. Well, if it was necessary I should use a shotgun. That is the only way that I can see, but I have never had occasion to do that. I never lost any but once in my life. If I have lost any it has been so few that I did not miss them.

QUESTION. My idea in regard to keeping hens is that the old fowls will do without very much range so long as they have sufficient green feed, but chicks want all the range they can have. I would like to ask the speaker if he thinks old fowls need much range?

Mr. ALMY. No, I do not think they do, not as much as young chicks.

QUESTION. Speaking about old fowls, how old do you keep them?

Mr. ALMY. I never keep anything older than a yearling.

QUESTION. Where do you market your eggs?

Mr. ALMY. The eggs that I sell on commission I send to Providence, but I have customers in Newport, Providence, and various other places. Most of the eggs, though, that I sell on commission are sold in Providence.

QUESTION. Have you tried to raise any other variety of birds than the Rhode Island Reds?

Mr. ALMY. No sir. I never tried to any extent. I did at one time have a couple of small flocks of Brahmas, simply to have a few eggs to raise roosters from. I thought it might improve the size of my eggs, but when I wanted eggs in the fall they did not lay, and when I did not care whether I had any at all they did lay.

Mr. GRAHAM. I understand that your success has all been due to raising chickens for producing eggs?

Mr. ALMY. Entirely, yes.

Mr. GRAHAM. As I understand it, there are more men in your locality who are doing just as you are?

Mr. ALMY. Yes, I think so, to a certain extent. There are very few there in my locality that make that their business almost entirely. At the same time, there are very few who do not keep hens. Almost every farmer there keeps hens to a more or less extent.

Mr. GRAHAM. Most of them keep about how many? The point I wanted to bring out was whether the section where you

live was not, as a rule, very fortunate in this particular line of business?

Mr. ALMY. Oh, the majority of them keep from 300 up to 500 or 600. There are a number of them that have a thousand to 1500.

QUESTION. What percentage of your eggs hatch?

Mr. ALMY. I was coming to that in just a minute. Dr. Wood says that he considers that a fifty per cent. hatch is a good average, but I do not. I think that my eggs, by setting the eggs from my hens, that they will average from 75 to 80 per cent. easily.

QUESTION. That is, of the eggs that go under the hens?

Mr. ALMY. Of all the eggs that go under the hens.

QUESTION. Your breeding stock is all pullets?

Mr. ALMY. No, sir, pullets and yearling hens.

QUESTION. How many fowls do you think that one man can take care of?

Mr. ALMY. That depends largely on the man. If a man is willing to get up at four o'clock winter mornings, he can take care of a good many. I can take care of a thousand or fifteen hundred myself. I have done it, but I would not advise anyone to try it unless they have got a pretty good strong constitution and a love for the work.

QUESTION. How much help do you keep?

Mr. ALMY. I keep one man all the time. Of course, occasionally I hire by the day.

QUESTION. What proportion of your three thousand chickens were hatched by hens?

Mr. ALMY. I cannot tell you exactly, but I should say three-quarters of them were. I have three machines and keep them running all the time during the short season of my hatching. My chickens are all hatched by hens with the exception of perhaps a hundred or two. I set a lot of hens, usually about forty or fifty, and sometimes more, sometimes about sixty, together with a couple of machines, at the same time. As soon as

the eggs are tested for infertility, I take the infertile eggs out and put the fertile eggs under the hens, if they will take them all, and, if not, I put the balance into the three machines, and let them hatch there. If the hens will take them, I prefer to have them hatched in the natural way.

QUESTION. How do you arrange about your setting hens? Do you have a special setting house?

Mr. ALMY. Yes, we have a regular setting house, or one that we devote to that purpose, where the nests are arranged in rows, where they can be shut on. We have sections of five, eight, or ten nests, which by dropping a board can be shut off. In that way I can let them off a part at a time, eight or ten, and then shut them on and let off eight or ten more.

QUESTION. Do you hatch the whole year round or just in the spring?

Mr. ALMY. Principally in the spring.

QUESTION. Is that 75 or 80 per cent. practically a summer hatch?

Mr. ALMY. I am speaking of a year round hatch. But in the winter I will agree with you entirely that for fall and winter fifty per cent. is a good hatch, taken on the average. In the spring, during the natural hatching season, I am able to get a good deal better percentage than that.

QUESTION. What do you do in reference to furnishing the hens with shell food?

Mr. ALMY. We always have to keep oyster shells by the hens, or something of that kind all the time. Shell grit, either commercial grit, or else gravel from the shore. There is a ledge quite close to my vicinity where I can get a sort of red granite grit. It is not round and smooth, but quite rough and works first rate for grit. We have some small gravel that is practically round, but it is too smooth.

QUESTION. How do you manage with your broody hens?

Mr. ALMY. We shut up our broody hens once a week.

QUESTION. How long do you keep them shut up?

Mr. ALMY. We keep them shut up a week. We shut them

up Monday nights and usually let them out the following Monday morning.

QUESTION. In a separate house?

MR. ALMY. No, we have a little rack, a strawberry crate, or something of that kind, and set it outside where it will be in a comfortable spot, and when I go to feed in the morning I set a water pail there so that they can reach it, and at the end of the week let them out.

QUESTION. When you let off from ten to twenty or forty of these setting hens do you have somebody there to watch them? I should think you would have trouble with them.

Mr. ALMY. No. If they are inclined to go back and all pile into one nest, I shut the birds up and go off, say for fifteen or twenty minutes, and they they are usually ready to go back. If they bother me in that way, usually, I leave the birds alone, and a majority of them, in the course of three or four days, will go on themselves. There will be a few that you will have to shut on.

QUESTION. If they do not go off by themselves you take them off?

Mr. ALMY. I take them off every other day, anyway.

QUESTION. What do you use for green feed in the winter?

Mr. ALMY. In the winter beside the mash I use cut clover with rowen that we raise ourselves. I also feed either cabbage or beets. We raise five or six hundred bushels of them.

QUESTION. Do you cut the beets up when you give them to your hens?

Mr. ALMY. I cut them in two in the middle, and feed them about twice a week.

QUESTION. Do you ever feed apples?

Mr. ALMY. I will not say that I never have fed apples, but very seldom.

Mr. GRAHAM. This may be an impertinent question, and if it is I hope you will not answer it, but I would like to ask

whether in your experience you have found that there are large profits in the poultry business.

Mr. ALMY. Well, that depends on what you call large profits, I suppose. Compared with the profits in some enterprises, I should not say that the profits were large, but the profits are quite satisfactory, and very good compared with the capital and time invested.

QUESTION. It depends on the amount of brain a person puts into it, I suppose?

Mr. ALMY. I don't know about the brains, but it depends a good deal on having a love for the business, and constant study and work.

QUESTION. What is the average yield of eggs, a good average egg yield?

Mr. ALMY. That is something that I cannot answer definitely. That depends a great deal on how many hens you use to set, and how often you use them. We always hatch our chickens in the spring, and I suppose, of course, that the hens lose quite a little time in incubating the eggs that we hatch. I think, however, that my hens, taking the whole flock altogether, averaged about 130 eggs apiece last year, which, of course, is a small yield, but it is enough to give a good profit.

Mr. GRAHAM. Is there such a thing as a hen getting too fat to lay?

Mr. ALMY. In my opinion, there is not. I believe that a hen that is not laying any eggs is not doing so for some other reason than because she is too fat. I do not believe that a hen will get too fat to lay. There are certain birds that are inclined to be lazy, but after a hen gets old, and beyond the productive stage, they, of course, let up in their laying for natural reasons, but when young I want to see them fat.

QUESTION. I would like to know what kind of a vessel you use to hold the drinking water for your fowls.

Mr. ALMY. I usually use a few shallow wooden pails that hold about five quarts, for my hens. For the little chickens I

use an open iron dish that is just about the size of an ordinary brick, made out of cast iron.

QUESTION. Just how do you rig that private box for the hen? How do you keep them so that the chicks can go out and in?

Mr. ALMY. Do you mean the cracker box?

QUESTION. Yes.

Mr. ALMY. We take the cover that comes on the cracker box and saw the top of the box right through and then we take the cover side of the box and nail lath over the open space so that from one-third to one-half of the front is open, and the rest is closed. I put on strips of lath across the open space so that the hen cannot escape, and so the chickens can easily run in and out.

QUESTION. Did you ever try feeding from a hopper?

Mr. ALMY. That is quite generally used in our locality. I think a large majority of the poultrymen in that section do feed from a hopper, but I have never done so.

QUESTION. What is the objection to that?

Mr. ALMY. One objection is that the house soon gets infested with rats, so that you waste a lot of your grain, whereas if you put in each day just what they will eat there is not much grain left over during the night. Of course, the night time is the time when the rats come in.

QUESTION. What amount of food do you give to a dozen hens?

Mr. ALMY. Well, in flocks of from 40 to 45, we feed about four quarts of ordinary grain, and of the mash all they will eat up in an hour or two.

QUESTION. You speak of rats. Do they get your chickens sometimes?

Mr. ALMY. Occasionally, yes. Not to any great extent.

The PRESIDENT. What do you feed them when they get to feeding on your chickens?

Mr. ALMY. We usually take a big stick to them, and go

around in every coop and hit them. We are not bothered very seriously with rats. The rats get under the hen house because they have been in the same location a good while.

QUESTION. Do you use any special thing for litter in the houses?

Mr. ALMY. Dry beach sand is all. We fill the houses with sod up nearly to the level of the sill, and then put in a layer of beach sand to keep the houses dry inside and to keep the house from getting muddy.

QUESTION. Do you have any trouble from hawks?

Mr. ALMY. Very little. The town offers a bounty on hawks and crows. There are many hundreds of chickens raised right in that little township, but we do not suffer from hawks to any extent. They seem to prefer my neighbors' hens to mine, so I do not lose any appreciable amount. Of course, I do some.

QUESTION. How do you tell your pullets from your year old hens and others?

Mr. ALMY. About the only way is that I notice when I put them into the houses. I try to put in those that I know are of about the same age. In that way I am pretty certain.

QUESTION. Is there any certain way of tagging them by a band or anything of that kind?

Mr. ALMY. No, I do not think that it is any use. Of course, you can tell to a certain extent by their general appearance. In the case of pullets their legs are apt to be smoother and brighter colored than in the old hens, but we always try to keep those of about the same age together, and in that way to keep general track of those that are in one coop.

QUESTION. Do you make any point of breeding fancy birds for exhibition purposes?

Mr. ALMY. Yes, we have for the last five or six years to a limited extent carried on a fancy egg trade. In the first start I aimed to raise market eggs and market poultry only.

QUESTION. Do you have any trouble in keeping your eggs clean in pursuing your method of keeping?

Mr. ALMY. I never have had any particular trouble from that. Of course, being situated on a low wet soil, in wet weather, our eggs are more or less dirty, although this dry sand counteracts that to a considerable extent. As long as you can keep it dry in the house, they do not get the eggs so badly soiled.

QUESTION. How do you arrange for nests? What do you use for nests?

Mr. ALMY. I do not know as I understand just exactly what you mean.

QUESTION. What kind of a box do you use for nests?

Mr. ALMY. We usually use a string of nests; that is, a board that is divided by six or eight or ten partitions, as the case may be, nailed upon a lower board, and then with a back and a top, and with a narrow strip in front, leaving the front open for the hens to enter the string of nests. We place them at one end of the house or on one side of the house.

QUESTION. What do you do to prevent vermin and lice?

Mr. ALMY. Well, I have had this season five different pickers dressing my poultry, and there has not been one of the five that has found a louse on any chicken that they have handled this season.

Mr. GRAHAM. I examined this plant on the 20th of July, and we examined sitting hens by the score, and if they were having any trouble from that source we could not find it.

Mr. ALMY. I will tell you what we do. When a hen is set, after the eggs have been put under the hen for four or five days, we powder her with Persian insect powder, and then three or four days before the chicks are hatched we put the powder on again. After the chicks are out we powder well, and we also oil the hen very cautiously under the wing. Then in about ten days, from a week to ten days, we go around just at night, just as the chicks are going under the hen, take

the hen out and oil her wings. The chicks will run back under her, and they will get daubed sufficiently with the oil to keep them down.

QUESTION. What particular oil do you use?

Mr. ALMY. We use sperm oil. That is all we ever do to prevent body lice. Of course, we have these mites that sometimes appear, and when they show up we have to spray the coops with kerosene emulsion.

QUESTION. I would like to ask Mr. Almy if he believes that a strong odor is a sure exterminator of mites?

Mr. ALMY. I do not. I believe, in fact, I know positively that one dusting with that powder will keep the mites off from fowls for a matter of two or three months.

A MEMBER. At one time I tried the experiment of using camphor balls. I thought they would make a good strong odor among the feathers which would be disagreeable to the mites. We put them right into the nests along with the eggs. It worked first-rate in certain respects, and in others it did not work so well. As long as the balls were whole, and the hens let them be, they were all right, but just as soon as they pecked them and broke them up they commenced to swallow them, or tried to, and the result was that it was not a conspicuous success. The lice disappeared at first, but on the whole the camphor balls did not accomplish what I expected of them.

QUESTION. Do you think that your houses are free from lice owing to the fact that you have left the floorings out?

Mr. ALMY. I think that helps.

QUESTION. Do you use any preparation on the roosts and poles and about the interior of the house to keep down the lice?

Mr. ALMY. Oh yes. We use a solution of carbolic on the roosts and poles, and kerosene or carbolic, or something of that sort on the interior of the house.

QUESTION. I would like to ask the speaker, Mr. President, before he closes, what would be a reasonable income from hens kept under the system which he has described. We

are looking for the dollar, and I would like to know whether there is any advantage, so far as the productiveness of the fowls is concerned, with his system as compared with any other?

Mr. ALMY. I will say in reply to that, that I think it is possible to clear a dollar a year per hen, clear of labor and everything. I do not think it will average so much as that. I think if you are averaging seventy-five cents a piece you are doing pretty well. Still, I think a dollar a year can be easily realized with the right kind of care.

The PRESIDENT. Gentlemen, I want to say that we have with us this afternoon another gentleman from Rhode Island, who is to speak on the subject of turkeys. Mr. Boltè of the R. I. Agricultural College.

Mr. BOLTE. Mr. Chairman, Ladies and Gentlemen: I would like to say that I am very glad indeed to be able to meet so many interesting poultrymen and poultry women of this state. I expected to meet you, but rather from the floor than from the platform. In fact, my opportunity to address you came unexpectedly, and for a time it was a little bit unwelcome, because I did not receive notice of it, and did not know that I was expected to speak until just after dinner today. Although I have been searching my brain and the brain of several people in the audience, to the best of my ability, to discover something which the other speakers have not or were not going to touch upon, and which might be of interest to you, I find myself rather in the position of a young man up in Massachusetts several years ago. He was just starting upon his career as a public speaker. I think he was about fourteen years of age. He had made a decided sensation in speaking before church socials and other similar bodies, and with such success that his friends got after him and induced him to enter a speaking contest that was going to be held by the grange. He worked up a speech that he thought would be satisfactory, and he used to go out in the barn and talk to the

cattle in order to get practice. When the contest occurred he came up to the platform as his name was called, came forward bashfully, wringing his hands, putting them in his pockets and withdrawing them, seemed to be very uneasy, and then finally said this: "I have worked hard, very hard to get this speech ready. I kept it all to myself. Nobody knew what I was going to say but God and me. Now I have got here He alone knows." (Laughter.)

Now I am not going to undertake to try to show some of these hard-headed poultrymen that I see before me that I know all there is to know about raising chickens. I do not. In the first place, I have been in Rhode Island only six months, and most of my experience has been in conducting experiments in connection with poultry much further west than that, but possibly I have been able to get in touch with some experiments and their results which apply generally all over the country, and the results of which may possibly not have been available to some of you, or you may not have had the opportunity to work out their practical application, and if I refer to some of those things it may be timely. Professor Graham in warning me that I was going to be offered up this afternoon said that he would like to have me talk about some of the things we are doing in Rhode Island, and then he said he was going to ask me to talk on turkeys.

Now there are certain things that have impressed me strongly in studying poultry conditions, and I am going to mention several of them as they happen to come to my mind. Some of them may not appear in very logical sequence, but I am going to offer them as they have appeared to me.

In the first place, I would like to say just a word regarding this fresh air system of housing fowls. That has been touched upon by both of the previous speakers, and I would like to give you the results of some experience that we had at the Rhode Island college. We have a number of colony houses of different birds, all of which have been built by the students. We

had some partially open, some others that were tightly closed, and some with a curtain front; and we had Plymouth Rocks, some Wyandottes, and Rhode Island Reds, and other varieties in closed houses, and we had a number of Leghorns in those houses with the curtain front, when there came a severe cold spell with heavy frost, and the Plymouth Rocks had their combs frozen clear to their heads, while on the other hand, not a single one of those white and brown Leghorns was touched. Now that seems to me to make a strong plea for the open front house. That is all I have got to say about it. It is a little singular why that should be so, but that was the result of our experience. I have tested quite a number of different types of houses elsewhere, by experiment station methods, and I have found varying results. In Utah, I, at one time, had charge of the poultry department, and there we did not get as good results with the curtained front as we did with the closed house. But the houses were not constructed so as to be wind tight, so as to give the sun on each side, and out there we used to get winds that swept right through the house. At that time I had rather come to the conclusion that the closed house was the best, but the evidence now seems to indicate a good many advantages in favor of the open front house, but we must be careful, nevertheless, to avoid a draft. In most cases, at least my experience seems to show that in most cases a draft causes a great deal more trouble than cold. I think enough has been said on that subject, and I am going to drop it right there.

Some very interesting experiments have been tried in connection with the incubation of eggs to discover why it is that we get more chicks by hatching with hens than by hatching with the machine. Some people do not have that experience, but a great many people do, nevertheless, have better results by hatching with hens. In a series of experiments that have been taken up it was found that the air under the hen was moist, and contained a great deal more carbon dioxide, which

has always been regarded as a great deal of an evil heretofore, and that they got considerably better hatches under the hens, presumably because of the presence of this impure air. That sounds funny to many of us, but that was the conclusion. Many of the workers have not been able to explain it satisfactorily, and possibly in another locality it would not have been found the same, but it was explained in this instance by following this line of experiment, that the carbon dioxide, or the vapor gases that are given off by the body, and which have been regarded as deleterious when coming in contact with chicks or with eggs really combined with the water and moisture in the air under the hen decomposed and took out certain elements of the shell, so that when the chicks came to hatch, the shell was much thinner and lighter and more crumbly, to state it practically, so that the chick could break through more easily, and they thereby secured a greater percentage of chicks from eggs which had been subjected to that vapor for twenty-one days.

Another experiment which may be of interest to the audience is one that was carried on by the West Virginia station some years ago to test the value of eggs coming from hens that had a free range as compared with those that were confined, and they found that while there was no appreciable difference in the egg production between hens that had a free range and those that had not, yet the fertility of the eggs from hens having a free range, and the hatchability of the eggs was far better than from hens confined.

The matter of exercise for fowls has been mentioned by one of the previous speakers. A series of experiments was carried out at the Utah station a number of years ago, and continued for three years. The final results went to show that this idea of giving chickens exercise in deep litter did not have any benefit, so far as observation went. They had three pens, one of Leghorns, one of Plymouth Rocks, and the other of Wyandottes, each having been hatched, and treated just exactly the same, up to the time that they were put into

the experimental pens. They received the same ration, one lot getting grain with no litter on the floor, and we found in two years out of the three that the Plymouth Rocks gave us a little better result for having grain in the scratching material, while the Leghorns did far better by having it in a box and not being compelled to scratch for their food. That is something which can be substantiated if you look at Bulletin No. 68 I think, of the Utah station. They concluded from that that the Leghorns did not need to have their grain ration in litter and that for the other birds it was desirable.

We have been carrying on some experiments in Rhode Island with respect to raising chickens. In that State a great majority of them can hatch eggs, but there are fewer of them who can raise a large percentage of their chickens. They lay this to a variety of causes. Some of them say it is not proper to give the chickens mash food, and a number of other things. Now I would like to tell you about an experiment which we have running at the Rhode Island station, in which we are feeding some pens with wet mash. Their food is all ground in the form of wet mash. They are not getting a single other thing. We are not running that to show anybody that that is the best way of feeding chickens, but it is just an interesting fact relevant to the experiment in demonstrating that we can raise chickens without going through a whole lot of extra labor as advocated by a good many of our authorities. We are feeding this way because we have got to regulate the amount of food in order to get the results we are after. We have two pens there with food of a good practical nature that have lost but one chick out of thirty-four in ten weeks, and one lot that averaged a pound weight when they were eight weeks old. That is not extraordinary. Lots of you can do as well. Lots of you can do just as well as that, and some of you better, but it shows that you do not have to feed all dry grain if you do not want to, and that you can raise chickens under a variety of conditions.

Another experiment was one that we carried on a year ago

in raising chickens. I paid a great deal of attention to that, and the most of my work was to test the system advocated by some of the big incubator and feed companies. The great majority of them said, "Feed our foods, give them beef scrap, fill up the hoppers, give them drinking water, use our foods, and that is all you need to do." I bought in the open market a chick food, a scratching food, and mash used for forcing broilers, and beef-scrap, from one of the most prominent companies, and fed it according to their directions, feeding the grain in the litter, and beef-scrap in a hopper, and giving them drinking water, just for my interest, and I fed another pen at the same time, of the same number of chicks, side by side in the sections of a long brooder house, a mixture of wheat screenings, with some millet seed, and, later on, cracked corn and whole wheat, as the chickens developed in size. For the concentrates I used greencut bone and skim-milk. Now these figures are authentic. I cannot say anything regarding the amount of food that it took, although, as I remember it, they were all about the same. At twelve weeks old the chicks that were fed a home-grown ration were practically double in size what the others were. I think they would average fully twice as much as the chicks fed on this dry system. The chicks would not eat the beef-scrap from the beef-hopper, although it would analyze over thirty-eight per cent. protein. I lay that largely to the fact that the greencut bone and skim-milk seem to be so much more acceptable and palatable to the chickens. In order to give a fair trial of a mixed food put up by one of the incubator companies, we started another experiment with the same kind of chickens that we had before, White Leghorns and Plymouth Rocks, and we fed them exactly the same ration. This time we left out the beef-scrap, and in one case gave them greencut bone, and in the other the ration which I told you about, mixed up with a certain company's feed, and we got a little better result by using our home-grown stuff than we did from using the other. In the third experiment we used beef-scrap, the grain being different, that is, the home-grown

grain, and we did not get any difference to speak of in the growth of the chickens or in the amount of feed consumed, but we were so far away from the market that we had to buy three times as much, so it was not a profitable plan to import that. Now down here we are close to the manufacturers, who are making these foods. I cannot say in regard to that, but that was our result in the state of Utah where we had to haul grain two thousand miles.

There are a number of interesting experiments that have been carried on from time to time. A gentleman down in the audience asked about our hopper method of feeding. We tried that under a number of different conditions, but in one case we used the grain in a hopper, and fed wet mash, grain, beef-scrap and wet mash, while a corresponding pen had a dry mash, and we could not see any difference except it took more labor to mix up the wet mash. In another instance we put the grain and mash and beef-scrap in the hopper, and in another pen we used the grain in the litter entirely, and fed the wet mash, and used green cut bone. It was done simply to compare methods of feeding, and we found that while we got more eggs from the hopper method it cost considerable more to produce them.

I do not want to take up too much of your time as it is getting quite late. If anybody has questions to ask, I would be pleased to do what I can to answer them?

QUESTION. Did the skim-milk take the place of the beef-scrap?

Mr. BOLTE. To a certain extent. Skim-milk does not have much fat in it, but it has quite a large percentage of protein when we come to consider the solid contents. A chicken cannot take enough skim-milk to replace beef-scrap, as a rule, but it is a very valuable addition to the ration unless you can get more for it in some other way. Of course, when your milk is selling for four or five cents a quart, you cannot afford to feed it to chickens, because you cannot count on very much over twenty cents per hundred on them, but that is the way we generally calculate its value.

QUESTION. Do you think beef-scrap is better than meal?

Mr. BOLTE. Meal is superior to beef-scrap when you come to mix it in your mash, but when you come to mix it up dry, I prefer the beef-scrap, because they can pick it up to better advantage.

Secretary BROWN. If there are no further questions, we will adjourn this session to 7:30 tonight.

Convention adjourned to 7:30 P.M.

FIRST DAY — EVENING SESSION.

Music.

President SEELEY: Well, we had a good deal about chickens this afternoon, and we are going to have some more on the same line this evening. We have a lady to speak to us this evening, Mrs. Mary Thorp Monroe, who will address us upon the topic, "My Friend the Hen."

MY FRIEND THE HEN.

By Mrs. Mary Thorp Monroe, Dryden, N. Y.

Mr. Chairman, Ladies and Gentlemen: This afternoon when I read on the programme that a poultryman was to give an address on twenty years' experience in the poultry business I wondered what would be left for me. They say there is a way out of every difficulty. Upon figuring it up, I found that I had kept chickens twenty-one years, so I made up my mind that although that was not very much advantage it would give me an advantage of one year in experience, and perhaps I could get along with that. Now if I should undertake to give my experience with keeping poultry I do not know whether you would believe it all or not. There is a good deal in a poultryman's life which better perhaps remain untold. There is a good deal of unpleasant work about it, and unless one has a thorough love of the birds themselves and an enjoyment of the out-door work, it will not keep one in the business very much longer than the ordinary run of poultrymen, which is not much over two or three years. Three years is about the life of the ordinary poultryman. There seem to be two classes of people who go into the poultry business. Those who have

made a failure of about everything that they have ever undertaken, who think they will try their luck at poultry keeping, and some who from ill health or some other cause seek in carrying on the poultry business a change and outdoor life or something of that sort.

Now do you know that a woman can always talk better if she can talk back, and if you will do as you did this afternoon, ask questions, I am sure it will be more interesting. The ground has been pretty thoroughly covered as to different methods of keeping and feeding poultry, and I am left to cover only such points as I can recall that have not been already touched upon, so that anything I say that is different from what you have heard this afternoon, why you must simply take your choice.

Poultry keeping is naturally divided into three branches, the rearing of poultry, and the housing, and the feeding. All of those three branches have been touched upon. But there is another thing besides those three branches that you will need to consider, and that is whether you are keeping poultry for market, or whether you would keep poultry from fancy, and that is the standard of excellence of your fowls. For myself, I have never kept market poultry. I do not know much about that branch of it, except in a very small and imperfect way, but fancy poultry I have kept and enjoyed, and I do my own work entirely out-of-doors in all its branches, so I could not keep enough fowls, you see, to carry on a proper market business. I never was able to boss one man, but in keeping fancy poultry I can run them to suit myself.

Now in regard to the rearing of chickens, if I should tell you all I knew about incubating chickens it would be very small, because I am not hatching chickens. A man that can hatch fifty per cent. is a perfect marvel to me. I do not know how he does it. I cannot take them out of the shell and make them live as other people can. As to the raising of chickens I do not lose many. The percentage is very small that I lose. Of course, I do not use many sitting hens. My variety is not the sitting variety. They are laying breeds. Very often I would like to have one of them sit, for if she would sit it would put her in a very nice condition by fall when I want to show her. Then too, I am told by old poultrymen that chickens that are reared by hens take something from the mother, absorb something that went to make up beauty, grace and attractive appearances, that they did not get from the incubator.

Now as to the rearing of chickens I would like to say something very similar to what was said this afternoon in regard to the heat of brooders. So many people keep their brooders at ninety or less. That is not warm enough. When I first began to keep chickens one of my first duties was to put on an old bonnet and take a garden rake and go out and rake out the dead chickens that I expected to find. I could not understand why so many of them died. I tried to take the best care of them I knew how. They seemed to have everything on earth that chickens could desire. Sometimes I would lose an entire brood. I worked in this discouraging way for a long time, and one day I went over to Groton, that is a town in the market egg district, where they raise thousands of chickens, and saw Mr. Blanchard. I went to visit some neighbors of Mr. Blanchard. You know his name well through the poultry papers. I said to Mr. Blanchard, "I have so much trouble with my chickens. What do you suppose ails them?" "How do you treat them," he says. I told him my story, and he said, "You do not keep your chickens warm enough." I went home and I warmed up those brooders, and I have kept them warm ever since. The only way to keep chickens is to keep them out of a cold room. You may think the brooder is too warm, but you cannot judge the heat by your own notion of what it ought to be. You must judge by what experience has taught the demands of the nature of the chick call for. If a chick is warm it will be comfortable, and happy, and will do well. You can tell by the appearance of the chicken more than in any other way. Most every brooder has a thermometer to show what the heat is, and an occasional glance at that will show whether they are warm enough or not.

Now in regard to feeding chickens, you know how one neighbor brags of how many eggs he gets, and the next door neighbor brags about his method of feeding, one feeding corn, and the other never feeds corn. One man feeds this, another man feeds that, and still another man feeds something entirely different, and the results that those men obtain are as varied as the methods which they pursue. So it all comes to my mind that it amounts simply to this, that it is not so much what you feed, as was said this afternoon, as it is the food taken in connection with the surroundings. After I started in the poultry business I was afraid that I would over-feed. I wonder

I didn't starve the poor little things to death. I think a great many flocks have been starved to death. But a great deal depends on the character of the food which you give your hens. Let me tell you about an experiment that they conducted at the Cornell Experiment Station. Now both grits and oyster shells have been spoken of during the day as necessary elements entering into the feed of poultry. They conducted these experiments at Cornell for the purpose of ascertaining what the effect of taking grits and oyster shells away from poultry would be. They conducted the experiment for six months. They took four hens of Plymouth Rock pullets, all of the same age, the same birds as nearly as possible as to size and weight and condition of health, and all that, and the same number of them in each pen. The first pen had oyster shells only and no grits. The second pen had grits only and no oyster shells. They had the grits before them all the time. It was a cubically formed grit. The third pen had what I think they called ground grit. It was sifted through cheese-cloth anyway. That is all they had. They wanted to see the effect of the grit upon the chickens. The fourth pen never had a solitary thing in the line of grit. After the completion of the experiment they killed all of those chickens in the four pens. In pen number one there were fifteen hens, so fat that actually one could almost say that they were not fit to eat. In the second pen the fattest Plymouth Rock was not as fat as the poorest in the first pen that had oyster shells. In every particular the same food was given them except the difference as to grits and oyster shells. The third and fourth pens, without grits, were simply skeletons.

DISCUSSION.

QUESTION. Did they eat as much grain as the other two?

Mrs. MONROE. They thought about. In the third and fourth pens the bones of those chickens would bend just like that. They had absolutely absorbed into their systems the lime that was in their bones. How much shell do you suppose that those pullets ate?

They ate five pounds of oyster shells. How many pounds of that cubical grit do you suppose that second pen ate? They ate sixty pounds of that grit. They worked and worked trying to eat that grit and trying to get what they could not find,

— lime. Now how about the eggs of this pen. But there was something more about the bones. The bones of the birds in the first pen would support eight pounds more weight than the bones of the birds in the corresponding pen,— in the pen that had had no oyster shell but had grit. Of course, the other two would not support anything. They suspended those little bones between two supports and hung weights upon them. Those hens that were so fat that they could hardly waddle, were simply covered with layers of fat, were perfectly gorgeous layers, and the second pen laid a few eggs. They did not lay very many, and as fast as they did lay them they ate them up, seeking after lime. The eggs that they ate did not give them what they wanted. It was lime they wanted.

QUESTION. Did those birds have any clover or anything of that kind?

Mrs. MONROE. They had everything that a hen could want. Everything that the most unreasonable hen could call for or ask for. They kept those hens the best they could in every particular. Water, grain, green stuff, everything. I guess they had everything. That was the experiment.

QUESTION. How about the eggs from the third and fourth pens?

Mrs. MONROE. They didn't lay any. Some of the eggs from the second pen were photographed, and the egg developed in the second pen, the very best one, was not equal to the poorest development of the first pen. Those hens would not have laid in months, in the third and fourth pens. How they lived was a marvel to me. It only illustrates one thing, and that is, that a hen is going to take care of her body first, and if she has enough surplus she is going to make that surplus into eggs. At the same time, the development of the various other flocks of birds in these pens was in exact proportion to the development of fat. That is the way it looked. I call that a very interesting experiment.

I have some pictures here. Here is one of a hen they call "Black Beauty." I want to tell you about her. This hen was

a mixed hen. She weighed only about three pounds and a half. She was one that they had particularly raised at the Experiment Station. In the big room where they kept her she had every kind of food that you could mention, scraps, grits, bone, and everything. This hen lived loose in that room. There she stayed, and ate when she pleased and what she pleased, and how she pleased. She is just as tame as she can be. I was up there a short time ago. She got a little bit of scientific inquisitiveness, and started off on a run to see what it was, and she picked up a little piece of paper about the size of a silver quarter. But that, to my notion, was not the interesting thing about her. I will tell you what she has done. She began to lay at four months and six days old. As I recollect, it was the 12th day of February that she began to lay, and when that picture was taken she had laid one hundred and one eggs, and had not stopped then. Now a Minorca usually moults in the fall. They lay early; but she had not moulted and was still laying. Now I think that that is a pretty good record, and a pretty good argument in favor of the particular care which that hen received. The point that I want to bring out, however, is that that hen had the choice of everything, and she had it when she wanted it, and just how she wanted it. Of course they provided a dish of water for her.

Here is a picture of another hen that was in a very interesting experiment. I will not take the time to tell you all the particulars. There was nothing said in this about moulting, and, in fact, I do not know whether you are interested in moulting, but in most cases poultrymen have a good deal to say about it. In this experiment they took eight pens of White Leghorns, and they dipped them all in Diamond Dyes, each of a different color. Then each pen was fed on a different food, fed on a different variety of food, and in a different way, and the feeding and the whole performance closely watched. Of course, the new feathers would come in white, and these colors were all the colors of the rainbow. This experiment lasted about eight months and it proved several things that I will

speak of. In the case of this White Leghorn in the picture her tail was a little askew, probably due to the closeness of the quarters, but her comb is just the sort of a comb that she should have, and her shape is right, and everything else is about right concerning her. They put her in the pen on January 24th. She laid the first day so they knew she was laying. The probability is she was laying before that. Up to October 12th of that year she laid 216 eggs, and then began to moult. When I saw her on the 4th of December she had not completed her moulting but she had stopped laying. Now the remarkable point about this case is that the hen had laid during the large part of her moulting. It is an exceedingly difficult thing to make a hen lay right through the moulting period. In this connection I saw a funny thing in a Washington County paper. It said that the farmers up there would be interested to know about the remarkable laying record of this hen, as she layed something like 230 eggs before she stopped. The article said that this was undoubtedly the result of a college education, but that very few farmers could afford to send their hens to college. Professor Rice stated that he had never known a hen to lay right through; that he had known them to lay until they were well started, and he had known hens to begin to lay before they had finished moulting, but he had never known of a case where they had continued to lay right through the moulting period. He said another thing that I wonder if you have noticed. It was in regard to the use of maize. I do not hear anything about the use of cracked maize in this section. It is a very useful food. I do not see how you can do your work without using it to some extent. Of course, at the college they experiment with all kinds of food.

I want to say just a word or two more in regard to hens moulting. It may explain the reason why some of your hens have not laid as you thought they should. Professor Rice told me that many times farmers had arisen during institute work and said they did not see why their hens did not lay; that they

had carefully selected their stock, and had picked up those that moulted early, and still they did not lay. Professor Rice said that they had about concluded, but that he was not prepared to let it go out, that a hen that took all summer to moult and all the fall to get into condition was not a profitable hen to keep because when cold weather came on, which had a natural tendency to stop laying, the number of months in the year when that hen would do good work was very small compared to what it ought to be, and he recommended that farmers should kill off that kind of fowls. Still at the same time, it does not do to kill off every hen that has a ragged appearance for a considerable time for some of those hens may have a very fine egg record. It is not a good principle to go on to kill the ragged hens and keep the sleek-looking ones, the handsome ones, because in so doing you may get rid of some that are making a fine egg record. I do not know whether that is your experience or not. I have not had enough experience in that line to know.

Mr. GRAHAM. Do you think you can make a hen moult at will?

Mrs. MONROE. I think that the care that a hen receives has a good deal to do with it. What you want is to get results in the poultry house, and if the method of feeding has a bearing upon the question that is something we want to know. I should be very interested to get that experience.

Mr. GRAHAM. Do you not manage your flock so as to have them moult at a certain time, and be in a good condition for exhibition purposes?

Mrs. MONROE. Of course, I take particular care of the birds I want to show. It is very largely condition that counts in a show-room. There is sometimes more in the condition of a bird than there is in the bird itself. Generally, the finer appearance a bird has the better. Of course, the appearance of a bird largely depends on its condition. A good bird in poor condition will not appear well in the show-room, but a

poor bird can be made to appear very well by being put in good condition, and oftentimes be made to win over a much better bird.

Mr. GRAHAM. By good condition you do not mean good grooming, do you?

Mrs. MONROE. To a certain extent, I do. A homely person is sometimes made to look very attractive by good grooming. We always want to look our best. So our fowls want to look their best. I would not send a bird with a poor coat, or one with a torn comb, or one with a toe gone, to the show-room. All such physical defects should be covered up. I do not mean that I would paint feathers or color their legs, or do anything of that kind, because the judge would probably find it out, but any bird which I sent to a show-room for exhibition purposes should be in the best condition possible. I would take every pains to make the bird clean and sleek-looking, and, of course, care should be taken to have it in perfect health.

A MEMBER. Does not the handling of a bird improve the condition?

Mrs. MONROE. Certainly; I am not an authority on all such matters, but where birds are confined in a pen they should be very carefully handled, or their condition will unfit them for the show-room. What little success I have had has come, in my case, from the goodness of the birds themselves and not from any particular merits of my own. I know that where I have failed in the show-room it has been by a lack of condition.

I want to say one word about houses. We have heard about the Massachusetts house, the Connecticut house, the Rhode Island house, but I wonder if you would like to know about the New York house. I think most any kind of a house is all right if it has somewhere about it in constant use a muslin curtain. It does not make any difference if it is an old piano box. It does not make any difference if it is a perfect palace of a henhouse, or anything else, if it has a muslin curtain about it so as to provide for a good circulation of air.

That is the essential thing, in my opinion. I do not care what kind of a floor it has, or how high it is in front or behind, nor on the side, or what it is made of, but I do not want any drafts, and to prevent drafts and yet at the same time procure a good circulation of pure air, a muslin curtain on your house is a wonderful help. A number of years ago I read about a muslin curtain. I think the first person whom I knew to try it was Mr. A. S. Hunter. He is an eastern man. I read about Mr. Hunter's house, and made up my mind that I would try one of those houses for I had become convinced that the old-style houses were defective. I had tried some of the other methods of building. Some of those houses cost more money than you can imagine, great long houses with beautiful floors, with ceilings and paper between the inside ceiling and the clapboards on the outside, with stone walls under the building, and everything else which prevents good ventilation and the circulation of pure air. Under the old method many of those houses were overcrowded. How long do you suppose it took the fowls in such a house as that to use up that air and then get cold? How long do you suppose it was after that inside sweating process commenced before your house was in a condition to produce disease? The breath of the birds during the day would fall and settle on the walls and at night it would freeze. The next day a little warmth would set in perhaps, causing that frozen breath to drizzle and throw off vapor. The result was the interior became damp and unhealthy. I commenced to build my style of a house about ten years ago, and have used that house ever since. Now it is about the only kind that is used in my section. If you are going to be successful with fowls all of these points must be studied. I suppose you must be guided, to some extent, as to the character of your house, by the climate, or your location. My husband did not care anything about chickens. He is interested in them simply because, he says they keep me good-natured, and he furnishes the food. He is my legal adviser.

He said to me one day when I first undertook the work, "Now Mary, if you will take care of those hens I wish you would." "Why," I said, "I don't know anything about hens. All I know about hens is that I like a hard-boiled egg once in a-while." "Well," he said, "if you will take care of them and produce any eggs over what we need in the family you can have them. You can have what you can make out of it." So you see I had my interest aroused in the business at that early period and commenced to give it careful study. After looking over many different plans of houses I thought I would build some of this type of house with the muslin curtains. It was a success from the start. You know how it is with a pen shed which is entirely closed except with an old-fashioned window in front. We had some of that type. At that time we only built the houses ten feet deep. Now I should build them larger, I should built them sixteen feet. Fifteen feet square anyway. At that time we only built them ten, the roosting room being ten by eight, and with the expectation of accommodating about twenty-five hens. When we first erected this kind of a house which I am going to describe to you they served the purpose so nicely, and I became so pleased with them, that the next year we put up a lot more.

The next year I used a muslin that was prepared for a veranda. It was oiled in some way so that the stuff shrank right away from the nails and gave me some trouble by pulling off. I used just plain unbleached muslin. I got strong, plain, unbleached muslin and tacked it on to the frame of the house very loosely. It is better to have it tacked on loosely because with the shrinking which goes on in the cloth it will not pull away from the nails. I have a photograph here which I am going to show you. The muslin should be attached to these frames quite loosely, or enough so that it will just wave in the wind. One beauty of it is that it will not obstruct the light. It will give about all the light that is needed. No wind goes

through those curtains. The house is absolutely warm enough. You know how it is when you go into a closed house, how often you are struck with that ghastly chill which arises from the dampness created by the breath of the birds, especially if the house is overcrowded, but in an open shed arranged with curtains of this kind no matter how small the pen, you are always sure to get good ventilation, and your fowls are always shielded from the effects of dampness and drafts. There was a man up in Johnstown, N. Y., that had a variety of bantams that were so delicate that he was afraid that they could not be raised in this country. When he first got them he had doubts whether he would be able to keep them, and sure enough before the winter was over some of those bantams grew sick. He hated to kill them, so he put a part of them in a shed that had no opening and a part of them he put in a coop outside where they were exposed to the air, and, do you know, that those little bantams who were put right out in the open air did the best. He never had any trouble with the variety after that. It seems to me that that was a very good argument. There was another man that I knew of that had two beautiful pens of fowls breeding in a combination house, such as many of you have seen, a house with a closed roof, and all banked up in very much the same way as the ordinary farm henhouse as is usually built. He wanted to make three matings. He had no place for the three separate pens, and so he put one pen in a closed room, and the second and third pens he took outside to a shed. He took his poorest birds and put them out there because he thought he was putting them in the poorest place. What do you suppose happened? He got more eggs from that poorest pen than he did from either of the others. This picture shows the curtain in about the way we generally use it. I am sorry you cannot all see it. In our state we do not care for the double-pitched roof. If you have money to put into your houses there is no particular objection to making

them somewhat ornamental, but for a house for ordinary purposes I strongly recommend this. This picture shows a single-pitched roof. It is not very high. In fact, it is not head room that you want, but it is floor room. We do not give though so much room to our poultry as we did years ago. This house is divided into two parts. On one side they are running about thirty hens, and on the other side about sixty. In speaking of houses of that kind I am reminded that one trouble with poultrymen has been that when they double up their hens they do not double up the amount of feed they give them. They forget to give them enough to eat. It is well to bear that in mind.

Now by looking at this picture you will notice that under this window there is a little muslin curtain. That muslin curtain does not extend to the ground but to the part that comes next to the ground. By putting it on in that way it serves as a wind break. No wind can come in at the bottom of my curtain. The air, of course, circulates through that curtain, but no wind comes in. Some of these houses have curtains which come down to within a foot of the bottom. Back of that place where you see the curtain is where we have the dust bath. This afternoon I noticed that there was nothing said about dust baths. I imagine that you people down here have something which takes the place of the dust bath. In our houses these dust baths are placed where the sun shines right through this window and inside there is a sloping partition which keeps the dust from flying into the room. Mr. Rice said that he regarded the dust bath as very essential. It is usually crowded all the time with hens. Up in our section they use soft coal ashes with plaster mixed. In pleasant weather this opens outward, or that window opens on the outside, which allows the dust to go out. Then above that is another glass window which opens on the outside also, but that does not show down here. That serves to ventilate

the upper part of the house and carry away any stagnant air that may be caught in the top part of the building, above the window or curtain. This is a very successful house, and where you have even the smallest amount of cloth used as a curtain in that way you will have an absolutely dry house. It is not a cold house as perhaps some of you think. It is simply cool. Hens do not need a warm house. It is a fact that at about nine or ten o'clock I always open the door between the two rooms, to warm the closed room. It is so much colder than the open shed. To my mind, it is a very delightful arrangement.

Mr. GRAHAM. Do you use warm or cold water?

Mrs. MONROE. Well, you know that all women like to have things handy. I have water the entire length of my house. In this part of the house I have a little hallway and that gives me a place there where I can keep ground bone, plaster, and such things, and on this side of it I have a water-faucet so that I can conduct water the entire length of my houses. In the winter time that is, of course, turned off so as to prevent freezing. I have water right there which comes from a spring. That is warm enough.

QUESTION. What do you use for litter?

Mrs. MONROE. I use straw because we raise it on the farm.

QUESTION. Rye straw?

Mrs. MONROE. No; it is wheat straw or oat straw. We raise some wheat but a good many oats, and, of course, we use the straw. I will tell you what I do use, and that is clover. I do not use much litter. That is not an economical way to feed poultry, but where it is thrown down to cows it will collect a surprising quantity of material that is all full of grass seed and one thing and another, and that, I think, is a good thing to put in the hen-house with a little litter. If I had to buy anything I should go to the mill and get buckwheat hulls. You can get them for carrying them away. There is a good deal in them.

I recommend the use of buckwheat straw, and also the broken pieces of buckwheat which are so often mixed in with it. They do not eat the hull. There is much of that food that is very good. I used to be greatly afraid of feeding grain, but I think a great many do not feed their hens enough. Hens need some strong food. I remember one time there was an old gentleman came to the institute where we were going to have a two or three days talk, and, by the way, that is something we do occasionally up in my section. We get together and talk "chicken," and we keep it up until the subject is pretty well thrashed out. Then we take up another topic and we talk that over, and we learn very much from each other. One day when we were holding one of those meetings an old farmer got up in the back part of the hall and he said, "I wish you would tell me why my hens don't lay." He was asked what sort of hens his were, and he said that he had Plymouth Rocks; that he had been careful to select his pullets, but that his hens did not lay. Mr. Rice, who was talking, said that he could not understand why Plymouth Rock pullets should not lay at that time of year. So at the noon hour they went out to visit the farmer's poultry yard, and when they went in the pens nearly all of those chickens tried to get at the man and acted fairly crazy. "Why," said Mr. Rice, "those chickens are hungry. What did you feed them this morning? How much did you feed them?" "Why," he said, "I gave them this pint cup full of"— whatever it was. Mr. Rice reached over and picked up one of the birds, and the bird had scarcely any solidity at all. It came up just like that. Those birds could not lay. They did not have vitality enough to make them lay. Hens have got to be fed generously. Feed what you have got on your own place, and then buy what you need to make up a good balanced ration as a supplement. It is always a good thing to put in everything that comes from the house in the

way of scraps, and then just shut your eyes and put in the rest. Hens need a liberal ration, and a ration which contains all of the egg-producing elements. Unless they have that, they will not do as well as you expect.

I would like to know how you introduce new blood through your flocks here. For a great many years I did not get along very fast. I did not seem to get anywhere. I would buy birds to breed from but I never seemed to get anywhere. I finally made up my mind that the principle I was working on was all wrong. I had been buying male birds and raising male birds to mate with my hens. Finally I made up my mind to buy some hens and see if I could not raise some chickens to mate with my birds. I thought I would try it that way instead of getting male birds. I think I paid ten dollars for one hen. I was careful to get in this hen things that I did not have in my own flock, and I had a pretty fair flock too. In Black Minorcas the color counts for a good deal. This hen was a beauty. I never found this hen on a nest, but I did not pay particular attention to that because sometimes they will drop their eggs in the dust bath. I have found a few eggs around in that way. I never got an egg all through the breeding season. Finally, I took her and put her in a shed by herself, and she never laid an egg. For a long time I could not make up my mind whether she was a layer or a liar. The fact was though she never laid an egg on my place. Where you buy hens intending to use their eggs as a means of raising chickens to mate with your fowls you have got to guard against just the experience that I had in this case. Of course, different people take different methods for keeping their flocks in strong condition, but with my experimenting I must have been put back some four or five years. I gave up ever buying male birds, and I have learned since to introduce new blood, and to introduce it frequently by raising new chicks.

I suppose there are good many here who have made a start at poultry raising. There may be some of you that are thinking of starting in to raise poultry, and it may not be amiss for me to say a few words as to the best way to get started. One of the first questions is whether it is best to buy eggs or to buy fowls. If you pay five or ten dollars for a setting of eggs it seems like a good deal, and, of course, you have got to take your own chances on raising the birds. Of course, the time of year makes a great deal of difference. Some people object to attempting to raise chickens late in the season. No matter, however, when you start, or how good the birds are that you get, in about three years your birds are going to be exactly what you make them. Let me repeat that, for it is an important thing to remember; your birds are going to be what you make them. They are going to be good layers, they are going to be of uniform color, or they are going to be a miscellaneous looking lot, and it will depend to a very large extent upon the way in which you select and handle your stock. In the fall it is cheaper to buy the birds. You can buy very good birds then cheaper than you can buy them in the spring.

Question. Do you think that a mechanic's wife, or the wife of a professional man, can take up the breeding and raising of fowls for the utility side the best or for the fancy side of poultry?

Mrs. Monroe. No matter who undertakes the rearing of poultry there are certain elemental things which have got to be learned and practiced in order to be successful. A great many physicians now recommend ailing women to take up the care and rearing of poultry so as to give them an employment out-of-doors and get the benefit of the outdoor exercise. But let me tell you something. No woman should do it unless she likes the work. Unless you have a liking for this work, never touch it. You must do it every day in the year, and when you take up the utility or market side of poultry it is a question of

management very largely whether you will succeed or fail. It is a question of taking a hen as it is and turning it into money, or taking a hodge-podge lot of chickens and turning them into money. It is something that requires the very best kind of management, and unless a person has a thorough liking for it and a will to study all the conditions of success they had better let it alone. There is one thing about poultry that people sometimes forget. There is no day in the year but what you can get returns, provided good management is used, but like anything else, with bad management, only failure can result.

I have noticed up here that people did not seem to raise fall chicks. I have wondered at that because there is a profit in raising fall chicks. Eggs are cheap in the fall, sometimes being as low as fifteen cents a dozen. At that time you can get eggs from fanciers who are breeding high-grade fowls at about half price, and I think it pays to raise fall chicks. Let me tell you of a little experience of mine when I first got an incubator. It was in September. There was a fair going on in our village, and I heard that they were hatching chickens by machinery. I made up my mind that I would like to see this performance because I thought if anybody else could do that I could. I went to see it, and was greatly interested in the operation. I looked the machine all over, and finally those at the fair with me said, "Wouldn't you like to have one of these brooders and an incubator?" The result of it was, although I had never seen an incubator before, that we loaded that incubator and the brooder and 160 little chickens that had been hatched out into a wagon and took the whole outfit home. Now 160 chickens was a good many to put into one brooder. I agree that no brooder should ever have as many as that. Those chickens were hatched from thoroughbred stock. That was a great advantage to me, but there was every color and every kind of variety. There was a lot of Brahmas, there were Cochins, and there were Black Minorcas,

and there was everything in the way of breeds, but it was all from thorough-bred good stock. This was about the 20th of September. That is a time when you have the time to devote to it. If you are a professional man's wife, and are thinking of going into the poultry business you cannot begin at any better time of the year than that. Well, those chickens did not have any too good care, but out of the whole lot I only lost eleven. I think a cat got some, and one or two died. All that they had that winter to eat was cracked corn. Those chickens were all in one room together, a room about ten by sixteen feet. About the last day of February a little Black Minorca pullet among them began to lay. Then I separated them. There were some sixty pullets. I sold the little cockerels. I got fifty cents a pound for those little cockerels. I sent them all to New York to a commission house, and got a good price for those sixty-five little cockerels. The pullets began to lay and they laid all that next summer. They did not moult that fall, and winter was well advanced before they moulted. I do not know how to explain that. But my experience, you see, was very satisfactory with those fall chicks. They all turned me a good profit. There, you see, was an experience for a woman that did not know anything about it. You cannot learn it, however, if all of your time is taken up with cleaning house and putting up pickles and taking care of children. If, however, you have the time to devote to it, you can raise quite a bunch of chickens for broilers, and incidentally make a few dollars. The question of profit from raising chickens upon a large scale, of course, there is not time for me to discuss. I think I have talked long enough. (Applause.)

President Seeley. Ladies and Gentlemen: Mr. Collingwood, of the Rural New Yorker, will speak to us on this same topic, and after his address the Question Box will be opened and the questions will be considered.

MY FRIEND, THE HEN.

By Mr. Herbert F. Collingwood, Editor, The Rural New Yorker.

Mr. President and Friends: I know perfectly well that I am not put up here to tell you how to raise a hen, or how to make that hen lay two or three hundred eggs a year, because you all know that I do not know how to do it, and I do not pretend to. I do not pretend to be a great success as a poultryman although I am trying to learn. I know this, however: that there ought not to be a sick hen in Connecticut after today. You have received a great deal of valuable instruction and information from the speakers here today. We have learned that every house ought to be comfortable and that every hen in the state ought to produce all the way from three to four hundred eggs per year. If this program is to be properly carried out, there is nothing left for me to do but to end the performance. Now I was told to make my discussion of this subject just as broad as I could. If I make it as broad as it is, I am afraid it will not go down, but I have learned in talking with people who say that they are very broad that when it comes to religious matters that broadness with them means ability, or power, or desire to do anything they please. So, if I apply that principle, that gives me a pretty wide margin to work on, since I have been requested to make this talk as broad as I have a mind to. Suppose I begin with a little bit of philosophy, and at the same time express my idea in regard to my friend, the hen. There are a lot of folks that love a horse about as well as they know how; there are also some that just love a cow, and there are some folks that put above their love for a horse or a cow their regard for the dog, and others still, when you mention the word sheep the way their tongues will run is a wonder. So it is, that the love of animals differs among men. I like all animals, but of all the animals my choice is the business hen. Let them have their fancies, but my mind is made up like a rock so you cannot fool me, for I love the hen. Now I am going to tell you in a few words why I love the hen. I compiled a little book once called "The Business Hen." I got what opinions I could from a number of practical well-known men in the poultry business and put them in there, and that

book contained something of value, as I thought, to one who tried to bring up a hen. I had a Swedish woman living on my farm, and do you know that that woman would take hens that I had given up in despair and bring them up so that they would lay eggs. I thought it was a good deal, but it was a fact that she could take the hens and bring them up so that they would lay eggs where I failed. Do you know that that woman violated almost every single rule that has been laid down for the conduct of the business hen, and she would beat me two to one in the production of eggs. That is a fact. I made her a present of a book, and talked with her about it. She admitted a part of it was all right, but she did not follow it, and she did get twice as many eggs as I ever did. Now the question is, how did she do it? I thought of the man who used to come into the charity organization office in Boston when my uncle was in charge of it; come in periodically and want a job. He would hang around until he got the job. There was something peculiar about the man. He would rather work on a woman's farm. If he could get a job working for a woman farmer he would rather do it. It surprised my uncle, because most of those who came to him, if they wanted a job at all, preferred to work with men. Finally he said to him one day, "Why is it that you prefer to work for a woman farmer?" "Why," the man said, "I have found that the blind side of a woman is the shadiest place for a hired man." Now, I do not know but he is right. Somehow he was able to get on the blind side of a woman. Now I have an idea that old Amy, that Swedish woman, knew how to do the same thing, only she knew how to get on the blind side of a hen. In other words, she understood the hen. She did not know anything about the science of it, but she did understand the hen. She studied the hen, she knew what that little bundle of feathers was. She knew what the hen craved. It was instinct with her rather than science. Sometimes our scientific friends will tell us all about feeding the hen. They figure it out to a single cent, and time after time pretend to tell us just exactly what that hen ought to have. They will tell us what the house ought to be, and what the temperature should be, and give us a lot of information all about it, and you read it, and think it must be so because you cannot disprove it, but to save your life unless a person can get on the blind side of a hen as that old Swedish woman of

mine evidently did you are not going to get eggs. Science does not do it all. It may help but it does not do it all. In this connection I cannot help but repeat a story of a situation I heard of in one of the New England states where they passed a law making a ten dollar fine for taking quail out of the state, and they made this fine so that if one should be caught taking quail out of the state he could be arrested. There was a scientific man who was greatly interested in that law. He wanted to save the quail of the state. He made it his business to go around and see how the inspectors were doing their work. That man could tell a good deal about the quail, but he did not know it all, as this story will show. From a scientific aspect he had that thing down to a very tee. He made a visit among the inspectors charged with carrying out the law, and among other places he went up into the middle of the state and there found an old farmer. The old farmer had on a pair of overalls, had a big bushy beard on, and he was not a man that the scientist thought ought to be an inspector. So he said to him, "I am going back to have you removed. You are not the kind of man we want." That made the old farmer mad. So he said to him, "Professor, I got a dog that knows more about quail than you do." Now that hurt the pride of the professor to be told that a man of that kind had a dog that knew more about quail than he did. He looked down by the farmer's side and he saw a little mongrel cur with one ear lopped down and the other out of place, one of those little good-for-nothing shaggy curs that we see running around country villages sometimes. He did not believe any such statement as the farmer made to him. He was mad, so he said, "I am going back to have you removed." "All right," said the farmer, "that dog knows more about quail than you do, and if you want to have me, I will prove it. Now if we stand here there is a man with a traveling case, and there are five men with grip sacks, and there is another, a woman with a trunk. Here is a boy with a bag. Now," says he, "who of them has got any quail in their baggage? Can you tell me?" And says the farmer, "I know that woman has got quail in her trunk." That remark rather nettled the professor, and so he says, "I am not going to ask that lady if she has quail in her trunk." "Well," says the farmer, "I know she has got quail in her trunk. Will you give it up?" Says the professor, "I will." So the farmer called the dog,

and he says, "Tige, sic em." The little dog smelled over the baggage, and then he put his nose up and smelled of the trunk and then moved back and sat up like that. They opened the case and there were thirteen quail that the woman was trying to take out of the state. "Now," says the farmer, "Professor, you may have science but you ain't got the smell." So it is, a man to take care of the hen business and make it pay must not only have the science but he must have the smell. He must understand the instinct and desires of the hen. I thought I had a smattering of science and could make hens lay, but that old Swedish woman who did not know anything about science did have the smell, and she did have the instinct to make those hens lay, and she did make them lay. I do not know what our professor friends will say to me for saying that those hens made a good record on a ration of corn, water and cabbage, but, my friends, I know that they had the woman in addition to help them out.

Now you may ask, what has the hen done that I should call her my friend. She has done a good deal for me, but the hen has done far more than that. She has done a good deal for our country, and for New England in particular. If you will read the books of that period, you will find it set down in print that away back two hundred and fifty years ago the hen saved New England. How do I prove that? Massasoit, an old Indian chief, was sick unto death. His medicine men were gathered about him. They were pounding their breasts and making a hideous noise, and were saying that the old fellow was dying. He was dying for lack of nourishment. Two men from Plymouth had been walking through the woods to see the old man. He was a friend of the whites. Those two men went over and they found the old chief in this condition, so they turned out the medicine men, they stopped the noise, and they saw what he wanted. They sent an Indian runner to Plymouth, and out of their scanty store secured and had brought back a pullet, which was killed and dressed, and from it they made some chicken broth, which they fed to the old chief, and thus saved the man's life. And it is set down in history that for the saving of Massasoit's life they secured peace and safety for the English colony until the time of King Philip's war. This hen saved New England in her early days. In our day the hen has lived to save New England again, for

there is many a farm back upon the New England hills which ought to be saved, and that is being saved by the hen, and which could not be held and would not be held for society, for country, and for the nation, were it not for the success of the owners in keeping chickens. You know that is so. There are men and women in this house who know of cases away back upon the hills where through the efforts of the humble hen, our little friend, prosperity has been brought to many a farmer, and glory to many a New England hill farm. Therefore, I say I do love the hen. I have no apology to make. I do love the hen for what she has done for New England and for what she is doing for me, and for all of us, because I know that she is one of the best friends that we have. She goes about her business and does it in her quiet effective way. She saves many a New England farmer from being ruined by the competition of the west, she supplies many a table and furnishes the housewife with many a little item. She takes care of the orchards well. I have many on my farm, and I know how valuable the hen is when at large in the orchard. I am getting so that I do not think so much of a Leghorn because it takes a seven-foot fence to keep them in whereas if one of you have got some Wyandottes they will stay right inside of a four or five-foot fence and attend to business. You put a hen of that kind in there and she stays right at home. She doesn't want to wander. She will stay there and be keeping those insects down. I know that where you put a fence around the orchard and where you follow that up by getting a good flock of Wyandottes and give them plenty of water, they will stay there and attend to their business well, and take care of our orchards and take care of our homes, better than ninety-nine per cent. of human beings. That is one reason why I love the hen. It is no disgrace then to stand up and say that I believe in taking care of the hen because the hen contributes much to help take care of us.

What is the hen? There is no use in talking about what she teaches us. I have just come back from a long trip up and down through Iowa. I had not been out there before for a good while. Some of those men that I met out there were commiserating you poor people who had to stay back in New England. Why, they said, how do you make a living? How can you live? You cannot raise steers and hogs and turn them

off! How can you get along? Why don't you pull up and come out here on the prairies? Well, I began to figure with those people. I stood in one of the packing houses in South Omaha, and saw those hogs and those cattle sold, and saw how they were killed and passed along. I stood there with one of those farmers with whom I had been talking, from southwestern Iowa, and pointed to a big steer, and said, there is the end of your farming. I pointed out the window rather and said, there is the end of your farming, my friend, where your farming ends ours begins. The end of your farming is the beginning of ours. We can afford to pay the tremendous price that we have to pay for your feed, feed it to our poultry, and make more out of it than you do on your steers. They did not believe it. Very well, I said, I will give you the figures if you will give me yours. So he gave me the figures showing what he made on a fifteen hundred pound steer. He figured it all out from the time the steer was born until it was sold at the stock yards, and the figures showed that on a fifteen hundred pound steer, in something over sixteen months, the farmer would be netted about twelve dollars in profit. Why, I said, there are plenty of men up and down our New England hills who will take twelve hens, and buy your corn and your grain, and feed your grain to those twelve hens, and make more profit out of it than you do on that big steer. He would not believe it. I showed him the figures and the man was astonished. He had no idea that such a thing was possible. He had an idea that it was a most wonderful thing that all of these people down here in New England did not come right out there on their rich soil and stay there. Well, I said to him, there is just one thing that has kept a great many New England men and women from leaving, and that has prevented many a New England town from running down hill into the Mississippi valley. Well, he was anxious to know what in the world that was. He said he would like to know. I said it is the sentiment, "There's no place like home." That is what has kept thousands of people on these New England hills, and that is what has kept people from seeking homes upon the prairies of the west, that is what has kept many people here who were content to work under hard conditions, just that sentiment, "There's no place like

home." That has made a Yankee content to stay at home and develop the place for himself, and where he can work for himself. Those men out there were astonished to understand that from twelve or fifteen hens on a New England hill we could make more profit, if fed their grain, than one of their big steers would bring. I think they believed it finally. One man out there said I should think from what you say that you people in the east are trying to develop much from little while our people in the west are trying to get little from much. And he went on to say that a fool can get little from much, but that it took a wise man to get much from little. And there is one thing where our friends, the hen, comes in and teaches us a great big lesson, if we would only heed it. I bought a ton of hay for my farm last fall. I got that ton of baled hay and it cost me $19.75. It was mixed clover and timothy hay. I had some curiosity to know what the man who baled it out in southeastern Iowa got for it, and the best information I could find was that he got $5.80. When I was out there this time I tried to find out. And in talking with one of them, and in speaking of the incident, I said they gave you eighty cents more than the market price. Why, he said, if we get five dollars for a good ton of hay we think we are getting a good price. They were getting $5.80 for that ton of hay, and they were paying $13.75 to the handlers and the carriers, who stood between them and the consumers. And when that man understood that you people on the hills here in New England could buy hay and grain at those prices, and make more than they could feeding steers, they were certainly astonished. One man said to me that the ignorance of the western man about the true condition of the east is only equaled by one thing, and that is probably the ignorance of the eastern man regarding conditions in the west. Now here is where our friend, the hen, comes in. My own hens came and told me just as plainly as any man could that they thought it was a shame for me to pay such tremendous bills for grain. I thought it did not pay myself. The figures seem to show it. The price of grain kept growing, kept going up and up last year, and as a result of it I started in and plowed up a piece of pasture land and grew between three and four hundred bushels of corn. You have no idea what a difference it made.

I do not think that New England farmers, as a rule, have any conception of the immense amount of money which they are paying out for supplies in the shape of hay and grain from the west. If you can do anything to raise your own grain it will be one of the most sensible things that you have done in a long time. I correlated some figures the other day on the question of how much the grain bill of Connecticut might be. I wrote to what I considered were good farmers in different parts of the state, and asked them to tell me how much the value of grain sold in their market town amounted to. I picked out generally the secretaries or presidents of your county agricultural societies. It seemed to me that that would make a fair proposition, and I am going to read just a few of those figures, and if they do not astonish you, you are made of different material than I am because I had no idea that Connecticut was expending any such amount of money. For instance, take a town like Rockville, Conn., and how much do you suppose was the amount of the grain sold in that town in one year? Figures carefully compiled show there is about $125,000 worth of grain sold in Rockville each year. Here is a statement from Putnam, Conn., $200,000 worth of grain. After considerable figuring it is a fair estimate, I think, to say that $200,000 worth of grain is bought annually in the town of Putnam in this state. Here is another statement from North Woodstock, Conn., $80,500 is said to be a conservative estimate of the amount of grain that is imported into that town. From Wallingford, Conn., a statement was made up of the grain sold by the four or five grain dealers, and on a conservative estimate, the figures having been compiled as carefully as could be, it amounted, in round numbers, to $95,000 worth of grain annually sold in that town at the high prices which have prevailed. Another statement was from Torrington. I got a very fair estimate from that town, showing about the same ratio. Another statement from the town of Branford showed that about $65,000 worth of grain was annually imported from the west into that town. Here is another statement from Simsbury, Conn., showing that a conservative estimate is that $85,000 will not pay for the amount of grain that is brought into that town. As to Hazardville, Conn., $40,000 is considered a conservative estimate. The state of Connecticut, in all probability, is importing from the west

between ten and eleven million dollars worth of grain every year. Now gentlemen, the hen tells us that this is extravagant, and she knows, and she says in tones that we ought to listen to, that if we are able to pay those fearful prices for grain, and she still pay a profit, she would pay a great deal bigger profit if we could save some of that bill. Now one of the most astonishing things to me that I saw in Iowa was a corn show. The state agricultural society paid nearly four hundred dollars in cash for prizes for single ears for the collection of ten ears of corn. They had it down to a standard and had a regular judging by points. In my judgment, it was one of the most valuable things that has ever been done. It seems to me that one of the most useful things that could be done for Connecticut farmers would be to make a collection of the various kinds of corn that have been grown in the state for so long. If we do not do it, some of these varieties are going to be lost, and I am inclined to think that it would be a misfortune because some of these are among the most fruitful grains that you can raise in this state. If some one would take hold of this, pick the ears, judge them, and find out about them, it is my belief that it would add millions of value to the state of Connecticut in a few years; and, gentlemen, let me tell you that you cannot afford to go on and pay the fearful prices which you Connecticut farmers have been paying for grain. I understand that here and in the city of Bridgeport, and in the city of Hartford, if we could get at the exact figures, it would show an enormous total of carloads of grain that are shipped from the west into these markets and sold for consumption here. I believe that Connecticut farmers should do something to save some of this bill. It is all right for us to say that these hundreds of thousands of dollars which are expended for grain are bringing fertility to us from the heart of the west. That is true, to a certain extent, but if we can raise our own grain, and particularly our own corn, we ought to do it. A beginning should certainly be made on that line. The time is fast coming when we have got to do it. There is no doubt about it. You cannot go on and make a reasonable profit on your farming and pay this enormous expense for grain. You must retrench on your expenses in this respect. Now if it had not been demonstrated that it was perfectly

practicable to raise grain in Connecticut for home consumption, I, perhaps, would not make this strong appeal. I could not believe that I could raise corn on my farm, on one of these poor, old, broken-down pastures that had not been plowed for years until the experiment was actually tried. The production from some of these little fine varieties of corn was the greatest I ever had, and the possibilities of those old pasture lands to produce grain, and in that way enable us to feed our little friend, the business hen, and our stock, is very great. You farmers of Connecticut must consider this. The west is reaching its limit in the production of grain. The far-sighted farmers in the west already recognize that fact and admit it. In a great many cases they are beginning to use fertilizer. In some cases they are beginning already to use wood ashes, and when a farmer begins to use fertilizer in the west you can make up your mind that he has got some good reason. That means that they are recognizing the signs of soil exhaustion, and in that state of affairs it is up to us who dwell in the east, and up to every friend of the hen, and especially to you New England people who are going to prove worthy of the brain and gumption of your ancestors, to raise more corn on your farms in order to feed this hen.

I do not want to talk too long, but there are two or three things that I do want to speak of.

The possibility of corn breeding in Connecticut is one of them. That is one of the great questions of the day, in my judgment. I hope that you will organize a corn breeders' association in Connecticut, the same as they have done in Iowa, and I think in Illinois.

Now what does this little friend of ours, the hen, teach us in a social way? I had a man say to me the other day that he was glad that we had taken an active part in the campaign to defeat for re-election Congressman Wadsworth of our state. As some of you may know, his opponent received thirteen thousand majority this year, and that was because the farmers went out against him and beat him. This man came to me and he said that we deserved some credit for that. I said, "Oh no. I did not do it." But do you know, friends, that if I was to place most of the credit I would give it to an old Wyandotte hen that I have on my farm. After that campaign had been in progress for a few weeks it seemed to me impossible to

make any dent upon the armor of this politician. It looked as though it was one of those things where you could not do anything. I stood ready almost to hold up my hands and say there was no use, friends, the farmers will not rise up and do their duty. The task ahead seemed so large that I was about discouraged. In that condition I went out on my farm one day along in September and there discovered an old Wyandotte hen sitting in the dooryard. She was sitting upon three or four old stones. I stood and looked at her, and then I turned to one of the men who was with me, and I said, "How long has this hen been sitting here?" "Two or three weeks." "We have tried to break her up and can't." "Why," I said, "can't you get her away?" "No," he said, "we have done everything that we can. We have bribed her with corn and she will starve before she will leave her job. We have tried everything we could think of to drive her away and keep her away from that nest but still she comes right back." As I listened to that story I thought, there is my lesson. If a hen will sit there in the cold, and in the wet, and be right up prompt and fair to her duty all the time, where you cannot whip her or dislodge her, why should a grown man lose his faith? The more I thought of it the more that idea took possession of me, and I went back and I attacked that man harder than ever. If I want a lesson of devotion to duty today I will go and look at a sitting hen. That was the greatest lesson I ever had in my life,— from that sitting hen. Another thing that the hen teaches us, and that is in the matter of advertising our goods. There is many a man up on your hill farms that will stand still, and who is really ashamed to come out, as it is his duty to do, and let the public know that he has something to sell. I know of lots of people who have lost many a dollar simply because they had not the courage to come out and tell other people that they had something to sell, and what it was worth. Such people as that can very readily learn a lesson from the hen. There is another class which can also learn a lesson from the rooster. The hen and the rooster are both advertisers. You sometimes hear people talk about hen men. People come and tell me about such men. I know of hen men myself. But you take men who are successful in business, and you analyze the situation right down, and the probability is that you will find that about ninety-five per cent of those people are what I call

rooster men. That is no joke. That is right. We talk in this country a great deal about "the man behind the gun." Some two or three years ago the air was filled with that expression, "The man behind the gun." You would think to hear it used sometimes that that was the greatest thing in the world, to be the man behind the gun; but my friends, that does not keep the world going, the man behind the gun. It does not begin to compare with the women behind the home. That is what keeps the world going. The efforts of the man behind the gun do not touch the heart of the matter at all, but it is these rooster men who go out and crow and tell of these big things that they have done, and if they do not overdo the matter you will find that they are the successful ones. My Swedish woman was a hen woman. As you can see, this leads us naturally to the consideration of two kinds of people. Perhaps some of you have heard the story of the duck that waddled through the barnyard and said to the rooster, "Why in the world is it that every time one of your wives lays an egg they run out of the house to get it, and everybody says, all the people on the farm say, 'What a wonderful hen that is?' Now I lay eggs, but they do not make any such fuss as that over me. They come out and find them as best they can, but no one ever speaks of me as a layer or as a wonderful duck, although the chances are that I lay as many eggs, if not more, than your wife does. Now why is it?" Well, the rooster opened his throat and crowed as loud as he could, and he said, "The trouble is this: you sneak off into the grass here and lay your egg and forget it, and then go down and take a swim in the pond, and nobody knows that you have laid an egg until they stumble upon it. The minute my wife lays an egg I advertise the fact, and the result is that all the family knows that an egg has been born into the world, and the reputation of my wife and myself is increased in consequence." "That is the whole point of it." "We advertise. You don't." Now there are lots of people who are like the duck. They want to advertise and they ought to advertise, but they lack the assurance and seem to be ashamed to do it. No one knows they have anything that is worth while to sell. Of course, there are those who do advertise, who make their influence felt, and who go into the marts of the world and make money. When a man has a good thing I believe he should stand by it, and he should let the

world know that he has something that is worth something, that there is a pedigree in it, and that it is something that other people want. That man advertises his goods. Another is perhaps skilled in some particular line. If he is a man of that type he advertises his skill. He lets himself be known, and from the day of Noah down to the present time it has been justly recognized that skill is worth more than pride. It has always been so and always will be so.

Another thing that our little friend, the hen, teaches us, and that is to stick to one thing. The only hen that I ever heard of that did not do that was a hen in Texas. This hen was set upon sixteen first-class eggs. The eggs were placed in a basket and put in a room. She sat upon the eggs until the nineteenth day. She knew that under her were eggs that were about to hatch, and if those eggs did hatch well that she was going to be the proud mother of those chicks. On the nineteenth day happened what I want to call your attention to, the point of my story. The boys on the farm filled up a crate with eggs which they were going to take down to the market, and they put the crate down near the hen. The old hen saw the crate and she saw the eggs. She said to herself, "There are hundreds of eggs in that crate. What a fool I am to sit on these when I can sit on those and raise a much bigger family. What a fool I am to waste my energies here on this poor little lot when I can hatch so many more. Why should I waste my energy? I am a fool." I am sorry to call my friend a fool, but that poor fool came down off that nest and got up on to that crate and spread out her wings and there she sat all through the night. Of course, all of the sixteen eggs in the nest that she had been sitting upon spoiled. She lost her opportunity because she did not attend to business. She tried in vain to warm up the crate. She did not stick to one thing, and in consequence lost everything. Now my friends, is there anybody here in this audience who will say to himself, that applies to me? I am sure there is someone here to whom that does apply. I do not know that I ever saw an audience in my life but what contained possibly two or three people who would take that application home, who would recognize a defect in their own make-up, and resolve to stick hereafter to small things, and do them well. That is the only way to acomplish results. Whatever you have to do stick to

it and do it well. Master it and make much of it. There are too many men who, like the hen, jump down off a sure thing, even if it is small, and in the hope of accomplishing a great thing, like the old hen who sought to hatch a crate of eggs, fail to accomplish anything. You never can do it. Stick to one thing.

I have come to the end of my story. Just one thing more, and that is this: I love the hen not only because of the material prosperity that she brings us, but I love the hen for the real chunks of wisdom and of philosophy that I have learned from her. She is a good, steady old friend. But I love the hen for her patriotic feelings, and for what she has done for New England. As I said in the beginning, but for our friend, the hen, there are thousands of acres on these bleak New England hills that would be abandoned because men could not go there and make a living. The hen has come to their rescue. She has enabled many a farmer to keep his home, and I say to you that the hen, of all animals, is the one that will help us to restore and bring happiness and prosperity to these old hills of ours. New England has raised many a man and many a woman of distinction. They have seen the light of day, many of them, in the homes established on these New England hills. The hen is responsible in no small degree for the sturdy character of those men and women who have been such a benefit to the world. She has done more for her country than the eagle. For my own part, I would be in favor of calling the eagle down off the American flag and putting the hen in his place. (Applause.)

DISCUSSION.

Secretary BROWN. The next thing that will engage our attention is what we shall find here in the Question Box. Here is a question for Mr. Almy. "Would a tight house with an open front save anything in the feed bill?"

Mr. GRAHAM. Mr. Almy, Mr. Chairman, has been called home. I think that Dr. Wood can undertake to answer most of those questions.

Dr. Wood. I will be glad to do what I can, Mr. President. If there are any of them that I cannot answer I will have to pass them.

With reference to this question, from my experience I do not think it would. I have never figured to prove that a tight house with an open front would save anything in the feed bill. I do not count upon saving in the feed bill. I give a hen all she needs to eat. I would not have a tight house anyway. I do not know how Mr. Almy would answer that question, but that is my answer to it.

Secretary Brown. Here is a question. "Do you believe there is anything in the theory of handling eggs during the incubator period with an oil preparation deposited on the shell over the ends having a tendency to so destroy evaporation as to lessen the chance of a good hatch?"

Dr. Wood. There is nothing in that. I handle my eggs, and I get just as good a hatch as anybody else with an incubator. I turn the eggs twice a day. I turn the eggs before I fill my lamp. Anything that the eggs get from your hands will not do them a bit of harm. Kerosene oil will do them harm sometimes.

Question. In the case of roup or a roupy cold how should creolin be used and how much?

Dr. Wood. I tried to make that clear this afternoon. I use equal parts of creolin and water. I take a little bit of absorbent cotton, twist it around, and swab out the throat of the fowl, or wash their mouth. If I do not think they have enough I inject it, sometimes stick the head in. I make use of a teaspoonful of creolin in a quart of water and dip their heads. It might do a whole lot of good.

Question. In cholera cases should a two per cent. solution of sulphuric acid be used?

Dr. Wood. That is merely as to the amount. If it is used as a disinfectant it is all right. When it is used about the

poultry house it is sprinkled about the ground. Sometimes you want to disinfect the droppings with it as well as the house.

QUESTION. If pullets are well developed do you think they are less reliable as breeders than yearling hens, especially when breeding for the fancier?

Dr. WOOD. I just as soon breed from a good, mature, healthy pullet as I would from a hen. Possibly with a cockerel that was all right a yearling would be better. If the pullet had gone through all right you might perhaps get better results, but as nine out of ten men won't pick hens that have gone through the pullet stage all right, that is where the trouble comes in.

QUESTION. Do you feed charcoal to poultry?

Dr. WOOD. I use granulated charcoal if I can get it. I keep it before them all the time. It may not be necessary to keep it there all the time, but that is the easiest way to feed it. Granulated charcoal can be bought of some of the supply houses that make a specialty of poultry foods.

QUESTION. By breeding from pullets does it not decrease the size of your poultry?

Dr. WOOD. I have never done it. I do not breed from a pullet unless it is a pretty good one.

A MEMBER. I think that question is open to a good many qualifications. When I say breeding from a pullet I mean a bird that is laying in its pullet year. She may be sixteen or eighteen months old, before I begin to use her.

A MEMBER. Mr. President, I wish that Dr. Wood would state how long he keeps chicks in his brooders, and how does he prevent huddling?

Dr. WOOD. Well, that is easy. I keep them in the brooder until they get through wanting heat. Sometimes it is six weeks and sometimes it is eight before they commence to get on top of the hopper, and when they commence to flock out in the front part of the brooder they have got all the heat they want. On cool chilly nights, if they are in the brooder they

get just as much as they want. I do not depend on my own personal ideas in that matter. A chick knows a great deal better than I do what it wants. If a chick wants heat it should have it.

QUESTION. How do you prevent them from huddling?

Dr. WOOD. Well, I make it a point to train my chicks to use the brooder until I get them so that they know enough about it. I do not let them alone. I keep them moving. If you will pay a little attention to them for about three or four days, you can easily take care of that. Of course, what you do depends to some extent on the weather. You can soon train them so that they will take care of themselves. You cannot do as well with summer chickens in teaching them not to huddle as you can in cold weather because in cold weather they soon find out that it is too cold to stay out there. A chicken is largely a creature of habit. A habit can be established with a chick as well as it can with a man.

President SEELEY. Doctor, the question is asked if huddling in the brooder does not mean a lack of heat.

Dr. WOOD. We do not have much, if any, huddling because we keep it so hot that they just stay in there. The lack of heat will, of course, cause them to huddle. I believe in keeping them warm.

QUESTION. How can you increase the egg production of our hens one dozen eggs per hen per year?

President SEELEY. I would like to see it done. I believe that the only way that you can increase the egg production of our hens is to give them plenty of food, a good variety of wholesome food, and give them enough of it. Do not go out and put down a couple of handfuls of corn, and then let them shift for themselves and expect that they are going to turn out a lot of eggs. You just put down a good big generous hopperful, and you will hear from them.

Mr. GRAHAM. I heard Dr. Wood make the statement, Mr. President, that certain hens got out of condition and

would not be egg producers any longer, and that they could be detected as hens that would not produce eggs, and I think he said it was on account of over-feeding, or something to that effect. I wish that we could have something more on that line.

Dr. Wood. Mr. Graham did not get the whole of what I said. I meant that under my system of feeding I keep food before them all the time. I keep everything they want before them all the time. I go out there every night and their crops are jammed full. I never saw a hen eat much from the feed hopper unless she wanted to. Once in a while you will get one that will make a fool of herself by over-eating. You take some people and let them have something that they like and they will make hogs of themselves. It is just the same way with a hen. Some of them make hogs of themselves. Some of them eat too much. That food hardens, the digestive organs are unable to take care of it, and then they get into trouble.

As to how I tell those hens. It is not difficult to tell the appearance of a good healthy bird. Every bird in good health ought to have a comb that looks well, and a good active appearance, but if a hen is a little bit off you can tell by the color around the eye. You will find that it will be just a little bit dark. If you pick that hen up you will find some deformity of the pupil of the eyes. It has gone wrong. It is staring off at an angle, and instead of being a nice round pupil you have a peculiar shaped pupil. It is all in the shape. It is turned out or up in the corner like that. Sometimes in the course of a week or ten days that hen will tumble off the roost with apoplexy. If you know that, you can turn her into market before she is ready to go off the roost. I could, of course, give you a nice lot of long names for it, but to put it in plain language, a good deal of that sort of trouble starts in by the hen making a fool of herself at the food hopper. That is what I meant.

There has been a good deal said here today on the subject of raising our egg production per hen a dozen eggs, and thus add largely to the value of what we receive from this product. It may be of interest to the audience to know what has been accomplished at the Utah Experiment Station along that line. Undoubtedly, there are some here who have read about this. The statement, I believe, has been criticised somewhat in the press, but I will not say anything about that because I am not sufficiently familiar with the facts. I do know, however, that when the average production throughout the county in general, according to the census figures, was seventy eggs per hen or less, and in Utah it was less than that, at the Experiment Station there they had a flock of something like four hundred hens, and the average production that same year was one hundred and fifty eggs per hen. Now this increase was achieved by perfectly proper methods; possibly too expensive for the ordinary small poultryman to use, but that record was obtained. In the first place, when they started poultry work at that station they secured some ordinary fowls, and several pure bred barred Plymouth Rocks, and some White and Brown Leghorns and Brahmas. Then they started to use dark nests, but they finally came to the conclusion that that was not conducive to good laying. Then they brought from all over the United States fowls that had made a good egg record, and they inbred at first to a certain extent by using cockerels from the best known of those different varieties. Then they experimented with foods. They fed them better than most of the farmers of the state did, and they also fed them with a ration that they had studied out. That does not quite agree with one of the speakers of the afternoon, but they did use a balanced ration. The results were surprising. The product increased remarkably until they had an average of one hundred and fifty eggs per hen where the farmers of the state had but sixty-five eggs per hen.

Mr. GRAHAM. Is there any other question that you wish to ask Dr. Wood or Mrs. Monroe while you have them here?

Secretary BROWN. Before we close the evening session I want to announce that the Board of Agriculture has selected the following committees to award the prizes for the exhibits of corn, apples and potatoes in the hall below.

The committee on corn will consist of Mr. E. M. East, Agronomist of the Connecticut Agricultural Experiment Station; Mr. L. A. Clinton, of Storrs, and Mr. E. G. Seeley, Vice-President of the Board.

The committee on the award of prizes for apples will consist of Prof. A. G. Gulley, of Storrs, Mr. N. S. Platt, Pomologist of the Board, and Mr. Charles A. Thompson, of the Board of Agriculture.

The committee on potatoes will consist of Prof. G. P. Clinton, of the Connecticut Agricultural Experiment Station; Mr. Charles Chapman, a member of the Board of Agriculture, and Mr. H. G. Manchester of Winsted.

This convention will now stand adjourned until tomorrow morning at ten o'clock.

SECOND DAY.

Morning Session.

WEDNESDAY, DECEMBER 19th, 1906.

Convention called to order at 10:20 A.M., Vice-President Seeley in the chair.

Music.

President SEELEY. Owing to circumstances, it is necessary to re-arrange our program slightly this morning and commence with an address on corn breeding by Mr. E. M. East, of the Connecticut Agricultural Experiment Station.

SOME PRINCIPLES AND RESULTS OF PLANT BREEDING.

By Mr. Edward M. East.

Mr. Chairman, Ladies and Gentlemen: Plant breeding has recently been called to the attention of the public by many magazine and newspaper articles, generally written from the sensational standpoint and full of distortions of the facts. Probably everyone who has had the subject called to his attention for the first time by one of these dissertations, has said: "Why this is not new. It is what I have been doing for years, and what my father and grandfather before me have done. We have selected our seed corn each year from the largest and best ears. We have planted our finest potatoes. We have been plant breeders."

This is literally true. Plant breeding is simply another instance of "Old Friends with New Faces." It probably has been developing ever since the beginning of the cultivation of plants; but the "New Face" which it now presents to us, the new prospects which are opened up, are due to the new facts which the science of the nineteenth century has brought to light, and which has made rapid advance possible.

We have record that by the Romans, and probably even by the Greeks and Egyptians, it was known that by selecting the best heads from their grains as seed for future planting, better crops were obtained and deterioration of varieties lessened. This was the use of method to bring about certain effects, and we can hardly say that it was not real plant breeding. However, the fact which I wish to emphasize is that at present we have methods that more surely bring results, methods that are as much in advance of those of even one hundred years ago, as the modern express train is of the old stage coach. Plant breeding is not yet a science. Many more facts must be discovered, and the great mass of data already obtained must be correctly analyzed and set in order before such a claim may be made for it; but the true scientific beginning has been made, and we are making rapid strides toward learning the causes and how to control them, of the phenomena which were observed and wondered at by our ancient forerunners in the work.

Some of our own most important agricultural crops, such as corn, tobacco, and potatoes are natives of America, and the beginnings of their improvement by the white race therefore date from the sixteenth century. In some places in America, however, the Indians had already developed comparatively systematic methods of agriculture, and it may be that the value of their work is underestimated. It is stated that several varieties of corn, including one of sweet corn, had been originated by the Indians of what are now the New England States, and that when the settlers of Massachusetts obtained seed from them, they taught them methods of selecting the largest and finest ears for their next spring's planting. It is here that we have the genesis of corn breeding. We might even go further and say that here advancement in corn breeding stopped until the introduction of the ear-to-the-row breeding plot, only a few years ago. It is true that several general laws had been established some time before, but they have only lately come into general practical use.

The first of these laws upon which we base modern plant breeding was the discovery of the sexuality of plants by Camerarius in 1691. This, however, was not put to any practical use until 1719, when Thomas Fairchild, an English gardener, crossed the carnation with the sweet william. From this time there is a gap in the progress of the work until the beginning of the nineteenth century, when Thomas Andrew Knight, an eminent English plant physiologist, showed the practical value of crossing and hybridizing in the production of plant varieties. Another important principle emphasized by Knight was that of inducing variation in plants by an increase or decrease of the food supply. At almost the same time a Belgian horticulturist, Van Mons, published several papers of almost equal importance in which he emphasized the principle of selection. Finally, came the introduction of a practical method to test the average productive efficiency of individual plants in particular characters, as illustrated by the ear-to-the-row comparison of the productiveness of ears of corn in the modern breeding plot. And while the literature on plant breeding of late years has been large, and the new principles involved of striking importance, we can hardly say that our present methods are any more than variations of these three basic principles: namely, inducing variation by means of crossing

or otherwise, comparison of the mother plants by means of the average of their progeny, and improving them by continuous selection.

The Economic Importance of Plant Breeding.

The economic results of the improvement of our field and horticultural crops are already extremely large, and the possibilities which have been opened up in the past few years are hardly comprehensible.

Professor Hayes, at the University of Minnesota, has increased the yield of the best variety of wheat previously grown in the state by twenty-five per cent. By ten years of careful work an average yield of twenty-three bushels per acre has been raised to twenty-eight bushels per acre. This improvement of twenty-five per cent. in the matter of yield, if calculated on the world's supply, would add six hundred and twenty-five million bushels per year, or, at a selling price of eighty cents per bushel, would add five hundred million dollars to the world's wealth. If we should calculate this on the amount grown in the United States alone, we could in a decade pay the national debt.

The corn crop of the United States is two billion bushels per year, with an average of about twenty-five bushels per acre, and there is no doubt but that there is a possibility that the yield may be gradually increased through the means of better yielding strains for many years to come, and no one can yet predict the limit of such improvement.

The improvement of the sugar beet has been going on one hundred years, and in this time the sugar content has been increased 125 per cent., resulting in profitable industries for the growers and manufacturers, and in greatly decreased prices of sugar for the entire world.

No one who is at all familiar with what has been accomplished in a few years in this country and Europe will doubt that there is a possibility of a five per cent. increase in yield of all the leading crops of the United States within a comparatively short time, say ten or twenty years, if money were provided to carry on the work. A percentage increase of even this amount would add to their value from one hundred

million to two hundred million dollars a year, this without taking into consideration improvement in quality and food value.

EXAMPLES OF RESULTS.

A great deal might be said concerning the benefits which have accrued through the many thousand improved varieties of orchard fruits and garden vegetables; but this would easily make a volume by itself, and we will leave it to speak briefly of those crops of more general interest which we might designate as farm or field crops. The work in this country leading to the improvement of the field crops has dealt mainly with corn, wheat, potatoes, and tobacco, which, of course, would be expected, owing to their relative importance. Very little work has as yet been done upon oats, although German breeders have been giving it their attention for many years, and one of their breeders, Kirsche, has developed a strain which yields heavily and yet stands up well without lodging. This oat has one fault, a heavy chaff, but it is possible that we might adapt it to this climate and improve this character.

Rye is another grain of great interest to the Connecticut farmers that has been a monumental success to the German breeders. F. von Lochow of Petkus has succeeded in breeding a rye almost without a fault, which yields in all comparative tests from twenty-five to one hundred per cent. higher than the best of the older varieties. A fact of peculiar interest in von Lochow's breeding work is that he established multiplying fields for increasing his improved seed on different soils and in different climates throughout the Empire in order to adapt different strains of his variety to diverse conditions.

WHEAT.

Wheat, while not of present importance to the state of Connecticut, serves to well illustrate what has been accomplished of late years in this country. The early varieties of wheat that were grown in this country were, of course, of foreign origin, and even yet a number of hardy varieties are being imported from Russia. The greater number of wheats grown in America at present, however, have had their origin in the United States and Canada. The original stocks were

such as originated by chance in fields grown from imported seed, and which, owing to their differences from the parent variety, were preserved and perpetuated. Mr. L. H. Haynes, of Fargo, North Dakota, the originator of Haynes Blue Stem has done much careful work in breeding wheat and has, moreover, made it pay the greater profits he has derived from this farm. The most important experiments of this kind in the United States are those of Prof. W. M. Hays, of the Minnesota Experiment Station, which are still being continued. From the year 1888 up to the present year, over five hundred different varieties have been tested from all over the world, and from these one variety, Minnesota No. 169 wheat, stands pre-eminent. This wheat, says Professor Hays, was originated from a single plant in the following manner: "Several of the best plants were chosen from a large number of plants of Blue Stem, each growing separately, a foot apart each way. All plants were rejected which did not yield five hundred or more grains of wheat weighing ten or more grams. The seeds from each chosen plant were planted for several years until sufficient seed was obtained to plant a field plot. Then for several years each of these new strains were grown side by side and compared with the parent variety. A few of the new strains proved superior to the parent variety, but the one designated as Minnesota No. 169 was so highly superior that all others were discarded." On large areas this wheat has shown itself capable of yielding at least two bushels per acre more grain than its parent variety, which is the best kind commonly grown in Minnesota.

TOBACCO.

In our own state the plant breeding which has been going on the longest is that of Dr. Jenkins on tobacco, which work in late years has been facilitated by the co-operation of the United States Department of Agriculture. The advantage of selected seed has been clearly shown, and the ease of unifying particular types by inbreeding demonstrated. Work is now going on under Mr. Shamel to increase the yield and quality of the standard varieties, and several promising hybrids are in their third year of comparative tests.

POTATOES.

With potatoes the work this station has done thus far has been to study the particular difficulties which are the peculiar property of this bud-propagated annual. It is now studying especially, the factors necessary to control in order to improve the potato in the important points of yield, disease resistance and culinary value; and has worked out a method by which the breeder can select potatoes of high cooking value without injuring the tubers for planting. Next year we hope to begin an extended study of methods, and possibly some actual breeding. We expect to have about eight hundred different varieties collected from all over the world growing here at the Station, and we hope all interested persons will feel free to visit us and see the work.

CORN.

Owing to the great common interest in maize or Indian corn, and the amount of work in progress at the Connecticut Agricultural Experiment Station, and in co-operation with growers throughout the state, I will treat it at greater length and let it serve to illustrate the general methods of plant breeding.

All economic plant breeding may be divided into five different lines: (1) Increase of yield, which includes breeding for disease-resisting varieties; (2) increase in actual food value, as for example, breeding for higher protein content in corn; (3) increase in commercial qualities, such as breeding for higher oil content in corn; breeding of flax for longer and stronger fiber, or the breeding of cotton for longer lint; (4) breeding for table qualities, as for the increase in flavor and sugar content of sweet corn, improved quality of apples and other fruits; and (5) finally, esthetic valuations, as for example, increase in size, beauty and flowering efficiency of many ornamental plants. It will be noticed that in the above mentioned qualities for which plant breeders are striving, corn supplies examples for four out of five.

The work on corn now going on in Connecticut in co-operation with this Station includes three of these main lines, and is as follows:

Mr. George A. Hopson is breeding a strain of the Longfellow yellow flint for larger yields of shelled corn per acre, and a greater percentage of protein to give his corn higher feeding value. At Elmwood, Mr. F. H. Stadtmueller is breeding a strain of Leaming Yellow Dent for higher total nutrients per acre, that is, high yields of both grain and stover and a higher feeding value. Mr. Charles S. Phelps of Chapinville is working to so adapt a variety of Yellow Dent corn that it will mature as large crops as possible upon the limestone soil of the hills in the northwestern part of the state, where the season is short. Mr. S. M. Foster is running two breeding plots; one of an eight-rowed yellow flint and another of a flint variety, sometimes called "English pigeon" corn, which runs from twelve to sixteen rows. Both of his selections are for higher yield of grain, as is also the "Longfellow" plot of Mr. Charles M. Jarvis of Berlin. At the Experiment Station we have work in progress with a twelve-row yellow corn of the flint type, originated by Mr. Frederick Sturges of Fairfield. This corn is a natural hybrid between the old King Philip flint and a southern white dent. The ears show very little of the dent type, and it is probably on account of its flint parent that the grain is quite high in protein content. Last season we planted one ear which analyzed 14.27 per cent. protein, which is 3.3 per cent. above the general average for field corn. The dent parent shows itself in the large amount of fodder produced, while the time of maturity is midway between that of the flints and the dent varieties. This corn has been grown for sometime on land which has been fertilized very highly, much more highly than the commercial grower could afford, and we have now placed it on a very poor soil, and hope to adapt it to making better use of what fertility there is locked up in this lighter, less productive type.

We also have at Mr. S. W. Woodruff's Sons' farm in Orange a breeding plot of Stowell's Evergreen sweet corn, which we are selecting for better yield of ears, and for kernels of the small, tender type so desired by the canner and the consumer. Here we are also making a study of the commercial possibility of increasing the actual sugar content of this variety by selection. As a comparative test of methods we are cooperating with the United States Department of Agriculture

in running two other sweet corn plots at Mr. Woodruff's, one of Early Crosby, and one of a New York grown strain of Stowell's Evergreen. We hope by this study of methods of breeding to arrive at the best system to be used for rapid progress in improving sweet corn.

The results this year have been very satisfactory, but even if no progress had been indicated this first season, it should not be a thing to discourage the plant breeder, for such work as we have undertaken, except in the cases of those rare variations which we call sports, cannot produce any astonishing changes in one year or in two years. Plant improvement is only achieved by patient, persistent effort, and it certainly cannot be held out as an opportunity to "get rich quickly." Nevertheless, there is sufficient money compensation to those who accomplish results, as is shown by the long established success of the Vilmorins in France and the Garton Brothers in England, and the later commercial prosperity in the United States of the corn breeding firm of Funk Brothers, who use twenty-five thousand acres of their own land in Central Illinois in their operations.

Methods.

The methods by which we are now working to increase yield, and which we know will produce results, are very simple, and may be summed up in four short sentences: (1) Select a variety adapted to the ends in view. (2) Select the best mother plants possible. (3) Determine the producing powers of the ears from these plants. (4) Continue propagation from the best yielding ears.

In actual practice the details of our methods are somewhat more complicated, but these four simple steps comprise the basis for all corn breeding.

The best number of ears to use in a breeding plot is yet unsettled. There are several conflicting factors entering into the consideration. On the one hand, the smaller the number of ears taken, the better can be the selection of the seed planted; while on the other hand, the larger the number of breeding rows to choose from, the stricter can be the selection of seed for the next crop. Then again, there is undoubtedly a danger of evil effects from too close inbreeding, by the use of too small a number of ears, as will be shown later.

From our present knowledge we believe that ninety-six ears is a safe number to use, so far as inbreeding is concerned, and this is the number that we suggest, it being understood that every alternate row is to be detasseled, which leaves only forty-eight rows to actually select from for seed. The ninety-six ears should be selected the previous season in the field, so that the breeder may take into consideration the qualities of the whole plant rather than simply the ear. He should select those plants which are of medium height, with strong stems, good brace roots, and broad healthy foilage; and which bear good ears at a proper height from the ground, covered with a moderate thickness of husk. In general the most perfect ears obtainable should be selected, taking into consideration all points that apparently have any relation to yield or quality. Time should not be spent, however, upon fancy points, for it should be remembered that nature sometimes develops different peculiarities in different blood lines, which go hand in hand with high yield, but which do not produce fancy or show ears.

The planting of these ninety-six selected ears in the breeding plot is the peculiar feature of our system. The plot consists of a number of parallel rows of corn, each separate row having been planted from the kernels of *one* ear, so that the corn produced by each row represents the offspring of one single female parent. The rows being of equal length and the stand approximately alike (the germinating capacity of each ear having been tested), *the weights of the corn produced on each row become an exact measure of the productive capacity of each individual mother plant, and each ear from a row is the daughter of a mother which had a known productiveness.* A pedigree on the female side may, in this manner, be established. It often happens by this method that in testing two seed ears practically alike in size, weight and general appearance, one yields at the rate of forty bushels per acre and the other at the rate of eighty bushels per acre. We find some very good-sized, nice looking ears in the forty bushel row, and we find some very poor ears in the eighty bushel row. By the common methods of selection the good ears from the forty bushel row have an equal chance of selection for seed with those of the eighty bushel row, except for the probable greater number of them in the latter. All will agree, however, that there is an

advantage in planting corn which came from the eighty bushel row.

I have found in a comparison of a number of ears that the smallest ear sometimes yields the greatest amount of grain in the next generation, when planted by the row system. The explanation is that this ear came from a strain that possessed to a remarkable degree the power of transmitting good yielding qualities, and while this individual happened to be small, possibly through disadvantage in environment, it still had the hereditary qualities of the strain from which it came.

The breeding plot is given only ordinary farm treatment through the season, and the only extra work is that of detasseling all even numbered rows so that we may have opportunity to select our seed from corn that is known to be the product of a cross, and thus avoid the dangers which come from inbreeding. It is also recommended that no plants in any of the rows which appear imperfect, dwarfed, immature, barren, or otherwise undesirable, should be allowed to mature pollen. Occasionally an entire row should be detasseled because of the general inferiority of the row as a whole. Detasseling is accomplished by going over the rows as many times as may be necessary and carefully pulling out the tassels as they appear. Indeed, great care should be exercised in this part of the work in order not to injure the plants and thereby lower the yields. The tassels should not be cut off, as this produces an external injury and at the same time the stalk is often deprived of several undeveloped leaves. The tassel should be allowed to develop far enough so that it can be separated alone at the top joint by a careful pull. This insures cross pollination and markedly increases the yield of succeeding crops.

Making Selections.

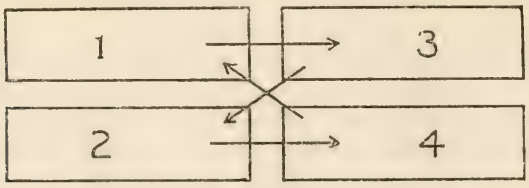
In the fall, selections of the best ears borne on the best stalks are made from the detasseled rows, as was done from the general field in the previous year. These ears are harvested when mature, and placed together with all those from the same row, in bags marked with the row numbers. Then each of the forty-eight detasseled rows is harvested and each row weighed up separately, together with the selected corn from the same row.

A comparison of the total weights of the ears from each row is the basis of selection of the rows from which to take seed for the next year, and in this selection fifty per cent. of the rows are discarded. The forty-eight rows are, however, considered in four quarters. We select the six best yielding rows out of the twelve detasseled rows in each quarter. This is done for two reasons; first, in order to avoid selecting too many ears from a few extremely good rows and thus breed from closely related plants; and second, a comparison by weight of each quarter's rows by themselves avoids somewhat the error of comparing two rows widely separated, and on uneven ground.

After comparing the ears from each row, noting the points previously mentioned, the final selection for the next year's planting should include four ears from each of these twenty-four rows, again making the ninety-six ears. Two ears from each row are used to plant in odd-numbered rows to furnish pollen (tasseled rows), and two to plant in even-numbered rows to be detasseled, and from which all seed is to be taken.

Our plan of planting to avoid inbreeding looks a little complicated on paper, but is in reality very simple.

The seed for even-numbered rows is always kept in the same quarter in which it grew, while the seed for odd-numbered rows is always brought from another quarter. To facilitate this plan it is convenient to have the field shaped as it is shown on the diagram, that is, quarters three and four end to end with quarters one and two, although no particular arrangement is absolutely necessary. The direction of changing the "tasseled seed" is illustrated in the diagram.



DIRECTION OF THE ANNUAL CHANGE OF SEED FOR TASSELED ROWS.

For the first quarter "tasseled seed" is brought from the fourth quarter, for the fourth quarter from the second, for the second from the third, and for the third from the first. This is done in order to carry the seed to bear "tasseled stalks" as far away as possible from their sister ears, which are to remain in the quarter in which they grew and produce "detasseled stalks."

The remainder of the plan for planting is explained in Bul. No. 152 of this Station. It is simply a mathematically worked out plan in which ears of corn from the same mother ears are year by year kept separated from each other as far as is possible on this size breeding plot: that is, the rows on either side of a tasseled row, — by which row they are in a great measure pollinated, — are planted the next year with more than one row between them.

These plans can be easily worked out by the breeders, but should any difficulty be encountered, this Station will be glad to give any necessary help.

Dangers of Inbreeding.

Our reasons for taking so much trouble to avoid inbreeding, are definite deductions from exact experiments. In a long series of careful investigations, the great Charles Darwin found that plants usually cross-pollinated, suffer great deterioration when self-pollinated or inbred. Other plants, such as wheat and tobacco, have through long ages become accustomed to inbreeding and suffer no ill effects from it. Corn, however, is a wind pollinated plant, and is to a great extent cross-pollinated. It has been found, though, by many observations on the time of maturity of the male and female flowers of the corn plant (the tassels and the silks) that when left to natural pollination by the wind, a considerable amount of self-pollination ensues. This does not have an ill effect upon the general field of corn, for here we save a few ears from a very large number of probably unrelated ears for the next year's planting, and sell or feed the remainder. In the breeding plot we have entirely different conditions. There, we are breeding from year to year, kernels from only a small number of ears which must necessarily be of closely related blood lines: and we must assure ourselves that there self-pollination does not take place, by detasseling the rows from which

we select seed and thus forcing a cross from the other rows which bear tassels.

In an experiment at the Illinois Agricultural Experiment Station, the continuous selection of seed from rows which were left tasseled and which became more or less inbred, reduced the yield to *fifteen per cent. less* than that of continually selected detasseled rows from the same plot. This effect appeared as early as the second year's breeding and was corroborated by the third year's work: and the discrepancy would probably have been even greater, except that the pollen falling on the detasseled rows came from rows more or less inbred.

In our plan of breeding, the entire lot of corn planted in the breeding plot comes from rows which have been detasseled in every previous year of breeding, and thus we get absolutely no effect of inbreeding.

CONCRETE EXAMPLE OF RAPIDITY OF PROGRESS.

I next wish to illustrate the rapidity of progress which may be expected in breeding work by an example of work done by the Illinois Experiment Station.

In 1896 Hopkins showed that while the variation in chemical composition of different ears of the same variety is very great, the variation in composition of the kernels of each single ear is very small. That is, the protein in individual kernels of a single ear may vary as much as one-half of one per cent. from the protein content of the whole ear, but in no case did they exceed this amount. On the other hand, the protein in different ears of the same variety grown in the same field, may vary as much as six per cent. from each other.

This uniformity of the individual ear makes it possible to determine the composition of an ear of corn by the analysis of a few kernels. The remainder of the kernels of the ear may then be planted if desired. The wide variation in composition between different ears furnishes a starting point for the selection of seed in any of the several different lines of desired improvement. Thus by shelling off two rows of corn from the ear as a sample to be analyzed, the composition of an ear is found, leaving practically eighty per cent of the corn of known composition to be planted. It was in this manner that selection for breeding to change the composition was started at the Illinois Station.

From the crop of 1896, two bushels, containing one hundred and sixty-three ears, were selected from a crib of white corn, each ear was analyzed and a great variation was shown between individual ears.

Selections were then commenced in two directions, for increase of protein, and for decrease of protein. A few of the best ears for each purpose were selected and each lot was planted by the ear-to-row method in a separate and isolated plot in order to prevent mixing with other kinds. From the crop of each of these plots another selection of seed for the following season was made by analyzing a large number of ears. This process has been repeated year after year with results as shown in the tables following:

TABLE No. I.

BREEDING FOR INCREASE AND DECREASE OF PROTEIN.

Year.	High Protein Plot. Average per cent.		Low Protein Plot. Average per cent.		Differences between the crops, per cent.
	In seed planted.	In crop harvested.	In seed planted.	In crop harvested.	
1896	.....	10.92	....	10.92	0
1897	12.54	11.10	8.96	10.55	.55
1898	12.49	11.05	9.06	10.55	.50
1899	13.06	11.46	8.45	9.86	1.60
1900	13.74	12.33	8.08	9.34	2.99
1901	14.78	14.12	7.58	10.05	4.07
1902	15.39	12.34	8.15	8.22	4.12
1903	14.30	13.04	6.93	8.62	4.42
1904	15.39	14.98	7.00	9.27	5.71

This table shows the average percentage of protein each year in the seed planted and in the crop harvested in each of the breeding plots. We can in this way compare the results of the different seasons.

The last column shows practically a continuously increasing separation between the high-protein and the low-protein strains. It shows that there have been developed two strains of corn one of which is now one and one-half times as rich in protein as the other. The importance of this can be better understood perhaps by considering that the average protein content of wheat is 13.3 per cent., and the average protein content of oats is 13.2 per cent.

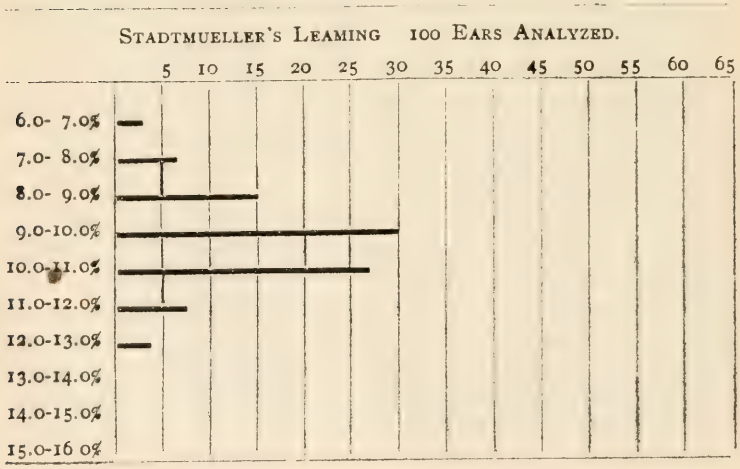
Attention is called to the fact that the drouth in 1901 hindered the full development of the kernels, and this seasonal influence was to produce corn with a high percentage of protein; but nevertheless the high-protein plot increased more than the low-protein plot, thus showing the effect of breeding even during this very abnormal year.

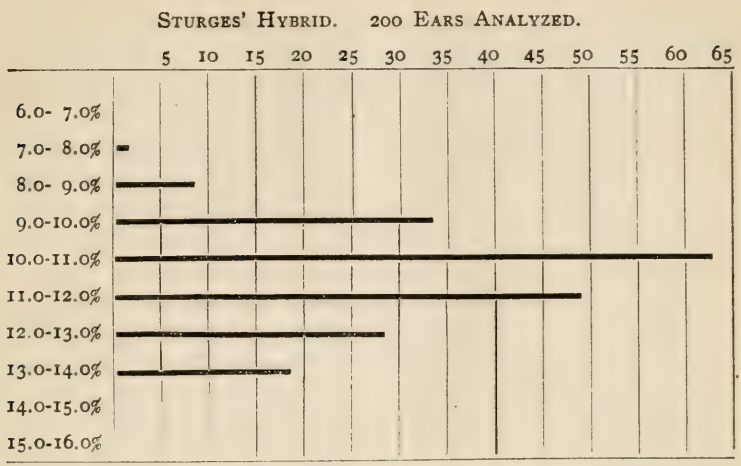
In our own corn breeding work, we make yield the primary consideration, for no reasonable increase in protein content could make up for a deficiency in yielding power. Our method is to select seed only from such detasseled rows as have shown by their actual yields compared by weight, that they are the best fitted for producing high yields under the conditions of soil and climate in which they are grown. From such high yielding rows a number of ears are selected as seed ears, — say three times the number of ears that we wish to plant. These ears are then analyzed and we select for planting those that contain the highest per cents. of protein.

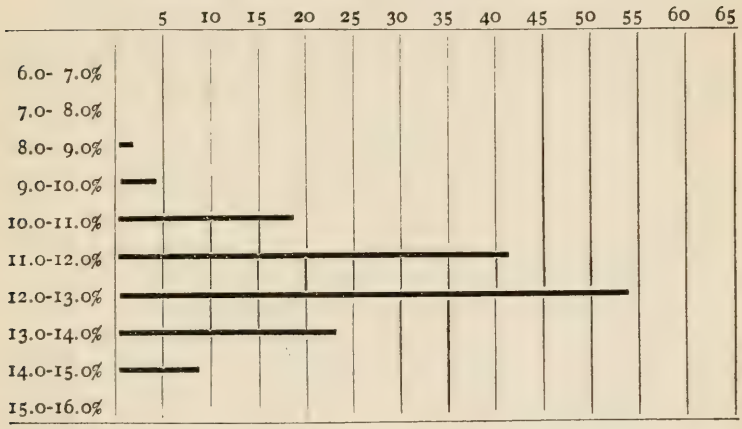
Table 2 illustrates some of our own work. It shows the variations that we have found in the protein content of some of our Connecticut corns, dent, hybrid, and flint. The figures, 5 to 65, show the number of ears which each contained, the per cent. of protein shown at the left.

Table No. 2

VARIATIONS IN THE PROTEIN CONTENT OF CORN IN 1905.







These are the variations from which we make our selection, selecting and planting the highest, and rejecting all others. It does not seem peculiar or improbable that plantings made from some of the high-protein ears shown here should raise the average protein content, and hence the feeding value, in the next year's crop.

This last table shows some of the actual producing powers of ears which we have compared in one of our breeding plots this last season (1906).

These ears were fairly uniform in shape and size and other physical characteristics, and well illustrate the fallacy of trying to improve corn with any degree of rapidity by selecting from the crib by physical characteristics.

The yield is not high owing to the poor land upon which they were grown; but a range of from eleven to forty-eight bushels of shelled corn to the acre, as producing powers of ears practically side by side and with a nearly uniform stand, is very striking. (See table on opposite page.)

This description of corn breeding methods will, I think, give some idea of the general methods of all plant breeding. Numerous other experiments have shown conclusively that with correct details of methods, and by perseverance in them, practically any change within reason can be effected in plant forms, within a reasonably short length of time. The laws upon which all this depends may be summed up in two statements which at first glance seem rather paradoxical.

(1) Variation, which causes the production among plants, along with many average plants, of a few more nearly like those sought, and a few more nearly opposite.

(2) Heredity, which enables us to produce from a few choice plants, a great many which do not return to mediocrity but resemble their aristocratic parents.

DISCUSSION.

The PRESIDENT. Gentlemen, you have listened to this exceedingly interesting paper. It is now open for discussion, and I am sure its value should bring out a very full discussion of the points involved.

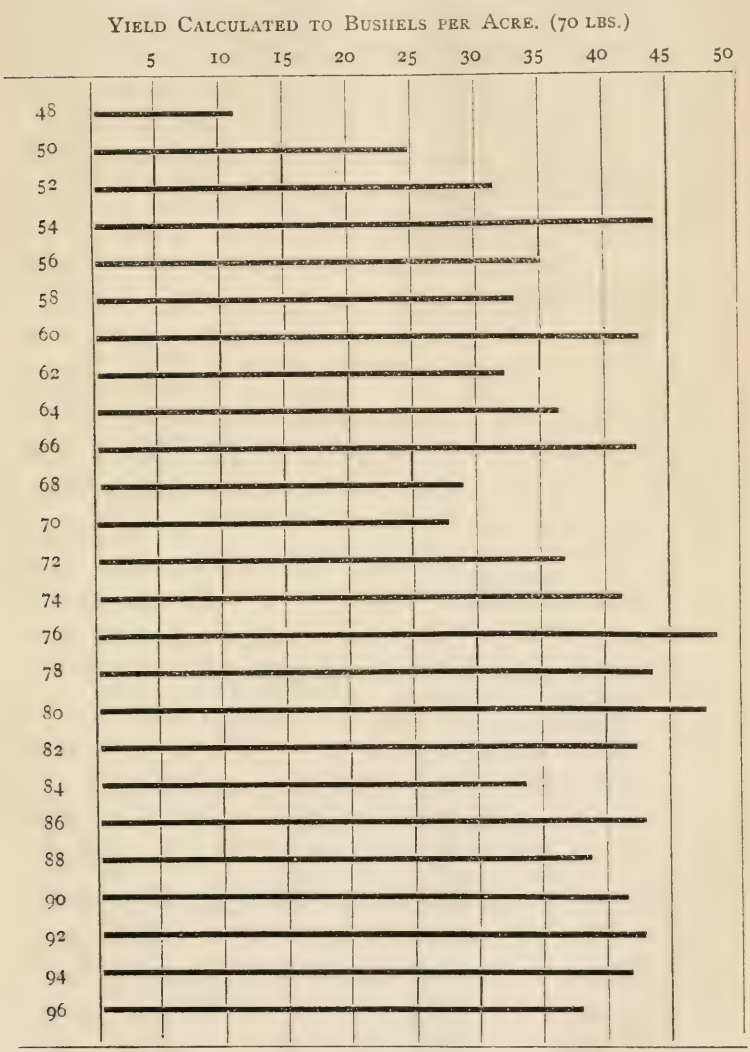
Secretary BROWN. I would like to ask the speaker if those rows which he just referred to were consecutive rows in the same field.

Mr. EAST. Yes; they are side by side. I could have picked out rows that showed a greater difference than these, but it was not my purpose to show the greatest difference.

The PRESIDENT. Do you think that it is conclusive that the feeding value of the flint is as much greater than that of

TABLE No. 3

VARIATIONS IN YIELDING POWER OF THE DIFFERENT EARS OF STURGES' HYBRID GROWN IN DETASSELED ROWS, 1906.



the dent as measured by the protein? In other words, is the protein in the flint as available or digestible as in the dent?

Mr. EAST. Yes, sir, the protein in the flint has been found as digestible, but I would not say that we can afford to throw away the carbo-hydrate in order to get a certain quantity of protein, but we could figure it this way: the protein is worth twice or three times as much, and if we have a certain percentage of protein in the yield we can figure out a certain value for each of them and make a selection on that basis.

That finishes my formal paper.

Secretary BROWN. Do the largest ears have any advantage so far as the value of the chemical constituents of the corn is concerned?

Mr. EAST. No, there seems to be no correlation between the size of the ears. I have noticed a large number of ears with that in mind, and there does not seem to be any essential difference. There is a difference sometimes in seasons which affects the formation of protein. Protein is formed first in the formation of the kernel and the starchy substance of the kernel is formed last. In some very dry seasons there is not a sufficient quantity of moisture or sunlight that forms the carbo-hydrate, and then the protein will appear lighter.

The PRESIDENT. Can you judge of the amount of protein by the weight of the corn?

Mr. EAST. No; you cannot judge the amount of protein in that way. You can judge roughly in the dent varieties of corn. Professor Hopkins of the Illinois Experiment Station, found in the hard or horny portion of the kernels of corn that there was more protein than in the tip or cap of the corn, and that by cutting the corn across with a knife, and by comparing and selecting those having a large amount of that hard, horny portion he could make quite a difference, but I am sorry to say that I have been unable to make any such difference in the

flint varieties. We tried that last year with a number of ears which were afterwards analyzed chemically, and I could only make a difference of less than half a per cent.

The PRESIDENT. You were speaking a moment ago about nubbins, and saying that you could see but very little difference in the quality. Now there are naturally a great many kernels developed on the nubbins, but not so especially at the tip end. Now that is not good corn, is it?

Mr. EAST. Well, we never analyze imperfect kernels. You mean kernels where insects have injured them perhaps?

The PRESIDENT. No, not those that have been particularly injured, but those that are smaller, shriveled up, lighter in weight and less perfect.

Mr EAST. Where the kernel is perfect, or the germ is perfect, there does not seem to be any great difference, but I should imagine that there would be with the imperfect kernel.

Mr. PLATTS. Mr. Chairman, I would like to ask the Professor this question: Is there any hope that corn can be so grown later on, in consequence of these improvements, that in its protein content it can be made the equivalent of wheat or oats?

Mr. EAST. Yes, the protein content has been greatly increased by improvement. The work which has been carried on in Illinois shows that, there, for eight years, the development grew to 14.98. That is quite a percentage higher than the average for wheat. Of course, it is not definitely known at present whether that will remain at 14.98 without continuous selection or not. There are two different theories on that; one of which is that wheat variation is often a very small variation in which a new character is obtained that will be permanent and without mere selection, but it is very likely that by selection of those seed grains which show an improvement, by a continuous selection a much higher protein content will be obtained. It is also probable that continuous selection will

be necessary to keep it up. With respect to corn that continuous selection would probably have to be made to keep it up, but that would not be a matter of any great difficulty because when this is found to be as high as 14.98, after the variety was established, the seed would be distributed all over the state, and in that way the breed carrying a high ratio of protein would become general, but that, of course, would not obtain upon a breeding plot. There it would be necessary to keep up the strain.

A MEMBER. Is there any way by which the farmer can select high protein corn, or would he have to have it analyzed in order to tell?

Mr. EAST. In dent corn only, and by that method of cutting, and selecting the least portion of floury starch in cutting.

The PRESIDENT. You know that the dent corn is much softer, and there is a difference in the way cattle take hold of it. You take that flint corn and dent corn and put them together, and they will eat the dent corn before they will eat the other. They will eat the dent corn all up. I believe it would be well for the western people to plant flint corn in the place of dent corn which they raise for cattle.

Mr. EAST. I do not believe that they will in the middle west. In the north middle west where they have a climate that is more conformable to northern Connecticut they might, but where they have a shorter season for maturing the flint corn those varieties are planted a good deal. That is especially so in Wisconsin.

Secretary BROWN. Is there any relation between the protein content and the total yield? That is to say, if a row should yield, we will say fifty, and the row opposite to it should yield fifty-five bushels, would it be likely to contain a larger protein content?

Mr. EAST. There seems to be no correlation in that respect at all. That is, we cannot select for the two characteristics, yield and high protein content, without knowing that they are by nature antagonistic.

Secretary BROWN. At this point in the proceedings, and before this very interesting discussion is completed, let me call your attention, ladies and gentlemen, to the fact that you are at liberty, and it is very greatly desired that the audience should ask questions freely. I think it is a great credit to the state of Connecticut that these investigations have been carried on, and if there is any way that any further information can be gained from Mr. East that will be of advantage to you or to the farmers of the state it should certainly be brought out.

Mr. PLATTS. I would like to ask, Mr. Chairman, what advice the Professor would give to a farmer as to how he should select the best corn. Is there anything in the form of the ears by which he can tell? What advice would you give on that?

Mr. EAST. If I had an ear of corn I could illustrate that in just a moment. Perhaps I can illustrate it with this. I do not know how much you can see of it from your seats, but this white floury portion in the tip of the kernel you will notice comes off very easily, and the white floury portion that is reached next to the germ at the end of the corn contains the least amount of protein, while the hard portion which surrounds the germ, and which is more or less translucent, contains a larger amount of protein. Therefore, in selecting dent corn, if you take five or six kernels from each ear, and cut them across in that manner, and reject all the kernel which shows a large amount of starch surrounding the germ at both the tip and cap, you will find that the difference is from a half to as high as two and one-half per cent. I should be glad to make an agreement in behalf of the Connecticut Experiment Station with any farmer who wishes to run an experimental breeding plot. I think the experience to be gained in that way would be very interesting to some of you. If you will make that selection by cutting the kernels across in the manner I have indicated, and then send three kernels from each ear of your selection, we will analyze it chemically and the actual per cent. which they contain will be reported to you.

Mr. PLATTS. As the protein content of the corn is increased what effect does that have upon the carbo-hydrates in the grain?

Mr. EAST. They decrease, because if they did not you would be getting more dry matter in your corn, and which, of course, is impossible.

A MEMBER. Would you advise the detasseling of the stalk that you expect to take the seed from?

Mr. EAST. Yes, I think you may rest assured, by doing that, that you have the best seed. If you take your seed from plants, or from a plant which is tasseled, you cannot at all be sure that there will not be some of it which has been pollenized in breeding from that seed.

The PRESIDENT. What is the process of examination?

Mr. EAST. In order to detassel a breeding plot, it must be gone over about three times. It should be pulled out in the upper portion, separated at the first joint, and when that is done at the proper time no injury results at all to the stalk, but if the detasseling is done at an improper time there may be some injury. Some fungus may injure the plant and reduce the yield, but otherwise there is no reduction in the yield when the tassel is pulled out at the right stage.

Mr. PLATTS. You want to be sure then to cut it before there is any appearance of pollen, as I understand you?

Mr. EAST. Yes.

A MEMBER. In making your selection of corn do you select the large ears in preference to the medium?

Mr. EAST. I usually select an ear that will give the greatest amount per acre, and at the same time the largest digestible nutrient per acre. I do not care particularly whether an ear is a handsome ear or not. There is something to be gained in the selection of ears whose physical characteristics are good.

Secretary BROWN. Do you think it is a good practice to shell off the corn from the tips and reject that in selecting seed?

Mr. East. Not for any reason of yield but only on account of the plants varying from the normal in maturity.

Mr. Beach. If you have corn of other varieties planted near your plot you may find that that will make a little difference because you are more apt to get a cross from some other variety on your tip from a butt kernel on account of the difference in time of maturity.

The President. Professor, have you ever investigated the matter of whether the dent variety is worth less or more than the flint for silage?

Mr. East. No, I have never known of an analysis to be made with that end in view. I have noticed though that it has been found, so far as the composition of the corn was concerned, that after eight years of breeding the ears have a higher protein value than before. That is, the protein greatly increased in the ears according to the opportunity which they had for selection.

A Member. What do you consider is the best variety of corn, so far as the nutrient content is concerned? I would like to get your views on that matter.

Mr. East. I would not dare make any suggestion on such a thing as that.

Mr. Platts. I would like to ask if some expression on that matter could be brought out in a general way, and also whether the mixing of the southern white would be considered as having a tendency to increase the yield per acre? I have known a great many western farmers that have the opinion that in mixing it with the Leaming it would make it mature very well, but that the stalk is a little dry. Wouldn't it therefore cut in better and make a better silage?

Mr. East. I should say in mixing the first year there would be practically no difference in the crop, but if you are going to run a breeding plot I should prefer to take some particular type and try to improve that rather than to make too many crosses. Corn is a variable plant anyway, and there

is no particular need of crossing it to make variations. In the tobacco plant you have a plant which is more uniform in type and it is necessary to cross it in order to make a sufficient variation, sometimes. I do not know as that answers your question exactly, but I should not say that there is any particular strain that we could better by producing variances through crossing with distinct types. I think the improvement should rather come through the selection of the best seed from distinct types or varieties. I think there are a good many strains that have their place, adapted perhaps to particular climates or localities. There should be a strain developed for each different climate, and for each different soil in Connecticut.

A MEMBER. So far as you know, sir, is there any difference in the protein content between corn grown in northern Connecticut and that which has been grown further south?

Mr. EAST. It is rather hard to make a comparison because there has been no test that I know of made with exactly the same strain or seed in the two different places, but from general analysis and from reason I should say that corn grown in the northern states would contain a greater per cent. of protein because of the shorter time which it has for the carbohydrate to develop, which, as has already been stated this afternoon, develops last in the progress to maturity of the grain.

A MEMBER. Mr. President, I would like to ask a practical question. I am a poultryman and make my living by the little hen. I would like to know if corn can be bred so I could feed it to my fowls exclusively and get as good results from it as I could by feeding wheat. The difference in the cost of the two grains is greatly in favor of corn. Now if I should raise more corn and raise that of the highest protein content, would it be necessary for me to feed wheat?

Mr. EAST. I have some doubt whether your fowls would thrive on wheat alone. You have to feed them other foods.

A MEMBER. I understand that now. I feed oats and wheat, buckwheat and cracked corn, but what I am getting at is if I raise a kind of corn of the highest protein content whether it will be necessary for me to still feed wheat?

Mr. EAST. Yes; I think that you would have to have different kinds of protein. Of course, the protein in corn is different, in some respects, from what it is in other grains. You need different kinds or varieties of protein. That is my present idea. I would not like to say until it was tried, but I should say that corn could be bred that was as high as the average of wheat, and it might be that you could adapt your chickens to it so that it would take the place of other things.

The PRESIDENT. Is there any greater feed value to the corn raised in Connecticut than in western corn?

Mr. EAST. I have only one year's analysis on that, and I would not like to say. That one year showed a slightly higher feed value, but it may have been that that was what we call a high protein year. It would be better before anything definite is said on that point, I think, to continue our investigations.

The PRESIDENT. I think the Connecticut farmers, as a rule, hold that their corn is richer.

Mr. EAST. Some of the flint corn was very much, but Mr. Stadtmueller's Leaming was almost a per cent. lower than the western dent. However, I could not judge anything from that.

Mr. BEACH. Don't you think that the flint corn, on the average, runs higher than the dent?

Mr. EAST. Yes, in protein, but I should say that the amount shown on that chart was over the average for the flint corn, but I think that the difference between the averages would be less than one per cent.

The PRESIDENT. I think we will have to arrest this discussion now. It is an intensely interesting subject, but our time is limited. It makes a vast difference to us as farmers whether we get a corn plant that will yield twenty tons to the

acre or one that will yield only twelve where we have to cut it up and put it into the silo, and, of course, it takes no more effort to raise one than the other. If there is opportunity we will investigate that a little later perhaps, but there is a matter to come up now which I know a great many of you will be warmly interested in, and that is a paper on the Gypsy Moth in Connecticut, by Dr. W. E. Britton, State Entomologist.

THE GYPSY MOTH (*Porthetria dispar*) IN CONNECTICUT.

(By Dr. W. E. Britton, State Entomologist.)

Ladies and Gentlemen: As State Entomologist and as Entomologist of the Board of Agriculture, a part of my attention has been occupied during the season in attempting to control, and to exterminate if possible, a small gypsy moth colony at Stonington, Conn.

In order that you may be more familiar, at the outset, with the gypsy moth problem, I will review briefly the chief facts regarding the introduction of the insect into this country, and its history as a pest in the old world.

INTRODUCTION FROM EUROPE.

About thirty-eight years ago, the gypsy moth was introduced into Massachusetts from Europe, and during the latter half of this period the insect has been not only a serious pest, but a veritable scourge, to the eastern portion of our sister commonwealth. So far as our knowledge goes, the gypsy moth was first brought to this country by Mr. L. Trouvelot, a French astronomer, artist and naturalist who resided for a few years in Medford, Mass., and who was much interested in silk production; he reared a number of different kinds of moths, including the gypsy, thinking that some of them might be of value in this connection.

The gypsy moth escaped accidentally from his breeding cages, and though Trouvelot destroyed all that could be found, he gave public notice of the escape, and warned the

people to be on the lookout for the insect, all of which goes to show that he was familiar with the species and knew of its dangerous character.

A few years later, garden fruit trees in the immediate vicinity were defoliated each year by caterpillars.

STATE WORK IN MASSACHUSETTS.

Thus twenty years passed before the species had multiplied sufficiently to attract more than local attention, but it had become firmly established, and in 1890 a bill was introduced into the state legislature and passed, providing for the appointment of a commission to control the pest, and making a liberal appropriation for the work. Doubtless you are all more or less familiar with the work of the Gypsy Moth Commission in Massachusetts. From 1890, when the work was first started — though reorganized in 1891 — it was continued through several changes in the personnel of the Commission, until 1900, when the legislature refused to make further appropriations, and the work was discontinued. At this time the insect was well under control; the infested area, though much larger than at first suspected, had been reduced, and a great many isolated colonies had been wiped out. But, like all state commissions, this one had its critics and its enemies as well as its friends, and the unfavorable criticism had the effect of stopping the whole work instead of changing or improving any portion of it. Had the personnel of the force been changed and the work kept up, Massachusetts would be in far better shape today. Surely the insect might have been kept within the limits of the 359 square miles which it occupied in 1900, when the work ceased. But for five years it was allowed to spread untrammeled except for the efforts of private individuals to control it on their own places, until in 1905 it had spread over 2,224 square miles in Massachusetts, and over the coast region of New Hampshire into Maine. The region about Providence, R. I., had become infested, and a small colony started at Stonington in this State.

Early in 1905, the Massachusetts legislature passed a new law, and made provision for the resumption of gypsy moth work, backed up by a substantial appropriation, and Mr. A. H. Kirkland was appointed superintendent by Governor Douglass.

Up to the present time the State of Massachusetts has expended about $1,500,000 in fighting the gypsy moth, and the end is not yet.

STATUS OF THE GYPSY MOTH IN EUROPE.

The name "gypsy moth" is the common name given to the insect by the English. In France the caterpillar is called "la commune," the common caterpillar. In Germany several names have been given to the insect, chief of which are "schwammspinner," "rosenspinner," "baumraupe," "stammraupe," etc.

In England the gypsy moth has never been a serious pest so far as we can learn, and though it was known to be fairly common there 150 years ago, and was taken by the earlier collectors, it is now almost if not quite extinct, and native material is wanting in contemporary local collections.

On the Continent, however, periodical outbreaks of the gypsy moth have occurred ever since such matters were recorded. It was found from Stockholm on the north to Algiers on the south, and extends from the western extremity of Europe eastward into Asia, the species occurring in limited numbers in China, Japan and Ceylon. The western and southern portions of the Continent have suffered most from its depredations. Much damage was done to trees in Brussels in 1858, especially along the streets and in the parks. In France, 150 acres of oaks were defoliated in 1868. Many oaks were stripped of their leaves in Italy in the year 1871. In 1852 at Odessa, in the Crimea in 1861-63, and at other places throughout Russia, Siberia, Germany and Austria, the gypsy moth has at various times done great damage.

All these outbreaks, though severe, have occurred over limited areas and have quickly subsided, lasting usually not more than three years. This indicates the presence of natural enemies which in the main hold the species in check.

THE GYPSY IN CONNECTICUT.

Ever since the gypsy moth became prevalent in Massachusetts it has seemed probable that the pest might at any time invade Connecticut. We have therefore been on the watch for it, though no systematic inspection has been made of the

regions where the pest would be most liable to occur. Several times during the past five years it has been reported in Connecticut, but investigation proved that some other insect was the cause of alarm in each case.

On July 30th, 1905, the first real gypsy moth was taken at Stonington, though I did not learn about it until six months later. On February 27th, 1906, I received from Mr. Ernst Frensch of Mystic, a letter closing with this sentence: — "Probably it will be new to you that *Porthetria dispar* (the gypsy moth) has reached the town of Stonington."

I wrote at once, making an appointment with Mr. Frensch, and visited him at his home Tuesday, March 6th. He showed me a female moth which he had found on an apple tree in the yard of his brother, Karl Frensch, near the railroad, and not far from the velvet mill in Stonington. This specimen was taken July 30th, 1905, and is now in the Station collection. The attention of Mr. Frensch was first attracted by two males flying about in the tree, but as he did not have a net, he could not catch them. On looking closer, he found the female resting on the bark, and he put her in his cyanide jar. Mr. Frensch also showed me an egg-mass which he found on a small twig in the brush-covered area close to the velvet mill. He suspected these to be gypsy moth eggs, but to make sure, he cut off the body of the female moth, and obtaining the eggs therein, compared them with those on the twig, and found them identical in size, shape and general appearance. He recognized the gypsy moth because he had been familiar with it in Germany.

On March 11th I again visited the place in company with my assistant, Mr. B. H. Walden, and we looked about the trees in the yard where the specimens were taken, but found no more fresh egg-masses. I found an old egg-mass on a pear tree in an adjoining yard. I had telephoned on my arrival to Col. James F. Brown, of North Stonington, Secretary of the State Board of Agriculture, and he joined us in the afternoon. We examined the brush-covered area just north of the velvet mill and found seven fresh egg-masses, which were immediately placed in cyanide bottles to kill the eggs.

After proving the gypsy moth to be present in Connecticut, the next step was to find out how widely it had spread in the state, or, in other words, the size of the infested area. Through

the kindness of the Superintendent, Mr. Kirkland, we were able to procure the services of one of the trained scouts of the Massachusetts force, Mr. C. S. Mixter. Beginning March 20th, he worked two weeks around Stonington, during which time he examined the trees upon about five square miles of territory, from Quiambog Cove on the west to Wequetequock on the east, and about as far north as the Hull estate on North Main street. He was quite certain that the whole of the infested area lay well inside of these limits, but two weeks was too short a time to make a careful search, and it was afterward learned that many egg-masses had been overlooked and subsequently hatched.

About five acres of brush land near the velvet mill was cut over and burned during April.

FUNDS.

From the first, Col. Brown, Secretary of this Board, has shown much interest in the work, and has visited the place several times. At a meeting of the Board in Hartford, it was voted that $1,000 be made available, if needed, for suppressing the insect. Governor Roberts and associates of the Board of Control assured us that if we could not handle the pest with the funds at our disposal, that more money would be forthcoming. At a later meeting of the Board another $1,000 was appropriated. The Board held a meeting at Stonington August 29th, and inspected the suppression work.

So far it has not seemed necessary to use all of the money so kindly placed at our disposal. The total cost of the work up to this time amounts to about $1,700, and we have drawn only $800 from the treasurer of the Board of Agriculture, the balance being taken from the appropriation made by the legislature to the Station for the control of insect pests.

DESTROYING EGG-MASSES.

Egg-masses can best be destroyed by soaking with creosote oil applied by means of a brush. A little lamp-black is added to the oil in order to show which egg-masses have been treated. If we attempt to remove the egg-masses from the trees we are liable to break them and scatter the eggs.

TRAPPING CATERPILLARS.

When small, the caterpillars remain on the leaves, but from the time when they are nearly half-grown they feed only at night, hiding during the day on the under sides of the branches, in holes, or crevices in the bark. They seem to prefer dark and sheltered places, doubtless to escape the attacks of birds, predaceous beetles and other natural enemies. We take advantage of this habit to trap them by placing bands of burlap about the trunks of the trees to make a hiding place for the caterpillars. The burlap is cut into strips eight or ten inches wide, fastened around the tree by a piece of wool twine placed half way between the upper and lower edges of the burlap. The upper edge is then folded downward over the lower edge, covering the twine. The bands are examined each day, and all caterpillars found under them destroyed. Over 1,300 trees were banded in Stonington.

BRUSH AND STONE WALLS A HINDRANCE.

Stone walls constituted one of the greatest hindrances to our work. Many of these were skirted with brush, such as wild cherry, wild roses and bayberry, the caterpillars feeding on the bushes and hiding in the walls out of sight. It was necessary to cut and burn the brush, and some of the walls were fired with oil to destroy the caterpillars. In four places where the caterpillars transformed in the walls we had to overhaul them in order to destroy the egg-masses.

Some of the infested trees had rough bark, cavities, and dead branches, all of which furnished hiding places for the caterpillars. In order to make our work effective, it was necessary to scrape and prune these trees, and cement up the cavities.

HOW THE PEST SPREADS.

Though the female is provided with wings, her body is heavy, and she does not fly. She rests on the bark of the tree, and when disturbed may flutter a little in falling to the ground. She is not able to lift herself from the ground to fly into a tree, or even to fly horizontally for any distance. Hence the gypsy moth would spread but slowly were it not carried from one place to another. The male is a strong flyer, and goes about

in the daytime, moving in a peculiar zigzag course. The caterpillars when young spin down on silken threads, and may drop upon a passing vehicle, person or domestic animal and be carried perhaps for some distance. Automobiles are perhaps the worst offenders in this respect because they sometimes move rapidly and go long distances.

As the caterpillars become larger they are apt to leave their trees and crawl about in search of food. In doing so, they often crawl upon persons or objects by which they may be carried upon trains, electric cars, automobiles, or in wagons, from which the caterpillars may not escape until they have reached another town or perhaps another state. When ready to pupate, they are liable to crawl upon packing boxes or other freight, or into freight cars; or egg-masses may be laid upon these objects and later be transported unwittingly to a new locality, and thus form a new colony. Moreover, in the worst infested section of Massachusetts, in caterpillar time it is almost impossible to walk about in the woodlands or even through the fields of grass without having caterpillars crawl upon the clothes. If these are not brushed off, one carries them into the wagon or automobile, or onto the trolley car, and thus aids in their distribution.

Undoubtedly the gypsy moth is spread chiefly through industrial traffic, yet historical associations have much to do with its distribution. For instance, Mount Auburn Cemetery, which is situated partly in Watertown and partly in Cambridge, is often thronged with visitors. This cemetery was cleared of caterpillars in 1893, and in 1895 the trees near the graves of Longfellow and Lowell were attacked by such quantities of caterpillars that much effort was necessary in order to save them. In like manner the region about Bunker Hill Monument is usually well infested.*

The infested area at Stonington is in some respects situated favorably for the work of extermination. The village is built on a point of land, and the moth infestation being just north of the village, is flanked on the east by the Wequetequock Cove and on the west by an arm of the sea. A line connecting these two bodies of water at the northermost extremity of the latter cuts the mainland some distance north of or beyond

* Forbush & Fernald, The Gypsy Moth, p. 106, 1896.

the point where any caterpillars or egg-masses have been found. Thus, unless carried across the salt water, it could spread only towards the north, and we sincerely hope that it has not spread beyond where we have found it.

OTHER PLACES EXAMINED.

In April, men were sent to hunt for egg-masses in Mystic, Midway, New London, Plainfield, Danielson, Putnam and Willimantic. In traveling about the state we have been on the watch, but have found the gypsy moth nowhere except at Stonington.

LIFE HISTORY AND INJURY.

The eggs are usually laid on the trunks and branches of trees, but sometimes on fences, buildings, etc., in July and August, in oval masses each containing about 500 eggs, and covered with hair (as shown in Figure 1).

FIG. 1. Egg-mass of Gypsy moth, natural size.

The eggs hatch about May 1st, and the young caterpillars soon begin to feed upon the expanding foliage, devouring nearly all kinds of vegetation. As the caterpillars approach

maturity, they feed mostly at night, and seek shelter during the day on the shady side of the trunks, under fence rails, stones and rubbish, where they may often be found in large numbers.

When full-grown, the caterpillar is between two and three inches long, dark brown, with a pair of blue spots on each of the first five segments, and the same number of red spots on each of the other six segments, making two rows of spots along the back; it is covered with long hairs, (as shown in Figure 2). The caterpillar usually reaches full size in July,

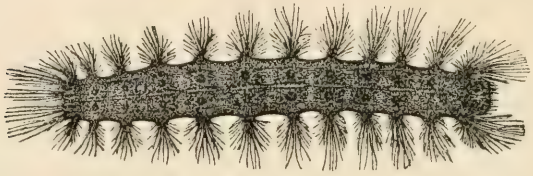


FIG. 2. Gypsy caterpillar, natural size.

and transforms to a pupa or chrysalis, usually spinning a few threads about itself (as is shown in Figure 3).

FIG. 3. Chrysalis or pupa of Gypsy moth, natural size.

During the latter half of July the adult moths emerge, mate, and the females lay eggs. The brown male has a wing expanse of one and one-half inches. The wings of the female

expand about two inches, and are nearly white, with delicate black markings. (See Figure 4. The male is shown in Figure 5.) There is but one brood each season.

FIG. 4. Female Gypsy moth, natural size.

FIG. 5. Male Gypsy moth, natural size.

FOOD PLANTS.

The caterpillars feed upon about six hundred different plants, including nearly all cultivated species. They defoliate pines and other conifers, which are killed in one year if completely stripped. Of our native trees the ash is perhaps more nearly exempt than any other kind.

In Stonington, nearly all of the caterpillars and egg-masses were found upon old apple trees. A few appeared on red maple, quince and rose bushes.

SPREADING INFORMATION ABOUT THE PEST.

As soon as possible after learning about the Stonington infestation, a bulletin was issued from the Experiment Station at New Haven, giving brief accounts of both the gypsy and

brown-tail moths, recommending remedies, and recording the presence of the former within the state. 10,000 copies were printed and distributed in March. Life history sets of these insects were prepared and placed in drug store windows, in a few libraries and other public places.

Placards giving illustrations and brief descriptions of the gypsy moth were also printed, and sent to each public library in the state. Circular letters were mailed to the school boards of all the towns, offering to furnish a limited number of these placards to the schools of each town on condition that the authorities distribute them. About fifty-six per cent. of the towns replied agreeing to do this, and nearly two thousand have been supplied to the schools.

In May the Station Report was issued, and this included the gypsy moth portion of the bulletin, considerably revised and elaborated.

On Nov. 26th a lecture was given in the town hall, Stonington, and the local work fully explained and illustrated by over fifty lantern slides. Talks have been given at about a dozen other places in various parts of the state, and on each occasion specimens have been shown to the people.

FORCE EMPLOYED.

Men were employed continuously on the work at Stonington from June 7th to September 1st. My assistant, Mr. Walden, was in charge from June 18th to July 1st, after which Mr. J. A. Hyslop of the Massachusetts Agricultural College, superintended the work until the first of September, when it was stopped on account of making the annual inspection of nurseries, as required by law. During June and the first half of July more help was needed, and ten men were employed in trapping caterpillars, two being residents of Stonington; the others were sent out from New Haven. During August five or six Stonington laborers were kept at work cutting brush. On November 16th the work was resumed with a force of five men, Mr. G. H. Hollister, a graduate of the Connecticut Agricultural College at Storrs, being in charge.

LOCAL ASSISTANCE.

The selectmen took an interest in the work, and aided it by employing men to cut the brush along the highways through

and beyond the infested region. This brush was burned by our men.

Messrs. Phelps and Darrell have cut considerable brush on their own places to help along with the work.

SUMMARY.

1905 Egg-masses destroyed before hatching,	29
1905 Egg-masses which hatched,	36
1906 Egg-masses destroyed,	47
Caterpillars destroyed,	10,000
Cocoons destroyed,	47
Trees banded,	1,300
Money expended,	$1,700.00

PENALTY FOR SENDING LIVING INSECTS.

There is a heavy fine for sending living gypsy moths in any stage by mail, or from one state to another, except for scientific purposes. Any attempt to otherwise spread the pests maliciously would be summarily dealt with, and the perpetrator severely punished if caught.

In the whole of our work at Stonington we have never taken away any living eggs, caterpillars, pupæ or adults, but have always killed them before carrying them to New Haven for illustrative specimens. It would not pay to take the risk of transporting them alive.

IMPORTATION OF PARASITES.

In the last appropriation of the Massachusetts legislature a certain amount was set aside to pay the expenses of gathering and bringing to this country some of the parasites and predaceous enemies that serve to hold the gypsy moth in check in Europe.

Congress has also made a small appropriation to the Bureau of Entomology for similar purposes. Mr. Kirkland early sought co-operation with Dr. Howard, Chief of the Bureau of Entomology, and placed the matter in his hands. Dr. Howard made a trip to Europe in 1905 and again in the summer of 1906, and had a large number of parasitized larvæ, cocoons and eggs sent to Massachusetts, where they have reared the parasites (the secondary or hyperparasites being destroyed) and a large

number of the true parasites have been liberated. Two species of predatory ground beetles have also been imported, and they seem to thrive here. So there is a prospect that in time these natural enemies may hold the gypsy moth in check, or at least assist in doing so. We must consider it as an experiment, however, until the parasites demonstrate their usefulness in this climate. But in Connecticut we are trying to exterminate the colony, and we believe that there is a good chance of doing it if it has not already spread beyond the northernmost points where we have found it.

FEDERAL AID.

Just before the adjournment of the last session, Congress passed the Agricultural appropriation bill, which carried $80,000 for work against the gypsy and brown-tail moths, to be expended by the Government Bureau of Entomology. The Bureau has already started work in the other infested states, and is planning to help us by scouting in other portions of Connecticut. We expect them to begin within a few weeks.

PRESENT CONDITION IN STONINGTON.

Considerable scouting has been done and a great deal of brush cut, so that the region will be in excellent shape for next season's work. All infested trees have been marked. It is difficult to find egg-masses or other traces of the gypsy moth at Stonington. Still the work must be kept up for two or three years before we can know whether the colony has been exterminated or not, and we shall keep it up if funds are available.

DISCUSSION.

Secretary Brown. I want to ask the attention of this intelligent audience to a few figures. Dr. Britton states that the average egg-mass contains from five to eight hundred eggs. It has been estimated that there is an average of three hundred female moths hatched out of each of these egg-masses, and that that is the product of a single moth the first year. The second year you have three hundred times three hundred, or ninety thousand. The third year you have three hundred times

ninety thousand or twenty-seven million. Now multiply twenty-seven million by another three hundred, and you get the enormous number which would infest the whole state of Connecticut if nothing was done to check their growth. The most amazing and convincing lecture on the gypsy moth that I ever attended was with Dr. Britton in the infested area in Massachusetts where we literally waded among them, and when we came out of the area we had to go through a cleansing process and have them brushed off of us before we would be allowed our personal liberty. It seems to me that the mere statement of this is enough to show the citizens of Connecticut the extreme danger to the agricultural interests of this state if the gypsy moth ever gets any considerable foothold here.

Convention adjourned until two o'clock.

SECOND DAY — AFTERNOON SESSION. 2 P. M.

Music.

Secretary Brown. I am compelled to announce, that there is a delay on the New York Central Railroad, and that Dr. Van Slyke has failed to make connection, but he will be here at 2:34. In the meantime Mr. L. A. Clinton of the Storrs Experiment Station, will present his paper on the most economical sources of nitrogen for plant food, which was to have been given tomorrow morning. Mr. Clinton, as you all know, is Director of the Agricultural Experiment Station at Storrs, and he will present his paper now so as to occupy the time until Dr. Van Slyke arrives.

THE MOST ECONOMICAL SOURCES OF NITROGEN FOR PLANT FOOD.

By Mr. L. A. Clinton, Director, Storrs Experiment Station.

Mr. Chairman, Ladies and Gentlemen: When I received a letter from the Secretary of the State Board of Agriculture asking me if I would address this meeting the thought that

came to me first was, "What shall I talk about?" I have talked around in Connecticut so much that I have said over and over again all I know, and to come here before this Board and talk over some old subject which would neither be of interest to the audience nor to the speaker was not pleasant. Just at that time I was considering the matter of purchasing commercial fertilizer for our use at the College. I was just getting prices on nitrate, and it seemed to me that there was a subject which would be of immediate and practical importance to every farmer in Connecticut who purchases commercial fertilizer, and I think that class includes a very large proportion of the farmers of the state. Probably a majority of the men before me, before the next spring arrives, will begin to think about this problem of the most economical sources of nitrogen as plant food. I am thinking about it, yet, and as I told my class the day before I left home, when I announced to them that I was to speak before this meeting of the State Board on the most economical sources of nitrogen, I did not know what the most economical source was and do not know at the present time, yet in spite of that, I have come here to discuss that problem with you.

For many years the subject of nitrogen in its relation to agriculture has occupied a prominent part in all agricultural discussions. It has even been figured out just the time when the human race shall face starvation because of the fact that the nitrogen supply of the world has been used up. No subject has received more attention from the agricultural press, from the experiment stations and from the United States Department of Agriculture than the subject of nitrogen. For the past two years the subject of inoculation has occupied first place, and it is doubtful if there is a farmer who has not thought that it may be possible by inoculation to reduce his fertilizer bill, at least by the amount that he has been paying for nitrogen. So wild have been the notions with reference to soil inoculation that I have had requests for information as to how to inoculate for potatoes, for corn and for the various other farm crops. It has not been universally understood that inoculation was designed only for leguminous crops and that it was through the growth of these legumes that inoculation was to prove of value to our farm crops.

I do not suspect that the farmers of Connecticut would be seriously startled if the President of the British Royal Agricultural Society in his annual address should state that within one hundred years the world would face starvation because the nitrogen supply would be exhausted. The Connecticut farmer is, however, concerned with the immediate cost of nitrogen, and those who have kept track of the fertilizer market during the present season will have discovered that nitrogen this year will cost very much more than last. Last year it was possible to secure nitrogen for 15 cents per pound. During the present season the lowest quotations which I have been able to secure have put the price of nitrogen up to nearly or quite 20 cents, an increase of 33 1-3 per cent. within twelve months is at least startling. It will lead many who have formerly paid their fertilizer bills, possibly not without question and more or less murmuring, to study the question more carefully than they have done heretofore to learn if possibly there are not some other sources of nitrogen available at less than 20 cents per pound. The present high price of nitrogen, however, is probably not the limit. The visible supply of nitrogen is limited and is growing less every year. The nitrate of soda beds of South America are not unlimited in their supply and it would not be at all strange if next year the price of nitrogen should go as high as 25 cents per pound.

This subject of nitrogen supply is all the more interesting when we realize that the larger part of the atmosphere is composed of nitrogen; that this valuable element is all about us; that the plants are growing in a sea of nitrogen, and yet for the most part are entirely unable to make use of it. Without doubt the time is not far distant when means will have to be taken by which this nitrogen of the air may be subdued or tamed or made to do our mission. Even at the present time the nitrogen of the air is being manufactured into nitrates, but the expense of this operation is so great as to preclude the use of nitrogen from this source as a commercial plant food. It is but little consolation for us to know that possibly in ten, twenty or more years a way will have been found by which this unlimited supply of nitrogen all around us will be drawn up as plant food. It may be a grain of comfort to us to know that the human race will be prevented from starving, but it does not help us to pay our fertilizer bills this year.

In studying the questions of economy in the purchase of any article there are things to be taken into account other than the original cost of the article. It is often true that an article may possess some peculiar qualities which will make it more economical even though it is purchased at a greater cost than another article. This is true in purchasing nitrogen as a fertilizer. The nitrogen comes in various combinations, some of which are immediately available for the plants' use, while other forms are slow in their action and cannot be depended upon to render immediate service. The various commercial materials which are available at the present time as sources of nitrogen are, nitrate of soda, ammonium sulphate, dried blood, cotton seed meal, tankage, dried ground fish and guano. While nitrate of potash might be mentioned, its price has gone so high as to preclude its use as a commercial fertilizer.

Of all the sources of nitrogen mentioned there is no one which can be more thoroughly relied upon than nitrate of soda. The nitrogen is already in the form which can be made use of by the plants. All that is necessary is that the fertilizer shall go into solution and no further change is required in order to make this material available for use. This is not true of any of the other materials mentioned as a source of nitrogen. They must all undergo certain chemical changes before they become available for the plants' use. Nitrate of soda then is naturally a standard nitrogen fertilizer. We know how it will act; we know when it will act; and we can see results from its action. Unfortunately the beds of nitrate of soda known at the present time are limited in area and the demand is so great that it will not be many years before the supply is entirely exhausted.

The present price of nitrate of soda, guaranteed 15 per cent. nitrogen is $60.00 per ton, making the cost of a pound of nitrogen from nitrate of soda 20 cents. The cost of sulphate of ammonia, containing 20 per cent. nitrogen is $75 per ton. This would make the cost of a pound of nitrogen from ammonium sulphate 18 cents. While ammonium sulphate is a valuable fertilizer and can be used for many purposes with perfect satisfaction, yet the continual use of ammonium sulphate has a tendency to make the soil acid, and in order to counteract this tendency, lime must be more generally used

than it is at the present time. Without doubt during the coming season ammonium sulphate can be generally used for miscellaneous farm crops and the nitrogen secured from this source is as cheap or cheaper than from any other source. It should be remembered that ammonium sulphate cannot safely be mixed with any material containing lime. Consequently it must be kept from mixture with ashes; basic slag; but it can be safely mixed with acid phosphate, muriate of potash, sulphate of potash.

Dried blood containing 8 per cent. nitrogen can be purchased for $38 per ton. This would make the cost of a pound of nitrogen from dried blood 23.7 cents per pound. It will be seen that a pound of nitrogen costs 5 cents more when purchased in the form of dried blood than when purchased in the form of sulphate of ammonia.

There is a limited quantity of fertilizer on the market known as dried ground fish. This can be purchased for about $38 per ton and contains 9.5 nitrogen and about 6 per cent. phosphoric acid. If we were to consider this as a nitrogenous fertilizer alone, the nitrogen would cost from this source 20 cents per pound. But in every ton of this material we would have in addition to the nitrogen 125 pounds of phosphoric acid. While this phosphoric acid is not immediately available, yet it does possess some value and where immediate results are not desired nor expected, there is no reason why dried ground fish cannot be used economically as a fertilizer the present season.

Another material containing nitrogen is commonly known as tankage. Just what this material is would be difficult to state, but it is the refuse from slaughter houses and such material as cannot be made into sausage and potted chicken is used in making tankage. This material, containing 5.8 per cent. nitrogen and from 11 to 12 per cent. phosphoric acid can be purchased for $31 per ton. It is probable that the phosphoric acid in a ton of this tankage is worth about $5. This would leave the 116 pounds of nitrogen in the ton costing $26 or about 22 cents per pound. It is evident that tankage at this price is not an economical source of nitrogen.

Of all the materials investigated and on which we have secured prices the present fall, a pound of nitrogen can be purchased in ammonium sulphate cheaper than from any

other source. Next to this comes nitrogen in nitrate of soda. Owing to the availability of nitrogen in nitrate of soda and to the facility with which it can be mixed with other fertilizer without deterioration, it is probable that for general use nitrate of soda will maintain its lead as a source of nitrogen as plant food.

In considering this problem the question arises is there not some practical source from which the farmer may reduce gradually the amount of nitrogen purchased as a fertilizer from year to year until finally he will be required to purchase only potash and phosphoric acid. When we compare the prices of these other fertilizers with nitrate of soda, we see that potash can be purchased for 4½ cents a pound, that available phosphoric acid can be purchased for about 5 cents per pound. These prices, compared with the cost of a pound of nitrogen would naturally tend to bring about the use of fertilizers relatively rich in potash and phosphoric acid and should lead us to seek home sources of nitrogen.

It may not be out of place to discuss briefly here the home sources of nitrogen and means by which the nitrogen may be preserved and used in actual farm practice. It is well known that by the growth of legumes as a cover crop we can capture some of the nitrogen of the air and incorporate it in the plants' structure and that these plants in decaying give up their nitrogen to succeeding plants. This fact has been known for years, and attention has been called to it so many times that it would seem almost unnecessary even to mention it again, and yet as a matter of fact the growth of legumes is not nearly so general as it should be. The practice has become so general of purchasing the nitrogen from commercial fertilizers and paying the bill after the crop is harvested that nothing except the rise in price of nitrogen from commercial sources will lead our farmers generally to consider the home supply of nitrogen. Many will hesitate to pay $8 or $9 per bushel for clover seed, even though as a result of the use of that clover seed nitrogen to the value of $100 or more may be secured.

Farm manure as a source of nitrogen is worthy of most serious consideration. Where large amounts of concentrated foods are used as in this state, the manure is especially rich in nitrogen. This element, however, is so elusive that as the manure pile is ordinarily handled, much of this nitrogen is lost

before it serves as plant food. If in every stable there should be kept a supply of ground phosphate rock and this phosphate rock be freely used in dusting the stable floors and the gutter and if it were sprinkled freely over the manure itself, it would serve not only to prevent losses of ammonia, but owing to the fermentation which takes place in the manure, phosphoric acid itself would gradually be changed from the insoluble form into the form available for plant food. Nearly all forms of phosphoric acid are being purchased. This is without doubt the wisest practice, but would it not be a wiser practice to purchase this phosphoric acid, at least a part of it, in the form of ground rock, or floats, and by the use of this material in the stables save the ammonia which would otherwise disappear.

In every fertile soil there takes place what is known as nitrification. Nitrification is the changing of the nitrogen of organic compounds into the form of nitrates and nitrate nitrogen is that form of nitrogen which is immediately available for the plants' use.

While there is much about this mysterious process of nitrification which is not yet understood, yet we have learned some things definite with reference to it during the past few years. We have learned that in order to have this take place there must be in the soil compounds containing nitrogen. These organic compounds may consist of rye which has been plowed under, of sod from grass lands, of various legumes or even from farm manures. In addition to these organic compounds containing nitrogen, there must be present oxygen, moisture but not saturated with water, proper temperature and the presence of certain organisms known as nitrifying bacteria. All of these things being present there is still one other condition which must be secured before these bacteria begin their work and that condition is an alkaline soil. This alkaline soil may be secured by applications of lime or wood ashes, but it must be secured if nitrates are to be formed in the soil. These nitrates are formed most rapidly during the season when nitrogen is most required by the growing plants. During June, July and early August, the formation of nitrates may take place very rapidly in the soil and there may be in the soil nitrates secured in excess of the nitrates used by the growing plants. As fall approaches and the soil becomes colder, nitrification lessens and finally ceases at the approach of winter.

Soil conditions which are absolutely fatal to nitrification are an acid soil, a soil lacking in organic matter containing nitrogen, a wet, cold, water-logged soil and soils deficient in nitrifying bacteria. As a rule, however, the bacteria are present if the other conditions are favorable. If conditions are not favorable for the work of the bacteria which are beneficial, then certain other organisms begin their work and actually set free nitrogen which may already be in the soil and in setting it free it escapes into the air as free nitrogen and is lost to us as a plant food.

Farmers as a rule are interested in this problem which has to do with dollars and cents. There are few problems which present possibilities of more immediate returns for the study involved than this problem which is the formation of nitrates in the soil. If the price of nitrogen in commercial fertilizer continues to advance for the next few years as it has in the past year, it will be absolutely necessary for us to seek some other sources of nitrogen as plant food, and in seeking these other sources, we will give more attention to the preservation and use of farm manures, and we will seek to learn means by which every field may be brought into condition so that it should be in itself a niter bed, that is proper condition furnished by which organic matter in the soil containing nitrogen shall break down or decompose and in this decomposition give up its nitrogen for the formation of nitrates.

DISCUSSION.

The PRESIDENT. When hauling out manure and throwing it into little piles, we are told that the man who does that would save money and save nitrogen if he would hire some one to spread it out on the field at once, or do it himself. Will you tell us why that is?

Mr. CLINTON. There are some people in the world called busybodies. There were some organisms in those manure piles that are busybodies. Fertilizer busybodies. They were bacteria, and they were working in there producing fermentation. As the result of the production of that fermentation ammonia is liberated and sent off into the air. If that manure

was spread out the production of that fermentation would have been stopped immediately and the manure would have been put in a position to carry this plant food into the soil.

The PRESIDENT. In other words, as I understand you, there is a process of fermentation which takes place, and the ammonia passes off in that way to a greater extent than it would in a larger pile, but if spread it has a tendency to conserve and preserve the nitrogen.

Mr. CLINTON. The ammonia does not evaporate. The water in the ammonia evaporates but it leaves the plant food behind. The plant food does not evaporate. The large part of that which we lose from the manure after it is spread out is water. We do not lose nitrate to any extent, and certainly not when compared with the loss which occurs where the manure is left in these little piles which we see so often on our New England farms.

The PRESIDENT. Suppose those piles freeze?

Mr. CLINTON. That has the effect to stop fermentation. If they are spread immediately when they thaw out then there is no special loss.

A MEMBER. How would you apply nitrate of soda?

Mr. CLINTON. I apply it broadcast.

A MEMBER. Lumps and all?

Mr. CLINTON. No sir. I want it crushed, and fine, before I apply it.

The PRESIDENT. How do you apply it? Is the hand the only machine for applying it?

Mr. CLINTON. I would not say that the hand was the best machine for applying it because I have a drill that will put it on very nicely.

Mr. PLATTS. What make of drill do you use?

Mr. CLINTON. It is an imported broadcast drill. I do not think it would be proper for me to advertise the name of the maker.

Mr. HOYT. Do you think that nitrate of soda in a greenhouse would be a cause of disease?

Mr. CLINTON. Why, in reply to that, I should think that nitrate of soda alone could not be the cause, although the germ which causes disease might produce a bacterial disease. I am not so sure what the result would be.

Mr. HOYT. Why I asked the question was because I have noticed that it sometimes produces a scab.

Mr. CLINTON. It might in some way work to produce a scab, but I should not think it would alone. I know that it encourages the growth of those germs which do make scab. Then I have known nitrate to be used in such concentrated doses that it has literally killed the plants, or destroyed the plants because of its caustic action. I have done that sometimes in farm crop work where I thought I had put it in the drill in fine form, but where it actually went in concentrated or lumpy form, and was very much too concentrated, so that the plants were literally destroyed by the nitrate.

The PRESIDENT. I take it then, to sum this thing all up, that your advice to the farmers of Connecticut would be to haul out their manure and spread it on the field as quickly as possible.

Mr. CLINTON. Yes, sir.

A MEMBER. Mr. President, I would like to ask how much more benefit he thinks he would get by putting it on with a spreader than by hand?

Mr. CLINTON. Why, that is simply the difference in the cost of labor. That is a computation in dollars and cents which I could not make for you. I say this, however, that no matter how carefully the ground is prepared in spreading it by hand it is wise to distribute the manure so that it covers the whole land and not put it on in chunks. In applying manure in top dressing grass lands, especially, it is important to have it all picked to pieces so that the large masses of manure will not fall upon one place upon the grass. A manure spreader picks

it all to pieces and thoroughly distributes it. In top dressing for grass lands, therefore, a manure spreader puts that on much better than it can be put on by hand. If a man has no other work to do, I question whether the difference is so great or not. Still, I think that the spreader breaks it up more uniformly, but whether it is applied by hand or by the spreader I think it gets through the soil pretty well even when distributed by hand.

Mr. MARSH. Can it be applied to grass lands at any time?

Mr. CLINTON. It can be applied at any time unless it is when the ground is so soft that the wheels of the farm wagon cut in. I do not like to haul it out at such a time. I think it is better, and I like to apply it in the spring after the snow is off but before the season has advanced so as to make the ground soft.

Mr. HOYT. As regards that other matter that I referred to I could give two instances in my own experience where the use of it was detrimental. One was in a house of carnations, and the other a bed of nasturtiums. In both cases they were killed because of its use. I had been using nitrate of soda successfully in growing carnations, and I think I had the finest carnations that were to be seen in that part of the country, that is, so far as the variety which I was growing was concerned. That was some twelve years ago. A friend of mine came along, and he wanted to know how I produced that result. I told him. He went off and claimed to use the same amount that I did but he had not a carnation left.

A MEMBER. I know of one man who killed several thousand hills of cucumbers. He wrote to the agricultural college in his state and asked them about fertilizers for cucumbers, and they told him to apply a handful of nitrate of soda to each hill. He did and killed every hill.

Mr. CLINTON. I want to say in reference to that, that it is well to take care not to leave nitrate of soda where farm animals can get at it. It should be kept away from all farm animals.

Mr. Hoyt. Has it any other use except to be made into fertilizer?

Mr. Clinton. It is used some in the arts and industries, but just what special uses it has I am unable to say.

Secretary Brown. Mr. President, in order to present the subject of free seed distribution before this convention, I beg to offer the following:

Resolved that: —

"The Connecticut State Board of Agriculture in annual convention at New Haven assembled, hereby places itself on record as thoroughly and most emphatically opposed to the so-called free seed distribution now authorized by Congress. It respectfully requests the Senators and Representatives in Congress from Connecticut to use their best efforts to secure the repeal of the law by which this free seed distribution is pro-provided for. And in order that this protest may be made effective, the Secretary of this Board is directed to forward to each of the said Senators and Representatives, and to the chairmen of the proper committees of Congress a copy of these resolutions.

Mr. Chairman, I move the adoption of that resolution.

The President. You hear the motion, which has been seconded. Any remarks upon it further?

A Member. Mr. Chairman, I rise to a point of information. In taking this vote does it include the whole convention, or is it limited to the delegates to this board meeting?

Secretary Brown. It is the convention of the State Board of Agriculture. The convention as a whole has a vote. Every man in the hall has a right to vote.

The President. Are you ready for the question?

Dr. Jenkins. Mr. Chairman, I should like to say a single word. I think we all understand pretty thoroughly what the situation is with regard to the seed distribution which is referred to in this resolution. The United States Government pays something like two hundred and fifty thousand dollars

annually, I believe, for seed which, as I understand, it buys under a contract, and the contract is awarded, according to law, to the lowest bidder. Of course, it needs no argument to show that the seed which the citizens of any state want are seeds which have the greatest germinating capacity and are of the best quality. Now the Government spends nearly the same amount of money to send this seed through the mail, but they are distributed in small packages, and the quality of the seed which has been sent out has been an agricultural joke all over the country, and that has been the condition of affairs for about as long as I can remember. We have them sent to us. Have them sent to us by Congressmen and Senators. We have had cotton seed, and a good deal of sorghum seed sent to us. A great many of the other seed which have been sent to us have been seed which could be grown nowhere but in a greenhouse. Some of those we have put in the ground have proven to be varieties which were suitable for other climates and totally unsuitable to Connecticut.

Now this distribution of seed as at present carried on is an expense to the taxpayers of the country, it is a nuisance to the agricultural department which has to attend to it, and it seems to me it must be a nuisance and a source of constant vexation to everybody who has anything to do with it except possibly the Congressmen who send them out. It seems to me there can be no two sides of the question, and that no man can defend that sort of a helter-skelter distribution of seed. That sort of thing is not in the interest of economy, and the passage of this resolution may help to avoid hereafter the dispensing of this large volume of seed, the work of which is put upon our people at Washington, and will help to avoid a lot of unnecessary labor on the part of the over-worked Congressmen, and it seems to me it is a step in the right direction and something to be commended. Unquestionably, there ought to be a certain discretion exercised by the department, and if there is to be any distribution, then the samples should be sent out,

not through the Congressmen but in a proper way by the department, to such persons who are intelligent, and who are raising crops that ought to be raised in the climate or in the locality to which the seed are sent, and who will make a full and complete report of the result of their tests to the department. Such a distribution of seed might be useful, and if the distribution were limited to that sort of a distribution, which is the only right minded one, there would be some public benefit in it.

As I understand it, this resolution is aimed at the system of seed distribution which has been without any regard to where the seed go, who have them, or the results that are obtained by their use. I am heartily opposed to any such free distribution as that.

The PRESIDENT. All who are in favor of the passage of this resolution will please signify it by rising. Now those who are opposed please rise. We will call it unanimous.

Secretary BROWN. There is a question which is not in the box, but which I would like to ask because I think perhaps some of our friends present may know something in regard to it, and that is as to the destruction of weeds by means of spraying with sulphate of iron. Has any one in Connecticut had any experience with the destruction of noxious weeds by spraying with sulphate of iron. I ask the question, Mr. President, because I have received an extended circular from an iron wire mill in which they had illustrated the effect of spraying with sulphate of iron upon various classes of weeds that pervade our soil. I wish to know if anyone in the hall knows anything of the result of any such spraying.

The PRESIDENT. Can anyone in the hall answer the Secretary's question?

A MEMBER. I would like to hear if it would have any different effect on weeds than it would have on grain or any other plant.

Secretary BROWN. That is one of the points that I would like to know myself. The circular intimates that the firm preparing this preparation propose to send a gentleman to show the work. I did not know but Dr. Jenkins, or some one connected with one of our Experiment Stations was familiar with the subject, and that is why I brought it up.

Mr. PLATT. Mr. Chairman, I have not used sulphate of iron for killing weeds, but I have used common salt. In the case of Canada thistles, where they were almost extinct by extreme cultivation, by following it up for two or three seasons they can be cleared out. The salt will be better in such cases as that.

Mr. PHELPS. So far as I know, I have not heard of any experience with sulphate of iron used in the way that the Secretary referred to, but in some places they have recommended for use sulphate of copper for spraying on to grain in order to kill mustard. Some plants are much more susceptible to that kind of a product than others, and it has been demonstrated, I think, that the mustard plant is one of that variety, and can be killed by spraying upon the foliage a weak solution of sulphate of copper. In England they are more thorough in their methods with regard to grain growing than we are in this country perhaps. They have to spray quite extensively with sulphate of copper for the destruction of mustard and thistles.

The PRESIDENT. It won't hurt the grain?

Mr. PHELPS. No. The grain is not injured at all if they use the right strength.

The Secretary suggested a while ago that the speaker of the afternoon was rather late, and if there is time I would like to refer to the subject which was up this afternoon. It may not be one that is worth killing time over, but it may be one worthy of a little further exemplification, and that is the question of securing chemicals, and mixing fertilizers upon our farms. That is a question of considerable importance, especially to those who use these mixtures in considerable quantities. For about eight years I have been buying from fifteen

to eighteen tons of chemical fertilizers and mixing my own fertilizer for use on the farm. I have felt that I have gotten two striking results. One was the saving of from six to seven down to, in recent years, about three dollars a ton, over the cost of the corresponding fertilizer in ready mixed goods. The other was that I felt as though I was getting something that I knew what I was dealing with, and something that was better adapted to my crops, and better adapted to the soil that I want to use it upon, than in any ready-mixed fertilizer that I could find. That part of the question might be a subject for discussion, but it is my conviction that in point of saving the fact was well proven. When I started about eight years ago I could save from five to seven dollars a ton over the corresponding fertilizer in ready-mixed goods. As time has gone on, the range of difference has not been as much for with the last two or three years I was able to make a saving of from three to four dollars a ton only, and if I did that I thought I was doing pretty well. Even then I thought it paid me well, and I felt I was able to make up a fertilizer which was just as good in all respects both physically and chemically, and at the same time make the saving which I have spoken of. I can provide the chemicals in a condition in which they should be used. The only thing to be careful about is to see that your nitrate of soda is not in a lumpy condition. It should be fine unless you have some means of grinding it. Unless that is the case, you want to be sure to specify that it shall be reground, and, if necessary, shall be shipped to you in fine condition. You will find it hard to make it fine with the shovel or hoe.

My mixture depends also upon the crop for which I am going to use it.

Previous to the present year nitrate of soda has been relatively about as cheap as any product that you could get, but as the prices stand today, I think there are other sources of nitrogen that are cheaper if you buy in wholesale quantities.

Secretary BROWN. I am requested to announce that there will be a meeting of the Corn Breeders' Association of Connecticut in the parlor adjoining this hall at the close of this session.

The PRESIDENT. Now the speaker of the afternoon is to address us upon a very important question. Any of you who are in New York City occasionally, and who have anything to do with milkmen and milk consumers will understand that there is a great deal of talk going on about milk and about getting it into the city in pure shape for the consumer, and to do it in a way so that the producer can make a fair profit and the retailer not make too much.

It gives me great pleasure to introduce to you at this time Professor L. L. Van Slyke.

COMMERCIAL METHODS OF JUDGING MILK AND CREAM.

By Prof. L. L. VAN SLYKE, New York Agricultural Experiment Station, Geneva, N. Y.

In commercial transactions in butter and cheese, certain points or qualities have been adopted as a basis or standard in fixing the commercial value of these products. The system now in use is the result of gradual development, but unfortunately it is not applicable to such products as milk and cream. Within a short time past there has been some desultory discussion about the desirability of judging milk and cream on a commercial basis. An increased interest in this matter was given by the Bureau of Animal Industry, which, under the management of its assistant chief, Mr. C. B. Lane, held a milk and cream exhibit at the National Dairy Show at Chicago in February, 1906. The milk and cream were scored on a basis devised for the purpose and the results have been published recently.

The only basis that is now in actual use in judging the quality of ordinary market milk is the percentage of fat and solids, and this is probably prompted mainly by the desire of sellers to conform to the so-called legal standard. New York City inspectors require that the temperature of the milk shall not be above a certain point when it reaches the city. In some few cases, as at condenseries and in the case of certified milk,

cleanliness is made a point of commercial quality. In most creameries and many cheese factories, the percentage of fat in milk is made the chief or only basis of valuation.

There is, unquestionably, an increasing demand for practicable methods of judging and grading milk and cream. Such methods can not be projected all at once in perfect condition but must be the result of development. However, a start should be made at home and this is a good place to present the subject for discussion. Differences of opinion on some details will necessarily arise and these must be impartially considered on their merits. Personally, I am still in an open frame of mind about many details. I naturally have a bias for emphasis of the chemical side.

We may here briefly consider some of the reasons why no adequate system of judging milk and cream exists:

1st. There has been a general lack of appreciation of the necessity of a satisfactory method. The average consumer of milk is the one who should be most interested and he is and always has been the most helpless in bringing about any reform for the improvement of his food materials. Cheese and butter makers have realized often enough that there may be important differences in milk and cream other than those shown by the fat test and the lactometer, but they have felt helpless in handling the trouble. When the milk or cream has been too awfully bad to mix with the general lot, the final resort has been to refuse to receive it at all. Such heroic measures always have uncomfortable accompaniments.

2d. In the case of market milk, there has been a feeling that the legal standard affords ample protection in respect to quality. We all know that even a legal standard has its limitations in the way of protection.

3d. Special difficulties are met when one tries to apply to milk any tests other than for fat and solids. The period of time when one can obtain samples is brief. The amount of time required to make efficient tests is considerable. There has been a lack of appliances. Tests other than those afforded by the senses are necessary.

REQUIREMENTS FOR A PRACTICAL SYSTEM OF JUDGING.

We may, at the outset, consider profitably some of the requirements that should belong to an ideal system of judging

milk and cream. Milk that contains any form of adulterant or that is below legal requirements in composition should be understood as being excluded from the application of any system of judging. It is condemned to start with.

1st. It should cover essential points and those only, that is, points that are actually important in showing the real value of milk or cream.

2d. The system should require as little equipment as possible. The only special apparatus required for judging butter or cheese is the little instrument known as a trier, which is used in drawing the samples. We can not hope for such simplicity in milk and cream tests.

3d. The method of judging milk and cream should consume as little time as possible, because many samples must often be tested in a short time, and results must often be known as soon as possible.

4th. The ideal method must be efficient, that is, it must enable one to place upon different samples of milk or cream such a commercial valuation as will represent their relative values.

CLASSES OF MILK AND CREAM.

Somewhat different methods of judging are required for different classes of milk and cream and so, for convenience, in this discussion, we will classify milk as follows, according to the purposes for which it is to be used:

(1) Market milk, milk sold for direct consumption as such;
(2) Creamery milk, that used for butter-making;
(3) Cheese-factory milk, that used for cheese-making;
(4) Certified milk, milk produced under certain specified sanitary conditions and reaching a guaranteed standard of composition.

Similarly, cream may be classified as

(1) Market cream, cream to be consumed as such, and
(2) Cream for butter-making.

FACTORS DETERMINING VALUE OF MILK AND CREAM.

In selecting points of quality to use as a basis in judging milk and cream, what are the essential ones? There is little

chance for variation of opinion in regard to three of these points, (1) composition, (2) keeping quality, and (3) flavor. Some difference of opinion may exist as to the desirability of adding to these the color of the product and the character of the package containing the product.

COMPOSITION OF MILK AND CREAM.

By composition is meant, not that indicated by a detailed chemical analysis, but such portion of the milk as is of most importance in enabling us to form a judgment in regard to the value of the milk for commercial purposes. Thus, in the case of market milk, the per cent. of fat and solids-not-fat gives us a sufficient amount of information to enable us to judge of the comparative composition of different lots of milk. In the case of milk to be used for making butter or cheese and in the case of cream, the per cent. of fat alone furnishes a satisfactory basis for judging the composition. The fat and solids-not-fat also meet the requirement of being easily found.

Composition is an important factor in judging and grading milk and cream. Thus, in market milk, the composition, other things being equal, is a direct measure of the food value; in creamery milk and in cream, the composition gives the butter-making value; and in cheese-factory milk, the cheese-producing value.

The next point to be determined is as to what score or number of points we shall allow for composition of milk, that is, what amount of fat and solids-not-fat shall count as perfect in market milk? If we have a score of 100 points for perfect milk to distribute between the qualities of composition, keeping quality, flavor, etc., how many of the 100 points shall be assigned to milk that may be called perfect in composition and what composition shall we regard as perfect? These questions offer opportunity for wide variation of individual opinion. Now, what amount of fat and solids-not-fat shall count as perfect in market milk? The following seems to be a fair proposition:

The figures used should represent as nearly as possible normal milk of average composition, that is, milk containing 4 per cent. of fat and 9 per cent. of solids-not-fat. This is preferable to a higher standard for the reason that a standard

of 4.5 or 5 per cent. does not represent the usual conditions nor necessarily the most desirable composition for general market milk. Others may suggest that the so-called legal standard should be taken as a basis for milk of perfect composition. It is unfortunate that we use the word standard in connection with the legal requirements governing the composition of milk because, properly speaking, it is not a standard at all but simply a method of prescribing the lowest permissible amounts of fat and solids-not-fat that will be legally tolerated in market milk.

The number of points that shall be assigned milk of perfect composition, in the sense above given, offers much chance for variation of opinion. In my own judgment, it should be given a larger number than any other quality and I would assign a score of 40 points out of 100 for milk containing 4 per cent. of fat and 9 per cent. of solids-not-fat.

The next question that presents itself is this: What number of points shall we deduct from milk that falls short of the assigned limits? Here again is chance for much variation of opinion. My suggestion is that we deduct 1 point for each .1 per cent. below 4 per cent. of fat and 1 point for each .1 per cent. below 9 per cent. solids-not-fat.

KEEPING QUALITY OF MILK.

By the keeping quality or power of milk, we mean the length of time milk remains sweet and palatable for direct consumption. In estimating the commercial value of market milk, this is an important factor, since milk that is sour or otherwise unpalatable, or milk that contains the products of any undesirable form of fermentation, is comparatively valueless for direct consumption, however rich it may be in fat and solids-not-fat. Such milk can generally be used in cooking and its full food value utilized.

The keeping power of milk is dependent upon (1) the number and kind of bacteria present and (2) the temperature at which the milk is kept.

The following factors can be used in gaining knowledge and in measuring the keeping power of milk: (1) acidity, (2) dirt in suspension, (3) fermentation tests and (4) number of

bacteria. Considerable time and expert skill are required to determine the number of bacteria in milk and so it will be frequently found inpracticable to make this determination in the case of ordinary market milk. The question may be raised as to how much added information regarding keeping power may be given by knowing the number of bacteria, without knowing the kind or kinds present, when we have determined acidity and dirt in suspension and made a fermentation test. Usually, the amount of dirt in suspension and the acidity and the fermentation test will afford a satisfactory basis for judging the keeping power of milk. In any case, we must be on the watch for indications of preservatives, the presence of which is suggested by slowness or failure to coagulate in a fermentation test. Fortunately we have practicable methods for making these determinations.

Under what conditions shall we call the keeping quality of milk perfect? (1) When acidity is not above .18 per cent., (2) when there is no dirt in suspension and (3) when no gas-forming ferments are present and no development of offensive products of fermentation occurs. (4) In case the number of bacteria is determined, there should not be over 100,000 per cubic centimeter.

How many points out of our 100 shall we allow for perfect keeping quality? Here again is a fruitful opportunity for difference of opinion. I think 30 points should be given.

In scoring market milk for keeping quality on this basis, a deduction of 1 point is made for each .01 per cent. of acidity above .18 per cent. Deductions for dirt in suspension and for gas-forming and smell-producing ferments are made according to the judgment of the operator. Judgment in these interpretations must be developed by experience. One point is deducted for each 100,000 bacteria above 100,000, when this point is used.

FLAVOR OF MILK.

By flavor is meant the quality that is perceptible to the senses of smell and taste. The sense of smell is, as a rule, capable of being developed so as to be more highly sensitive than the sense of taste in detecting variations of flavor. In

ordinary market milk, properly handled, there should be no marked odor and nothing at all offensive. The taste should be slightly saline and rich but without other marked features. There should, particularly, be no unpleasant after-taste.

The abnormal odors and tastes noticeable in market milk, otherwise good, come from two sources: (1) From certain things eaten by the cow, and (2) from the direct absorption of strong-smelling substances present in the air surrounding the milk, such as manure, ensilage, cabbage, etc. We do not usually have to deal with ill-smelling products developed in the milk as products of fermentation, except in case of milk that has been kept under conditions that favor rapid aging.

The presence of such abnormal flavors in market milk may not be perceived by tasting or smelling the milk under ordinary conditions. They become more readily perceptible by placing some of the milk in a perfectly clean fruit-jar or bottle, closing fairly tight and warming to 100°F. for a brief time. On opening the jar or bottle after such heating, any abnormal odor is made prominent, even though previously imperceptible.

Milk may be called perfect in flavor when it is free from any abnormal odor or taste, but not insipid.

For perfect flavor, a score of 25 points should be allowed, or, 30 points, if color and package are not considered. In actual experience, flavor does not hold the same kind of relation to market milk as to cheese and butter. A flavor that is imperceptible in the ordinary consumption of milk usually becomes concentrated in the process of butter or cheese-making and usually affects seriously the final product. A flavor must be very bad, indeed, to render milk useless for cooking or for purposes other than direct drinking.

Deductions for imperfect flavors must be made according to the experienced judgment of the operator.

COLOR OF MILK.

Market milk should be of a slightly yellowish color, which is strikingly different from the white or bluish color of skimmed or watered milk, but it should be as deep as the color of good cream. Milk may be artificially colored but is then apt to be

too high in color or not of the right shade. Color is observed by direct inspection in comparison with a sample of milk that is regarded as standard.

SCORING MILK.

The qualities we have been considering, viz., composition, keeping quality, flavor and color, are intended for use in judging and scoring milk. For the reasons previously given, the following scale of points is suggested:

Composition,	40
Keeping power,	30
Flavor,	25
Color,	5

If desired color may be omitted and flavor increased to 30.

The method of scoring is as follows: The milk is examined for the qualities mentioned in the manner already described and the defects are indicated by deductions from the perfect score in the following manner:

(1) Composition. The perfect score is 40 points and this is reduced 1 point for each .1 per cent. below 4 per cent. of fat and 1 point for each .1 per cent. below 9 per cent. of solids-not-fat.

(2) Keeping quality. The perfect score of 30 points is to be reduced (a) 1 point for each .01 per cent. of acidity above .18 per cent., (b) a certain number of points, according to the judgment of the examiner, for dirt in suspension, (c) also for any abnormal results shown by the fermentation test, and (d) 1 point for each 100,000 bacteria above 100,000 in one cubic centimeter of milk, when this determination is made.

(3) Flavor. The perfect score of 25, is reduced by the presence of abnormal odors or tastes, the examiner using his judgment as to the amount of reduction required.

(4) Color. The perfect score of 5 is reduced for any marked variation from the usual color of milk.

SCORE CARDS.

For convenience, score-cards are used in keeping records of the results of judging and scoring where many samples are

examined. The following form serves as an illustration of a commercial score-card:

Name or number identifying sample,.....
Date, ... Judge, ...

Qualities.	Score-points.	Score of Sample.
Composition,	40	35
Keeping power,	30	28
Flavor,	25	25
Color,	5	5
Total,	100	93

In dairy schools and competitive public exhibitions, where the main object is educational, the reason for each score should be given and a special score-card used, something like the following:

Numerical and Descriptive Score-card.
Date..... Judge.....
Name or number identifying sample.
Material examined.....

Numerical score	Composition	Keeping quality	Flavor	Color, &c.
Perfection	40	30	25	5
Score given	—	—	—	—

Descriptive score (indicate details of scoring below by figures and checking.)

Composition	Keeping Quality	Flavor	Color, Etc.
Perfect	Perfect	Perfect	Perfect
Per ct. of fat,	Per ct. acidity,	Stable	White
" " " solids-not-fat	Dirt	Heavy	Bluish
	Abnormal fermentations	Weedy	High
	No. of bacteria	Bitter	Abnormal
		Tainted	

The scoring is used as a basis of grading milk. The following system of grading market milk is suggested.

GRADING MARKET MILK.

In the case of butter and cheese, three or more grades are recognized, the various grades being based largely upon the results of scoring. A less complicated system is necessary

for market milk. Two grades would probably be found sufficient for practical purposes. The following suggestions are made for these grades:

Grade 1. (1) Composition, not less than (a) 3.5 per cent. of fat and (b) 8.8 per cent. of solids-not-fat.

(2) Keeping quality, (a) acidity not over .2 per cent., (b) Freedom from dirt in suspension, (c) Freedom from objectionable ferments.

(3) Flavor, normal taste and practically no odor.

The total score for milk of the first grade should be not lower than 90. All other milk should be second grade. Milk in the first class should sell at a premium.

JUDGING AND SCORING MILK USED FOR BUTTER AND CHEESE-MAKING.

A somewhat different system is used for creamery milk. (1) Give perfect keeping quality 50 points and perfect flavor 50 points. Judge and score on this basis. (2) For each point the milk scores below 100, deduct .01 from the per cent. of fat found in the milk. (3) Use the result thus obtained as the actual per cent. of fat on which to base dividends.

Illustration: A milk containing 4.5 per cent. of fat scores 40 points on keeping quality and 40 points on flavor. The value of the fat equals 4.5 less .2 (.01x20), which is 4.3.

When creamery patrons realize that lack of cleanliness means decrease of fat and of dividends, they have a fundamental incentive for producing cleaner milk.

JUDGING AND GRADING CERTIFIED MILK.

Certified milk is usually guaranteed in respect to composition and cleanliness. Therefore, in judging such milk, use the guaranties as a basis for scoring and otherwise proceed as in the case of market milk.

JUDGING MARKET CREAM.

In judging cream, the same factors of quality are used as in the case of milk except that in composition the per cent. of fat alone is used. One other change might be made and

that is to drop color and substitute for it the quality of body, by which is meant the evenness of consistency and freedom from lumps.

In composition not less than 20 per cent. of fat should be used as a basis for perfection and from this is deducted 1 point for each .25 per cent. of fat below 20.

Acidity and flavor are of especial importance. Not more than .2 per cent. should be allowed in perfect cream.

In grading market cream, the same general method of procedure can be followed as in case of market milk.

In judging and scoring cream for butter-making, follow the method used in the case of milk used for butter-making.

If milk and cream were produced under uniform conditions of reasonable cleanliness, then there would be one and only one difference, only one basis of judging and grading, and that would be on the basis of the composition.

The ultimate object in judging and grading milk and cream is educational. When dairymen can be taught to furnish clean milk and cream, the system of judging will be reduced to the simple method of determining the fat and solids or the fat alone.

DISCUSSION.

The PRESIDENT. I would like to ask Professor Van Slyke in regard to another point. How shall we go to work to secure reasonable compensation for the producer for taking all the care and pains that is necessary to produce a good article of milk and give it to the consumer, or to the man who sells to the consumer? How are we to do it? It does not cost much sometimes to make milk but it does cost a great deal to make a good pure wholesome four per cent. milk or thereabouts, and put it upon the market in a perfectly good healthy state. Do they offer sufficient inducement to the producer, remuneration sufficient to the producer of this kind of milk? I feel sure they do not at the present time. That is the vital question that the farmer wants to know about. If any of you gentlemen have considered this point in regard to milk and are ready to

tell how the farmer can be paid a fair compensation for producing that kind of an article that is just what we want to know. I say that the poorest paid man in all the world of those that labor anywhere within five hundred miles of the city of New York is the farmer. Within the last few years he has been compelled to pay a great deal more for his help. Twenty-five dollars a month for a farm helper, with his board, is about as low as you can expect to get help, and the price of milk is going down instead of up. Can you tell us, Professor Van Slyke, how to meet that situation?

Prof. VAN SLYKE. I am not enough of a statesman to say.

A MEMBER. I noticed in the Professor's paper that he spoke about a standard. That is one of the hardest things for the farmers to agree upon. I think there are certain kinds of flavor that we agree upon, but there is a great variation of opinion as to what is good milk.

Dr. WRIGHT. It strikes me that it is somewhat a matter of local health regulations.

Mr. COMSTOCK. In connection with the scoring of butter and cheese there is no legalized standard. That is simply a custom that is agreed upon, and that prevails between the buyer and the seller. In some cases I do not imagine it would be practicable to lay down any legal standard as to such a variable and frequently intangible thing as flavor. Tastes differ, of course.

In regard to the question that the chairman suggested, I may say that that is one of the serious difficulties that confront the milk producer. I am not a specialist in those things, or in that particular phase of the subject. At the same time, we all know that there are consumers of milk who would like a better quality, and who would be willing to pay for it if they were assured that they were getting a quality of milk that was better in character than any old thing that they are likely to get. On the other hand, there is opportunity for education.

There are others who can be educated or persuaded into paying more for milk that is of a specially good character. This has been shown in the case of the sale of certified milk, where customers have been gradually educated to the use of that grade of milk, and ultimately a successful trade established. It has been done simply on the basis of furnishing a milk of guaranteed composition and cleanliness.

Of course, another point in this connection is that if the farmers would get together and produce a better quality of milk and then insist, as other combinations do, upon a fair price, there would be a solution of a large part of the difficulty.

Mr. COMSTOCK. If I understand the speaker aright in regard to the scoring of milk for butter and cheese purposes, you would take off on the fat a per cent. according to the score on flavor.

Prof. VAN SLYKE. That was the suggestion, yes, sir.

Mr. COMSTOCK. And consequently, the man who furnished the milk would be deprived of a certain amount of pay for the milk that he delivered?

Prof. VAN SLYKE. Yes; for the fat.

Mr. COMSTOCK. So that if he delivered so much fat to the creamery, and the butter maker took that and made it into butter, is there any certainty that the butter that is sold from that cream or fat is going to bring the farmer any more or any better price? If there is not, the man who furnishes his cream is consequently simply throwing his good money into the hands of the directors of the creamery to be distributed to the stockholders instead of getting it himself.

Prof. VAN SLYKE. That might be true in the case of a man who was producing a milk of very high quality, but it is probable that if the differences were slight that the quality of the product would not in the long run affect the material very much. Of course, if that plan worked out practically it would not need to be used but a short time before everybody would be producing better milk.

Dr. WRIGHT. May I say a word in regard to this question? I am not a member of this Board or connected with it, but I have been connected with a board of health for a good many years, and I want to say that the change of feeling that has occurred among milk consumers in the last eight or ten years is truly wonderful. I believe that this question is largely going to settle itself. There are people now that are willing to pay a good fair price, and a price that will pay the farmer, if they can be assured that the milk is clean and of a really good quality. Of course, we examine more or less milk that comes into this city as to quality, but of its cleanliness we are not always sure. I noticed that the speaker passed over the bacterial side of the question very lightly. I assume that he takes comparatively little stock of bacterial count in milk, but I believe that the milk producer and the milk dealer can get a good fair price for their milk if they will hold the quality rigidly up to a high standard. I believe that the men who are now in the market doing that thing, and the men who are going to get in early, are the men that are going to get in on the ground floor and get a decided advantage in the near future over those who do not deliver clean, wholesome milk. I think that the farmers of the state of Connecticut have largely got this matter in their own hands. The farmers constitute a majority of the legislators of the state. They are the men who are controlling our legislature to a very large degree, and I wish they would make a state standard for milk. At the present time, we have no state standard. A man outside of the city of New Haven can make any kind of milk he sees fit, and can sell it anywhere he is allowed to. If a milkman goes outside, and he is a man that is responsible, the farmer can ship his milk around from one to the other until it is practically impossible to trace it, and in that way some of it may get in. We have had that happen quite often. The point I want to make about it is though, that the matter is largely in the hands of the farmers themselves, who control our legislation, and I

hope that the time will come when they will give us a state standard. There is no question but what those that will furnish a first-rate article can get good prices for it.

The PRESIDENT. I cannot keep still on this subject. If you want to improve the quality of milk, I say strike at the root of this matter. Go through the cow stables and strike at the root of the trouble.

Mr. W. L. MITCHELL. I will tell you what the trouble is there, the farmer feels that he does not get paid for having a clean stable. I handle a good deal of milk, and I have been in some stables that badly needed attention, but as the market stands now there is not very much inducement for a farmer to spend much money in putting in new improvements provided he is only producing a small quantity of milk. There is not much inducement for the ordinary farmer that is keeping just a few cows, and sells whatever milk he may have over what his family wants. I expect we are not coming anywhere near up to the proper standard. Where a man, however, is producing any quantity of milk I think it is a radically different matter. There are a good many milkmen in the cities who would be glad to get that milk, and it would be an easy matter for them to conduct a little campaign of education and educate their customers up to paying for a good sanitary clean product, so that the producers can meet the extra cost of producing that kind of milk. I do not know how much it would be. It might be a cent a quart, or possibly not more than half a cent, but I think the brother over here on my left is all right in what he said about the stable. There is where the principal difficulty lies. Of course, a good many farmers do not know how to properly take care of their milk. Milk for market wants to be promptly taken care of. You have got to begin right at the stable, for the first twenty minutes after that milk is drawn from the cows tells a majority of the story. The animal heat

should be gotten out of it as soon as possible. If proper care is taken to keep it clean and get the animal heat out of it, you will have good milk, and that is all there is to it.

Mr. Edwin Hoyt. Mr. Chairman, I would like to know what this word "good" as applied to milk means. Does it mean clean milk simply? Is it clean milk or dirty milk, or, do you mean by good milk a good wholesome quality of milk? I do not believe there are any two of us that agree on just what that means. What do you mean by the word "good milk." That is what I want to know. Is it milk that is not only clean but has from four to five per cent. of butter fat in it, or is it milk that is rich in grease, oil and butter? Is it milk that is rich in cassein or cheesy matter? A Jersey cow may not make a good calf although her milk is rich in cream. An Ayrshire will make a fat calf. Now why wouldn't an Ayrshire cow be better to give milk for family use, and where you had children, than the Jersey which was rich in cream? The word "good" it seems to me must be taken to mean not only quality but the quantity of butter fat which the milk contains. I would like it very much if somebody would give a definition of good milk.

The President asked the question, who was going to pay for making this better milk. I will allow that if we do not get a price for that milk there is little, if any, inducement to try to improve the quality, but I think that the question is dependent upon another, and that is, the class of stock that you keep. You must have cows that will produce that kind of milk. The ordinary cow will not do it. Your cows also must be kept in a condition to produce milk which will pay for the extra cost of making it.

A Member. Mr. President, I am going to take a little exception to the remarks of my friend on the left. When people demand good milk they will get it. The people get just what they want. Just what they demand. Now I do not know how it may be in other places, but here in New Haven

the people, as a class, are no different from those of other towns, but you let a milkman announce that he will sell milk a half a cent a quart cheaper than the others, and that is the man that is going to get the trade over and above the other man who tries to keep a good sanitary stable. That is not an encouraging state of affairs. The question is, therefore, how is a man going into the business of milk farming in the state of Connecticut, I mean into the business of running a clean sanitary well-kept milk farm, when he is face to face all the time with that sort of thing. Such a man may spend a good deal of time in building up a trade, but I venture to say that if today or tomorrow some other milkman comes down a half a cent in the price of milk in the town in which he resides that that man's customers will leave him by the score. Now those are facts that you have got to meet. You cannot deny but that today it is not quality but cheapness of the article that you are obliged to deal with. I have seen how this works out time and time again. I produce sterilized butter. I had a customer that I furnished for three years. Another man went to that house and he said, "I will sell you your butter for twenty-five cents a pound during the summer, but during the winter I must have so much more." I could not sell my product for that. The fact is the farmer has to meet this competition everywhere. There is only one salvation for the farmer, and that is to organize like a trust, to get together in farmers' meetings and gradually work out a solution for this trouble. Talk over these things and come to some agreement. There is not a farmer in the state of Connecticut but what can get some benefit by coming together in these meetings and helping to talk these things over. The trouble is with the farming class that it is indifferent to its own interest. How many people are there represented in this room compared to what there ought to be if the farmers took the interest that they ought to in their own business? Why, if they did, this

room would not begin to hold the people that would be here.

The PRESIDENT. Mr. Secretary, will you please take the chair?

I am greatly interested in this question. I cannot keep still. I have traveled from Harlem to the Battery many a night, almost all night long, trying to sell milk in the city of New York. I commenced more than thirty years ago. I know pretty well regarding the selling and marketing of milk in the big city of New York, or in the New York as it is today, taking in the outside cities and all. I know pretty well how the thing works from my own individual experience. I have sold milk there, and to do it have gone without sleep, gone without my meals, gone cold and hungry many a time. I did it when I could not travel by the horse cars, nor by the elevated cars, nor by the subway cars, or by anything of that kind, but when I had to travel on my feet from one house to another to sell my milk. Now how did I ever do it? You talk about getting good milk. I would go to a customer and tell him I had good milk to sell. The man would ask my price. I would talk with him a while, and from all of his remarks would judge that he was an honest man, and was willing to pay for good milk. An arrangement would be made that I would deliver him good milk in good shape or he need not take it. Now I have had many such cases where a man would receive the milk and would distribute it for a little time. Then somebody around back side of him somewhere would find out that he was getting perhaps a little more for his milk than they were selling theirs for, and they would go to the girl that provided the pail in the morning and offer to leave a little milk. They would leave it for a few times in that quart pail. They, perhaps, would take the cream from two or three other quarts that belonged to other people and put it into this one quart for a few times as a sample of what they were able to furnish, and at the same time they would be selling perhaps a half a cent a quart under the other. They would do that sort of thing with the customers

of the man that I was selling to right along, and after a week or two I would get a notice that I need not ship any more milk. No further explanation. That is all I knew about it. Go down and see about it. What is the matter with the milk? Well, they will complain that the milk is a little soft; that it came a little bit short in quality. So I would have to go to the next man along on my road, who perhaps might be a friend that I had been doing business with, and perhaps I would tell him that that man had thrown up my milk. Now I have had this occur. Throw up your milk, did he? Yes, he did. Well, did he make any complaint? Yes. He told me that the milk was not good. He did? Yes. Well, I can tell you what was the matter. It was the half a cent a quart less that he bought his milk for. Your milk was good. He told me it was good, but he found out that he could get his milk just a half a cent a quart less and so he threw up your milk with scarcely any notice to you. Now what can you do with such a situation as that? Carry out his agreement? Not a bit of it. You could not find, if you tried, the vestige of an old white horse to attach. He had no responsibility back of him. You can get a judgment against them but it will not do you any good.

I am not saying that all dealers are of that kind. There has been some improvement. This matter has been pushed so far that there are people in the city of New York, milk dealers and milk consumers, who today are ready to pay a reasonable price, but where there is one of that kind there are five hundred that are not ready, and that are ready to take advantage of every possible point to take it out of the farmer and increase their own profit.

I am reminded of what Commissioner Brown, of the state of New York, said at one time. I was asked by him to appear before a committee and give my views in regard to a standard for milk. I said to Commissioner Brown, when he asked me to state my individual opinion in regard to it, how can you do

it? I would like to know how you can do it. Here is a dairy of cows that will give you for one month in the summer three per cent. milk. Another month they will give you milk that will measure up three and one-half per cent., and still another month your milk will fall off to two and three-quarters. Perhaps in some other month they will give you a four per cent. milk. Here is another dairy where the cows on one day will give you a four per cent. milk, but somebody sets a dog on them, and they are driven helter-skelter around for a while, and the milk that you get from those cows at that time may not be over two and one-half per cent. fat. When there is such a chance for so great a variation, how are you going to fix a standard? All of those variations take place in the same cows, kept under the same conditions, and milked by the same man. I do not care if you feed them on the same food and care for them all exactly alike, you will have a result in just that way.

I believe there is only one standard practicable in regard to milk. I believe it today. I said it was so in 1890. I believed it then. I believe it in 1906, and that is, you must take every care to produce a good pure milk from healthy cows, properly cared for, and kept in a state of perfect cleanliness, and deliver that milk sweet and pure to the man who distributes it, and that is all there is to it. You cannot do any more if you try. Make it a misdemeanor for any man that takes anything out of it or puts anything into it. Punish him by fine or imprisonment, or by either one or both. I do not care which. That is the only standard that is practicable. You have got to market your milk just as you market any of your other crops. It has got to stand, to a large extent, on its merit in the market. If one bushel of wheat is worth more than another, let the man who wants the better grade pay for it. If one dairy's milk is better than another, let the man who wishes the better milk pay for it. By keeping good healthy stock, well

cared for, and putting upon the market a good product is all that you can do towards fixing a standard. You cannot fix it any other way.

A MEMBER. Mr. President, I live in New Haven. I have been drinking milk for some little time instead of anything else, and I have traveled up and down and around about in a vain attempt to find a good palatable milk. I have been willing to pay ten cents. When I go to any farmer's place oftentimes I cannot get a good glass of nice rich milk which is clean and a nice flavor. Why is it?

The PRESIDENT. That is a good point.

Mr. STADTMUELLER. Mr. Chairman, I do not know of any other fat product that is placed before the consumer after it leaves the producer before he is able to test the quality of the output. That is, the milk that is ordinarily taken to the cities requires an interval of time which varies from one or two to forty-eight hours, and within that period of time the development of bacterial life goes on in the milk, and that largely determines the quality of the milk itself. Now this lady who has just referred to the flavor of milk, when she goes into the country and asks for a drink, if she gets it fresh the bacterial life that comes into that milk had not had a chance to assail or begin its work, but you take that same milk, and let it go through the ordinary channels of trade and it will not keep sweet for more than thirty-six or forty-eight hours. Now the raising of the standard is the very thing that will enable her to get better milk and a milk which will keep longer. The decomposition which takes place in milk goes on with greater or less speed until it reaches the consumer. That leads me to another thought. A previous speaker asked what was the meaning of the word "good" as applied to milk. Of course, that is a very elastic term, and capable of perhaps more than one definition, but as the result of quite a number of years of experience in the retail business I think I am justified in saying that the ordinary acceptation of the

meaning of the word "good" as applied to milk is what is acceptable to the consumer. Any milk that is cheap, unless it has soured, is good milk in the eyes of some consumers, perhaps of the average consumer.

Now our city friends, of course, look down upon us as not knowing very much, but we have so many evidences of it, and so many things come within the experience of anybody who is in the retail milk business, that it is sometimes quite discouraging to one who attempts to raise the standard of business. For instance, take an illustration that occurred in my own experience. We had occasion to raise the price of our milk because of the increase in the cost of labor, of feed, and everything that the dairyman has to do with. We raised it two cents a quart. We had among our customers a dentist. Men who are dentists are accepted by the world at large as belonging to that class of professional men that are really intelligent. Well educated. Perhaps that is a wrong statement, but nevertheless that is the ordinary interpretation of the type of man that are dentists, and this man was no exception to that. He frankly stated that he would not pay the extra price. Frankly said that he did not feel that he could afford to do it. And that as he was not justified in doing that, that he felt, at least temporarily, justified in withdrawing his patronage. Anyway, he left us, and left a feeling on both sides. He left us owing a balance of a few dollars, and in the course of a month or two we asked our man to call at his office for a payment. While he was sitting at his desk writing out a check our man said to him, "Well, Doctor, how are you getting along?" "Well," he said, "Ben, I am not getting on just as well as I used to." "Well, what is the matter?" "Why," he said, "when I first began to take milk of this other man the milk was very good. It was not as good as yours but it was satisfactory, and it cost less. In the course of a little time it began to deteriorate and after he had adulterated it for about a week or two, says I, "Smith, when

I started to take milk from you it was all right, but it has got so poor that if there does not something happen I shall have to get it somewhere else." Smith recognizing that he was up against it says, "Well, Doctor, to tell the truth I am not astonished to hear you say so. I have been rather up against it myself. I know that some of that milk has not been what it should be, but I will tell you what I will do. I have just had a cow come in that is going to produce a milk that will please you, and I will let you have the milk from that one cow right along. You just wait a day or two." And then the doctor said, "that milk has been fine ever since." Well, as he went on with his story my man began to laugh, and the doctor noticed that he seemed greatly surprised. As the doctor finished his story he burst out with a perfect "Ha ha." The doctor looked up in amazement, and asked him what he meant. "Why, Doctor," he said, "I have lived beside Smith for four years, and he hasn't owned a cow in the last four years." That is the trouble with the retail milk business. Anything that will appeal to the pocket nerve of the customer is good milk. Anything that has a real tendency to elevate milk and make it good is all right in its way, but simply raising the price is a pretty poor business proposition.

A Member. I have been waiting for the Professor to answer that question that was asked by the President, "what are we to do in order to receive better prices for our milk?" The speaker does not appear to be equal to the occasion. I think I could have answered it in about three words, — simply by saying, make it worth it. That would have been my answer. I have been in the milk business for ten years in the city of Stamford. I have made my milk, and I have also received it from those that produced it. I have been trying for a long time to improve the quality. As city inspector, I have been trying to find some man that would pay a farmer a good price so that he could afford to make first-class, high-grade milk, and it is very hard work to do it, because there are so many

people that want cheap milk. I have found one dealer that would promise me this, that he would pay the farmer what he ought to have for producing his milk, but what do you suppose I said that was? I said that no man can produce you as good a milk as you ought to want to sell for less than six cents a quart. If you will pay the man that, I will name one who will produce you a milk up to the standard. He promised me he would do it, and if things had been just right he would, and today he would have wanted another dairy, but there were some reasons why he could not. Finally he made an arrangement whereby he was to pay six cents as fast as he sold it, but now he is taking the entire amount at six cents, and he is making a bigger margin on his milk than when he sold a cheap variety.

This milk question will never be settled until people find out that wholesome milk costs money. It is a matter of education, but it is coming very rapidly. The wonder to me is that the public and the producers and dealers do not see it, but it is coming very rapidly. The time is fast approaching when we are going to get better prices for both butter and milk. The producers will receive it, and the consumers will be willing to pay it, because they are going to find out just as they already have in some places that they cannot get a twenty-dollar suit for fifteen dollars, and when they find out that they cannot get a pure wholesome grade of milk for six cents, a great many families are going to be willing to pay a higher price. I think that the milkmen can do a good deal to create a demand for that kind of a product because after all it is a matter of education. It is such gatherings as this and grange meetings which help push on the good work. The dairymen's meeting which will be held in Hartford will also help the cause.

Prof. Van Slyke. Mr. Chairman, I would like to say before I go that if the practical application of what I have

said yields no more fruit than the mere discussion that has followed it I shall feel amply repaid. I believe, however, that if we will study a little more closely the subtler properties of milk and cream we will find out some surprising facts. For instance, if you produce a quality of milk, and without any special care take a clean fruit jar, which is glass, then keep that milk at an ordinary temperature for two or three hours, and then smell of it, the chances are that there will have been some surprising developments and some that will be educational in their way. One gentleman asked what was meant by the term "good milk." That is too big a question for me to attempt to discuss now, and I will simply say that good milk is something like a good conscience, it is a matter of education. One summer I was at a farmhouse where there were some people from New York City. On the table was some milk which was produced on the farm. The people from the city were very loud in their praises of that milk, and wondered why in the world they could not get milk as good as that at home. I give my word for it, and my wife agreed with me, that in the elegant language of the street it was as "bum" milk as I ever tasted. It was not lacking in flavor. It was lacking in richness and it was full of flavor.

Now what was good milk?

Convention adjourned to 7:30 P. M.

SECOND DAY — EVENING SESSION.

Convention called to order at 7:30 P.M, Vice-President Seeley in the chair.

Music.

The PRESIDENT. I take pleasure in introducing the speaker of the evening, Mrs. Mabel Loomis Todd of Amherst, Mass.

Mrs. MABEL L. TODD. Mr. President, Ladies and Gentlemen: I have chosen this subject of Tripoli tonight because I have found since our trips there to observe the eclipses during

the last five years that few people were at all familiar with this country or its people. Of course, as you know, geographically, Tripoli is one of the countries upon the northern coast of Africa. Morocco, Algiers, Tunis, Tripoli and Egypt occupy the entire northern coast of Africa, but Tripoli is better known perhaps among all of these as a Turkish province. The country, however, is practically independent. The bulk of the population is made up of Arabs and Moors, and from that very fact you can imagine that it is a very curious place. A very small per cent. of the people speak English, not many more of them speak French, and a great majority of the rest speak Arabic. There are a few who speak Italian, and others who speak a mixture of several of the dead languages of southern Europe. So you can see what a mixed population it has. From our previous experiences of 1900, it was a delightful surprise when we found that we were to repeat our trip of five years previous.

I feel a little more as if I belonged before this audience tonight than I ever did on any of the former occasions when I have had the pleasure of speaking before you. When speaking to you before I could not in any true sense be called an agriculturist, but since then I, too, have become a farmer. I have purchased a place at Buzzard's Bay, which is chiefly entitled to notice on account of its trees. I, always, as some of you may remember, have taken an interest in the preservation of trees, and this place in particular is a very delightful one to me on that account. There are fifty acres of trees. I practically saved those trees from destruction. I have tried to practice a little forestry among them. I have bought some oaks and some beeches, and so I feel that now I can come before you as an agriculturist, and with a little more reason on that account speak to a special audience like this.

My subject, however, is the antipodes of forestry, and however enthusiastic I may be on the subject of forestry in general, and the preservation of noble, artistic looking trees in particular, I shall try to confine my attention to Tripoli and its people.

Tripoli lies on a great bay of the Tripolitan coast which commences just after you pass the extreme northern point of the great African peninsula which stretches out into the

Mediterranean from the northern coast of Africa. This peninsula is one of the most northern points of the continent jutting out into the Mediterranean. As one approaches the coast and becomes familiar with the part which that particular country has played in history it becomes really impressive. A part of it represents the scene of the operations of the conquering Romans. A part of it the country from which the Moors, who founded the Alhambra and made such an impression on the history of Spain, took their departure. And so I might mention not only Spain and Italy and Malta, but other countries which have played an important part in the history of that particular section, dating clear back to prehistoric times. The sandy soil of the peninsula as one sails along the coast is noticed to be most prolific, especially in raising many kinds of semi-tropical fruit, and other things. I am hoping tonight not to say much about the eclipse or to give you any of the details of our scientific expedition there, but to tell you more about the physical nature, fashions and characteristics of this most interesting country. All the way along nearly the whole extent of the African coast one sees views that one hardly expects. The great African mountains stretch along this coast. The Atlas range. Many of its high peaks are covered with snow, and as one travels along you see the beautiful azure of the Mediterranean upon the one side, you breathe the balmy air of that almost tropical region, and also view the mountains capped with snow off to the south. It is a journey of surpassing interest, because you see such constantly changing views and so many unusual places. The city itself stands upon a point of land which juts out into the great bay. In approaching the town one sees many remarkable tombs, which have been built, and which from recent investigations, even as late as last year, have been proven to have been the tombs of eminent people who were banished from Constantinople for some trouble or for the commitment of some misdemeanor and obliged to remain in that place. So that in its early history it probably was a penal colony. One of them in particular; that I remember, being a woman who begged to be buried, or to have her tomb made in such way that her face would be bent toward her beloved. Another, of a sultana, who was banished, rests in one of these tombs. It is a very beautiful thing to go

into some of them, and see the way in which they are constructed and decorated, because they must have been there for some hundreds of years.

Of course, to say anything about the early history of Tripoli would practically involve a statement of the history of considerable of the ancient world. It was one of the places which was most thoroughly colonized by the Romans, and the Romans were not driven out until after the sixth century. In 622 A. D., when the place was taken, a magnificent mosque was erected, and from that time practically dates the exclusion of any form of the Christian religion. Thereafter, along that whole northern coast practically ceased to exist every vestige of Christianity. Of course, the country was very much more fertile in those days, and probably capable of supporting a much larger population. Many of those details we do not quite know. But it is a fact, nevertheless, that in sections remote from the settled portions of the country we, today, find evidences of former occupation, ruins and remains of former structures, remains of magnificent arches and statues, showing the location of former cities of considerable population, remains which in their perfect state must have been beautiful in character, and yet all now literally surrounded with drifting sand. That is all that remains of that most beautiful architecture dating back to the period when the Romans conquered all of the known world. It is a striking evidence of the decay wrought by time and of the existence of a civilization of which we have little knowledge. It is indeed one of the wonders of civilization. You can hardly dig three feet in that sandy soil without great probability of injuring some very beautiful things which they left, and it would be useless to attempt it as the Turkish government is very loth to allow any digging. Still, some archeological investigations have been made in that region, and they show clearly the great historical interest of the place.

The people, as a class, are suspicious of strangers. Upon the occasion of our first visit they very carefully investigated our telescopes, and everything that came there for us, but the second time we had no trouble in that respect because they knew that the telescopes were harmless. I suppose it is the manifestation of the same feeling that causes them to prevent diggings, but there is undoubtedly a great amount of riches

from a historical standpoint in these places. Of course, the sand has drifted to such an extent over the sites of those ancient gardens, statues and buildings, and everything else that they are practically covered. Some of it probably to a depth of twenty feet or more.

The old city stood in practically the same place as the modern city of Tripoli. At some future time investigation of that ground will undoubtedly disclose rich historical finds. Nobody knows how large a population lived in that locality in those early days, or to what extent civilization was developed among them.

Of course, one of the most striking things about the city that the foreigner notices is the mosques, the Mohammedan churches, the entrance to which is very jealously guarded. The Mohammedans are fanatical to a degree, and will not allow an impious foot to step inside of their mosques. An exception, however, was made in our case, and we, for the first time, were allowed to go into six of these mosques, and in five of them I am quite sure we were the first Christians ever to be admitted. I am sure I was the first Christian woman ever to be admitted into one of these places of worship. I wish I had time to describe them in detail. Some of them are very beautiful and very interesting.

It is difficult for me to know just what phase of the large subject would interest you most. I have found upon looking over my memoranda of Tripoli that there was so much of interest and so many different points that I would like to dwell upon that I hardly know what to speak of. I think a talk on the arts of Tripoli would be most interesting. Some friends were saying to me, "Mrs. Todd, why don't you give a talk about the desert?" Well, there is so much to say about the desert that I would have to talk to you at the rate of 210 words a minute in order to cover the subject within the time allotted to me, and even then I am afraid I would not give you an adequate idea of the charms of that region. To me it is all very wonderful. I was deeply impressed when I was first there, and if I had known I was to go back a second time would have studied some features of it more closely.

Aside from the historical interest of the city itself and its surroundings, many of the buildings possess a peculiar interest.

One might say a good deal about the prisons and the punishment of criminals, and the general conduct of the government itself. Probably, you remember in the history of our own revolution that about 1784, just after the close of the revolution, we had a very short but vigorous war with Tripoli. A good many of our vessels cruised in the waters of the Mediterranean adjoining Tripoli, and some Americans were taken prisoners, and some years elapsed before many of them regained their liberty and came back to this country. That whole phase of the topic is one of extreme interest.

One of the most delightful things that I enjoyed during my first visit there was to search through the archives in the old British consulate. The British Empire has had a consulate established there for a great many years. There is no American consulate in Tripoli. In fact, the people of Tripoli naturally class Englishmen and Americans together. There are certain volumes there which give a very picturesque idea of the life in that region a hundred or more years ago. There is an old book there which I think is out of print, consisting of a series of letters from one of the wives of an early British consul, which are most interesting. She was a charming writer, and gives the story of her life there with the Arabs in a most interesting manner. She touches upon many very curious and interesting phases of the life which she led from 1785 for about sixteen years thereafter. I wish I might dwell upon that if there was time. In many respects the country has remained unchanged, and the habits and customs of the people have been very little affected in the past century. Perhaps Tripoli is more subject to outside influences than at that time yet I hardly think it could have been more picturesque then than now. The Americans have had but little to do there. The commerce with the United States is not large. The foot of the American tourist rarely goes there. When we first went there in 1900, we practically made the British consulate our headquarters. Our telescopes were put up on the roof terrace, and our headquarters were practically there, although we were supposed to be in a little inn which there is in Tripoli. Still, most of our time was spent in this consulate, and we found it a most interesting place. It is built in the form of a square surrounding an interior courtyard. In this courtyard was a large tree, one of those peculiar trees native to that

climate, and which extended entirely above the house terrace. A gate led from the street into the courtyard, where were the general offices and utility part of the house. On the interior of the yard there is a gallery running about part of the house which surrounds the inside of this courtyard, and upon that gallery it is that the family are very apt to have their meals, and this opens from the drawing-room, bedrooms, dining-room, etc., and the more pleasant apartments of the house. There is no third story. On the roof terrace the family usually take their recreation in the latter part of the day when the sunshine has become sufficiently cooled by the afternoon and evening air.

Of course, society and social customs there are radically different from anything with which we are familiar here. In Tripoli, ladies, and especially the Arab ladies, never go into the streets if it is possible to avoid it. If they have been married five years, they may go into the street veiled, and they all wear in the street a very beautiful garment called a pelisse. It is a fashion quite different from what one sees in Algiers or Tunis. It is worn about the head or thrown over the head in such a way as to drop down across the left eye. So that when you see a Tripolitan you see the upper part of the left eye. Of course, you do not know from that black eye whether it is a beautiful young lady or an old crone. You cannot tell because either is apt to have that black eye. Such eyes belong to any style of beauty, and, of course, everybody may be beautiful in Tripoli. I will say more about their habits of dress very soon. We had a very charming invitation to a luncheon at a house of a prominent resident where I met some ladies, so that I really did have an opportunity to look into the family life of the upper class Tripolitan.

There are a great many Jews in Tripoli. I believe it is estimated that there may be 160,000 Mohammedans in Tripoli, in this province, and perhaps 56,000 Jews, and 3,000 Christians. That is about the proportion into which they are divided. The Christians are Roman Catholics, chiefly from Malta, a few Italians, and when I was there, there were only a very few other Europeans. Of those only fourteen were English people. One was a missionary, Dr.————. I asked him if he ever made a Mohammedan into a Christian, or if he expected to, and he said, " why no, I am not here to do that." Then I said,

will you please tell me what is the sense of sending a missionary here if you do not make converts? He said, "I am here to save their eyes, to cure them when they get ill, and I am here to show them the practical superiority of the Christian religion. I am not doing anything to convert them. When they see how much superior the Christian religion is to the Mohammedan that may come. Our initial effort is directed to treating the diseases of their bodies. We put ourselves upon a friendly footing among them by doing whatever they need, but at present a Mohammedan rarely thinks of changing his religion." He said, "of course, in time they will come to see it. It is a very slow process, and probably in my lifetime I shall see very little result of that kind. The process is very slow, but it pays to do it, because in two or three generations there will probably be a change, and they will be glad to do it." As many of you know, the religion of the average Mohammedan is a very real thing to him. They look with very great suspicion and even hatred upon the Christian faith. There is a race of people, one of the tribes there, who live upon the border of the desert, among whom there is such an intense hatred of all Christians, that they will never, if they can help it, meet a Christian face to face. If they see one of the hated persons within the range of their eyes, they will immediately pull the black veil over their faces, and will not allow their eyes to come into contact with your eyes. They are so fanatical that unless one were surrounded by friends and backed by the power of the government it might be a dangerous affair.

I was in Tripoli when one of the great caravans which traverse the Sahara came up from the desert. It was a most picturesque sight. I wish I could adequately describe it. They had been four months on their way. There were 260 persons in the caravan. They were all travel-stained, dirty, and worn out from that long trip from the interior, and what really seemed to me so pathetic, they had no water except a little in their water bottles. An interesting thing in that connection is the way that they sometimes wash dishes. Many of the servants are instructed, especially those who come from the desert, not to waste water in washing dishes. We often went on picnics with our Arab servant who came from the desert, and instead of having the dishes washed in water they would rub them in the sand, and they came up perfectly clean.

Such an operation as that, I have no doubt, would seem a little peculiar to us. In a country, however, where water is so scarce it seems a sinful thing to waste it, and so these servants have been instructed to put the dishes into the sand for cleaning purposes.

When this caravan came up it was really a very dirty, tired-out looking company. Among them there was an Arab bride from the desert who came up entirely enclosed in a palanquin on a camel, and, of course, we did not catch a glimpse of her. She was surrounded by a guard, whose guns interested me intensely. I do not know where they got those long guns. They were so long as to be really peculiar, longer than anything we see in England or this country. These men were carefully guarding this bride.

These caravans always start from a certain point in Tripoli and return to that point eight or ten months afterwards. They make trips into the far interior, covering hundreds of miles. I witnessed the departure of three different caravans containing about three or four hundred camels, and I saw the return of only one. It is largely by means of these caravans that commerce is carried on with the people living in the desert and in the interior. They go down into the Sahara for ivory, gold, ostrich feathers, gum, wax, and other products, which they bring to the coast. The three most important things which they get are gold, ostrich feathers and ivory. For these they receive generally things that are made in England, and which are transported in the same way to the interior. The industry, however, which has brought Tripoli forward into the notice of the world of manufacturing of late is the cultivation of a species of grass with which some of the hills are covered. They are now trying to add to it. It is a species of grass which grows there naturally, and which has been found well adapted to use as paper pulp. A great many camels make short excursions into the regions from which this comes and bring these wonderful bales of grass, containing from 250 to 300 pounds to the city. It is baled by hand, in a very primitive form, by native men. It is baled and pressed, and then bound with iron. When it reaches the seaport it is immediately shipped to England to make paper of.

The gardens in Tripoli I ought to speak of because they are of great interest. When one first arrives there one gets

an impression that no such beauty spots could possibly exist because most of them are surrounded by mud walls. Whenever a garden is made there they surround it first by a high wall, sometimes four or five feet high, and sometimes much higher, the wall being constructed of mud. I have gone with my camera many a morning down the little narrow streets of Tripoli to some of the places where they had gardens, and where we had been introduced, and the foliage and blossoms in some of those places were truly remarkable. The pomegranate there is a very beautiful tree, the scarlet bloom of the fig trees is also most agreeable, and the beauty of the date palm trees in that region is remarkable. The date palms, pomegranates and figs, and certain vegetables which they cultivate, and of which the Arabs are very fond, are for the most part to be found in these garden spots surrounded by mud walls.

If there was time, I wish I might describe to you the appearance of the streets. There are no pavements, in the sense in which we understand them, except on two or three of the streets, and these are composed of very rough cobblestone. Most of the streets are simply unpaved roads, and as you go down you get very dirty. It is therefore a very agreeable contrast to step from one of these streets into one of those delightful garden spots. When you go in there, you find a well very much as it was in the old days of Carthage. There is no change. They raise the water in the same way. There are two masonry pillars, one on either side, with a beam across upon which a rope is wound, and then a cow is used as the motive power to raise the water. The cow is in charge of an Arab boy. As the cow walks up the short incline or hill the water is raised. Then the cow backs down to the bottom, letting down the empty bucket. Then she walks back, and as it comes up full is drawn off into a little trough which carries it out into a small canal that leads into a reservoir for the garden. Every gardener has his reservoir, and most all of them have the cow, and the Arab boy to draw the water. Then they have little canals running around the garden in such a way that each square gets its own amount of water. By pursuing that method of irrigation almost anything can be grown that will grow in that soil and that climate. If they were to

pay the slightest attention to their method of culture, and improve it more or less, they could raise anything which was adapted to the climate and could make their country much more productive than it is.

I want to speak of the desert air. Personally, I am getting to be a good deal of a sanitarian. In all of my life experience I have never had anything so pure as the breath of the desert air. It is just as if one's lungs were taking in the breath of creation's morn, the very first that entered man's lungs, so pure and sweet is it. It is really wonderful what an effect that pure air has upon one. I believe the people in that region would have no disease of any kind if they would obey the simplest requirements of hygiene, but they are not cleanly, and they are not over scrupulous in their habits, and they have a great deal of trouble with their eyes. All of the houses are surrounded by white walls. That undoubtedly has some effect upon the eye. Then there is more or less fine dust in the air, carried into it by the winds, which has a very bad effect upon the eyes, but I think if they were careful to shield their eyes properly there would be no trouble whatever. The English people there do not have the same troubles, and the troubles which they do have yield almost instantly to the slightest treatment, and it is nothing but carelessness which produces the eye diseases one sees there upon every hand. The people almost never have any trouble with their lungs. They have nothing that is peculiar to the country, out of the ordinary except the trouble with their eyes. Of course, the houses are most unhygienic. I would like to show you a picture of the Tripolitan houses, but I have no facilities for that purpose here. Instead, I will give you a description of the weather when the wind blows from the desert. The only thing that happens in the air is the disagreeable weather which occurs in the summer, sometimes. When the wind turns from the south then it blows what they call a kabellah. It blows three days from that direction. When the wind is north to northeast or northwest, and usually when east or west it is very beautiful weather, but if the wind turns, and instead of blowing from one of those directions comes from the south it blows direct from the desert, and the air soon begins to feel like air which comes out of a furnace. One morning I put my head out of

a window to look, as I always did, at some of the wonderfully picturesque scenes that lay about our headquarters. I felt at once as if I had put it into the air surrounding a hot furnace. The wind had changed in the night. It made just that difference with the air outside. The house walls are about three feet thick. Of course, you do not notice the change of climate inside. The thickness of the walls keeps the heat absolutely within check. Of course, some of it is bound to find an entrance through the doors and windows, but that morning it had not gotten into the house at all. It was a tremendous change. Moreover, everything was soon covered with a very fine white powder. As the day progressed, the wind still blew from the south, and we knew that we were in the midst of one of those winds about which I had heard but had never before experienced. It blew all day a very comfortable summer heat of perhaps eighty, and then the thermometer went up to 82, 84, 85, and at night it stood at 89. We went to bed with considerable trepidation as to what the next day would bring forth. The next morning, although the house was cool, the thermometer standing at about 92, yet as the day progressed it went gradually up to 93 and 95. We went to bed that night with it climbing close to a hundred. The next day, the third, it went to 110, but there is such a dryness that even at that temperature one hardly notices it. I did not notice it as much as I often have in this country when it has gone to 90. Ordinarily where we were it never went above 90, but in Tripoli even 110 is not unbearable by any means. By this time, the wind still blowing from the south, the whole air was filled with the little fine dust from the desert. It got into my watch and into my camera. We were invited to this luncheon of which I spoke about this time. I had to go with an interpreter because my early education in Turkish and Arabic was sadly neglected. So I always took an interpreter. When we started out, he said, "Where is your tunic? It is too hot for you to be without it, and that we must keep along in the shade of the walls until we got to the place."

When we reached the house the doors were immediately opened and it almost seemed like stepping into another climate, going into that large house surrounded with solid masonry and stone. I wished I had my thermometer there to measure the difference, but I think it must have been 110 outside. The

hostess met me at the interior, and perhaps you will be interested if I give you a brief description of the way she was dressed, and of some of the other guests. Her hair was braided down her back, and held in place with gold and silver ornaments. She had at least five or six gold cords perhaps seven, laced around her head and around her neck, around her arms and down over the front of her dress. Then she had on a blouse made of a brilliant colored silk, sleeveless, and trimmed with scarlet embroidery in gold, and three short skirts, the upper one being the shortest, and the other two still longer, all being made of a different brilliant shade of silk. Then she had on a full Turkish lower garment of brilliant blue silk. The whole was very light, and it seemed in such a climate that it was a natural thing to wear, and I thought if American ladies who were visiting in such a country, only wore one color at a time it might be better. When I got into the large drawing room of the house I found that she was going to entertain us by showing us some stereoscopic pictures which she had. I looked at the pictures and put them back. Then I found that she wished to examine the dress that I had on and one or two little ornaments. She manifested considerable curiosity. Finally through the interpreter she said, "Ask this lady if she would not like to wear one of my suits for the luncheon. Tell her that we are not quite ready to serve, and that there is time for her to change if she would like to." Of course, I should like to, because I always wear native dress where I can. So she took me with her own two maids into her own room, and brought out herself a most gorgeous white native garment, which I put on. It was beautiful. Then she brought out other things to go with it. They were the best of all the clothes that she had. She also had some bracelets which were so heavy, that when fastened on my arms the weight was quite noticeable. They were native works of art, as well as the other things, and when fastened in place extended from the wrist to the elbow. And the ornament that she gave me to place over each ear gave me a most effective and impressive appearance. It took me fully an hour, even with the help of both her maids, to get into all of those things. And when I was fully dressed I was certainly one of the most gorgeous specimens that you ever saw. Then I went out with her to

greet the other guests at the luncheon. Her luncheon, like everything else that has anything to do with the Arabs, was late. It was not ready until a quarter of three. After having donned all of this magnificence, I went out with eight or ten other ladies equally gorgeously dressed. When the luncheon was announced we sat down around the board, and the gentlemen were admitted. There were seven gentlemen invited to this luncheon with my husband. He had not come in before. When they came in each gentleman was presented to her, and in my husband's turn he was presented, and passed along, but he did not recognize me. I saw him as he looked along this line of fourteen Arab ladies, and I tried to meet his eye for an instant. I did catch it sufficiently long to see an intensely amused expression upon his face. Soon after I managed to get his eye, and he said, "Well, I wish I could speak Arabic, because English does not do any justice whatever to this occasion." I told him what had transpired.

Let me tell you a little of the detail of serving that luncheon. In front of each was a pile of plates. The first course was brought in and put upon the top plate. There were something like twenty courses served in all, and each one was brought in and placed upon the top plate, and you were expected to partake from that. It was very difficult for us at first but after we got through with the first few courses, of course, the pile of plates was reduced because after each course was served the plate was taken out, and then the next course was put on the top, and then that was taken away, and so on until the last course was served. I wish I could tell you the things that we were given to eat. It would be impossible for me to describe that meal in detail. There were meats and other things cooked in a very peculiar way, and some of which were exceedingly delicious. Then there were stringent pickles, I do not know that they were pickles, but I took them for such, which the native ladies ate with great relish, but which did not appeal to me. There was a great variety of native fruits, among which were fresh figs which were most delicious. The meal was exceedingly well served. Then at the end came, as is usual, some very nice Turkish coffee. The luncheon took about three hours to serve. After we passed from the house we noticed that the south

wind was going down, and during the night it ceased entirely, so that the next morning dawned with the wind shifted to the east, and beautiful weather reigned once more.

One of the characteristic scenes of Tripoli is the market day. People to the number of ten thousand, and sometimes more, come in from the surrounding region, thirty or forty miles, and bring in the products of their farms, there being meat, vegetables, water jars, and everything you might think of to sell. You can imagine what that means in a city with such little narrow streets as they have there. Each of the streets of the market contains those selling a particular line of material. There will be meat in one street, and perhaps the next one will have marmalades, and perhaps the next one will have honey, all kinds, not made up in any shape at all, but as it comes from the bees. Then would come those with water jars, and then others with the things that Arab children wear. I must speak in particular of the extremely lovely water jars that one may pick up at the bazaars and on market days. Some of them are most interesting. They are things that people can bring home for the entertainment of friends, for some of them are exceedingly curious. The natives are very deft and artistic in their methods of manufacturing them down in that region, and are extremely picturesque. The water jars are very much upon the same pattern as those made by the Romans eighteen hundred years ago. In fact, there is no change in the shape whatever.

I think that one of the most curious customs of the country, and one which makes Tripoli stand out distinctly in my mind, is the wedding customs. When a wedding is going to occur in a family, or when a man has made a pilgrimage, or when something of great moment is to occur in the immediate future, they make a great outcry about it, seem to be anxious to have everyone know all about it. One night I was awakened about three o'clock by a great sound of halloaing in the street. When a wedding occurs in some leading family, the same thing takes place. One night I was awakened by this sound, and I looked out and saw what I took to be a caravan of Tripolitans going by. They did not look to be people of great consequence in the social life of Tripoli. It was a bridal procession. There, in a palanquin, covered except as to the upper part of her left eye, was the bride, and following her was

quite a regiment. The servants of the woman were making this noise. I immediately sent down to the man below to find out what it was. He gave me the name of this family. He said that week there was to be a wedding, which was going to occur when they were to welcome a new daughter into the family, and they were telling the whole town by means of this sound of their great joy. When I looked out there must have been twenty or thirty of them. The next morning came a large square envelope, very picturesque in appearance, inviting us to come on Wednesday. This was Monday. Our invitation was for Wednesday, but the wedding was to last through Wednesday, Thursday and Friday. A wedding in Tripoli sometimes takes a week. The next night after the matter is announced, the bridegroom goes through the street and makes the same outcry, which, I take it, is a sort of farewell to his bachelor friends. He brings out a lot of gifts, and gives a bachelor dinner to his young friends. In the meantime while he is thus engaged his fair bride is being conveyed by her mother and given into the charge of his mother. Then the next day he goes to the mosque and gives his announcement that he is to be married to this young lady. She has never seen him. No young girl is allowed to see any man except her own father, and possibly, of course, the members of her family. The next day she sits in state. She has never yet been seen by her bridegroom. That morning she begins to sit in state. She sits for three hours while his friends come in and look at her closely. We were invited to see that part of the wedding on this first day, on Wednesday. At that time she goes out of her room on the balcony, and is conveyed downstairs by four female slaves carrying her, and then four little girls follow her. She must be carried all the way down. When she gets into the courtyard, where the ceremony is to take place, she is placed in her seat. Meantime her face is covered with a costly veil or cloth, but when she gets down that is pushed up a little. The day that we were invited we found the bride sitting on a slight platform, and around her were eight or ten girl friends. Native musicians were playing the most barbarous music you can imagine, and singing a bridal song. When we went in we were introduced to her relatives, and it was very interesting to see the ceremony. While I was there being introduced to her people, the sun came around to such

an angle that it began to shine down into her face. It seemed to be undignified or improper for the bride to move. She, in fact, was required to sit there for three hours. It must have been very terrible for her to sit there that way with the sun shining into her eyes. So one of her little bridesmaids apparently decided upon a revolutionary measure, and although she was not allowed to move one of them took one elbow and another the other, and they raised her to her feet, and when they got her to her feet, one of them leaned over and took this little slippered foot, and then the other in the same way, thus pushing her into a shady position, and seating her again. She could not turn her eyes or raise her hand.

I had a curious experience there. I asked the mother of the bridegroom if I might take a picture of the interior of the house, and she said, "Oh certainly, I am perfectly willing that you may take it anywhere except of the bride." So I snapped the camera. At the time I noticed a lot of rather peculiar looking people, but I thought it would be interesting to carry away a picture of the scene. That night as we were at dinner, a foolish fellow came rushing up the steps eagerly demanding to see me. Come to find out, he desired me to give him the picture. He said that he had been threatened, that his life would be taken if he did not secure the impression, and that there were men who were following him even in there. I asked the British consul what I should do, and on his advice that it would be better to let him have it I gave it to him, and then what did he do but go straight to our expedition photographer to have it developed. He wanted to see what was on it himself. Our photographer told me he had a very strong temptation to develop the wrong end and bring him the other end, but it had been taken out in the wrong way, and there was nothing there. So he did not have any satisfaction except that he showed it to his Arab friends and all saw that there was no danger of any of the family life being exposed in the picture. It may be interesting to you for me to say in passing that the Arabs have a dislike of having anything photographed which they think would in any way be a violation of the law of Allah. One time I saw a boy at the top of a date palm tree. They get from the top of the date palm tree some remarkably juicy fine dates, and the boys of the village have a way of climbing up the long limbless trunks which is very interesting, going

to the top of the tree and securing this fruit. The little boys are sent up. They have a way of clasping the trunk of the tree, of throwing their body away from the trunk and almost walking right up the trunk of the palm. They are very expert at it sometimes. This boy was in the top of the tree, and I thought I would get a picture of him, and just as I turned my camera upon him he shifted around to the side, and when I walked around to the other side he changed his position to get away from me. In other words, he went around the tree. From that experience, and others, I learned that it was sometimes impossible to collect pictures of them. I tried it many times. The Arabs are terribly afraid of anything that suggests any interference with anything that Allah has made. That is the reason that we never could get some of them to help us in the work of preparing for the eclipse. They considered it was against the laws of Allah, and although they would not occupy the building, and some of them would not assist us, yet they helped us set up the instruments. We had at different times quite a number of different nationalities in our employ. My husband, in Tripoli, had at least a dozen nationalities among the men who were helping him set up the telescopes. I asked him one day how he got on with so many different ones speaking different languages. He does not speak but a few words of Arabic, and a little Italian. He said that he did not understand it. He said that he could not say exactly how it was, but there were always some who seemed to understand what he said. If they could not understand either his Italian, or the few words of Arabic which he was able to speak, then he immediately launched some Japanese at them. Nobody knows, but they seemed to understand the Japanese so that he got along very well. There were certain words which they seemed to grasp, and, when accompanied with gestures or motions expressive of the idea, were easily able to comprehend. But these different men were very faithful. They were as faithful as they could be. The only trouble which arose was on account of the difference in religion among them. Some of them were Jews, and the Jews, of course, would not touch a single thing on Saturday. Of course, the Maltese and Italians or descendants of Italians were Catholics, and would not labor upon the Sabbath. And

the Mohammedans, of course, had their religious duties at the mosques. So there were three different days that interfered very much with the work of setting up the instruments. That was the principal difficulty. There were others, but generally those three religions constituted the principal obstacle to our getting ready for the eclipse. By this time our preparations had been well advanced, and we found that the interest in our work among the populace was considerable. There was a great deal of misunderstanding due to their superstitions. The women were especially fearful that something dire was going to happen and had to be assured that it would not bring any harm to them. When we were there in 1900 I was invited into a room among a number of women, and I found a great deal of terror among them. They begged me to postpone the eclipse, and when I told them that I could not do that, then they begged me to see that when the terrible day of darkness arrived nothing should happen to them; that no harm should come to them. I said that I really could not put off the day of darkness, that I must allow that to come, but that otherwise there would no harm come to anyone; that it would not last but a short time, and then that everything would be as it was before. On the occasion of our second visit, while we had a great many interesting experiences, there was not the terror expressed that there was upon the first time. There was more intelligent interest in it. But they could not see or understand how it happened that the same man should come back to observe the eclipse a second time. There was a great deal of interesting gossip about it. When we were there in 1900 they said that my husband was to go up in some tremendous balloons, and that when he got up almost to the sun he would set them on fire, and that would shut out the sunlight, and that would produce the eclipse. How one astronomer was to go up in several balloons was something I never could understand. They called him, the second time, the great sorcerer.

But I must tell you a little more about the market days before I go into any further description of the eclipse. I am afraid that my time is rapidly coming to an end, and there are so many things of interest to speak about that I must not

leave out any of the principal ones. The native market where they bring in their cows, goats, camels, birds, donkeys, and all the various animals that they use in their native life and in the desert, and these other things they sell or use in their domestic life, constitutes a picturesque and most interesting scene. They come in and establish their tents. These little tents cover the entire place for more than a mile, and extend back, perhaps a thousand feet on to the water. There are not less than ten thousand of them, and it is a kind of county fair, or an institution which takes the place of that same sort of thing which we have in this country. The bartering, trading and selling which goes on among them is highly interesting. They come in, with all their different kinds of animals. I must say a word about the donkeys particularly. I have seen them come in bearing burdens which I think the Society for Prevention of Cruelty to Animals would have found most objectionable. They are most always overloaded. I never saw a donkey that did not look absolutely pathetic. The poor little things are no larger than a pony, and they go along with their ears wagging, and with a most pathetic expression. I fear they are subject at times to great abuse, but it is almost impossible to see how they could get along without them. Of course, the camel is a common animal among them, but the camel is more costly, and they are therefore much more careful with them, and the same can be said of the Arab horses. I think the life they lead could hardly go on without them. Then when the event opens, and the location of the tent has been fixed upon, the women establish a seat flat on the sand, and the bartering and selling goes on. The costumes, the manners and ways of the people, the intense interest which they take in the transaction, all contribute to make a most interesting scene. I never have seen such a really unique combination before.

I must hurry on. Tripoli, of course, as I think I said, is located in a semi-tropical region. Through the day, as a rule, the air is intensely warm, but about five o'clock in the afternoon is the first time that one can go out with any comfort, and it is then that the better class of ladies appear upon the roofs, or in the shady places of the courtyards to take their

daily exercise. In the British consulate where our headquarters were located we were peculiarly fortunate. The courtyard contained some large trees, which cast a beautiful shade, enabling us to pass some pleasant hours there. From the roof of the consulate the view at such times of the day was often splendid. Upon one side was the blue Mediterranean extending out many miles, as far as the eye could reach, and on the other side was the sweep of the mighty desert, extending hundreds of miles into the interior of Africa. Speaking of the desert as it impressed me at the time, it comes back to me very vividly. The desert proper is a vast expanse of wavy, sandy plains, over which the currents of air are constantly shifting. The sand is very light in character, easily lifted by the wind, and is therefore shifted about in the same capricious fashion that the winds themselves blow. Wherever the works of man have been established there, one can have no assurance that they will endure, for the sand driven by the winds covers up the remains even as a grave is covered with earth. Of course, as I said before, the country immediately south of Tripoli has changed somewhat in character with the process of time. The probability is that the sand did not come as near the city. One cannot contemplate that vast area of waste country without a feeling of awe. It exceeds anything I have ever seen. One can look off for an immense distance and it has a sobering effect to think that there is not a human being in that direction for perhaps a thousand miles, and you can go down, down, down into the heart of that great expanse and never meet a human being.

But I must tell you something of our singular experience just before the eclipse. In 1900 we had an absolutely clear sky. This time we expected that it would be clear. The weather had been fine up to the day before the eclipse. We had had absolutely clear weather with fine blue skies. We knew it was the dry season, and that there might be winds. The day before the eclipse there was a wind started from the south. That was disturbing because we had had a lovely north wind right off the sea practically ever since we had been there. The thermometer began to rise. The heat began to be oppressive. The banners upon the flagstaffs hung down in a listless way as if there was no more life in the air. As the

wind increased they began to flutter a little but all indicating that the wind was coming from the south. That was terrifying, because about the only thing except a storm which would obscure the sun that could interfere with our success was a kabellah, which would darken the atmosphere and bring up the sand from the desert. It appears as a yellowish bank advancing from the desert while overhead you may have a perfectly clear blue sky. Of course, we knew that if the kabellah blew we might have all our labor and pains for nothing. The morning of the day was hot. It was so hot it really seemed as if it was 110. I said to a friend, "Is this kabellah due?" He turned the subject off, saying "Well, I think it is a slight one, perhaps, but it may be all right by the time the eclipse begins." The eclipse began at two o'clock. I went up upon the roof and looking off could see that yellow bank while overhead all was clear. The wind was blowing from the south. What was going to happen by two o'clock no one could tell. It had been blowing then for a day and a half. About eleven o'clock I found myself quite nervous. It was a brilliant blue overhead. Where the sun was it was absolutely clear, but the old carpenter whom we had in our employ, seeing my distress, as I went from one side of the roof to the other, looking out over the desert and then at the sky, was very much concerned. Finally he said that he thought that we would have no kabellah by the time of the eclipse. That was very encouraging. Soon after he called my attention to a spot off on the blue Mediterranean where the sea could be seen very well, and there was one little whitecap, which instantly showed to us that the wind had changed, and that we should not have any more south wind. I watched that white cap. One after another they appeared, and finally became general. The change in the wind had saved us, and we were able to make a very good observation.

If I had time I could tell you many more wonderful things about this most interesting country, and its people, but the time came for us to return home, and we had to leave our hotel and take our departure for a more promising land. I do not know that I can close in any more expressive way than by using the native words for "Good-bye." They have a different meaning and significance from ours. On this occasion

when we were on the steamer, and the strip of blue water was getting wider and wider between us, and the beautiful and interesting place where we had had so many unique experiences, some of our friends bade us adieu in the beautiful Arabic words, which imply a promise to return.

The PRESIDENT. The convention will now stand adjourned until Thursday morning at ten o'clock.

THIRD DAY — MORNING SESSION.

THURSDAY, December 20, 1906.

Music.

Secretary BROWN. Ladies and Gentlemen, I regret very much to have to announce that the speaker of the morning, Mr. F. E. Dawley, Fayetteville, N. Y., is too ill to appear. I regret it both on Mr. Dawley's account and very much so on our account. Fortunately, however, the subject of agriculture, the subject in which we are all interested, is so broad, that there is never any lack of subjects to talk about, and fortunately for us we are situated so near to one of our Experiment Stations that we shall not lack for a speaker. I have secured the consent of Dr. G. P. Clinton, who has been making some investigations during the past year upon the subject of potato culture and the potato blight, to occupy a few moments this morning in an address upon that subject. Of course, it should be understood that Dr. Clinton comes at a moment's notice and without special preparation, but he is always prepared with something that is worth hearing.

Dr. CLINTON. Mr. Chairman, Ladies and Gentlemen: I am sure that I regret more than anyone in the audience that the speaker who was to be here is not able to appear. I think that you will agree with me that most every man has his hobby. I have mine, in fact, I have heard that it had been said of my hobby, that I would rather stick my nose into a rotten potato than to eat a good one. Now, if that is so, it is not because I have not the power of smell, but because I see, or think I see something in that potato, or back of that potato that is of interest to me and to you. During the few years that I have

been connected with the Station I have turned my special attention to diseases of the potato. During these three or four years the blight has been a most prominent disease in Connecticut, and so what I have to say relates to the diseases of the potato in Connecticut, and especially to that most serious trouble, the blight.

The potato, like all other plants, and also like animals, is subject to serious diseases, in some cases resembling each other quite closely so that a person of mature judgment and experience in dealing with such matters recognizes some of them. Those troubles that occur upon the tubers are not subject to treatment by spraying. Those that occur upon the leaves are more or less subject to treatment. The blight is one of those forms that first appear upon the leaves, and I wish to speak of three different points with reference to blight troubles. Of course, you know in a general way that moist weather is largely the cause that brings on a sudden decay of the vine or leaves, and the disease usually makes its appearance on the under side of the leaves. Then, under favorable conditions, the tubers may rot from the same trouble, so that we have injury to the foliage and a rotting of the tuber, which, of course, reduces the yield of marketable potatoes after a crop has been grown.

Now the first topic that I wish to speak upon is that of spraying, and especially with reference to field spraying. We spray potatoes for the potato blight. The older Bordeaux mixture is the thing that is usually used. There is a difference as to the method of applying the spray, and it is upon that that I wish to speak more particularly now. I have found that in Connecticut the spraying of potatoes is not general, but it has increased in each of the four years that I have been here, until today I see quite a marked interest in this subject. A great many more people are spraying today than there were four years ago, and I think the number is bound to increase as our farmers recognize more and more the efficiency of it, so that later on it will become the general custom. In general I find that most people are fairly well pleased with the results. Of course, there are some that will not get results from spraying. In general, the value of spraying depends on how serious the blight is with which you have to contend, how carefully a man sprays, and whether he sprays at the proper time.

Spraying for blight should begin usually about the middle of July. Very often, especially in this vicinity, the farmers begin earlier than that and stop at about that period. Now the good result of most of their effort is wasted if they stop about the middle of July because it is only from then on that the blight appears and that spraying has its value. The reason that they are afraid to go into every field with their machine is that they will injure the vines. Of course, some fields are much more luxuriant than others, and it is easier to go through those fields where the potato plants are not so luxuriant, but even if you have to go through fields where the vines are quite luxuriant, I would still advise that it be done. The potato vine will stand a good deal of abuse, and not show it. It will recover readily. I know of fields that were sprayed this year where the man could scarcely see, and he sprayed all through that field. He was fearful of the result upon his vines, but in a day or two he would not have known that he had been there at all.

Now there are three ways of spraying potatoes. One by the use of a hand pump, where you drive through with a man pumping and two men following with a hose. I have been criticised by some. I do not object to friendly criticism at all because that will bring out, perhaps, something that is useful — but I have been criticised for some things that I have said with reference to methods of spraying. I do not say that that is not a practical method, but I do not wish to be understood as advocating it for anything more than it is worth. It takes considerable time, and a man who wants to spray ten acres will find it rather a long and tedious job. I think, however, that there is no other method that is as thorough and safe. So if a man has the time and does not have too great an acreage, he will find that the most satisfactory way to spray potatoes. It takes one man to man the pump and drive, and two men to handle the lines of hose. By the use of this method you can get a thorough spraying of each individual plant as you go along. That is the principal advantage of it, that you can do the work thoroughly. Of course, the success of any method of spraying is dependent to a large degree upon how serious the blight is. If it is quite serious the spray should be put on through the season from the middle of July

to the first part of September, especially through damp, muggy weather, and for the length of time that the Bordeaux will stick upon the leaves. Another method of spraying is by the use of the barrel pump or cart spraying. That is where the nozzles are stationary and attached to the back of the cart. By the use of that apparatus you can spray four rows with one or two nozzles for each row. This method only requires one man to handle the sprayer and one man to drive the team. Possibly one man could operate it if he had a steady horse, but it usually requires one man to drive the team and another to handle the sprayer at the same time. This is somewhat like a power sprayer except that the horse does not furnish the power. The man furnishes it with the pump, the pump being the ordinary barrel pump. The objection to this style of apparatus is the same as that urged against a power sprayer; that is, that we have the stationary nozzle, and the horse has to go at a certain gait, and that is rather fast in order to get good thorough spraying on the vines. Of course, with such an apparatus, a good deal of the spray is bound to land upon the ground rather than on the plants. In this method I find it a decided advantage for a man to spray through in one direction and then to go over it in the opposite direction of the row, so that it takes in the two directions, and in that way fully covers the foliage. The spraying can be done much better. I find with all of the power sprayers it is very desirable to spray twice.

The third method is with the power pump sprayer, by means of which the horse furnishes the power to the nozzles, and in other respects the spray is applied as I have already described. The objection to this is the lack of power in a good many of the sprayers. The horse has to move too fast to get good results, for unless the power is applied at about the right point to the nozzle you do not always cover the vines. I hope that the time will come when we can get a power sprayer that will be satisfactory in all respects, but as yet I have not seen a perfect one. They are all more or less unsatisfactory. Where a man has a large acreage he may be compelled to use these imperfect machines. I am hoping that I may be able to eventually find one machine that I think much better than the others, and which can be generally used for this purpose, and thus get rid of the disadvantages of the

present types. There is a demand for a machine that will do good work on large fields and do the work quickly, and at the same time do it thoroughly.

Now I planned some experiments this year with reference to the potato blight, but the experiments were very unsatisfactory because there was less of the blight and less of the rot than in any of the four years. My experiments, this year, therefore, do not show what I wanted to bring out, because of the lack of cause of the rot in the tubers.

I am studying potatoes from two points of view, — first, to find out everything I can in regard to the fungus without any reference whatever whether it is of practical or impractical importance, and, secondly, to see if there are any modifications that I can make in our method of treatment of fungus disease. I have found out a good deal about the fungus, but there are some points that may have escaped me, as others have worked on them and have not discovered them.

Now as to the practical part of the thing, the spraying, I am testing different ways and different kinds of spray. So far, it has all practically come down to this point, that you must do your spraying thoroughly and at the proper time. If that is done, you may expect an increase of a moderate amount such as we had this season. It is more difficult, or rather perhaps I should say that it has been my experience, that it is more difficult to prevent the rot of the tubers than it is the blight of the vines. The rotting of the tubers, as I understand it, from my experience, comes about by the spore of the blight being washed on to the tuber, and under favorable conditions of moisture, producing the rot in the tubers. Therefore, if you can keep the blight off the vines, there is no danger of rot to the tubers. Still, differing conditions sometimes alter cases. Where the vines rot suddenly, the rot will sometimes reach the tubers below. I think that may be due to the fact that the blight has only been there for a short period of time and then a rain has come on, or some other reason has arisen which has carried the rot down to the tubers. We all know that seasons differ very much as to the amount of rot which is produced. but some seasons where the blight on the vines has not been so serious the rot on the tubers has been much greater. I think when that is the case that they have had this a long time, and that it has fallen down from the leaves. This year we had

very favorable early conditions for producing the blight. The rains of June and July were unusually large, and the blight started in the fields a little earlier than it did last season, but this rainy period was followed by a dry period, so that we had very little injury to the foliage, and none whatever to the tubers. We did have an injury, however, which is due to very dry weather, in some cases. I refer to the pit burn. Out in the central west they suffer more from this than anything else, but it is due to very hot weather being followed by rainy weather. It is due to a loss of moisture. The leaves dry up from the trouble. I speak of this because a good many persons are apt to confuse it with the blight.

Now as to our spraying experiments we have carried them up to the point where we are able to say that by thoroughly spraying by hand we can increase the yield over unsprayed fields, and it is very effective in keeping off early blight, and keeping down the ravages of insects.

Now the second line of work that I am looking into is a study of the disease-resisting power of different varieties of potatoes. I have been studying these different varieties to see if certain varieties are more or less subject to disease. The government is doing a good deal of work along this line, but while I have done some work in that direction I have not been studying the potato especially except as to the blight. The other work is not so far advanced. Now there are certain of the fungus diseases which seem to attach themselves more often to the plants of certain varieties. In other words, there are varieties that are more resistant to disease than others. In the case of blight, in my own personal experience, I have not seen a resistant variety. I have not seen resistant individual plants such as we sometimes find for some other fungus troubles. The government has carried on some very interesting work along this line. Of course, that work has not been limited to the potato. The government got a strain that was resistant to certain cotton diseases. By going out into the field and finding certain individual plants that seemed to be resistant, and by breeding from those plants they built up a strain which seemed to be resistant to disease. Now they are trying something of that same kind with the potato, but where the potato

blight has infected a field seriously I have never seen an individual plant that would stand up against it. We have thought that there might be certain varieties which were resistant to the blight. Part of these observations are based upon these conclusions, but in order to judge one variety as compared with another we should have it in the same field side by side and subject to the same conditions. They must be compared on practically the same conditions. You cannot have a good season for blight and compare a plant with another variety another season when the conditions are different. You cannot compare them with another variety and another season, but a man may have one set one time and another another. Mr. East is interested at the Experiment Station in potato culture, and I am interested in diseases. He has planned some experiments which will aid me. On a large field he has secured quite a number of varieties, about eighty, which we intend to grow on a small scale. My part of the work will be to watch these, and see if there is any difference in the varieties, so far as the resistant powers to disease are concerned. With that idea I imported the Scotch potatoes, which were said to be especially resistant to blight. They being imported and not acclimated, they did very poorly the first year, as all potatoes do, and the year was not a favorable year to test them for the blight, because there was no blight. There was quite a difference in the varieties, however. There were three varieties that remained green and stood up well until they were killed by the frost. Most of the others died early. This is the second point of my study.

The third point is on this matter of rotting of the tubers, I sent out a circular last spring, asking certain farmers to test ridging up of potatoes as a means of preventing tuber rot. I recommended that that method of culture be tried to see if it made any difference. I am not advocating ridge culture here or claiming at present that it has any advantage over the other. That is not the point that I am trying to bring out. What I wanted to do was to test my idea with reference to the falling of these spores. If the potatoes were buried to a greater depth, and therefore more safely hidden or kept from the spores they would be less subject to the rot, and have a

better opportunity to come to maturity before the rot could reach them. That was the theory. This was tested in a general way in Europe some years ago, and some experiments made, which however, were not especially carried on with this point in view, but they, in fact, seemed to show that potatoes were less liable to rot when they were deeper in the ground. In my conversation on this subject with a good many farmers, the majority of them have seemed to have had less where they were ridged or buried deeper than they did where they were near the surface. I have had replies to some of those circulars. This was not a year to test it in good shape, because we had no rot on any of the potatoes in the state. Those replies that I have received, so far as the effect of ridging over unridged, speak as highly of ridging as they do of the unridged. A few got a greater yield from ridging than they did from the unridged. That ridging, of course, will vary with different years. Of course, in a very dry year it might tend to injure the potatoes because it would dry out. In our own experience, the experiment seemed to show that the ridged ones did not do as well as where level culture was pursued. I ridged them severely. Another year I would have them ridged early and not so severely. I would modify it this way. I would go deeper in the ground. I think I will get the same effect. That is, if the potato is buried more deeply under the ground there would be less opportunity for the tuber to dry, and the probability of dry weather affecting it in the ridge would be lessened. I intend to carry these experiments on for a period of years, as to all of those methods concerning rot.

Those are the three points that I have been working on. Now if you have anything to ask me I should be glad to answer it, if I can.

DISCUSSION.

A Member. What does it cost per acre to spray?

Prof. Clinton. That varies. I should say, in this state, at least eight dollars an acre. But, if you get a twenty per cent. increase of yield you make it up in that way. In New

York state they have figured it down, and they have gotten a less cost. I think it runs there from three to six dollars.

QUESTION. Have you sprayed some vines on your own fields and left others unsprayed for purposes of comparison?

Prof. CLINTON. Oh yes, and then we have compared the yield of the two to test them. That is the only way to do. Some people may spray a whole field and possibly not do any good, but if they got a good yield they would say that that was good spraying when, of course, it would mean practically nothing.

QUESTION. What is the average yield one year with another comparing the sprayed potatoes with the unsprayed?

Prof. CLINTON. That varies greatly with the years. You get a per cent. which is scarcely noticeable some years, and in others you would get a good per cent. I have gotten as high as a hundred per cent. In New York their increase runs from twenty-five to over a hundred per cent. in a vast number of experiments which they have carried on.

QUESTION. What do you think of drill culture? Do you plant in drills or in rows?

Prof. CLINTON. Just in rows.

The PRESIDENT. Do you think you get as big a yield in drill culture?

Prof. CLINTON. I do not pretend to speak along that line at all because my subject is fungus diseases. I am not here to tell you farmers how to grow potatoes. That is not my specialty.

The PRESIDENT. As I understand, in carrying on those spraying operations, you went across one way and then back the other?

Prof. CLINTON. No, not quite that. I went back on the same rows only in the opposite direction. In using one of these power sprayers you cannot throw it, by going through in one direction, so as to get it all over the plant, but by reversing

and going back in the other direction you get the other side of the plant. If you go in the two directions you are sure to cover them thoroughly.

QUESTION. Is it necessary to spray the under side of the foliage?

Prof. CLINTON. Of course. The fungus forms on the under side of the leaves. If a spore gets there it seems to hatch better. Then too, the underside spores of some leaves will drop down on the upper side of leaves below them, and most of them get in through that process. Of course, where you get in and thoroughly cover the plant upon all sides, and saturate the foliage, you will get better results. You cannot do it too thoroughly.

The PRESIDENT. How many sprayings does a crop need in a season?

Prof. CLINTON. It depends entirely on how thoroughly it is done. Where you use some of these power sprayers you should give as high as eight sprayings. My work has been effective with from three to four sprayings with a hand sprayer.

The PRESIDENT. About what time ought the first to be given?

Prof. CLINTON. From the tenth to the twentieth of July, depending on the season. Just before the blight begins to appear. In early potatoes the foliage is pretty well covered by that time, and they think that this early spraying protects them. One of the points that I want to make clear is that these late sprayings are not the essential ones. If you have the time and the opportunity, spray early.

The PRESIDENT. How far advanced has this blight got to be in order for the spraying not to do any good?

Prof. CLINTON. That will depend on the condition of the foliage. If it is matted to the ground it may not do good because of the great difficulty in reaching the seat of the

trouble. In that case it is pretty hard, after the blight is started, to stop it by spraying. It is always best to begin early.

Mr. BEACH. Do you find that the spores are likely to be carried over in the fall in the land? Is a piece of land where the blight has been discovered more likely to be badly affected with the blight than a new plot?

Prof. CLINTON. That I cannot answer definitely, because that point is one in the life history of the fungus, that I am studying to try to find out. These spores will die in dry, hot weather, and they would not, under any condition, live over the winter, that is, theoretically. These fungus spores, however, are not destroyed, for, apparently, they did live in the old dead vines, or in the old tubers.

Mr. BEACH. I was interested in what Professor Clinton might say bearing on that question, because in my experience I had an instance where it seemed to be shown that it lived over two years. I had a field that had potatoes on it two years ago. The field lapped over into an adjoining one where, so far as I know, potatoes were never grown before. This particular year we put two lots under cultivation. We sprayed about the 20th of July thoroughly over the whole of it. In about ten days I was planning to spray again, but delayed a little to get a dry day, and apparently I delayed a little too long, for in going over the field the second time I noticed where the blight was much more severe than it was on the adjoining area where no potato crop had been raised before. That difference continued for the rest of the season.

Prof. CLINTON. Two years ago I imported some potatoes from Colorado. They do not have the blight there. I planted them on a piece of land that had had no potatoes on it for a number of years. What I wanted to find out was if I could get tubers that did not have the blight and plant them on land that did not in order to see if I could get a crop that

was free from it, or if I could get a crop that I could carry through to a later time in the season with less spraying than other native varieties. I found, however, that I had it, and I explained it on the ground that it was carried in by the potato bugs. The disease is a peculiar one. You may have a crop, which so far as a careful examination shows is absolutely free from spores. Then, if you have a spell of wet weather come on, and a little drop of moisture gather upon a leaf, a spore will germinate in that moisture, and in a few hours the fungus will penetrate into the leaf. After it gets into the leaf, it grows with the weather, especially if the weather is muggy, and damp. If the weather is dry it comes to a standstill and does not progress.

The PRESIDENT. I would like to ask Prof. Clinton if he does not consider that the difference in the two lots of ground, one where potatoes had previously been raised, and the other where they had not, was a sufficient reason for there being a difference in the progress of the blight?

Prof. CLINTON. I am not quite prepared to say that.

Mr. BEACH. The condition of the soil and the method of treatment was very much the same, but the area where the blight appeared, and where we suffered the most from the ravages of it, did not have potatoes upon it last year. It had them two years ago. I know it had no potatoes last year, but I want to make it clear that it was the very same soil, and the crop received the same treatment. I could see no reason why there should be any difference between the two parts of the field except that the blight spores had lived over for two years.

The PRESIDENT. Don't you think that virgin soil where potatoes had never been raised before is not as likely to produce the disease?

Mr. BEACH. I don't see why that should make any difference with the blight on the leaves. The spores of the blight may be in the ground that has been affected, and that is what

I am trying to find out, whether the spore will live over so as to affect a subsequent crop, but I can readily see how the blight might be carried into a crop growing upon a new field. The point with me is whether the yield would be decreased if you continued to raise potatoes upon a field which had been infected.

The PRESIDENT. If you wish to get entirely away from the blight, you go out somewhere and plant your potatoes where they have never been raised before and you are pretty sure not to have it the first year.

Dr. CLINTON. That is what I understood the gentleman did, but he found it worse on the land that had not had potatoes on it the year before.

Mr. BEACH. My theory is that we have got to adopt some principle of rotation; that it will not do to grow potatoes on the same ground two years in succession. More time must elapse before it will be safe or prudent to try to raise a crop upon the same land.

Secretary BROWN. Gentlemen, Mr. Newcomb has asked permission to occupy the attention of the audience for ten minutes on the question of bovine vaccine. It is something that the Board of Agriculture neither endorses nor refuses to endorse, but which we look upon with an open mind. We are always ready to learn about anything that is going to improve the condition of Connecticut farmers.

NOTE. Mr. Newcomb then explained bovine vaccine.

The PRESIDENT. I can testify that, in my opinion, this matter that Mr. Newcomb has brought to our attention this afternoon is very important for us to investigate.

Secretary BROWN. This is rather a mixed diet, but a very good one, I think. Now we have a gentleman to speak to us for half an hour, or a little more, on the noblest animal that has been given for the use of man,— the horse. Mr. Frank D. Ward, of Batavia, N. Y. It is a subject with which Mr. Ward is entirely familiar, and one concerning which I know you will be glad to hear.

THE HORSE.

By Mr. FRANK D. WARD, Batavia, N. Y.

Mr. Chairman, and Members of the State Board of Agriculture: I sincerely regret that any change of program is necessary this morning. I regret it, both on account of the disappointment you must feel in not having this most important subject, "The Production of Sanitary Milk" taken up, and on account of the physical condition of my friend Dawley, whom I fear is a very sick man.

Coming up from New York this morning I was engaged upon a very serious problem in mental arithmetic. The problem was this: how in the short time that was allotted to one subject I could say to the farmers of Connecticut the many things that I wanted to say as to the importance of the live-stock industry. I could not get any satisfactory answer to the problem from my own thinking, but Colonel Brown, your Secretary, furnished me with an answer after I got here, when he told me that I must occupy this hour in talking about the breeding of horses, a subject that I have always been interested in, because ever since I was a boy I have been in love with that noblest of animals. Furthermore, a large portion of my life has been passed as an exhibitor of horses, and as a buyer and seller of them. But, best of all, I have been interested in the horse because I could get into a buggy and take a good ride, and, to my mind, a better ride than a man ever takes in a machine, for, an automobile will never take the place of a good horse.

Now it strikes me, brother farmers, that one of the serious mistakes that the farmers in these eastern states have ever made is in giving up to a great degree the breeding of live stock on the farm. There never can be, and there never will be any great agriculture, in a broad sense, in these eastern states, except as the breeding and keeping of live stock plays an important part in the operation of the farm. If you have studied the history of agriculture in all countries, you must agree with me that this is a fact, that we must make the breeding, keeping and feeding of some class of live stock an important part of our farm work. Now this morning I am going to say to you that there is no class of live stock on the farm

that will pay as much clean profit as breeding horses. I am afraid that this afternoon I will insist to you that the sheep is better than the horse, but if I get mixed up, do not blame me for I really take so much interest in each that when I am talking about one I am apt to forget about the other. I know a great many people feel that perhaps the time for breeding good horses is past, but we all remember the time, years ago, when an ingenious Yankee attached a pole and an electric wire to a street car, and we thought then that the market for horses was gone; that there was going to be no demand, and then there were the great plains of the west, those boundless pastures, where they could breed horses so much cheaper than we could that people seemed to give up the idea of breeding horses on these eastern farms. Now what is the result? The statistics in every large city of the United States show that there are more horses in use today per thousand of inhabitants than were in use when the street cars were drawn by animal power. The demand has increased instead of diminishing. Then there was the bicycle, and later on the automobile came into fashion, and the air-ship is the only thing that will ever compete at all, because that is the only means of locomotion that can go into the air where horses cannot go. But, my friends, any machine made by man will only strengthen our love for the horse.

Now I had no idea when I stepped off from the train in New Haven this morning that I was to address you on the subject of horses, or I would have looked up the conditions in your state a little more carefully. I have not looked them up because I think I know them pretty well. This is my fifth trip here, and I have spent a good deal of time in Connecticut when I have been here. I think that the conditions here are just about the same as they are in my own state of New York. Now the statistics that are kept show that in New York state there is a demand, in the farming districts, and in the towns for 130,000 horses each year. More than a hundred thousand horses die on the farms of the state, and thirty thousand in the towns and cities of the state. That means that there must be 130,000 horses supplied every year to fill or to meet that demand. Of course, Connecticut is not as large a state as New York, but I suppose, as is natural, a good many of you think it is a little better one. However, I think

that the relative demand for horses in Connecticut would be just about the same as it is in New York. As a rule, the horses that are furnished to meet the demand on the farms very largely come from the great ranges of the west. Those of you who have had experience, those of you who watch the markets, will agree that we can raise a better horse in these eastern states, a horse that will sell for more money in any good market, a horse that will live more years and do more work, either on the road or on the farm, than can be raised in most sections of the west from which many of our horses are brought. Wisconsin can grow a pretty good horse. Kentucky would not admit that she took a back seat. There are, however, climatic and soil conditions that enable us to grow, as a rule, much better horses than can be grown upon the great ranges for shipment into these eastern states. I know that there are concerns all through the middle west which make a business, and it is a profitable business, of buying up rough horses for shipment east, buying up horses which are diseased, horses which are vicious, horses which have formed bad habits, and horses which are not worth twenty-five dollars, — make a business of buying such horses as that and shipping them into the eastern states for the use of our farmers. Their only desire is to get those horses fat, and after getting them fat, they are loaded into cars in good shape, and in the hands of some trained horseman are sold out to our farmers and to men in our cities and towns for driving purposes. Those horses, you know as well as I do, never stand up well. Many of those horses have traits of character which make them entirely unfit for use on farm work or in the highway. I can cite a case which happened in our own community, where a man bought for use on his farm a bunch of six horses. They were horses that came from the west, and which he purchased to help till that farm. In eight months there was only one horse out of the six that he could hitch into a buggy and presume to drive with any satisfaction. I could stand here and cite cases of that kind for hours, but suffice it to say that when you buy a western horse you buy a cat in a bag.

Now I said that there were conditions here which enabled us to breed a better horse than could be brought from the western states. If you doubt that statement, I wish you

would look up the facts, for you will find that that statement is correct. We have made some serious mistakes in our methods of breeding horses, for, as a rule, as you all know, for you know it is true before I state it, the law of heredity and proper care as to the parentage of horses bred and raised in our eastern states has not been given the attention that it should. That old rule given thousands of years ago is as true today as it was when it was first announced, that whatsoever a man soweth that shall he also reap. If we breed from unsound parentage, unsound offspring is the logical result. You can get ringbone and spavin, and blind staggers, by breeding just as truly as you can breed color, and you can breed vices just as truly as you can breed any other characteristic of the horse. That means that the parentage on both sides must be absolutely sound. It means, also, that the parentage on both sides must be vigorous and entirely free from blemishes. When a man undertakes to breed a good horse in any other way he is bound to fail.

Now another mistake that has sometimes been made is in believing that a horse was a horse. That is true in a sense, but the man who would succeed must choose as between types. Suppose we were to divide the horses of the country into types. We would have four. In the first place, there is what is known as the general purpose horse. I just want to say a word about that, because I believe that is a serious error that we have made in breeding horses. That does not stand for anything. That is the kind that many a farmer has and it is just what nobody else wants. Now I do not like to say plain things, especially on my first introduction to an audience like this, but we only come together once in a while, and I feel it is my duty, if I am going to do you any good, or certainly enough to justify me in talking to you at all, to say things plainly, and to say them in a way that you will remember them. You know that a minister that never hurts the feelings of his parishioners rarely ever does them any good, and it is probably true that the minister that hurts the feelings of his parishioners the worst is the man who ought to do them the most good, especially if he speaks the truth. Now brother farmers, we have paid so little attention to the intelligent breeding of horses that we have almost committed a crime. By a general purpose horse, I mean a horse weighing from 950 to 1,150 pounds. Now understand,

there is a place, of course, in our economy, so far as the weight of that horse is concerned, but it is not the weight of the horse alone that we must consider. It is the horse that is bred for a special purpose, and I would like to draw the line at 1,150 pounds. If I was going to breed my horses for carriage driving, I would breed them at a hundred pounds heavier, because that horse will wear just as many years and do more work and do it better. If you have studied the markets you will find that while certain types of horses are in demand, yet for the general purpose horse you seldom find much, if any, call for one over the weight that I have spoken about. That is about where they run. Now I want to say to you, my friends, that we cannot afford to grow horses in any such way. We want a horse that will sell for more money. There is no use in breeding a horse that nobody wants. The general purpose horse, or a horse that is supposed to be able to be used for draft purposes, farm work, or for carriage driving is a failure. If you are going to buy a farm horse, you want a farm horse, and not a horse that is too light for your work. If you are going to buy a carriage horse, you want a carriage horse, and not a great heavy animal that is fit only to be used in a dump cart. So we will cut the general purpose horse off. We cannot afford to bother with them so far as breeding them as a type is concerned.

Now there is another class of horse that some of you may be interested in. I do not suppose you ever breed them down here. That is the trotting horse. I think in the history of breeding there never has been a greater success, or greater skill shown than in breeding the American trotting horse. When you come to think of it, it is wonderful. Just think how the records have been lowered within our memory. I remember when I was a young man of seeing a picture of Flora Temple, with a record of 2:18 1-4, and underneath was an article written by one of our leading horsemen, who contended that that was the limit; that Flora Temple had established the limit of speed possible for the trotting horse to reach, but you know that there is many a man today who can hitch up a horse to drive to church or to the post office which can nearly equal that speed. They have kept on lowering the record until they are down pretty well to the two

minute mark. And right in that connection, brother farmers, there is another matter that I want to speak of. I do not want to irritate you, but I do want to speak of this one thing. I want to say, in short, that if I had a boy and a colt, and I thought that that boy would never succeed except in connection with trotting merely, if I had a boy on the farm that showed any such disposition as that, I would send that boy off to a boarding school, and I would not let him come home until I had wheedled some other fellow into buying that colt. I would not allow that boy and that trotting colt to grow up together on the same farm. (Applause.) Now we are going back. I do not like to say those things, but I have watched this thing so much, I have watched good clean boys grow up to manhood, where they have been associated with trotting horses, and I have followed those boys for years afterwards, as they were laid away in drunkard's graves, I have watched those boys until they were a disgrace to the community in which they lived, and I say to you that this is my deliberate conclusion. I do not know what it is, but there seems to be something about it that has an influence, or a tendency to drive manhood down, and when it comes to choosing between a clean boy and a colt I am going to take the boy every time.

Now we have got these classes down to two. Now we have a heavy coach horse, carriage horse, and driving horse. There is a class of horses that we can grow and grow to perfection, because we are surrounded with all of the natural conditions for doing it, and doing it well, if we only breed intelligently. We can grow a class of horses that will not only pay a profit, if we want to sell them, but will last on the farm more years and do more work, and do better work than the class of horses that we are so largely breeding today. I am not here to advocate any special breed, but we must, if we are wise, breed for the best advantage to ourselves, and we must go far enough to see that in those particulars we must select certain types or characteristics, and it seems to me, Mr. Chairman, that we will find more in the heavy horses that are brought from those sections of the world where breeding has been intelligently carried on for generations than we can hope to find or expect to find where the ancestry or breeding or pedigree is so short. Now I would select for a heavy draft horse such a breed as the Percheron or the Clyde, horses that

have been bred along distinct lines, and intelligently so, for many generations. It seems to me we will find all the merits that we are looking for in horses of that type or of those breeds, but if we want to select a hackney, a French colt or German Oldenburg horse, those are both good types. Why, I could tell you the history of the breeding of some of those classes as I have studied it in their native countries, and I think you would be surprised. They are so particular with their breeding that the government comes in and puts its hand on a man and says, you must do so and so. A man is not allowed to breed in any way that he may choose. He must get the consent of the government to do it before they will allow him to breed a horse. When our government steps in, perhaps not as radically as that, I am disposed to think it may be a good thing. But, my friends, it is something to select the highest type of farm animals, and in doing that for breeding purposes one of the first and most essential things is to get good parentage.

So then, in the selection of horses, be sure, first of all, as I said a few moments ago, that you have a vigorous animal, and then you want one of good form. One of the principal reasons or justifications that we have for breeding or keeping horses, is to get something out of them, and a good looking horse always sells the best. So always look out and require good action, I do not care whether it is a draft horse, weighing a ton, or whether it is a carriage horse weighing eleven hundred pounds, if that horse fails in its ability to travel well, that horse is a failure all the way through. When a horse is traveling the impression which anyone gets of an animal is largely from the action, so that the ability to travel in good style is one of the first requirements. Now in judging of the action of a horse it seems to me that people are hardly complete enough in their methods of examining the horse. What I mean is this. I think if three-fourths of the farmers up in our county were to show their horses to prospective buyers they would take them out of the stable with a long rein or strap attached to them, and let the horse go around in the yard for a little while. Now, brother farmers, you cannot tell a thing about the action of a horse in that way. You can get no idea about it. Some of them will take the horse

out by the halter, and walk it up and down the yard, trying to show it off in that way, but a prospective purchaser can get no adequate idea of the action and style of that horse from any such showing. Then they will let that horse trot. A good walker is always able to trot fast enough for ordinary purposes. But when the owner of a horse lets the horse start from you, let him come back, toward you, so that you can see how he acts both ways. If you are going to buy a horse on that kind of an examination you want to see how the machine works. If that horse springs out or springs in, just let some other man buy that horse, and let some other man breed from that horse, for, if its feet are not set right, or its head does not set right on its body, it will never be a satisfactory horse to you. A horse should lift its feet high enough so that they will always well clear the ground. When you take a horse out you do not want one that is shuffling through the dirt or sand. You want a horse that lifts its feet well, with good style and good action, and that steps off as though it felt strong and lively.

Then when that horse trots don't go to Madison Square Garden for your ideals of action. It seems to me that the marked tendency of the market is to demand horses of too high action. I want a horse to lift his feet up so that he can travel easily and freely, but I do not want a horse to step so high that, according to my way of thinking, it spoils the general appearance of his action. So I recommend selecting a type which has a medium high action.

Then always be sure in the selection of a horse of another thing, and that is, that the horse has brains, and that it is free from any vices. There is no animal under the sun into whose keeping we place our own lives and the lives of our families as we do into the keeping of a horse, and the horse that is bred from vicious parentage is apt to bolt at any time, and is apt, in some trying time, although he may have been good for years, to do something which may cost us our lives, or may cause serious injury either to ourselves or to the members of our families. So be sure of the parentage of the horse, and make sure that it comes from good gentle, manageable stock. You can breed vices as well as you can breed good points. Get a horse of a good cool temperament with plenty of brain, with good feet, good legs, and action, and then it does not

make much difference, if you have all that, what else you have. Further than that, get a horse that has a good color. So, to sum the thing up, in breeding or in buying, select some of these different types that I have described, and be sure, as I say, that you get a horse having good feet, good clean limbs, good size, with good strong joints, and in breeding be sure to cross those types that go naturally together. What I mean as to that is this; I have been told many a time that a large horse would not wear well. There never was a greater mistake than that in the world. I have been told, "Why, you will have to go to the blacksmith shop every time you go to town with a horse like that," and then, "that they pound themselves all to pieces." Brother farmers, they do not do any such thing. And then, another thing. I do not believe there should be too much difference in the size of the sire and the dam. There never should be, in my opinion, over two hundred pounds difference between the horse and the dam. We find sometimes a much greater difference than that, sometimes that of several hundred pounds, and that is too pronounced a difference to get good offspring. That is not the right kind of a cross, in my opinion, for the offspring is quite as apt to partake of the action and motion of the dam as it is of the sire, and if you have a large heavy horse crossed with a dam of much lighter weight you are liable to have a weak foundation. So, be cautious to make a very careful selection as to type or size, and then breed up carefully.

Another thing. I would not cross a carriage bred dam with a draft horse sire or vice versa. When you have carriage bred blood bred in that way you reduce the size of the draft horse, and do not add at all to its value as a heavy draft animal. When we cross a carriage bred dam with a draft bred sire, we expect to get a larger colt that will sell at a high price, but, for the reasons I have already given you, I think that is a mistake. There will be certain things which will crop out in the offspring that will spoil it for the best markets. A carriage horse wants to be about a certain size and weight, and we should breed to keep it there. In a carriage horse we want something else beside the points common to a heavy draft animal. We want a good, tidy, bright appearing head, good brains, active disposition, and a horse that will travel well. By using a draft horse sire and crossing it with carriage

bred blood we are apt to get a form that will destroy the animal for selling in good markets, and we will be disappointed. So, my advice is to breed carriage or coach breeds together, and not cross over from one to the other.

Now in breeding colts I have the best results with breeding in the fall. I like the fall bred colt very much better than I do the spring bred colt, and there are several reasons why that should be done. When a dam is through work in the fall, let her have the time through the winter to be with that colt and raise it. You will get a better colt than if you allow the colt to run with the dam through the working season. Then feed that colt liberally all through the winter. I do not believe there is any danger in giving it all the grain that it will easily eat, — a reasonable amount. I never yet have known of a colt that was injured in any way from eating too many oats. On the other hand, I would not feed corn at all. Do not make the mistake of feeding a young growing colt corn because there is nothing in corn that goes to make up a good horse, especially during its growing period. We are sometimes inclined to blame the blacksmith because our horses go lame. My friends, do not blame the blacksmith until you go into the situation and see what the trouble is. You can breed a horse with weak, poor bone. You can take a colt that has been bred well and feed such a colt upon that kind of food, and to a very large extent destroy the vitality and strength of the animal's frame. Right there is where we have made a mistake in feeding our horses too strongly with a carbonaceous ration. You may not think it is possible, but that is the fact, you can weaken the bone. That has been proven over and over again. At our Experiment Station, where the principal feeds are experimented with upon all classes of animals, it has been shown that you can weaken the bone until there is but little vigor or vitality left, and where you have a horse of that kind the chances are quite largely that it is due to the food which that horse had when a colt. So do not blame the blacksmith until you find out what the conditions have been in the barn.

Another mistake we have made is in feeding horses timothy hay. I do not believe that timothy hay is a good food for the farm horse. I would feed clover hay. Mix it up with some

of the other good hays, but clover is always a good food for a horse. Do not be afraid that it will give them the heaves. It will not do it. I defy any man to cite one case where clover hay ever gave a horse the heaves. A horse has but a comparatively small stomach, which holds only from twelve to fifteen quarts, depending somewhat upon the size of the animal. Now when we put down two big forkfuls of clover hay, and then feed four quarts of oats, when that horse has swallowed it all the stomach is pretty nearly full. Then if we start out in the morning and the horse shows some evidence of heaves do not think it is the clover hay. It was not the clover hay. It was not that at all that produced the symptoms, but it was our injudicious method in feeding. When you feed your horse never feed in a way to allow it to gorge its stomach. A horse, as a rule, should have a concentrated ration. A concentrated ration of hay or alfalfa, and a little good grain, depending somewhat on the weather, and on the time of year. If it is alfalfa hay do not feed oats. Let him have a little corn because you may injure the animal by feeding an overplus of nitrogenous food, and you can do it more quickly than you can by feeding carbonaceous food. Now to get back to the little colt. Feed it oats and not bran. If you are going to feed it bran, feed it a little bran with a little linseed cake. Keep that colt growing every moment of its life because we want to make the best horse that we can. Now when the colt is turned out in the spring, do not turn the colt out, where it has been fed all winter on grain and its mother's milk, into a soft pasture, because you know that grass in the spring is about ninety-five per cent water, and the other five per cent. is made of other elements, and there is not very much food value in it. You cannot afford to weaken or check the growth of the colt. Keep up that feed of hay and grain until well into the month of June when the grass gets new and fresh and contains nutriment enough to keep that colt growing all the time. When that colt has been well fed and well taken care of by the time it is three years old the expense of production has ceased. Then it is able to earn its living. With a colt of that kind you know about what it should sell for, and you can make a good profit. By raising horses of that kind we can stop this everlasting flow of money into the pockets of western speculators, because by following some of these simple rules that I

have tried to outline we can breed a better class of horses than can be brought from the great ranges of the west by anybody.

Now just a word on another point. I have had horses weighing twelve hundred pounds, and I have had them weighing seventeen hundred. I have worked them side by side. I have had to take the twelve hundred pound horses and plow heavy clay soil. I have had a chance to test the merits of the two classes pretty thoroughly, and, my friends, I want to say that I never fed a heavy horse one quart more of grain than I have fed to the smaller horse, which was doing work in the same field. I have never had to pay more money for shoeing although the blacksmith always scolded a little. I never have had to go to a blacksmith when a horse has lost its shoe any oftener with the light than with the heavier horse.

My aim in breeding horses has been, in the first place, to get a horse with good points, and then I have been determined to feed that horse in such a way as to get the most out of it. If a horse lost its shoe I just went right on. I have had heavy horses that looked well and traveled well. I have made it my business to drive my family to church, and we always got there on time and got back in time for dinner. And if you can do that, that is about all that most of us want. I have taken my wife in a carriage out for a drive behind a sixteen or seventeen hundred pound horse, and the other fellow has had to ride in the dust. My plea today, before you, is for a heavier bred horse, for some special uses, and you want a special purpose machine for especial uses. You can get those types of animals if you breed intelligently, and if you do that you will find there will be an ample reward when you put such horses into the market.

Just one thing more and I am done. There is another side to this question, my friends. I hinted it to you a little while ago. I said that I had a good deal of interest in boys. I always have had and I hope I always will. A great many people are worrying because so many of our farm boys have left the old places and gone off to the cities. Well, the Lord knows that the cities need them. I do not know what they would do for population if the farmer did not send it. I do not blame some boys for turning their backs upon the old farm. The fact is that life upon the farm has not been made attractive. I think, my friends, that the thing that takes a

good many boys to the city, and away from home influences, can be summed up in the simple statement, that their parents have not been just to them, have not treated the boys right. Now that is a serious charge. I do not make it because I am down here. I would make it if I was in my own county. I say that the fathers and mothers of a great many of these boys that have gone away have made a serious mistake. There is no more precious spot on earth than the home, and I believe in doing all possible to keep the boys there until it is time for them to establish homes of their own. The trouble has been, or one trouble anyway, that when father has given the boy a colt, or a calf, or has set apart a field for him to work, and the time has come when father wanted that colt to sell, or wanted to sell the calf, he has done so without consulting the boy, and put the money in his pocket. Now perhaps some of you think that sort of thing is right, and that because the boy was yours you could do what you liked with property that the boy regarded as his. But, my friends, do not make that mistake any more. You cannot treat a boy that way without his resenting it, and if there is any good manly blood in him, he is bound to break away from that kind of treatment. Let the boy have that colt. Let him have it for his own. Let him take care of it and bring it to maturity. Let him have the enjoyment which springs from the sense of property. It will help to make a better man of him. And you will find if he has a colt of his own, and if he is allowed to have proper time to play with it, that boy will take a larger interest in other affairs of the farm and will be far more likely to stay with you than if you adopt the other course.

Secretary BROWN. There is nothing further upon the program at this morning's session, and the convention will stand adjourned until two o'clock.

THIRD DAY — AFTERNOON SESSION.

Convention called to order at 2 P. M., Vice-President Seeley in the chair.

Music.

The PRESIDENT. I take pleasure in introducing Mr. Frank D. Ward, President of the New York State Sheep

Breeders' Association. Following his address there will be a discussion opened by Mr. Stadtmueller, President of the Sheep Breeders' Association of Connecticut, and at the close of this discussion there will be a business meeting of the Connecticut Sheep Breeders' Association, which will be held in the hall of the convention.

SHEEP BREEDING AS A FACTOR IN CONNECTICUT AGRICULTURE.

By Mr. Frank D. Ward, President New York State Sheep Breeders' Association, Batavia, N. Y.

Mr. President, Ladies and Gentlemen: I was glad to speak to you this morning on the subject of horse breeding, and I am twice glad to come before you with a better message at this time, — one on the industry of sheep breeding. I sincerely believe that that is a key which will help to unlock the way to success to many a farmer in this State of Connecticut. One of the problems that is facing the farmer, not only in this State, as I have seen it, but in my own State of New York, and in some of the other eastern States, is how to secure help to till the farms profitably. I want to say to you that if the farms of Connecticut were covered with heads of livestock that they are capable of carrying, and of supporting with profit, the hired help problem would be solved right there. I believe that the conditions in Connecticut are such as will justify, not doubling, not quadrupling, but by increasing twenty times over the number of sheep that are kept on the farms of this State. You have hundreds and thousands of acres, as I have seen the years past while traveling through this State, that will pay a higher cash profit if stocked with some of the improved varieties or breeds of sheep than you can derive from those farms in any other way. Some sections of the country are particularly adapted to the growing of grain. I say to you, in all sincerity, that you do not live in such a section. You can never hope to succeed by continuing the practice, or by depending to any great extent for a profit on the growing of grain or cereals, or potatoes alone on any Connecticut farm. I do not claim to be a prophet or the son

of a prophet, but the facts show that the statement I make is correct. Some parts of Connecticut are adapted to the growing of fruit; some parts of your State, as I see it, are adapted to dairying, but there are great areas in this State that are adapted to none of these ordinary farm practices. Sheep, and nothing else, will help solve the problem of profitable agriculture on these farms. But you say we have tried this. We have tried it and we have met with difficulties. We have met with obstacles, and we have not been able to overcome them. I want to say to you, and I say it sincerely, that there is not an obstacle in the way of successful sheep breeding in the State of Connecticut that you cannot overcome if you will. And I also want to say to you, that there is a tremendous obstacle in the way of your ever successfully growing grains or cereals upon a profitable scale in your State. I was over in one of the best parts of this State this fall. They were thrashing on the farm. And the thrasher boasted at night that he had thrashed out four hundred bushels that day. I went to a large fair, where I judged all of the farm machinery, and among the prizes offered was a prize of one hundred dollars for the best exhibit of farm machinery. A part of that exhibit was a thrashing machine. The superintendent of the department came around and rather apologized for the presence of that machine there. He said it was a good machine, in a way, but, he says, it is of no use to us because it is too big. If that man would take that same machine out into our county he could not get a job to do with it because he would find it was too small. That illustrates the difference in the grain raising capacity of the soil in different sections. That man thought it was a big day's work because he had thrashed four hundred bushels that day. Within a few days I went into a large thrashing machine establishment and I looked at a grain carrier and thrashing machine capable of handling four thousand bushels a day alone. The sections of the country that are capable of growing grain calling for machines of that capacity are the sections that can control that particular branch of farming. We cannot, and you certainly cannot compete with growing grain carried on upon any such scale as that. We people might just as well turn about and make up our minds that we cannot do it. I do not know whether any further preliminary explanation, Mr. Chairman, is

due or wise, but I want to get all I can out of this for your good. I did not come down here to say unkind things, but when a man stands before an audience and attempts to be a teacher, he is false to himself and to his audience if he does not speak what he believes to be the fact. I mention this because I am firmly convinced of its truth, and I believe it is for your good to have it stated.

I was so tired yesterday that I wanted to go home and go to bed, but, my friends, I did want to bring a message to the farmers of Connecticut. I am glad to be here. I want to say to you that I came because I am interested intensely in this most interesting subject, sheep breeding. I always liked something that was alive. I had no use for anything else. I like a live man today, or a live animal. I have no use for the fellow that is not alive and not on to his job. When I was four years old my father went with an uncle and bought some sheep, a small flock, some of which were imported. I do not remember all of the arguments I first used at that time, but I remember that I never ate a square meal until I got some of those sheep. I just set out to have them, got them, and from that time, when I was four years old, I have been a sheep breeder. I have bred different classes of sheep, pure merino sheep kept alone for wool and worth nothing for anything else but wool production, because the merino does not enter into or become a factor in mutton production and never will. None of the various classes of merino sheep enter into mutton production at all. I do not want to step on anybody's feet here, and I hope they will not feel hurt by my making that statement, but that is the fact. The merino is a wool-producing sheep. It never has been a producer of first-class mutton, and never will be. I have always owned a flock of long wool sheep, a good many of them. I have had many different varieties. I have crossed the Atlantic and had my pick among some of the best flocks on the other side, Cotswolds. I have imported others. I have spent a great deal of time in studying sheep breeding in a country that is successfully breeding what are known strictly as a mutton breed of sheep, and from this experience, and from a lifetime of breeding, experiment and observation, I want to talk to you a little while this afternoon upon this subject just as I see it.

I want to repeat again, first of all, that there are very few farmers in Connecticut but what should have sheep on their farms because there is such a large proportion of the State that is worth more to stock with sheep than can be gotten out of it in any other way. I know some of the drawbacks. If you people were to tell me confidentially the thing that stood in the way most of all I should say it was on account of dogs. But, my friends, I say to you that that is not the reason at all. The farmers themselves are to blame for that obstacle being in the way of their success. Do you know that dogs very largely are influenced in their conduct toward sheep by the fact that they have never seen them before? They think they are wild animals, and if upon the farms of Connecticut there were fifty times as many as there are at present there would not be as many killed by the dogs as there are now.

Another thing: We have got some politicians over in our state. I want to give you a little history of the best dog law that ever was introduced into the New York state legislature from the point of view of the farmer. That bill was a very favorable one to the sheep breeding interest. It was introduced and referred to one of the committees of the legislature. There was a hearing on that bill. How many farmers do you suppose attended that hearing? There was not one, either in person, by proxy, or by letter. Some of the country clubs down on Long Island sent delegates up to that hearing, and they took money enough in their pockets to put up a nice dinner for the committee. They met around the table, and they wined them and they dined them, and before the cigars were half smoked out the committee voted unanimously that there was no call for that bill. Now I want to tell you that we never can hope to secure legislation in that way. I do not blame anybody because the dog men said that the bill was bad and a wrong to them. They had just as good a right as anybody else to come before the committee of the legislature and present their views. I have no quarrel with them, but I do have a quarrel with the farmers who were too indifferent to make their wants known.

When the Grout bill was before Congress I helped pass the hat through an audience of farmers at an institute in our state in one of the leading dairy sections for the purpose of

raising money to defray the expenses of the Assistant Commissioner of Agriculture in going to Washington to advocate that bill. The man worked hard night and day, went without any compensation whatever, and it was not fair that he should in addition pay his own expenses. We thought it would be a good thing for the farmers' institute to undertake to raise enough money to defray the expenses of the delegate from that great dairy state to Washington to look out for the interests of the dairymen, and, do you know, my friends, that while taking up that collection, I saw farmers whose business it was he was trying to protect, and who had a vital interest in that legislation, drop ten cents in that hat. I want to tell you we cannot get anything out of the legislature in that way, and we do not deserve to have anything. When the time comes that the farmers will stand together and say, "We demand this," then they will get some help and some encouragement from the legislature and they will get a dog law that will protect. If there are drawbacks to the success of the sheep industry in Connecticut there are none, I am sure but what can be overcome. The greatest drawback that I can pick out to the possible destruction of sheep by dogs is the gross indifference of the farmers themselves. (Applause.) I want to tell you that the small, poorly-tilled, behind-the-times farm, with an indifferent proprietor, stands more in the way of success of sheep breeding than all the dogs in the state. A farmer will buy the best grain he can buy. He will select the finest wheat. He will screen it until there isn't a trace of a shrunken berry in it. He will buy beans and screen them until there is not an imperfect bean in the lot. He will send up to a man in some other state and get the best potatoes that it is possible, the most improved variety, and the best quality. And after he has done all that he will go and buy the cheapest farm anywhere in the country, and then because it is not satisfactory he will curse the whole business. My friends, you cannot be and never will be successful in that kind of a way. A man who starts out determined to succeed and who puts some energy into his farming, who studies his work, and takes a pride in it, that man, no matter if he is in competition with men who are better located, and who perhaps are better equipped, will get a profit that is greater than can be gotten out of any other branch of farming. I just want to tell you,

briefly, some prices that sheep are selling for. We get the market reports of sales of sheep in the different large centers, New York, Chicago, Buffalo, and Pittsburg, showing that sheep are selling at certain prices and that that is about what they are worth. I was in Buffalo, in the stockyards, and as I was eating dinner at the hotel, one of the sheep salesmen came in with a broad smile on his face. I asked him what tickled him. Why, he said, that he had just sold his lambs for $8.50. Well, that was enough to make a man laugh. There is some chance to do business with some satisfaction where you can get prices like that. But let me tell you another thing. You never saw any market reports where the price was limited for high class mutton. We are scouring all Europe for an outlet for the products of American farms. There is not a week in the year but fat sheep or lambs are eaten at the club houses in New York City that are bred and fed on farms in Great Britain. But, you say, we are exporting and shipping all the time. Yes, that is true. We are exporting for the European market, exporting there liberally a great many different articles, but on the other hand, we are importing mutton that we ought to raise ourselves, and that kind of reciprocity possibly nets the other fellow the most profit. I know a man who was no better located than a great many of you are, who sold every lamb in his flock at a net price of sixteen dollars each, and those lambs were only a few weeks old. Nearly all of them were twin lambs. I know another man over there that makes a specialty of growing fancy Wethers for hotels, and clubhouses in New York City. I have known him to sell fat Wethers for as high as forty dollars each. Anybody can raise that same kind if he will. Whatever man has done man may do. He has made many sales from twenty-five to forty dollars. What we want is more men who will raise that kind of sheep. We have not got enough of that kind. The flock from which these forty dollar Wethers are bred are pure bred sheep, good sheep, but understand there is no difference, or very little difference in the cost of production of sheep of that grade, or of raising lambs bred in that way over lambs bred from an ordinary flock. The expense is not largely over that from selling sheep from an ordinary bred flock. I can tell you of men that are selling hothouse lambs, and for every lamb they have in the flock are getting not less than ten dollars each,

and nearly all of them are twin lambs. Now how does that compare with your profits on potatoes and on other crops which you raise in this vicinity, for a market for which you depend upon city consumption? How does that compare with your profits on butter, cheese or anything else? I want to tell you away up over it all is the profit that you can make from growing choice sheep on these Connecticut farms.

I have no particular breed to advocate. There is no best breed, because there are many methods of breeding. One breed may be best adapted for one purpose and another for another, so that I cannot tell you what breed is best. Then I would not undertake to do it if I knew until I got pretty well acquainted with the man that wanted the information. We all have our likes and dislikes, and what might be best and most profitable for one man might not be at all suitable for his neighbor. These little fancies that we have are a very important part of our being, and we cannot ignore them. Some men like a horse that will go a mile in two minutes and a quarter, and others are well satisfied with one that has a three minute gait. So it is with sheep. Some men want one thing and some men another. But, if I get well acquainted with a man and find out what his likes and dislikes are, then I have no hesitation in expressing my opinion to him as to the best breeds of sheep, and as to what is best for him or for his farm.

If you are breeding sheep for hothouse lambs, the large, plain, coarse tailed merino is a pretty fair breed because there are characteristics of that breed that make them adapted to that particular line of breeding. Those lambs must go to market about this time of year, from now until the twentieth of February; and the large, thick-fleshed, massive breeds of sheep cannot be bred in the times of year when these lambs will go to market. Right in this connection let me call your attention to an important fact. You cannot produce wool and mutton at the same time. Perhaps in the history of breeding there never has been anyone who accomplished more under the conditions that then existed than Albert Buckley, who began away back two hundred and forty years ago. He bred horses, cattle and sheep, but his chief work was with sheep. He was a mysterious old man. I have been amused sometimes in reading the early history of those old breeders, and how they quarreled, and what they thought about Buckley. He left

quite a record of what he had found, and of his conclusions and experiences. Among other things he wrote to a friend, and in the letter made this statement: "In all my experience I never yet have found the best quality of mutton and a thick, healthy fleece of wool in the same animal," but there are lots of people, intelligent people, who do not know as much as Buckley knew two hundred and forty years ago.

I have sold a good many sheep in my life. I have been breeding pure-bred sheep, and I have sent them across the Pacific to Japan, to Europe, lots of them, to South America, and into nearly every county in the eastern states, and that means a lot of correspondence, and from all that experience let me tell you this fact. About three men out of four when they want to buy a ram, the first question they will ask is, how cheap can you sell it, and they want one that will insure wool all over the face. Well, I have to tell them a good many times, that it is not wool that we are growing, but it is mutton, but somehow or other it makes a great deal of difference with them to be told that he has wool all over the face. But that aside, it is nevertheless a fact that you cannot get mutton and wool in the same animal. If you want a large, healthy, heavy fleece of wool, you must raise a different breed than you do if you are after mutton. We want a good carcass, a heavy, fleshy, massive carcass of mutton, and when you get that you can make up your mind that you have got a good quality and can get a good price for it in the market, and they will take all the wool there is with it. So, if you are raising mutton, do not pay any attention to the fleece. When you find that kind of a sheep you want to buy it because the best that you can find are poor enough.

Now if you are breeding lambs to sell, just let me give you a little advice. There ought to be a good market for lambs in Connecticut, because, as I have seen this state, it contains a great many little towns scattered all through the farming sections, and some places are filled through the summer with a class of people, summer boarders, who are willing to pay high prices if they can have just what they want to eat, and you people can supply that demand with the very highest quality of meat that can be put into any man's stomach. For that purpose you want some of the dark-faced, thick, fleshy, breeds of sheep, like the Shropshire or Southdown. I think

you will find those breeds most suitable for that purpose. I take it that where you are so situated that you can grow lambs for the summer market, for these large hotels and pleasure resorts, that they will be a most profitable branch of breeding.

Now just for a little time I want to talk about some of the ways of caring for sheep. We used to think that if the sheep had plenty of straw they could work down the straw stack better than anything else, and that when we fed them grain there was nothing so good as corn. But let me tell you, brother farmers, that you cannot make good mutton on wheat straw, timothy hay, or on a diet of mixed hay or corn. You cannot make it that way. I have eaten a good many pieces of mutton, but if you are going to create a demand for high-class mutton you must produce the kind that people want, and which brings a high price, this large, juicy, sweet meat that is better than any other meat that ever was put on the table. Last Thanksgiving I supposed, of course, that we would have turkey, the regulation turkey. That is always considered a dignified way of setting the table for Thanksgiving. I asked the good Missis about it, and she says, I guess we will have a lamb roast. Well, do you know, that when I sat there at the table on Thanksgiving Day and ate that sweet, juicy meat, I could not help but feel that it was far and away better than turkey, the usual dish for a Thanksgiving celebration. I have eaten mutton in the old country, and I never tasted better mutton than we have grown right on our own farm. Those sheep were fed in a way to develop the best class of meat, sweet, solid, juicy mutton. That is the way they were fed in the first place, and then carefully taken care of afterwards.

Now just for the sake of an example, let us take a flock of sheep at lambing time, and if we have been judicious in feeding and caring for that flock, we will have no trouble at this time of year, and we will have no loss. You can go to bed at nine or ten o'clock in the evening and sleep with a clear conscience, and without any fear that there may be loss or trouble in the barn. And when you go out in the morning you may find a half dozen little fellows running about playing with each other as happy as they can be. But in order to bring about this happy condition of things, you want to begin long before the lambing time sets in. I know from experience that there is nothing so discouraging as having a condition in the

barn that exists on so many farms where the management has not been right. Now let us go back a little and see what care will bring about this condition and then we will go on and see what can be done. One of my early experiences was this: I went down into Monroe County, and I bought a flock of breeding ewes. It was about the middle of February. They were Cotswold ewes. I did not like the looks of them. There was a good deal of merit to them but they had not been cared for right. They had been left out in a storm. And they had some bare spots around their necks in the fleece. I did not show them to my friends. They had lambs that spring, and the lambs died. They would die in spite of me. The ewes were strong, rugged looking ewes, but quite a number in the flock died. I made up my mind that I would have those sheep in better condition the next winter. They were strong, rugged, broad-backed, and as clean as they could be. I got them into the best condition I could. Took good care of them all through that season. Then I took my friends around to see them, and I had good luck with them after that. You cannot succeed, especially with sheep which you are breeding for mutton, without exercise. That is a great essential in the breeding of sheep. Without exercise the flock will not do well. You must keep them out and keep them strong on their legs. Keep them stirring and teach the lambs to walk before they are born.

I think it was two years after that I bought another flock of Cotswold ewes. I bought them away over in Livingston County, where they had run out all winter without even a straw hut to run under for protection in bad weather. They ran out on those pastures, and it was a mighty good thing for the sheep. The first lamb I lost in that flock was the sixty-fifth lamb that was born. We simply had to pay no attention to them. They were strong, vigorous, hardy, and robust, and soon made good shipping stock. Now if you can do that, get your flock into that kind of condition, you need not be afraid of any trouble in lambing time.

Now in regard to feeding sheep. One of the best things is to provide a good field of rape. I do not know as you raise much of it down in this country. If not, let me tell you how I cultivate it. I have sown hundreds of acres of rape, and have always found that this plan worked well. In most cases we

sow it broadcast, putting on about a pound and a half to two pounds per acre. Sometimes we sow it with oats. We put on about the same amount of seed, a pound and a half to two pounds to the acre, thus saving the trouble of running over it with the seeder. The rape will not interfere with the oats. It will only grow up about an inch before the oats are cut. It does not make a rapid growth, but most always when we get the oats cut and shocked up, and then comes a soaking rain, that will start that rape to growing, and there we have got so many acres of the very best pasture for any kind of sheep. Sometimes we raise it with corn. At the time of the last cultivation of corn, that is, late in the season, we go through the field of corn when it is away up over our heads, and we sow about the same amount, a pound and a half to two pounds, right ahead of the cultivator. That is in a field that has been cultivated all summer. By running the cultivator through between the rows at a time when the corn has attained such a large growth, you may wonder how a man can throw the rape seed, but it is the nicest job I ever did. Take a good steady old horse, put a saddle on him and put a muzzle over his face. A good muzzle can be made by taking a bushel salt sack and tying it over his head. Then take your jackknife and cut some holes to snap the lines through, and you have got one of the best muzzles I ever saw on a horse. Then just take a pail of rape seed and go right straight through and throw the seed over the tops of the corn for a width of about five rows at a time. That will cost you about a shilling an acre. After the corn is out of the way, of course, the rape comes on, and with these different fields of rape you have got an ideal place for the late fall and early winter feeding of your ewes. I do not suppose that rape after the season has progressed through December to January, and sometimes, if it is open, into February, is of much value from a food standpoint, but they like it. Now feed them in the morning all they will eat, and then let them go out, and let them paw in the snow and exercise around in the field, and you will find that those lambs will not bother you a bit.

Now I have had a good deal of experience in feeding, and under our conditions we have found that feeding them a rough ration made up in this way is conducive to the best results. Feed a ration of mangels in the morning. I do not know

whether you grow them, but in our section we grow a good many of them. The dairymen like them for dairy cows. As a night ration, feed corn ensilage. For a grain ration, it is a good plan to give them a mixture of coarse bran, and add to that one-fifth by bulk of cut oil-cake. Or, you can give them oats and bran in equal parts, and one-third of the whole in oil-cake. That is, take two bushels of oats and two bushels of bran, and one bushel of oil-cake. I believe it is the best grain ration you can give the flock. We feed in some place where it can be scattered to some extent, so that they eat the grain slowly. At noon give them a little straw or something of that kind. We have never had any trouble with the growing of sheep rapidly with that feed.

I have shown sheep a good deal, and have shown ewes at eighteen months, or thereabouts, weighing from 220 to 240 pounds each, and rams weighing from 250 to 280 pounds each, at that age, and those sheep had never seen hay in their lives, and did not know what it was.

Then in addition to that, an important thing is to give them plenty of clean water. The water must be in a clean trough, tub or pail, and the trough or pail should be kept scrupulously clean. Never ask a sheep to drink out of a trough or pail when you are unwilling to drink out of it yourself. If it is clean enough so that you are willing to do it yourself it is good enough for sheep. I have seen sheep come up to a trough that looked a little dirty and reach clear over and take the end of the pipe in their mouths rather than to drink it out of the tub. I have had sheep that were fed in a barn who would not drink to satisfy me, and by taking the empty pails out and giving them a good cleaning with a scrubbing brush, and then taking a cloth and washing them thoroughly clean, and filling them up the sheep would drink all right. A sheep is very particular about the water it drinks. It must be clean. And then another thing: if you feed ensilage, feed all they will eat once a day. The appetite of a sheep is something you need to watch. Feed them only just such a quantity as they will eat up clean in a reasonable time. To give them more is of no practical advantage to them or to you. Now, in feeding ensilage, feed only once a day. If you begin feeding it twice a day they will not eat it over three or four days. Feed it once a day and you will find it a most suitable feed for

any mature sheep. If you can have roots in addition, perhaps so much the better. I do not want to say that you must have roots. I do not believe it is necessary, because we get succulent food which they need in corn ensilage, and that will do very well, but if in addition to that you can have roots it is all the better.

Then in regard to the care of sheep aside from the feeding. Always keep them moving. Have their quarters always clean and always dry. Wet backs and muddy feet mean loss in the sheep-fold. They must be clean under foot and dry and they must be protected from storms. Now how closely shall we protect them? I just let the sheep be the judge of that, to a certain extent, themselves. If they want to go out into the snow I let them. I do not believe enough snow can fall on their backs to injure them, but I do not want them out in a cold bleak storm in the fall, because that, many times, means disaster, and that is a place where a great many people make a serious mistake. During a cold, rainy, wet spell the cows will come up, and we put them into the stable. The horses will come up under the barn, and to get rid of them we put them in, but a great many think because sheep have a heavy warm fleece of wool that they can go, that they do not need any protection. That is a serious mistake, and yet that is just what you do when you leave sheep out in the rain. They have got to dry out that wet, clammy, cold fleece with the warmth and heat and vitality that is in their bodies, and which they need for their own use. They have to stand around waiting for that to dry out, and until it is dried out they are not comfortable. Stock which is uncomfortable cannot do well. That is the kind of stock that you want to get up first. Let the cows and horses go until you can take care of them. That means that the sheep breeder should always have a rack with some of the best hay in the barn in it so that when they begin to feel hungry they always know there is a light in the window for them. Keep them comfortable and keep them growing every day of their lives.

Now we are ready to go back to those lambs. We should have a dry sheep shed, free from drafts, and to prevent a draft through it, do not allow windows on the opposite side to be open. The best shed has only one opening out of it where the wind can blow out. Let the shed have a wide door, so that

they can pass freely back and forth. Now, in addition to that, let the little lambs have a lamb parlor, where they can go and lie in the litter and sleep, and eat, and have a jolly good time. They would rather be by themselves than to be with the large flock. A little lamb, if well fed, does not have much of any longing for its mother. A sheep, as a rule, is not capable of affection. They are as cold as a snow drift. If a ewe has not plenty of feed for a lamb she will not care much about the lamb, and if that lamb is not hungry it will not care any more about its own mother than it does about any other sheep. Make that lamb parlor right off the place where the ewes run. Put up some boards dividing off a place, seeing to it that the corners of the boards where the little fellows pass in and out are rounded off. The place where they pass in should be just wide enough so that they can get through and so that the old sheep cannot go through. Then a part of the furniture of that lamb parlor should be to have it so arranged as to have plenty of good air, but without drafts. Then you must have a place to feed them, and, first of all, you want a grain trough. The grain trough should be made with the bottom about as wide as that program. The bottom should be perfectly flat, and you want the sides not to exceed two inches high, and we need it long enough so that they can all eat without crowding. Then we want something else. You want a cover over the trough to prevent their jumping in. On either end have an upright standard, and from these standards directly over the center of the trough, which is about the width of that pamphlet, have a strip about one inch by three. That is to keep the lambs from jumping up in there. When you feed the lambs the natural inclination of them is to jump into the trough. They are going to jump and huddle right in there, but if you teach them that trick when they are young, they will remember it and will soon cease to try to get into the trough. I have seen them run and jump right into the feeding trough, and when they do that, there is always danger of spreading parasitic diseases in that way. Now in this trough we want to feed them so as to produce the greatest, and most rapid and most healthy growth possible. That means, to begin with, that they should eat sugar, but we cannot afford to buy it and we cannot afford not to. The digestion of a young lamb is not strong. In fact it does not begin to get strong until

it is about two weeks old. Sometimes at ten days old they will begin to eat. Their digestion is not strong enough to take any of the foods usually prescribed for young lambs, and it is better to leave them to the mothers. After they have got along so that it is prudent, take some coarse winter wheat bran. I cannot tell you from a scientific standpoint why winter wheat is better, but from my experience I know that from the standpoint of the sheep they like it better. With the coarse winter wheat bran feed some fine ground old process linseed meal. Feed them about equal parts of bran or oat cake, and one part, of bulk, in ten of linseed meal. In feeding linseed meal you want to begin very low down in quantity. If you begin by feeding them a considerable quantity you are very apt to throw the whole machine out of balance. You want to begin with just a little and increase it slowly. I do not know where the limit is. I have fed a single sheep a pound of oil-cake per day for months in succession, and I never saw sheep that were in more vigorous, healthy and strong condition than those, but understand, a pound a day is enough to kill a sheep if you feed them that amount, or anywhere near that to begin with. To begin with, one part in ten, and add slowly of the oil-cake until you have one part in five. When the lambs are three weeks old, I would begin to add a little ground oats in place of the winter wheat. I would also add a little fine ground corn.

Now as to the hay rack. I believe in feeding them a little nice early cut clover or alfalfa. If not that, feed a little corn ensilage. Above all that, see that the hay rack is cleaned out thoroughly. It should be cleaned out at least three times a day. Put what there is left in for the older sheep. It will take but a moment to do it, and you will be repaid ten times over by seeing those little fellows grow so rapidly. Then we want another piece of furniture in that lamb parlor, and that is a clean water pail, and have water in it all the time. With such feeding as that they will eat the feed up clean in a reasonable time, and you will be able to grow them rapidly.

If you are going to sell those lambs, put them on the market, feed them in addition a little brown sugar. Let them have quite a lot of it. Put in about half as much sugar as you do of bran. They are very fond of it. Do not, however, make the mistake of giving the lambs sugar unless they are

going directly into the market, because if you cut off feeding sugar you will kill them. If you ever take the sugar away they will die. It is unsafe except where the lambs are going to be sent to market. The sugar can be purchased of most any grocer.

Now there is another thing that we want to do. Every sheep should be docked. I know that that sounds cruel to a great many of you, but it can be done without cruelty to the sheep, and it is a great advantage. What is the use of the great tail that some sheep have anyway? I never could see. I have asked some scientific investigators, and I am thoroughly convinced that it costs a great deal more to raise a pound of bone than it does a pound of meat per sheep. I am going to hazard a guess that it costs ten times as much to grow a pound of bone as it does to grow a pound of meat. Now how shall we dock them? There is where the danger lies. I have seen some of them, after I had cut the tails off, bleed to death because I could not stop it. I have corded their tails and have done everything to stop it. I have corded the tails for hours before I cut them off. With an animal of a high nervous organization, the whole nervous system will suffer, but with a sheep it is a little different, and they will stand almost anything, but with high bred, fleshy, nervous lambs they will not stand any such abuse. I have corded their tails, and I have seen times, my friends, when I felt so badly that I have gone off to the house out of sight when I have seen the struggle and pain and bleeding that came from cording their tails. I have lain awake at night, more than once, just before the time came when I knew I had to cut those lambs' tails off. I have even let lambs go because I had not the pluck to go and do it. But I have found another way. There was somebody that made what they called a docking bench. When I saw it I thought I would rather like it. I sat and looked at it. I tried it, and came to the conclusion that the one way in the world that was safe to the man and humane to the sheep was to burn their tails off. I have taken the tails off from fifty lambs in that way, and have them run right away and go to playing, run right off and go to eating. There was not a lamb in the lot that knew until he came to suck his mother the next time that he had not got anything to wiggle. It takes them off at just the right place, at about an inch from the end.

Taking the tails off will make a difference of from fifty cents to a dollar a head, and they will gain faster than any other lambs. In order to get the best price in the market, the lambs must be sent in the very best condition. They must be fat. The market demands that they should be fat, and it wants them that way if it takes them at all. That kind of lambs will sell from now on, from December through into the spring, and certainly until the middle of December, at very high prices. But those lambs must be fat. Anything short of that does not sell for a high price. One of the chief salesmen over in New York told me a week or two ago, when I asked him about prices, that the best ones were then selling for about sixteen dollars, that the ordinary were selling for about ten, and that the common were worth usually enough to about pay the freight and commission. Now what we want to do is to sell the sixteen dollar kind. The farmers that do not believe what I say I presume will continue to sell the ten dollar kind, but brother farmers, let me tell you, that that is the kind that does not pay. You want to handle the best. Raise the best and sell the best. And let me tell you another thing in that connection, that the demand for that kind is a demand that is far above the supply. The time will not come when it will not pay to raise that kind of mutton.

Now in closing I want to say what I said in the beginning, that if you are determined and intelligent in selection, and if you care well for the flock, the flock will care well for you, and you will make a greater net profit on a Connecticut farm in sheep breeding than you can make in any other line of work that you carry on. (Applause.)

DISCUSSION.

The PRESIDENT. If you have any questions to ask Mr. Ward let us have them now.

A MEMBER. What kind of fences do you use around your pastures?

Mr. WARD. I will tell you. In the first place, the boy that leaves his home usually leaves it for some pretty good reason, and I do not believe that you need to be told that he will stay there if things are to his liking. It is just the same

with a sheep. If you have good pastures, your sheep will stay on them. I have been breeding the large mutton breeds of sheep, and in my experience it is not necessary to run high, strongly built fences across the meadows. I just stick a stake down and nail on a wide board at the bottom, and carry my bands above. The sheep do not want to wander because there is nothing outside that is half as good. If I were to recommend a fence for sheep, I should say build a fence, perhaps, as high as that table. I would just put the posts about fifteen feet apart, put a board or band wire rather thickly together at the bottom, and stretch it further apart as you go up. Sheep are not the disorderly animals that some people make them out to be. Of course, there is a difference in breeds of sheep as to their wandering propensity. There is one breed, in particular, the Cheviot, that is naturally a wilder animal, and they will jump more than any other. They are used to rustling up on the boundary hills between England and Scotland. But for most of the ordinary breeds, a low wire fence will be sufficient to restrain them.

The PRESIDENT. At about what age do you dock your sheep?

Mr. WARD. It depends somewhat upon the weather. If the weather is good, I just as lief dock them at two days.

The PRESIDENT. What time do you recommend?

Mr. WARD. Well, usually about a week later. Preferably at about two weeks old.

The PRESIDENT. Now if there are no further questions, I believe we are to hear from Mr. Stadtmueller.

Mr. STADTMUELLER. Mr. President and Gentlemen: I am on the program, I presume, more as a matter of formality than anything else, and only by virtue of my position, perhaps as the President now of the Connecticut Sheep Breeders' Association. Perhaps, in that capacity, however, I should have a few words to say to you in discussing this matter. First, along the line of desirability of sheep husbandry in the State

of Connecticut. The economical conditions today are entirely different from what they were a few years ago, and the success of any agricultural enterprise in the state today rests largely upon the ability or inability of the individual to properly gauge the trend of affairs, and the question of whether sheep husbandry will be successful in Connecticut again is simply one of whether it fills the requirements of the existing situation. The crying problem of agriculture today is the question of labor, and that taken in connection with the increased price obtained for wool, and for mutton, and the excellent home market, are largely the factors by which we will have to be governed. Nobody can hesitate very long as to the advisability of going into the sheep raising industry, if we are to accept the conclusions of Mr. Ward. I will not enter into the question of the special care of sheep or anything of that sort. That ground has been very well covered. But the message that we want to carry home, or send home to the Connecticut agriculturist is the conviction that the economical conditions existing in Connecticut today are again favorable for a profitable entry into sheep husbandry in this State. Bear in mind that thing, just that thing, stripped of all other factors. That is the important thing to dwell upon. If you have analyzed and traced this out to your satisfaction, and are convinced that that is a correct conclusion, then we are ready to see what can be done to encourage the industry, and the first thing that we run up against is the dog question. Now I have been president of your association for the last four years. Prior to that time I had rather a superficial interest in sheep. Since then I have been actively engaged in the work, and have a flock at present of about three hundred sheep. During that period of four years, largely by virtue of the position which I accepted, the thing I have heard the most about in connection with the raising of sheep has been this everlasting dog question. I have been practically talked to

death about it, and if I did not have a good constitution I certainly would have been. But let me tell you, in all sincerity, that after having made a careful survey of this question, and a study of the ins and outs of it as far back, perhaps, as 1840, I am now prepared to make the statement that, in my judgment, the dog question as regards sheep husbandry is simply a secondary one, that that cause alone does not explain the decline of the industry in Connecticut, but that the decline is due to changes in our economical condition, and because of the decline of the industry, and because of the increase in our dog population the dog question has become one of seeming importance. Now then we are again in an era where we are confronted with conditions purely economical, where sheep husbandry becomes profitable, and that is why I want to bring home to you that idea so as to divorce you as much as possible from this everlasting dog question. The first thing is to get the sheep and to get to work to take care of them, and then let us take care of the dog afterward.

Now as regards the line of action. To obtain some information as to intelligent action along that line, it appeared to me that some assistance might be obtained from gathering statistics regarding the number of dogs in the State, and the amount paid for damages by them. Of course, there is a great deal of damage committed by dogs upon sheep, the liability for which is never determined, and there is another considerable amount of damage that is adjusted quietly between the parties directly interested without the intervention of the town, and the only damage that is accessible to the public is that which goes through the ordinary channels or administration of town affairs. Now in that connection, let me give you just a few figures concerning the returns which have been made. We have 168 towns. Although this was commenced last May, we have, up to date, obtained returns from 137 towns, or about 80 per cent. of them. The returns from these

137 towns for the fiscal year 1905 showed that they had registered 43,403 dogs, the license fees from which amounted to $51,783. If these figures are representative of the State, the total number of dogs may be computed as approximately 54,253 for the whole State, with license fees exceeding somewhat $64,000. Although we had returns from 137 of the total number of towns, only 127 of those returns were complete. In those 127 towns with complete returns the total damage paid by the towns amounted to $5,878 for the year 1905. Now then, if that is right, the estimated loss in all the towns throughout the State for the year 1905 will be an amount not exceeding possibly eight thousand dollars. After this work was undertaken, Col. Brown, Secretary of the State Board of Agriculture, directed my attention to the fact that a similar survey or investigation had been undertaken by the State Board of Agriculture in the year 1888, and published in the report of the board for that year, from which I have taken the following figures, they being interesting for comparison. At that time, the total number of dogs that were returned was 32,415, as against 54,253 in 1905. The total damage by dogs returned in 1888 was $10,279, as against $7,800, which is the way my later figures result. Now at the time of the report of the investigation in 1888 the sheep population was at that time estimated by Mr. Gold, the former Secretary, at fifty thousand, but the next census of 1890, two years later, which was probably somewhat more accurate, returned the sheep population as 38,000. In the returns for the year 1900, at the time of the next census, the sheep population of the State is but 23,000. We have no means of knowing the exact number today, but we are all well aware of the fact that flocks of sheep not exceeding one hundred dollars in value are exempt from taxation, and, therefore, there is no correct and ready means of ascertaining the sheep population throughout the State. We have been seeking to obtain information by sending first an inquiry to every town clerk asking him to submit

the name of anybody in his town that was interested in sheep breeding, and after receiving that list of names, by writing back to those people asking for more names. In that way, we have been able to obtain the names of about 525 active sheep breeders in the State. Further returns from a great many of these would indicate that the average flock was about twenty sheep, and with something over five hundred breeders, would account for about ten thousand sheep. Now in my experience, I feel that it is within the fact to state that we have not touched or reached fifty per cent. of the sheep breeders of the State, and as we only know of 525, there is in all probability something over a thousand, and that would bring the sheep population up to somewhere between twenty and twenty-five thousand. Then we have these facts before us. We had in 1888 a dog population of 32,000, with a damage of $10,000, and with a sheep population of 38,000, which we can compare now, in the year 1905, with a dog population of about 55,000, and with damages of $7,800, and with a sheep population of about 20,000 to 25,000. If these figures mean anything at all, they simply confirm the statement made at the commencement of my remarks, that the leading question in connection with sheep husbandry in Connecticut today is not a question of dogs because, manifestly, taking these records covering a period of about twenty years, the dog population has steadily increased and the sheep population decreased, but in spite of that fact the primary question for a rehabilitation of sheep husbandry in Connecticut today is not, I affirm, one of dogs, but it deals to a very great extent with the economical problem connected with the general business situation with which we are face to face. Of course, I do not wish to be understood now as claiming that dogs are perfectly immaculate, or that nothing can be or should be done to restrain the evils resulting from them. In fact, the board of directors have had the matter up along those lines, and have discussed it thoroughly. They have been working along that line, or rather

I suggest that it be considered along the following lines, first, that the attitude of the Sheep Breeders' Association should be made known towards encouraging the destruction of vicious dogs as expressed by a bounty offered to anybody for the killing of dogs worrying, chasing or killing sheep. That bounty, as most of you know, used to be ten dollars, but we were compelled to scale it because the income of the association was not adequate. I do not know whether it is generally known that the board of directors, realizing that we would be confronted with this condition, appealed to the last legislature asking for an increase of our appropriation so as to be able to maintain the ten dollar rate, and that appeal was unsuccessful. That is why we had to come down to five dollars instead of ten dollars. Of course there is room for a difference of opinion regarding the wisdom of such action, but let me point out to you that the State of Massachusetts some two years ago increased the rate of bounty from ten dollars to twenty-five dollars for every dog found worrying or chasing sheep, and then another question came up, as to the feasibility of asking for legislation to restrain the liberty of dogs. It seems to me that it is a very debatable proposition whether the dog, simply because its owner pays a dollar for a license, should be allowed to roam all over creation and I am compelled to carefully fence in a cow that is a much less harmless animal, or why a hog has to be restrained, or a calf or a sheep. That leads to the question of fences. The legal definition of a fence has not been prescribed, I believe, but should not a fence for this purpose be described as one of sufficiently strong construction to confine the sheep and exclude the dogs, and would it not be a good proposition, if the State, by allowing a town to collect revenue from dog licenses, in return for which the dogs are allowed to roam at will, should assist in maintaining fences of sufficient character to keep the dogs out? If it is not right that the State should do that, then the town that gets the benefit from the dog license fees, I think, should be

made to do something along that line. I do not believe the State will do it, but isn't that a good argument to use to emphasize the fact that the dogs should be restrained?

Now, as Professor Brewer pointed out, I think at the meeting in '88 or '87, — did you ever stop to think what the sentiment for dogs rests upon? Is it not true that it rests upon the fact that a dog most always respects his owner's rights and always goes to the neighbors to do an injury? Have you ever thought about that? I think that is usually true. Now if that dog is compelled to be restrained and kept at home, and commit his nuisances, such as he will commit under those conditions, at home instead of being allowed to wander from one farm to another, would not seventy or eighty per cent. of the dogs disappear? I believe there is something to that idea. Think of it. Take those things into consideration, and above all, if the Sheep Breeders Association decides to call for any legislation, let us put forth a united effort. Let us go up to the hearing at the Capitol, and let us insist upon our rights.

Now there is one thing that Mr. Ward spoke of that I would like to refer to, and that was, politicians, and he pointed out how a bill which had been drafted in the interest of the sheep breeders failed at Albany. I have had some little experience in legislation in this state. I do not know how they do matters in Albany, but here is a description of an affair which happened within my experience, and I imagine it is about the same way up in Albany. I think if the sheep interests failed to be present at that hearing it was largely because they had not been sufficiently informed that it was to take place. In this instance that I have in mind occurring in this state, the President of the Connecticut Sheep Breeders Association was at the Capitol, and the committee was asked to notify him of anything of interest. They promised to notify him when any matters affecting the sheep raising industry were to come up, but the first notice he received was a telephone call that the committee was in session and was

awaiting his appearance. It was, of course, utterly impossible for him to do our interest justice at any such short notice, and I will guarantee that they had known it weeks before.

A MEMBER. Mr. President, I have been very much interested in the talk of Mr. Ward, and also that of Mr. Stadtmueller. I agree with him exactly on some points, but when he says that the dog should be considered as a secondary matter I would like to ask him how we are going to consider the dog a secondary matter when we have about sixty thousand of them in the State and less than half that of sheep. It looks to me as if the dog was fast getting to be a primary matter.

This is a pretty serious question to the farming interest. Within three months, in my own town, every flock of sheep, I think, in the town has been used up to some extent by dogs. Every sheep man knows that the damage is not limited to the sheep that the dogs kill, and that you can be paid for, and when he spoke about dogs roaming over the fields, and that they should be restrained, I agreed with him perfectly. I think they should be taken care of at home. There is no use of depending on the town officials, or on anybody that holds office in the town, doing anything about it, for every time you shoot a dog you lose a vote. It is not going to solve the difficulty to depend on local men. They haven't got the pluck to do it. I think we want something pretty stringent to settle this dog business. Something ought to be done to kill off about seventy-five per cent. of what we have in the State. It would not hurt anybody materially if that was done.

Mr. Ward touched upon some very nice points. I have been a sheep raiser all my life, and my father before me. I agree with him that we have got thousands of acres in Connecticut that are capable of feeding nothing else but sheep, and if the boys are going to the city today it is because they have got discouraged on the farms, and the result of it is, as Mr. Ward remarked, help is very scarce. I have a farm away up

here in the northwestern part of the State, and am trying to run it alone. If I could turn it into sheep I could do it with less labor, but with this everlasting dog question all the while before me what can I do? Even up in that country I have to get up nights to see whether they are among my sheep or not. It is enough to make the cold chills run up and down your back when you go out in the morning and find perhaps thirty or forty of them dead. I do not want to buy a flock of sheep and turn them loose just for the privilege of giving those curs that snap at you as you go along the street something to do. I have got discouraged. What is the use of putting good money into a class of live stock that those little curs are liable to go among any night and destroy half of them? I do not think I will do it. I hope something will be done so that things can go back on the old basis. I can remember the time when every farmer in my section had from twenty-five to three hundred sheep, and they all of them had money. That is one thing that the farmers want to cultivate — something they can get money from, and you can get cash for mutton and wool. If wool is to go back in price to where it was in those days then it is all the more reason why we should be able to raise sheep in Connecticut. I agree with Mr. Ward that something ought to be done to improve the stock if the industry is going to amount to much. Lambs on the ordinary farm today, from the ordinary run of stock, are worth about five dollars apiece. Out among our farmers we are not talking much about lambs bringing from fifteen to forty dollars. Those are most too precious for the ordinary farmer to talk about raising. Up in my section there is nobody left but old men and old women. All the young folks are gone. Those old farmers are a little slow about learning the principles of modern farming and stock raising, and it will not do any good to talk to most of them about this expensive manner of raising forty dollar lambs. Our old farmers are not going to do it. We must have something that will do well on our New England hills,

and if the sheep industry is going to be built up we have got to have a class of stock that will make it practicable among those that will take care of them. I do not mean by that scrub stock, but some good ordinary stock that the farmer can make a fair profit from, without having to give them any fancy care. Wool, you know, is worth anywhere from twenty-five to thirty-five, which is very different from what it was a few years ago. I have bought lots of wool for ten cents, but today we are paying anywhere from twenty-five to thirty-five. It seems to me that the inducement to go into the business of sheep raising is good if we can get rid of this everlasting dog question, but, Mr. Chairman, as I said before, I am discouraged.

Professor BREWER. Mr. Chairman, I am not a sheep grower, and have not been since my boyhood, but I have always been interested in this matter of dogs and sheep in this state. My own belief is, and I say it advisedly, that the reason why we do not have an abundance of sheep in this state is dogs, and dogs only. Now it is very easy to say that dogs do not do so much damage, that there is only so much money paid out in this state for damage, but the trouble about that position is that we know that that sum of money does not begin to cover the whole bill. It never will until we can have the dogs restrained. Now what shall we do about it? I believe in agitating the matter all the time, at every legislature, and while I can hardly hope to live to see the day when we will have a sensible sentiment among the farmers and among our legislators in regard to dogs, yet I think that a continual protest upon the part of the farmers will tend to create that sentiment and in time we will have the same condition here that they have brought about in some other places. Do you hear the Canadians complaining all the time of dogs? I never have. I took the pains many years ago to investigate the matter, and, as many of you know, I have been interested in Connecticut agriculture for a long while. I was connected with the Board

of Agriculture in 1866, and one of the first things that came prominently to my attention was this matter of sheep and dogs.

Many of you are old enough to know that back at that time a great deal of slaughtering was done in Connecticut. Sheep and cattle were slaughtered here. This great business of slaughtering cattle in the west did not grow up until the great plains, containing the vast pastures of the west, were opened up, and that did not happen until just after the building of the Union Pacific Railroad. That was away back in 1870. To be exact, I believe the last spike in the last tie of that road was driven sometime in 1869. At that time there were no cattle shipped from the great plains, and there were no great abattoirs in Kansas City and Omaha, and other great western centers. There were no great herds of sheep there. For, as some of you will recollect, herds of buffalo were common upon the western plains at that time, and in some instances absolutely stopped the trains. When that railroad was opened gradually there came a great change. That threw New England into competition with the western country, and because cattle could be brought here, and because of the inventions which made the transportation of meat practicable, New England and other eastern farmers could not maintain their position. Prior to that time there was no icing machinery that was in use anywhere in the north. I think there were but one or two attempts to use it until after the war. The first ones were started in the southern states during the war. Now when this condition started in and the preservation of meat was made practicable, so that it could be transported in good condition for long distances, slaughtering of cattle and sheep gradually died out in the east. I cannot give the precise figures, but at the time the slaughtering of lambs was a great deal of a business in this section. A great many were imported from Canada. I do not know whether I have the figures accurately in mind, but I have in mind there were some twenty

or thirty thousand lambs slaughtered here which came from Canada. They had laws there which controlled the dog, and what is of more importance, they had public sentiment with the sheep growers, and the government did what it could to help the sheep men, and they grew vast numbers of lambs and shipped them for you to slaughter and eat here.

Now there are a great many things that come up that might be interestingly dwelt upon in connection with the discussion of such a subject as this. It has been on my mind for a long time. Now in the matter of the mere killing of sheep, it does not seem to me that that is the great difficulty. I was reared in a region where it was a poor farmer who did not have at least fifty or sixty, and so on up to two or three hundred sheep on his farm. It was in one of the newer and more sparsely settled districts, I will admit, but it was a fair average farming region. We had no manufacturing centers immediately about us, and, by the way, they are places from which the dogs, to some extent, come. The damage is not entirely done by the neighboring farmers' dogs by any manner of means. It is done in many cases by these irresponsible curs that are owned by nobody, and whom nobody claims, from surrounding towns and villages. Our location, however, was not situated so that they worried our sheep. The trouble arose chiefly, I think, as Mr. Stadtmueller has well said, owing to the gradual change which took place in economic conditions. I mention this to show that the trouble with dogs is not a new idea. It is an old, old complaint. Writers upon ancient agriculture mention the fact that sheep will not fatten after being chased by wolves, and it is now generally understood that if you have a lot of wethers out they will not fatten in the field if dogs are allowed to worry them. If some miserable dog gets into a flock early in the season, while it may not kill any sheep, or, at the most, not more than one or two, there are still apt to be a number of ewes that will slip their lambs before the time

comes, and if the flock is chased, as I say, it is well known that they will not do as well as if they had not been chased by dogs.

Now what has been the result of almost every attempt to breed better sheep here? I can cite examples where men have paid as high as fifty dollars a head for high-grade sheep. I remember one instance of some Southdowns, for which the owner paid a very high price. Those sheep were killed by dogs, and all he could collect was three dollars apiece. Now it is unquestionable that there is no incentive for a farmer to introduce high-priced blooded stock that costs him any such price as fifty dollars if, as soon as he gets them on to his farm they are to be killed by dogs and he receive only three dollars a head.

There has got to be a different sentiment created. We must keep on agitating the matter all the time, in season and out of season. A state law which will provide for greater restraint of dogs may go far to solve the difficulty. Some one referred here, a few moments ago, to the well-known fact, that a dog almost always respects its owner's property. I do not believe any of you ever had a dog on your farm that destroyed your own sheep. They will go sometimes three or four miles and take somebody else's sheep. That is a part of the dog's nature, and it is one of the reasons why farmers should demand that people take care of their dogs.

Then there is another thing. You want to get it so you shall have the privilege of shooting any man's dog that you see in the field with your sheep, no matter whether it is worth fifty cents or a hundred dollars, it should make no difference. There is no reason why you should be compelled to take any risk in the matter. Your property is valuable to you, and to the town, and you should have the utmost right to protect it. Every flock of sheep in the state increases the value of the land it runs over. Every increase in the flocks of sheep in the state increases the price of land. They fertilize the land, and

make it better for farming purposes, and there is no reason why Connecticut farmers should be debarred from raising large flocks of sheep simply because they are unable to successfully protect them from ravages of despoiling dogs.

I do not wish to take any more time. It is a matter that I have felt deeply upon for a great many years, and when you consider how many millions of dollars of taxable property there would be in this state in addition to what we now have if you could have caught about two-thirds or three-fourths of the dogs and cut their tails off behind their ears it is a matter for astonishment that we have such a sentiment as exists in Connecticut on this dog question. I have no doubt if that could have been done it would have increased the value of the agricultural interest in Connecticut many, many millions of dollars. It would have had a great effect upon other business interests in the state. If that could have been done they would have found it out pretty quickly too. I want to see everything done that can be for I believe it is a most important matter. There is no more reason why a dog should be allowed to worry or kill your sheep, or kill somebody else's lambs, than that I should do it myself. If I did they would prosecute me for damages. I hope that the day is not far distant when we shall see a radical change of sentiment in this state on this question.

Mr. BARBER. One of the greatest difficulties that the farmer has to contend with in raising sheep is that he is only paid for just exactly what he finds to have been killed. The situation is something like this. Out in our back country districts, where most of the sheep are raised, the farms lie in rough land, much of it woodland and rocky isolated places that are not fenced at all. Now dogs chase the sheep and drive them into those wild mountain places, and the trouble is you never can find the sheep that are killed. The selectmen say when they come to pay the price of the sheep, that they will pay you for those that you have found dead. In my

case, when I went home a month or so ago after some of mine had been killed, I found the selectman had been there. There was one sheep missing. I spent a half a day looking for it, and I did not find it. The selectmen say, "We will pay for that when you show us that it is dead." There is where the trouble comes in. The dogs are allowed to roam right through the fields, and they drive the sheep into the mountainous places, and you never can find their carcasses.

We should have a law that would restrain the dogs just as much as it restrains other animals. They should not be allowed to roam at large over every field. I agree with Mr. Stadtmueller, that if they are allowed to do it then the State, or the towns, should take a part of this money and help us put up fences that will keep the dogs out. If the State gives these men the right to keep sheep-killing dogs on the payment of a small license, why should they not help build the fences? I say if the State is going to let these animals run riot, it should build a few fences to hold them so that the farmer can have a few sheep and perhaps develop this industry in Connecticut. Is not that right?

Another little thing I look at is this: If this money paid for dog licenses and dog taxes went into the State treasury instead of the town treasury, and then these payments for damages to sheep came from the treasury of the State instead of the treasury of the towns I believe that the State would be more liberal in its dealings with the farmer, and there would not be the trouble that we now have in getting money from the towns. Now they feel that the money being in the town treasury, we will pay just as little as we possibly can and avoid a lawsuit. The selectmen do not like to be criticised for paying out large amounts on account of town expenses. I suppose they think it makes a difference with their political strength, and anyway they do not do it.

A Member. If the State and the town would work together to restrain every dog so that it cannot be off of its

owner's premises, it would be all right. I think that will largely settle the matter. I do not see why that cannot be done.

Mr. PHELPS. Mr. Chairman, I have taken very much interest in this question of the sheep industry in the last two years. I believe when the time comes that Connecticut farmers really wish to undertake to build up the sheep industry that the dog question will become a secondary question, as our President has said. It seems to me it is belittling to the intelligence of Connecticut farmers to say that this question is too big a question for them to handle. I believe that the prophecies that are made by men who have made a study of the sheep industry show that there is money in it when it is rightly handled, and when the farmers begin to appreciate that there is money in it on these New England hills, the dog question is a question that will be settled by the industry and skill and intelligence of our Connecticut farmers. I believe it can be easily settled and will be settled when that time comes. Now I believe also, Mr. Chairman, that the conditions are rapidly becoming more and more favorable to the building up of that industry, and that those conditions, as our President has said, are very largely economical questions. The low price of Connecticut land today as compared with western land is one reason why the sheep industry is likely to increase in the next five, ten or fifteen years. The nearness of good markets, and the convenience with which you can get transportation to good markets, and particularly the improvement in the methods of transportation that have arisen, all these things are going to contribute to a rise in the sheep industry in Connecticut. The people are beginning to realize, especially those residing in our cities and towns, that they have been eating chicken and lamb, and other lines of meat that have been kept in cold storage for periods of four, five, or six months, and then delivered to their tables by the grocer

as fresh chicken or lamb. You tie a man down for an explanation of that, and he says it has never been salted and that it is really fresh.

Now it seems to me, Mr. Chairman, that there are two possible ways, or rather one of two possible ways by which we can effectually deal with this question, and one is by the construction of dog-proof fences. That is the way I am going to try to handle it. We have got our flock built up now from about thirty to one hundred. We have built it up to that in the last three years. We have purchased fifty in the last three years, and next year we shall have about fifty breeding ewes, and a year later I hope to have a hundred or one hundred and twenty-five. But we have taken the precaution to bring the sheep in regularly at night, feeling that the danger of loss came at night. This coming year I hope to be able to build a dog-proof fence around a small area, so as to be able to bring the sheep into that at night instead of having to bring them into a building. That is one possible solution of the trouble, as the greater part of the damage from dogs will be found to occur at night or in the very early morning.

Another possible solution of the situation is through a more thorough control of the dogs, and I believe we are going to find a possible solution in the periodic local scares that are coming up in connection with hydrophobia, and if boards of health can order dogs to be muzzled when found off their owner's premises, they have equal power to order that they shall be killed when found unmuzzled off their owners' premises. I think there is a side or phase of the question which is worth while for us farmers to consider, — whether it is not possible that the law shall require that all dogs shall be muzzled for twelve months in the year just as much as for the selectmen or health officers to require that they shall be muzzled for two or three months.

Mr. Patterson. Along the line that Mr. Barber was speaking relative to the dog tax going into the State's treasury

and there being drawn upon to pay damage claims, I want to say that I think that would be a good move, and that that is the proper way for that money to be applied. Now we know that all of these towns that are near the cities are suffering from damage done by these city dogs. I am not able to tell anything about the number of dogs that there is in this State kept in cities as compared with the towns, but the bulk of the population being in the large cities and towns, of course, they must contain by far the greater number of dogs, and I believe that the number of sheep annually killed by dogs from these places will be found to be much the greater number. I have heard of instances, as where dogs come out from a city like Middletown and kill sheep in Berlin, and the town of Berlin had to suffer for that, when the damage was not done by dogs kept in that town at all.

Mr. FARNHAM. Along that very line I think I can give a little information. There are farmers out here on the farms of Cheshire and Hamden whom I believe would keep a large number of sheep if it was not for the dogs that come out from New Haven. There are thousands of acres of land back here on these hills in the immediate vicinity of New Haven where there is not one single sheep and there will not be, in my opinion, until every dog is restrained just the same as they are restrained on account of panic from rabies.

I would like to say this in regard to fences to keep out dogs. Fences can be made no doubt to keep out dogs, but I should like to know how that compares with the cost of building ordinary fences. I would like to fence in a field of, say a hundred acres, with dog-proof fence, but I think there is a pretty large cost to build a nine-wire fence five feet high, such as you would have to have, as I understand it, to keep dogs out and sheep in. I would have to have a fence like that around the entire tract, and to build two or three miles of fence of that kind would be pretty costly. We cannot do it.

A MEMBER. Another point about this thing, Mr. Chairman, is that the selectmen do not agree, and then local politics always enter into it. If a selectman is friendly to you, he will pay your claim. If he is not, I know of instances where just claims have been held back for a good while.

Mr. DOOLITTLE. I agree with the member that has just spoken. Many times a selectman does not want to pay a claim for damages, because he is afraid it is going to make enemies. Politics enters into the dog business very much, and I am inclined to thing that we ought to have a man who should make it his sole business just to look after the dogs, and to put that man under a bond. Then, if he did not do it, he should forfeit his bond. In these days of hydrophobia when all of these miserable curs are running at large, the damage, in my opinion, comes largely from dogs that are kept by people that work in factories, and who are away from home during the day. Lots of them you will find have two or three or four dogs. They do not need them any more than they do wings just at present. A great many of them do not pay any taxes or take out any license on their dogs either, and when the tax collector undertakes to collect they will claim they do not own them.

Mr STADTMUELLER. Mr. Chairman, I would like to say just a few more words before this discussion closes. I have been much impressed by the unanimity of feeling that apparently exists among the farmers here. We are not so far apart as appeared in the first place.

Now as to the cause of the decline of the sheep industry in the state of Connecticut, I still adhere to my original proposition. In reply to the statements that have been made I want to ask those who think that the difficulty has been entirely with dogs what they think they did with the dogs when the sheep population was very high in this state. Why do you think that the dogs ever let it grow to the dimensions it did attain? Why did the number of sheep ever attain the magnitude that

it has in the state of Ohio? My friends, the dog question, as I said before, is really a secondary one, and the decline of the sheep industry was due more to economical conditions, and its revival will be due to the restoration of practically the same conditions which existed in the first place. It never could have attained any magnitude in Connecticut if it had not been for certain economical conditions which were favorable for it.

Now I was interested in what the gentleman here said about the cost of fencing in an area for sheep pasture. Do you realize that you can put up a fence that will keep dogs out at a cost of about one hundred dollars per mile? You can. You can buy wire fencing today for about twenty cents a rod, four feet high. You people have got to bear in mind the fact that the cost of all that kind of material is very low. It is only three years ago when I had to pay from twenty-eight to thirty cents for the same wire.

Professor BREWER. How much does it cost to put up the fence?

Mr. STADTMUELLER. Why, that depends upon the formation of the ground. If you have got to blast the holes, you cannot put it up for one hundred dollars a mile, but there are thousands and thousands of acres of land in Connecticut where it is entirely possible to erect dog-proof fences at that price, and that is the place in which to start the sheep industry, gentlemen.

Now the fact has been brought out here that there should be a better enforcement of the law. There, I think, you are coming to the real gist of the matter, and that is just a question for action by this Association as I regard it. There is where an organization of the sheep interests can do great good. You can frame your laws the way you are a mind to, but so far as the enforcement is concerned it will always come back to a question of policy in the town where the trouble arises. The

only way to fight this issue and to get the remuneration for just damages is to avail yourself of the aid and facilities of this Association, and to call upon it for its assistance in adjusting those damages. There is a field of operation where I think the society can be of large usefulness to the sheep breeders of the state. A great deal will depend upon the activity of the sheep breeders themselves. I do not care how strong a man you may be in your local community, the Association never can be of the value it should be to its members as long as the members themselves are indifferent to what it can do. Every sheep man in the state must take an active interest in this matter, and must make it his business to let the society be of use. In other words, every man who is a sheep man has got to make himself into a private detective and has got to take upon himself the work of looking up these cases, and has got to make a specialty of it, and inquire and follow up the dogs, and follow up these registration laws. That is one place where there ought to be a much greater activity among the individual members of the association. If you fail to be successful as individuals then fall back on this organization. Report the facts and ask the officers to go ahead. You will soon change the whole sentiment on this subject if you go about it intelligently.

The PRESIDENT. I have been much impressed by the discussion that I have heard here today, and these speeches in regard to the importance of the farmers understanding what they are doing. It has been brought out in a very strong way that we have many men who are doing no mean work, and the work that they are doing is bound to have a great effect in building up this industry.

The time has now come for our usual adjournment, and this convention will stand adjourned until 7.30 P. M.

THIRD DAY — EVENING SESSION.

Convention called to order at 7.30 P. M., Vice-President Seeley in the chair.

Music.

The PRESIDENT. I am happy to introduce the Rev. John Calvin Goddard of Salisbury, Conn., who will address us relative to the future of the small New England town.

THE FUTURE OF THE SMALL NEW ENGLAND TOWN.

By REV. JOHN CALVIN GODDARD, Salisbury, Conn.

Mr. Chairman, Ladies and Gentlemen: Of the 168 towns in Connecticut, 59 showed a loss at the last census: for example, Colebrook, near Salisbury, the last town in Connecticut to be organized, dropped from 1,098 to 684, 37 per cent. While if McDuff should rise to inquire today: "Stands Scotland where it did?" the painful reply from Windham County could be: "No, Scotland has slipped in four decades from 720 to 471." Ninety-eight of our towns have receded from their former maximum. Some of them remind us of what Artemus Ward said of his friend, that he "had been dead two years and liked it."

But rest you, merry gentlemen, let nothing you dismay. This is only one side of the shield. The other side is, that not one of these small towns is in any danger of going out of business. Not Marlborough, which holds the low water mark at 322. Not Andover, at 385. Not Union, at 428, up in the woods, where the pastor once said he could not keep his chickens because the foxes got them all. It is possible that some of them may decline even farther, and still not go out of business. Just north of Salisbury, in Massachusetts, lies the town of Mt. Washington, which contains neither doctor, lawyer, nor minister, and keeps happy. Massachusetts has thirteen towns smaller than Connecticut's smallest. No, the small town is not going to draw up its feet into the bed after it, and be gathered unto its fathers yet a while. Kai gar, as they say at Amherst, "and with good reason for."

In the first place, the political and individual importance of each one of these little republics keeps it alive. In the United States of Connecticut there are 168 sovereign units, each of them having the individuality and self importance of a South Carolina. Each of them has for its motto: "Nemo me lacessit impune" — beware of treading on my corns! This sensitiveness is still further accentuated as follows: Ninety-five of our one hundred and sixty-eight towns elect a majority of our General Assembly. Yet they contain but eleven per cent. of our population. Mark Twain remarked recently that he would like to cast his whole voting strength for Jerome, giving him one for Mark and two for Twain. But the voting strength of the average villager, compared with the rest of the State is more than three, without resort to repeating or humor. Union elects the same number with sixty-one votes that New Haven does with 11,478; that is to say, there is 188 times more fun voting in Union than in the City of Elms.

Secondly, the small town has a future because of its agricultural and rustic intrinsic worth. I am aware that much has been written and more believed about the abandoned farms of Connecticut, but when you come to look for them, you will find they are like Goldsmith's Deserted Village — not on the map. Somebody has been romancing at our expense, and our reply should be like that of the vigilance committee in Texas, who having hanged a suspect for horse stealing and discovering immediately that he was innocent, concluded that etiquette required an apology to his widow, to whom resorting, the captain explained the mistake, closing with the words, "Madam, the joke is on us."

Now it is true, as Professor Charles S. Phelps, recently of Storrs, has pointed out, that many Connecticut areas were never designed to support a progressive system of agriculture, and their return to forest is but a natural reversion. Decline in New England is limited to such areas. But in the valleys and within hauling distance of markets progression is manifest. The common impression that Connecticut farming as a whole is declining is a mistake. The General Assembly of 1845 ordered a special farm census, which gives us a basis for comparison, and shows, that while the staple crops, such as wheat, oats, rye, and corn, have diminished, the loss is more than made good by orchard, garden, dairy and meadow. The

hay crop is at least a half larger, butter and milk have more than doubled, while all farm products have increased from fifteen and one-half to twenty-eight millions.

Formerly, the farmer from wayback felt as the boy, who, on being told that if he kept on so, he could not go to heaven, replied, "Well, I've been to the circus twice and to Uncle Tom's Cabin once. I can't expect to go everywhere!" The modern farmer can be more "on the go." The good roads improvement has come to stay; the extension of the trolley is working a revolution in the country no less than in the city, while lighting and power lines are following in their track. Already few houses in Connecticut are beyond walking distance of a telephone, while rural free delivery is a growing blessing and will inevitably be joined with the benefit of the parcels-post. All this means the relief of isolation, the growth of neighborliness, the bringing near of markets, schools and churches.

And if, nevertheless, some areas do find their way back to a state of nature, what then? If the deer increase, as is the fact, here and there; if it be possible for a party to go to a lonely spot, as one of them recently told me, and kill four rattlesnakes each year; is the country going to the dogs because it is going to the snakes? There are some high uses for wild land, aside from agriculture. On the top of the mountains of Salisbury are thousands of acres of wilderness, Adirondack in their ruggedness. It affords a noble retreat for my friend and next door neighbor, the Hon. Donald T. Warner, whose generous and hospitable "Lotus Lodge" welcomes scores of guests each season long.

Some people prefer to be near to Nature's heart. When William Travers Jerome came into Salisbury for a home, he scorned our lake fronts and highway farms; he took the axe, with which he had broken into Canfield's faro bank, and blazed away to a knoll, adjoining a swamp, "far from the maddening crowd," and there he builded his house upon a rock. He can't grow anything there, but you could not dislodge him from his Salisbury position any more than Tammany could dislodge him from his Manhattan position. The truth is, that men of means will more and more seek ownership among the mountain fastnesses and stony water courses of Connecticut.

Forestry and landscape gardening will conspire to improve and accentuate their native characteristics. Connecticut will yet adopt the example of Massachusetts in appropriating large areas for State park reservations, like the Middlesex Fells near Boston. All of which means not the relapse of our small towns but their transfiguration. There are better ways of estimating a place than by its population and grand list.

Lastly, the future of the small town is assured, because of its historical and genealogical importance. Every one of these little republics is an Andorra; has a history of its own better worth telling than that of the second Punic War; is as full of legends as Sleepy Hollow, only waiting for its Irving.

But historical and genealogical associations beget more than sentiment; they are among the most positive assets which a town possesses. They beget a filial spirit which is not lost even in the busiest career or the farthest divergence from home.

Such a filial feeling is worth more than dollars and cents to any community, though it repeatedly expresses itself in benefactions beyond the dreams of subscription committees. Branford discovered it accidentally, when it was trying to raise a modest library among its friends, and wrote to a long-departed son of the soil, whom few of them had ever seen. He responded by assuming the whole expense of that magnificent architectural plant. Mr. Blackstone had carried all these years a cherished though unsuspected loyalty for his native town. Instance after instance could be given of men and women who have thus remembered their town, through its church, library, cemetery or school, after years of absence or years of apparent indifference.

Along with this filial spirit may spring up a town organization, broader than the village improvement idea, a social and town-promoting society and board of trade in one, which fosters the welfare of the place in a marked degree. The Salisbury Society is such an institution. In Middlefield, Mass., a most extraordinary enthusiasm has been aroused, enlisting college presidents and professors, men of mark and scattered sons from far. On the other hand, without the use of town co-operation, Norfolk, Conn., has enjoyed an amount of public spirit, unparalleled in the state; a spirit, which has been made

contagious, so that it would be easy to show how that three-quarters of a million dollars had been expended for public interests in that corner of the state, through the stimulus of Norfolk's example. The Library, the Gymnasium, the University Club, the Boys' Oratorical Contests, the wealth of music, choral and orchestral, enjoyed by the whole vicinage, all sprang out of an original love for the town of Norfolk, which eventually overflowed its borders.

Yet when it began in a simple way, Norfolk, now a thriving community, was a quiet little town of about a regiment and a half, that had been declining in population for decades, and was nearly three hundred short of the census of 1860. Town loyalty and public spirit in other words, do not depend upon the size of the town, nor the thrift of the town. Indeed, a small town is more sure of enjoying it than a larger one. For a man finds it easy to make a darling of his village, but it is hard to put your arms around a city.

The PRESIDENT. There being no further business this convention now stands adjourned without day.

Delegate.	Name.	Place.	Date.	President.	Secretary.
N. G. Williams	New London County	Norwich	Sept. 11–14	E. Judson Miner	Theo. W. Yerrington
I. C. Fanton	Windham County	Brooklyn	Sept. 25–27	F. H. Deming	Joseph B. Stetson
I. C. Fanton	Beacon Valley	Naugatuck	Oct. 17	Wm. J. Noble	Wm. L. Lloyd
Seaman Mead	Berlin	Berlin	Sept. 19–21	Chas. M. Jarvis	W. W. Christian
E. G. Seeley	Chester	Chester	Sept. 26	Francis G. Clark	Theodore Perry
C. E. Chapman	Colchester Grange	Colchester	Sept. 19	C. E. Staples	Myron R. Abell
E. Halladay	Farmington Valley	Collinsville	Sept. 12–14	Oliver F. Perry	Emerson A. Hough
E. G. Seeley	Granby	Granby	Sept. 26–27	Geo. O. Beach	Theodore G. Case
C. L. Tuttle	Greenf'ld Hill Country Club	Greenfield Hill	Sept. 11–14	N. H. Sherwood	Mrs. Belle Adams
Seaman Mead	Guilford	Guilford	Sept. 26	R. C. Loper	Robert De F. Bristol
C. E. Chapman	Harwinton	Harwinton	Oct. 2	W. J. Barber	D. R. Bentley
W. L. Davis	Madison	Madison	Sept. 19	S. A. Scranton	Edward M. Willard
Seaman Mead	Mad River Grange	Waterbury	Sept. 26	A. J. Pierpont	H. B. Cooke
J. F. Brown	New Haven Co. Hort. Soc.	New Haven	Nov. 6, 7, 8	Robert D. Pryde	Thomas Pettit
I. C. Fanton	New Milford	New Milford	Sept. 18–21	Noble Bennett	Frank E. Soule
D. W. Patten	Newtown	Newtown	Sept. 25,26,28	Robt. C. Mitchell	P. H. McCarthy
J. F. Brown	Orange	Orange	Sept. 3, 4	W. S. Woodruff	Arthur D. Clark
James B. Palmer	Putnam Park Association	Putnam	Sept. 3, 4	Michael R. Joy	Ernest M. Arnold
N. G. Williams	Rockville Fair Association	Rockville	Sept. 25–27	A. Kingsbury	A. Leroy Martin
I. C. Fanton	Simsbury	Simsbury	.....	J. O. Phelps, Jr.	S. A. Eddy
C. A. Thompson	Stafford Springs	Stafford Springs	Oct. 2–4	W. H. Hall	C. F. Beckwith
D. W. Patten	Suffield	Suffield	Oct. 2, 3	Waldo S. Knox	W. L. Stiles
E. Halladay	Union (Somers)	Broad Brook	Sept. 20	Henry J. Bridge	Henry F. Fletcher
W. L. Davis	Wethersfield Grange	Wethersfield	Oct. 25–27	Josiah G. Adams	Charles C. Harris
J. B. Palmer	Horseshoe Park Agr. Ass'n	Willimantic	Sept. 18–20	Chas. A. Gates	Truman R. Sadd
N. G. Williams	Woodstock	So. Woodstock	Sept. 18, 19	Chester E. May	Leonard H. Healey
J. F. Brown	Wolcott	Wolcott	Oct. 11	Wm. A. Faber	E. M. Upson
C. A. Thompson	Conn. Dairymen's Ass'n	Hartford	.....	H. O. Daniels	J. G. Schwink
C. L. Tuttle	Conn. Pomological Society	Rockville	Sept. 18–20	J. C. Eddy	H. C. C. Miles

OFFICIAL LIST OF SOCIETIES, HOLDING FAIRS IN 1906.

Name of Society.	President.	Secretary.	Treasurer.
New London County,	E. J. Miner,	T. W. Yerrington,	Chas. W. Hill.
Windham County,	Frank H. Deming,	J. B. Stetson,	Oscar F. Atwood.
Beacon Valley,	Wm. J. Noble,	Wm. L. Lloyd,	Wm. G. Hard.
Berlin,	Chas. M. Jarvis,	W. W. Christian,	Willis H. Upson.
Chester,	Francis G. Clark,	Theodore Perry,	G. Myron Abbey.
Colchester,	C. E. Staples,	Myron R. Abell,	Isabelle L. Strong.
Farmington Valley,	Oliver F. Perry,	E. A. Hough,	Benj. F. Case.
Granby,	Geo. O. Beach,	Theodore G. Case,	Stanley W. Edwards.
Greenfield Hill Country Club,	N. H. Sherwood,	Mrs. Belle Adams,	A. C. Acker.
Guilford,	R. C. Loper,	Robert DeF. Bristol,	William C. White.
Harwinton,	W. J. Barber,	D. R. Bentley,	P. Hogan, Jr.
Madison,	S. Arthur Scranton,	Edward M. Willard,	Edward Willard.
Mad River Grange,	A. J. Pierpont,	H. B. Cook,	W. L. Pierpont.
New Haven Co. Hort. Society,	Rob't. D. Pryde,	Thomas Pettit,	David Kydd.
New Milford,	Noble Bennet,	Frank E. Soule,	Edwin J. Emmons.
Newtown,	R. C. Mitchell,	P. H. McCarthy,	Henry G. Curtis.
Orange,	Watson Woodruff,	Arthur D. Clark,	Edward L. Clark, Jr.
Putnam Park Ass'n,	Michael R. Joy,	Ernest M. Arnold,	Richard Gorman.
Rockville Fair Ass'n,	Andrew Kingsbury,	A. Leroy Martin,	Francis A. Randall.
Simsbury,	Jeffery O. Phelps,	S. A. Eddy,	Chas. E. Curtiss.
Stafford Springs,	W. H. Hall,	C. F. Beckwith,	Robert H. Fisk.
Suffield,	Waldo S. Knox,	W. L. Stiles,	J. O Haskins.
Union (Somers, etc.),	Henry J. Bridge,	Henry F. Fletcher,	Chas. A. Thompson.
Wethersfield Grange,	Josiah Adams,	Chas. C.Harris,	Chas. C. Harris.
Horseshoe Park Agri. Ass'n,	Chas. A. Gates,	Truman Sadd,	Geo. S. Elliott.
Woodstock,	Chester E. May,	Leonard H. Healy,	Melancthon Riddick.
Wolcott,	William A. Faber,	E. M. Upson,	E. M. Upson.
Conn. Dairymen's Association,	H. O. Daniels.	J. G. Schwink,	B. C. Patterson.
Conn. Pom. Soc.,	J. C. Eddy,	H. C. C. Miles,	Orrin Gilbert.

RETURNS OF AGRICULTURAL SOCIETIES, 1906.—Finances.

SOCIETIES.	Cash on hand.	Single Admission Tickets.	Membership or Season Tickets.	Grand Stand.	Donations and Unclaimed Premiums.	Entrance Fees, Trials of Speed.	Other Entrance Fees.	Rent of Grounds.	Other Sources.	State Appropriation, 1906.	Totals.
New London County,	$230.64	$2723.55	$178.00	$524.00	.....	$505.00	$18.50	$599.50	$1403.75	$278.08	$6461.02
Windham County,	.....	969.95	71.00	123.10	.....	65.00	94.30	257.60	17.05	.....	1598.00
Beacon Valley,	.....	789.80	38.00	28.15	.....	82.60	22.20	113.75	.....	150.28	1224.78
Berlin,	73.95	3846.15	401.00	218.90	$117.50	40.00	.....	567.50	1150.58	183.08	6598.66
Chester,	78.05	127.05	55.00	.....	.....	.....	.....	13.35	152.25	.....	425.70
Colchester,	.....	63.85	.....	.....	.....	.....	5.50	7.00	70.30	100.00	246.20
Farmington Valley,	35.63	829.35	.....	189.10	.....	480.00	36.75	199.85	562.00	157.10	2487.78
Granby,	39.27	595.10	.....	126.45	.....	285.00	.....	132.25	122.06	126.30	1426.43
Greenfield Hill Country Club,	570.14	1872.30	92.50	515.35	152.55	.....	50.00	60.00	1165.21	.....	4477.96
Guilford,	639 21	168.65	106.00	.....	20.50	.....	6.50	35.00	180.16	164.87	1320.89
Harwinton,	128 35	.....	6.00	.....	.....	.....	24.70	396.75	112.50	131.00	799.30
Madison,	3 37	55.00	20.00	.....	3.00	.....	20.00	38.50	100.00	111.39	252.26
Mad River Grange,	33.38	198.40	59.75	.....	8.00	.....	.....	.....	200.90	.....	510.43
New Haven Co. Hort. Society,	258.16	290.00	93.00	.....	353.50	.....	.....	.....	39.50	182.07	1328.28
New Milford,	12.20	857.15	.....	169.60	128.80	486.50	.....	233.82	207.90	143.36	2239.33
Newtown,	.....	776.95	.....	228.50	100.00	360.00	5.00	236.35	276.94	154.36	2138.10
Orange,	121.83	2497.90	117.00	398.15	26.00	327.00	104.00	207.33	172.66	207.33	4192.19
Putnam Park Ass'n,	48.07	1937.30	.....	599.24	.....	112.50	157.98	190.50	.....	170.28	3215.87
Rockville Fair Ass'n,	1422 36	2681.75	141.50	804.50	12.00	163.30	26.00	559.15	2112.73	296.21	8219.50
Simsbury,	40.05	1062.73	40.00	.....	692.43	250.00	41.50	156.10	360.00	120.77	2763.58
Stafford Springs,	198.26	3777.90	277.00	863.80	.....	489.72	199.25	102 .15	33.00	330.21	7194.29
Suffield,	577.08	1420.04	.....	121.00	.....	374.00	.....	182.75	92.50	100.00	2867.37
Union (Somers, etc.),	986.20	.....	.....	.....	41.00	.....	.....	63.50	201.05	110.77	1402.52
Wethersfield Grange,	128.28	54.40	53.50	.....	204.22	.....	.....	.....	80.00	.....	520.40
Horseshoe Park Agri. Ass'n,	343.98	2810.40	96.00	589.50	.....	725.00	46.05	596.00	150.00	230.55	5587.48
Woodstock,	258.00	1181.25	105.00	345.05	25.62	125.00	101.30	227.25	96.83	231.99	2441.87
Wolcott,	3241.01	368.60	76.00	.....	4.35	.....	9.00	90.35	138.70	.....	3970.01
Conn. Dairymen's Ass'n,	239.67	.....	375.00	.....	.....	.....	.....	.....	135.57	2114.19	2860.43
Conn. Pom. Soc.,	.....	.....	509.50	.....	.....	.....	.....	.....	.....	148.21	.....

RETURNS OF AGRICULTURAL SOCIETIES, 1906. — FINANCES, CONTINUED.

SOCIETIES.	Expenses of Fair.	Premiums for Speed.	Premiums for Amusement.	Other Premiums and Gratuities.	Permanent Improvements.	Other Expenses.	Cash on hand.	Total.	Indebtedness of Society.	Real Estate.	Personal Estate.	No. of Members.	No. of Stockholders.	Capital Stock.	Admission Tickets.	Season Tickets.	Grand Stand.
New London Co.,	$1,263.48	$1,400.00	$325 00	$1,155.50	$1,654.66	$587.00	$75.38	$6,461.02	$4,900.00	$10,000.00	.....	190	.....	.....	$0.35	$1.00	$0.25
Windham County,	284.46	400.00	70 00	955.70	.....	180.84	.....	1,891.00	.....	2,000.00	.....	626	.....	.....	.35	.....	.20
Beacon Valley,	411.40	81.00	186.00	239.00	168.10	.....	57.00	1,085.50	.....	.....	.....	38	.....	.....	.25, .15	.....	.15
Berlin,	1,690.00	243.00	640.50	131.00	3,600.00	280.61	13.55	6,598.66	9,500.00	15,600.00	$900.00	401	.....	.....	.35	1.00	.10
Chester,	151.34	.....	17.87	146.15	.....	47.05	63.29	425.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colchester,	75.13	.....	.....	119.31	.....	.....	66.76	246.20	1,300 00	2,500.00	225.00	74	.....	.....	.25	.....	.....
Farmington Valley	1,043.22	780.00	.....	258.25	140.41	230 00	45.90	2,487.78	2,300.00	9,203.07	.....	.....	70	$5,000	.25, .15	.....	.....
Granby,	175.70	680.00	90.00	207.25	63.98	186.65	22.85	1,426.43	1,000.00	2,500.00	.....	.....	.....	.....	.25	.....	.....
Greenfield Hill Country Club,	1,580.00	.....	.....	765.49	900.00	237.93	994.54	4,477.96	4,600.00	10,223.00	1,000.00	181	.....	.....	.35.25,15	.75	.50, .25
Guilford,	178.31	.....	.....	378.30	.....	126.00	638.28	1,320.89	.....	.....	.....	212	.....	.....	.15	.50	.....
Harwinton,	232.75	.....	.....	248.90	55.50	215.00	47.15	799.30	300.00	755.50	200.00	142	.....	.....	.....	.....	.....
Madison,	25.00	.....	25.00	125.20	32.45	10.00	1.00	.....	25.00	.....	70.00	26	.....	.....	.10	.....	.....
Mad River Grange,	.....	282.59	.....	131.00	8.50	76.42	31.92	.....	.....	.....	.....	30	.....	.....	.25	.....	.....
New Haven County Hort. Society,	383.47	.....	.....	622.50	.....	79.00	243.31	1,328.28	218.00	.....	.....	93	.....	.....	.25	.....	.....
New Milford,	588.98	966.00	150.00	397.45	.....	136.00	.90	2,239.33	2,656.65	.....	.....	.....	.....	.....	.15, .25	.....	.25
Newtown,	49.48	780.00	158 78	.....	201.87	1,150.35	.....	2,340.48	1,000.00	.....	5,000.00	120	.....	5,000	.25	.....	25, .50
Orange,	779.64	760.00	131.50	804.00	71.99	369.58	1,275.48	4,192.19	.....	.....	4,000.00	117	.....	.....	.50	.....	.25
Putnam P'k Asso.,	969.07	737.50	967.50	471.16	59.00	.....	11.64	3,215 87	2,500.00	10,000.00	.....	.....	76	5,000	.35	.50	.....
Rockville F. Asso.,	851.96	1,076.59	1,285 00	1,172.90	3,760.68	65.00	207.37	8,219.50	2.000.00	10,000.00	.....	.....	123	3,330	.35	1.00	.....
Simsbury,	554.81	530.00	58.00	.....	437.63	254.07	129 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stafford Springs,	1,884.84	1,505.25	1,625.00	1,465.28	.....	.....	714.92	7,194.29	1,629.56	12,000.00	500.00	.....	56	5,000	.25, .50	1.00,1.50	.25, .50
Suffield,	2,186.66	907.50	150.00	100.00	420.11	609.05	680.71	2,867.37	1,020.00	7,000.00	.....	.....	.....	3,075	.35	.....	.10
Uni'n(Som'rs,etc.),	51.39	.....	50.00	161.55	.....	94.30	1,045.28	1,402.52	.....	.....	.....	362	.....	.....	.....	.....	.....
Weth'sf'ld Grange,	67.65	.....	.....	109.50	99.15	238.28	5.82	520.40	1,000.00	7,000.00	300.00	228	44	5,000	.25	.50	.....
Horseshoe Park Agri. Asso,	397.21	1,615.00	765.00	1,064.83	150.00	1,306.24	289.20	5,587.48	500.00	.....	4,624.11	.....	49	2,025	.35	1.00	.25
Woodstock,	431.78	382.00	280.00	890.00	276.50	.....	181.59	2,441.87	.....	8,000.00	675 00	548	.....	.....	.25	.....	.25
Wolcott,	425.93	.....	.....	489.25	.....	7.90	3,046 93	3,970.01	.....	.....	50.00	76	.....	.....	.25	1.00	.....
Conn. Dairymen's Asso.	.....	.....	.....	396.54	338.80	1,474.06	655.03	2,864.43	.....	.....	.....	.....	.....	.....	.....	.....	.....
Conn. Pomo. Soc.	119.93	.....	.....	.....	.....	.....	62.70	.....	.....	.....	.....	690	.....	.....	.....	.....	.....

ANALYSIS OF PREMIUMS AND GRATUITIES PAID.—FARM STOCK.

SOCIETIES.	Bulls.	Milch Cows.	Heifers.	Calves.	Working Oxen.	Steers.	Fat Cattle.	Horses.	Horses, Speed.	Sheep.	Swine.	Poultry.	All other Stock.	Total.
New London County,	$60.50	$207.25	$48.75	$34.25	$79.50	$21.50	$16.00	$161.25	$1,400.00	$100.50	$43.50	$195.25	.....	$2,368.25
Windham County,	60.00	56 00	78.00	41.00	86.00	52.00	.....	71.00	400.00	10.00	.....	58.75	$5.00	912.75
Beacon Valley,	.....	6.00	21.00	3.00	1 75	2.00	2.00	7.80	82.60	2.00	3.50	28.50	16.00	176.15
Berlin,	41.50	95.50	18.00	15.00	20.00	6.00	3.50	27.00	243.00	25.00	29.00	115.50	186.00	825.00
Chester,	1.00	2.50	1.50	1.50	9.00	1.75	.....	5.25	.....	.....	2.00	11.00	.....	35.50
Colchester,	3.25	8.25	2.50	1.75	2.50	4.00	1.50	7.00	.....	1.00	.....	5.75	.....	35.50
Farmington Valley,	28.00	34.00	33.50	11.00	20.00	23.00	1.00	7.00	780.00	.....	.....	33.00	.....	970.50
Granby,	14.00	34.50	19.50	8.50	15.50	16.50	.....	26.75	.....	4.00	.....	22.50	.....	161.75
Greenfield Hill Country Club,	12.00	24.00	16.50	10.25	115.00	10.00	6.00	122.84	.....	8.50	5.00	42.25	48.90	421.24
Guilford,	2.75	10.25	3.50	1.75	26.25	8.25	3.00	23.75	.....	.....	3.25	29.25	6.25	118.25
Harwinton,	4.00	1.15	3.05	.....	45.35	17.05	1.60	7.65	.....	1.50	.....	35.70	5.15	122.20
Madison,	1.50	12.50	1.00	.....	21.00	2.75	2.00	4.00	.....	.....	1.00	11.50	6.75	64.00
Mad River Grange,	3.00	25.00	8.00	2.00	30.00	3.00	2.00	4.00	.....	.....	3.00	12.00	.....	95 00
New Haven County Hort. Society,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Milford,	14.50	54.00	6.50	20.00	49.00	24.00	7.00	31.00	966.00	.....	4.00	4.00	1.00	1,181.00
Newtown,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orange,	10.50	47.00	9.00	6.00	42.50	126.00	9.00	44.50	760.00	4.50	11.00	24.75	18.00	1,112.75
Putnam Park Association,	.....	.....	.....	.....	.....	.....	.....	176.00	1,200.00	.....	.....	11.75	.....	1,387.75
Rockville Fair Association,	30.00	59.00	49.50	17.50	88.00	12.50	6.00	64.25	1,076.59	48.00	17.00	242.75	.....	1,711.09
Simsbury,	.....	.....	.....	128.00	63.18	.....	.....	247.50	.....	.....	.....	140.75	265.00	844.43
Stafford Springs,	36.00	107.00	53.00	27.00	118.00	31.00	7.00	46.00	.....	31.00	10.00	.....	30.00	49.60
Suffield,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.00	.....	.....
Union (Somers, etc.),	6.00	21.00	4.50	3.25	3.00	.....	.....	12.00	3.00	.....	3.00	22.50	.50	778.75
Wethersfield Grange,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Horseshoe Park Agri. Association,	47.00	62.00	130.00	27.00	80.00	17.00	13.00	58.00	1,615.00	11.00	12.00	39.75	171.70	2,283.45
Woodstock,	.....	.....	259.00	.....	40.00	50.00	.....	129.00	382.00	34.00	.....	71.25	.....	965.25
Wolcott,	25.50	39.25	35.50	26.25	67.00	17.00	4.50	32.00	.....	5.00	.....	41.00	19.00	312.00
Conn. Dairymen's Association,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Conn. Pomological Society,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

ANALYSIS OF PREMIUMS AND GRATUITIES PAID.—CONTINUED. FARM PRODUCTS.

SOCIETIES.	Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Beans.	Buckwheat.	Grass Seeds.	Potatoes.	Carrots.	Beets.	Parsnips.	Turnips.	Onions.	Other products.	Total amount for Grain and Root Crops.
New London County,...	$4.50	$.....	$ .75	$.....	$ .75	$2 50	$ .75	.....	$4.75	$1.75	$4.25	$.....	$3.00	$3.25	$13.75	$40.00
Windham County,.....	1.50	.75	.75	.....	.75	2.25	.75	.....	27.00	1.25	1.50	.....	2 00	2.75	25.00	66.25
Beacon Valley,.....	3.10	.....	3.20	.....	1.80	4.75	1.80	1.00	14.50	1.25	1.25	4.00	2.25	.50	14.00	53.40
Berlin,.....	14.25	2.00	2.00	.....	1.50	.75	2.00	.....	14.50	1.50	3.50	.75	1.00	4.25	6.25	54.25
Chester,.....	5.30	.30	.60	.....	.....	3.40	.....	.....	11 45	.45	.50	.45	.65	1.10	.....	24.20
Colchester,.....	1.50	.40	.....	.....	.....	.....	.....	.....	2.35	.....	.60	.....	.....	.60	.....	5.45
Granby,.....	2.20	.....	.....	.....	.....	2.30	.....	.....	8.50	.....	.....	.....	.....	.....	10.80	23.80
Farmington Valley,....	.....	.....	.....	.....	.....	.....	.....	.....	.75	.25	.25	.25	.25	.25	6.25	9.00
Greenfield Hill Country Club,.....	7.00	.50	.....	.....	.....	.....	.....	.....	12.25	2 00	2.75	.50	.50	1.25	4.00	30.75
Guilford,.....	15.25	.75	.25	.25	.40	.65	.40	11.60	.75	.40	1.90	.30	.50	.75	16.25	50.40
Harwinton,.....	7.60	.....	.50	.....	.80	1.60	.60	.....	6.50	1.30	.50	.80	1.80	3.75	1.45	27.20
Madison,.....	6.25	.....	.....	.....	.....	.65	.....	.....	3.00	.50	.50	.....	.....	1.00	4.00	15.90
Mad River Grange,.....	.50	.50	.25	.....	.25	.....	.75	.....	5.00	.75	.75	.50	1.00	3.00	.....	13.25
New Haven Co. Hort. Society,.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Milford,.....	2.75	.....	.50	.....	.....	.50	.....	.....	14.25	1.00	1.00	.75	1.25	2.75	8.75	33.50
Newtown,.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orange,.....	10.00	.50	.75	.....	.50	7.25	.....	.....	13.50	.75	1.25	.75	.75	3.00	39.25	78 25
Putnam Park Ass'n,....	4.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44.75
Rockville Fair Ass'n,..	9.25	.....	2.50	.....	1.50	9.75	1.00	.....	88.50	2.75	4.00	.50	3.75	4.25	71.80	199.55
Simsbury,.....	.....	.....	.....	.....	.....	83.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stafford Springs,.....	22.85	.75	1.75	3.00	1.75	21.50	2.00	.....	119.00	4.00	2.25	.50	4.25	5.50	.....	189.10
Suffield,.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union (Somers, etc.),...	1.50	.....	.75	.....	.50	.....	.....	.....	6.25	.75	.75	.....	.50	.75	8.50	21.75
Wethersfield Grange,...	2.00	.....	.....	.....	.....	.....	.....	.....	11.50	1.50	2.00	.....	3.00	9.00	15.00	44.00
Horseshoe Park Agricultural Association,.	5.50	.....	1.50	.....	.....	8.00	1:50	1.00	37.00	1.25	9.00	.....	10.50	9.75	31.25	116.25
Woodstock,.....	.....	.....	.....	15.75	.....	.....	.....	.....	16.45	.....	.....	.....	.....	.....	.....	32.20
Wolcott,.....	21.50	.50	1.25	.....	1.00	1.00	.50	.....	19.50	2.25	3.25	.50	2.25	5.25	7.00	65.75
Conn. Dairymen's Association,..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Conn. Pomological Soc..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

ANALYSIS OF PREMIUMS AND GRATUITIES.—CONTINUED. FARM PRODUCTS AND MISCELLANEOUS.

SOCIETIES.	Fruits.	Flowers.	Other Cult. Crops.	Butter.	Cheese.	Honey and Wax.	Bread and Cake.	Sugar, Syrup, Preserved Fruit.	Total Farm Products.	Agricultural Implements.	Mechanical Inventions.	Fine Arts and Fancy Articles.	Decorated Carts and Trains of Oxen.	Plowing at Exhibition.	Grange Exhibit.	Medals.	Diplomas.	Total Miscellaneous.
New London County,	$12.75	$16.00	.....	$1.00	.....	$4.00	$5.50	$2.75	$82.00	$3.00	$16.00	$86.25	.....	.....	.....	.....	17	$105.25
Windham County,	83.40	34.90	$25.00	4.50	$6.00	2.25	25.80	15.00	263.10	.....	158.90	23.50	.....	.....	.....	.....	4	182.40
Beacon Valley,	21.50	4.75	1.25	2.00	.....	2.50	1.00	2.50	88.90	.....	.....	3.75	$16.00	.....	.....	.....	.....	19.75
Berlin,	52.00	30.25	.....	3.50	.....	.....	12.25	4.50	102.50	.....	22.75	.....	10.00	.....	.....	.....	.....	32.75
Chester,	14.25	1.95	14.50	.50	.....	.....	3.30	12.30	46.80	5.55	9.85	8.75	15.50	.....	.....	.....	.....	39.65
Colchester,	7.35	2.65	20.36	.75	.....	.50	4.45	1.50	37.56	.....	15.00	21.30	4.50	.....	.....	.....	.....	40.80
Farmington Valley,	8.50	5.75	.....	.....	.....	.....	4.20	6.00	24.45	.....	.....	19.50	.....	.....	.....	.....	.....	.....
Granby,	5.00	.75	.....	2.00	.....	1.00	9.75	2.00	29.50	.....	.....	16.00	.....	.....	.....	.....	.....	16.00
Greenfield Hill Country Club,	39.50	29.50	62.85	2.50	.....	3.00	14.50	8.30	189.50	.....	15.00	116.75	22.00	.....	.....	.....	30	153.75
Guilford,	34.15	10.25	2.60	4.25	.....	.40	3.95	6.10	112.10	...	.....	49.95	98.00	.....	.....	.....	.....	147.95
Harwinton,	16.00	3.20	8.15	.50	.30	.30	7.90	.80	64.35	.....	.....	12.35	50.00	.....	.....	.....	.....	62.35
Madison,	8.00	2.80	.....	.50	.....	.....	1.00	.....	28.20	.....	.....	16.00	17.00	.....	.....	.....	.....	33.00
Mad River Grange,	5.00	.75	.....	.....	.....	.....	.....	3.00	.....	5.00	.....	4.00	5.00	.....	.....	.....	.....	14.00
New Haven Co. Hort. Soc.,	33.00	542.50	47.00	.....	.....	.....	.....	.....	622.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Milford,	68.25	3.50	.....	.....	.....	.....	12.25	11.75	95.75	.....	.....	53.20	.....	.....	.....	.....	.....	53.20
Newtown,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orange,	69.50	3.00	.....	.....	.....	.50	8.00	3.50	84.50	.....	.....	40.50	248.00	.....	.....	.....	.....	288.50
Putnam Park Ass'n,	19.00	31.75	9.50	.....	.....	.....	16.25	15.00	91.50	.....	40.00	77.00	.....	.....	.....	.....	.....	117.00
Rockville Fair Ass'n,	144.25	22.70	.....	5.00	.....	1.00	15.25	45.00	233.20	.....	.....	105.65	.....	.....	.....	.....	.....	105.65
Simsbury,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stafford Springs,	44.00	4.25	61.15	.60	.....	.....	4.75	11.00	314.85	.....	36.90	73.00	55.00	.....	.....	.....	17	164.90
Suffield,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union (Somers, etc.),	8.25	.....	.....	.....	.....	.....	2.30	2.00	12.55	10.00	.....	16.25	.....	.....	$2.25	10	19	48.50
Wethersfield Grange,	16.00	6.50	.....	.....	.....	.50	3.00	2.15	72.15	.....	.....	37.35	.....	.....	.....	.....	.....	37.35
Horseshoe Park Agricultural Ass'n,	190.83	8.50	.....	.....	.....	1.00	2.30	6.25	208.88	.....	.....	71.25	.....	.....	.....	.....	.....	71.25
Woodstock,	66.60	20.35	18.50	10.00	.....	2.50	19.45	9.75	179.35	.....	56.10	71.25	.....	.....	.....	.....	.....	127.85
Wolcott,	42.00	.75	19.25	1.00	.....	.25	4.00	.....	133.00	.....	.....	13.25	16.00	.....	15.00	.....	.....	44.25
Conn. Dairymen's Ass'n,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Connecticut Pom. Society,	308.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NUMBER OF ANIMALS EXHIBITED.—1907.

SOCIETIES.	Bulls.	Milch Cows.	Heifers.	Calves.	Oxen (pairs).	Steers (pairs).	Fat Cattle.	Horses.	Horses — speed.	Sheep.	Swine.	Poultry (coops).	All other Stock.
New London County,	23	135	31	24	80	27	17	34	38	91	40	284	.....
Windham County,	32	44	45	38	36	30	.....	42	.....	24	.....	125	2
Beacon Valley,	.....	5	11	8	5	1	1	4	11	9	6	87	.....
Berlin,	28	62	18	24	12	10	4	122	9	23	135	150	122
Chester,	2	4	2	3	10	3	.....	5	.....	.....	6	32	.....
Colchester,	5	20	8	7	2	10	1	10	.....	6	.....	15	.....
Farmington Valley,	13	19	21	9	8	10	3	.....	.....	.....	.....	.....	.....
Granby,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greenfield Hill Country Club,	6	17	12	14	50	6	6	.....	.....	9	5	200	.....
Guilford,	8	19	9	7	14	8	3	15	.....	.....	9	124	27
Harwinton,	5	2	7	.....	19	16	4	7	.....	7	.....	76	26
Madison,	2	8	1	.....	34	3	4	4	.....	.....	1	25	66
Mad River Grange,	5	30	10	4	18	6	3	6	.....	.....	9	50	.....
New Haven County Horticultural Society,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Milford,	11	61	9	24	29	17	4	15	.....	.....	3	14	.....
Newtown,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orange,	7	37	11	6	31	15	6	28	.....	10	10	55	28
Putnam Park Association,	.....	.....	.....	.....	.....	.....	.....	45	.....	.....	.....	.....	.....
Rockville Fair Association,	19	45	55	22	42	12	6	29	35	41	22	616	.....
Simsbury,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stafford Springs,	11	47	30	23	22	11	6	16	.....	43	4	.....	.....
Suffield,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union (Somers, etc.),	2	8	2	3	1	.....	.....	7	1	.....	2	62	.....
Wethersfield Grange,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Horseshoe Park Agricultural Association,	14	24	63	21	35	8	4	.....	.....	13	12	75	.....
Woodstock,	.....	.....	149	.....	15	23	.....	53	.....	.....	.....	111	.....
Wolcott,	11	32	24	18	35	12	8	23	.....	31	.....	105	8
Connecticut Dairymen's Association,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Connecticut Pomological Society,	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

AGRICULTURAL FAIRS IN CONNECTICUT.—1906.

SOCIETIES.	PLACE.	DATE.	ATTENDANCE.						
			Monday.	Tuesday.	Wednesday.	Thursday	Friday.	Saturday.	Total.
New London County,	Norwich,	Sept. 11-14,	....	1,500	....	8,000	2,500	....	12,000
Windham County,	Brooklyn,	Sept. 25-27,	....	....	2,500	....	....	....	2,700
Beacon Valley,	Naugatuck,	Oct. 17,	....	....	4,500	....	....	....	4,500
Berlin,	Berlin,	Sept. 19-21,	....	....	8,000	12,000	6,000	....	26,000
Chester,	Chester,	Sept. 26,	....	....	....	....	....	....	....
Colchester,	Colchester,	Sept. 19,	....	....	....	.. .	350	....	350
Farmington Valley,	Collinsville,	Sept. 12-14,	....	....	700	2,500	700	....	3,900
Granby,	Granby,	Sept. 26-27,	....	....	1,000	....	2,000	....	3,000
Greenfield Hill Country Club,	Greenfield Hill,	Sept. 11-14,	....	873	300	3,339	1,710	....	6,222
Guilford,	Guilford,	Sept. 26,	....	....	10,000	....	....	....	10,000
Harwinton,	Harwinton,	Oct. 2,	....	14,000	....	....	....	....	14,000
Madison,	Madison,	Sept. 19,	....	....	1,500	....	....	....	1,500
Mad River Grange,	Waterbury,	Sept. 26,	....	681	1,500	....	....	....	2,180
New Haven County Hort. Society,	New Haven,	Nov 6-7-8,	....	245	450	513	....	....	1,208
New Milford,	New Milford,	Sept. 18-21,	....	200	1,500	1,000	800	....	3,500
Newtown,	Newtown,	Sept. 25-26-28,	....	1,000	3,000	....	1,000	....	5,000
Orange,	Orange,	Sept. 3-4,	3,000	2,700	....	....	....	....	5,700
Putnam Park Association,	Putnam,	Sept. 3-4,	4,500	1,500	....	....	....	....	6,000
Rockville Fair Association,	Rockville,	Sept. 25-27,	....	2,500	12,000	....	....	3,000	17,500
Simsbury,	Simsbury,		....	....	....	....	....	....	....
Stafford Springs,	Stafford Springs,	Oct 2-4,	....	1,000	12,000	2,000	....	....	15,000
Suffield,	Suffield,	Oct. 2-3,	....	....	....	....	....	....	....
Union (Somers, etc.),	Broad Brook,	Sept. 20,	....	....	5,000	....	....	....	5,000
Wethersfield Grange,	Wethersfield,	Sept. 25-27,	....	169	208	179	....	....	556
Horseshoe Park Agri. Asso.,	Willimantic,	Sept. 18-20,	1,000	1,200	3,500	....	....	....	16,500
Woodstock,	So. Woodstock,	Sept. 18-19,	....	3,388	1,139	....	....	....	4,502
Wolcott,	Wolcott,	Oct. 11,	....	....	....	2,000	....	....	2,000
Conn. Dairymen's Asso.,	Hartford,		....	....	....	....	....	....	....
Conn. Pomological Society,	Rockville,	Sept. 18-20,	....	....	....	....	....	....	....

OFFICIAL DIRECTORY

OF THE

CONNECTICUT PATRONS OF HUSBANDRY

FOR 1907.

OFFICERS OF CONNECTICUT STATE GRANGE.

Master, O. S. WOOD, Ellington.
Overseer, B. A. PECK, Bristol.
Lecturer, L. H. HEALEY, No. Woodstock.
Steward, F. P. JOHNSON, Warren.
Assistant Steward, H. W. ANDREWS, Brookfield Center.
Chaplain, REV. F. COUNTRYMAN, Stony Creek.
Treasurer, N. S. PLATT, New Haven.
Secretary, H. E. LOOMIS, Glastonbury.
Gate-Keeper, E. F. HUTCHINSON, Andover.
Ceres, MRS. NELLIE A. COOK, Hamden.
Pomona, Mrs. ADDIE C. HYDE, Brooklyn.
Flora, MRS. HATTIE J. WELTON, Plymouth.
Lady Steward, MRS. MARY K. TAYLOR, Lebanon.
Annual meeting the second Tuesday in January.

EXECUTIVE COMMITTEE.

P. B. SIBLEY, Danielson,	Term expires	1908
J. H. Hale, South Glastonbury,	" "	1909
J. H. BLAKEMAN, Oronoque,	" "	1910
O. S. WOOD, *ex officio*,	" "	1908
H. E. LOOMIS, *ex officio*,	" "	1908

FINANCE COMMITTEE.

H. C. DUNHAM, Middletown, G. A. HOPSON, East Wallingford,
W. L. PIERPONT, Waterbury.

COMMITTEES FOR 1907.

Woman's Work

Mrs. Mary W. Phipps, Prospect.

Deputies.

Geo. A. Hopson, General Deputy, East Wallingford.
Central Pomona, No. 1, Hubert S. Blake, New Britain.
Quinebaug Pomona, No. 2, C. H. Potter, Southbridge, Mass.
East Central Pomona, No. 3, Andrew Kingsbury, Rockville.
Mt. County Pomona, No. 4, J. H. Putnam, Litchfield.
New Haven County Pomona, No. 5, W. S. Hine, Derby.
New London County Pomona, No. 6, C. E. Staples, Colchester.
Excelsior Pomona, No. 7, F. M. Candee, Naugatuck.
Seaview Pomona, No. 8, E. H. Wright, Clinton.
Fairfield County Pomona, No. 9, Joseph Adams, Westport.
Housatonic Valley Pomona, No. 10, Gilbert A. Vincent.

Board of Arbitration.

The Executive Committee, Overseer, and Lecturer.

The Patrons Mutual Fire Insurance Company.

President, Geo. Austin Bowen, Woodstock.
Vice-President, D. H. Carrier, Glastonbury.
Treasurer, B. C. Patterson, Torrington.
Secretary, Chas. E. Bacon, Middletown.
Annual meeting, third Tuesday in February.

OFFICERS OF THE GRANGES.

NAME.	MASTER.	LECTURER.	SECRETARY.
POMONA GRANGES.			
Central Pomona, No. 1,	Henry C. Dunham, Middletown,	Mrs. B. B. Robbins, Bristol,	Chas. E. Bacon, Middletown.
Quinebaug Pomona, 2,	Everett E. Brown, Pomfret Center,	William H. Barron, Jr., Danielson.	W. F. Day, Danielson.
East Central Pomona, 3,	Chas. B. Sikes, Ellington,	Fannie L. Tilden, Ellington,	Laura J. Brewer, Hockanum.
Mountain County Pomona, 4,	Geo. F. Douglass, Collinsville,	Silas E. Stockman, East Morris,	Arthur B. Ferry, Winsted.
New Haven Co. Pomona, 5,	Walter S. Hine, Derby,	Mrs. C. A. D. Allen, Wallingford,	Oscar L. Smith, North Haven.
New London Co. Pomona, 6,	Carroll E. Staples, Colchester,	F. N. Taylor, Lebanon,	O. L. Pultz, Lebanon.
Excelsior Pomona, 7,	Wilson L. Pierpont, Waterbury,	Lewis Garrigus, Waterbury,	Mrs. Martha E. Judd, Southbury.
Seaview Pomona, 8,	Edward B. Lynde, Chester,	Miss Eunice Burch, East Lyme,	D. Eugene Smith, Madison.
Fairfield County Pomona, 9,	Benjamin Brundage, Danbury,	J. Arthur Sherwood, Long Hill,	Mrs. N. E. Blakeman, Oronoque.
Housatonic Valley Pomona, 10,	H. W. Treat, Bridgewater,	Mrs. Adele T. Brush, West Cornwall,	F. S. Peet, Kent.
SUBORDINATE GRANGES.			
Washington, No. 11,	Ralph J. Averill, Washington Depot,	Mrs. Anna Clark, Wash. Depot,	Frederic J. Ford, Wash. Depot.
Tunxis, 13,	F. L. Granger, Jr., Bloomfield,	Frederick C. Bidwell, Bloomfield,	Geo. K. Marvin, Bloomfield.
Hope, 20,	William L. Benton, Burrville,	Eugene Wadhams, Torrington,	K. K. Kimberly, Torrington.
Lebanon, 21,	Otto L. Pultz, Lebanon,	Mrs. May K. Taylor, Lebanon,	F. N. Taylor, Lebanon.
Cheshire, 23,	Willis B. French, Cheshire,	Frederick Doolittle, Cheshire,	C. A. Buckingham, West Cheshire.
Berlin, 24,	Earl Cooley, Berlin,	Mrs. Walter L Atwater, Berlin,	W. H. Shumway, Berlin.
Union, 25,	William B. Dayton, Southington,	Mrs. Georgia Scotton, Southington,	Austin S. Chaffee, Southington,
Glastonbury, 26,	Stancliff Hale, So. Glastonbury,	William H. Carrier, So. Glastonbury,	Miss Lucy E. Miller, So. Glastonbury.
Suffield, 27,	Edw. F. Newton, Agawam, Mass.,	H. D. Sikes, Suffield,	Mrs. E. F. Newton, Agawam, Mass.
Meriden, 29,	Julius I. Ives, South Meriden,	Mrs. Mary A. Ives, South Meriden,	Mrs. Mabel A. Francis, Wallingford.
Wapping, 30,	J. Edward Collins, Burnside,	Miss Emily M. Lane, Rockville,	Miss S. Rosa Dewey, Buckland.
Manchester, 31,	Arthur E. Loomis, S. Manchester,	Miss Mabel Loomis, S. Manchester,	Keeney B. Loomis, South Manchester.
North Cornwall, 32,	Mrs. A. P. Brush, W. Cornwall,	Noah Rogers, W. Cornwall,	Mrs. Niles Scoville, West Cornwall.
Wallingford, 33,	Geo. A. Hopson, Wallingford.	Arnon T. Henry, Wallingford,	Flora E. Hough, Wallingford.
Cawasa, 34,	Mrs. Jennie Hinman, Collinsville,	Miss Bertha Scherwer, Collinsville,	Mrs Annette E. Case, Collinsville.
North Haven, 35,	Hobart J. Brockett, Clintonville,	Mrs. H. F. Potter, North Haven,	Ethna E. Hoadley, New Haven.
Little River, 36,	Austin E. Pearle, Hampton,	Mary B. Litchfield, Hampton,	Gertie M. Thompson, Hampton.
East Hartford, 37,	Archie J Evans, Hockanum,	Mrs. Mary H. Pease, Hockanum,	Miss Charlotte C. Smart, Silver Lane.
New Canaan, 38,	J. Howard Hoyt, New Canaan,	Frank N. Horton, New Canaan,	Mrs. D. A. St. John, New Canaan.
Burritt, 39,	Charles H. McKirdy, New Britain,	Miss Lila F. Clark, New Britain,	Mrs. F. H. Sharpe, New Britain.
Senexet, 40,	Chas. T. Lindeman, Putnam,	Mabel E. Whitaker, Putnam,	Chauncey S. Child, Putnam.
Konomoc, 41,	Ezra J. Hempstead, New London,	Mrs. Anna M. Bliven, New London,	John J. Lawless, New London.
Mattabessett, 42,	C. Marsden Bacon, Middletown,	Mrs. E T. Birdsey, Middletown,	Daniel T. Haines, Middletown.
Brooklyn, 43,	Mrs. C. S. Hyde, Brooklyn,	Miss Annie Page, Wauregan.	Miss Gladys Stone, Brooklyn.
Newington, 44,	Thomas A. Francis, Newington,	Nellie Luce Eddy, New Britain,	Florence A. Davis, Newington.

OFFICERS OF THE GRANGES.— CONTINUED.

NAME.		MASTER.	LECTURER.	SECRETARY.
SUBORDINATE GRANGES — *Cont.*				
Ellington,	46,	F. H. Holton, Ellington,	Mrs. Emily M. Parsons, Ellington,	F. B. Nangle, Rockville.
Bolton,	47,	Mrs. Elizabeth Loomis, Bolton,	Miss Annie M. Alvord, Bolton,	Miss Annie E. White, Bolton.
Whigville,	48,	E. W. Hart, Forestville,	Miss Ruth G. Atwater, Bristol,	R. S Carnell, Forestville.
Westfield,	50,	F. E. Boardman, Middletown,	Rev D B Hubbard, Middletown,	E. A Smith, Middletown.
Tolland,	51,	C. Hibbard, West Rockville,	Mrs. S. E. Edgerton, W. Willington,	Mrs. Edyth N. Edgerton, W. Willington.
Vernon,	52,	Charles W. Bradley, Rockville,	Mrs. Charles B. Reed, Rockville,	Mrs. Emma D. Pitkin, Talcottville.
Plainville,	54,	W C. Buckley, Forestville,	B. W. Edwards, Plainville,	Florence Cowles, Plainville.
Stafford,	55,	J. M. Larned, Stafford Springs,	F. N. Plumb, Stafford Springs,	Mrs. Abbie Ide, Stafford.
East Haddam,	56,	Hobart H. Mack, East Haddam,	Stephen D. Brainard, Colchester,	S. E. Williams, Colchester.
Durham,	57,	Wilbur L. Davis, Durham Center,	Mrs. Lulu Coe, Northford,	Miss Ruth M. Tucker, Durham.
West Hartford,	58,	M. L. Bristol, West Hartford,	Miss F. L. Griswold, West Hartford,	Geo. B. Thayer, West Hartford.
Saybrook,	59,	Geo. E. Sheffield, Saybrook,	John S. Dickinson, Saybrook,	Mrs. Marion A. Chalker, Saybrook.
Wolf Den,	61,	Everett E. Brown, Pomfret Center,	Mrs. Alice E. Wilbur, Abington,	Mrs. Anna L. Badger, Abington.
Eureka,	62,	Geo. F. Douglass, Collinsville,	Fred Goodenough, Torringford,	Mrs. M. V. Douglass, Collinsville.
Middlefield,	63,	Almon D Emmons, Middlefield,	Miss Lucina C Miller, Middlefield,	Gordon S. Goodrich, Middlefield.
Mansfield,	64,	L. A. Clinton, Storrs,	E. A. White, Storrs,	Charles Thom, Storrs.
Quinnatissett,	65,	Oscar Robinson, Webster, Mass.,	H. M. Thomson, Thompson,	E. E. Rhodes, Thompson.
Killingworth,	66,	Chas. N. Davis, Clinton,	Chas. W. Coe, Clinton,	Hattie M. Davis, Clinton.
Cromwell,	67,	John F. Chalmers, Cromwell,	Harvey Jewell, Cromwell,	Miss Lottie M. Sage, Cromwell.
Natchaug,	68,	Burton M. Welch, Chaplin,	Flora Wilson, Chaplin,	Clarence E. Chester, Chaplin.
Shetucket,	69,	Jared Fuller, Scotland,	Mrs. Francis R. Bacon, Scotland,	Miss Mary A. Smith, Scotland.
Canterbury,	70,	Lemuel N. Carpenter, Canterbury,	Mrs. Grace I. Barrows, S. Canterbury,	Levi N. Clark, So. Canterbury.
Mad River,	71,	Henry B. Cooke, Waterbury,	Mrs. Jeanie Judd, Waterbury,	Mrs. Mary L. Packer, Waterbury.
Plymouth,	72,	Ard. Welton, Terryville,	Mrs. Hattie Welton, Terryville,	Edith E. Sutliffe, Plymouth.
Indian River,	73,	Geo. F. Platt, Milford,	Frank N. Platt, Milford,	Geo. S. Clark, Milford.
Winchester,	74,	Chas. E. Johnson, Norfolk,	Hopson Hurd, Winsted,	Edward L. Humphrey, Winsted.
Coventry,	75,	Oliver C. Hall, Andover,	Mrs. Carrie B. Johnson, Andover,	Mrs. Aurilla M. Snow, Andover.
Clinton,	77,	Selden S. Carter, Clinton,	Mrs. Sarah E. Bronson, Clinton,	William H. Kelsey, 2d, Clinton.
Colchester,	78,	Carroll E Staples, Colchester,	Mrs Jennie Plumb, Colchester,	Mrs. Hattie J. Strong, Colchester.
Housatonic,	79,	Harry Wilcoxson, Stratford,	N. E. Wells, Putney,	Geo. Meachen, Stratford.
Colebrook,	82,	Lewis T. Allen, Winsted,	James W. R. Allen, Winsted.	Miss Grace I. Allen, Winsted.
Totoket,	83,	Geo. L. Ford, Branford,	Mrs. Elizabeth F. Harrison, Branford,	Walter S. Watrous, Branford.
Foxon,	84,	C. W. Grannis, East Haven,	Mrs. John R. Merrick, Totoket,	Frank M. Sperry, Totoket.
Waugumbaug,	85,	William Smith, So. Coventry,	Mrs. Florence Trask, So. Coventry,	Miss Helen Potter, Willimantic.
Webutuck,	86,	Edw. J Chaffee, Amenia Union, N.Y.	Mrs. Florence S. Odell, Sharon,	H. V. D. Reed, Amenia Union, N. Y.
Hillstown,	87,	Frederick Schaffer, Hockanum,	Hattie E. Brewer, Hockanum,	Chas. G. Strickland, So. Manchester.
Ekonk,	89,	Mrs. Geo. H. Gallup, Ekonk,	Miss Margaret Tanner, Campb'lls Mills	Miss Lottie E. Stanton, Ekonk.

OFFICERS OF THE GRANGES.—Continued.

Name.	Master.	Lecturer.	Secretary.
Subordinate Granges.— *Cont.*			
Seymour, 91,	E. J. Leavenworth, Seymour,	Mrs. Carrie Coleman, Seymour,	Miss Grace E Yarrington, Seymour.
Harmony, 92,	Homer E. Clarke. Stepney Depot,	Miss Ethel J. Wales, Stepney Depot,	Edwin C. Shelton, Stepney Depot.
Border, 93,	Chas E. Little, Willimantic,	Mrs. Louise A. Goss. Willimantic,	Mrs. Lillian M. French. Willimantic.
East Windsor, 94,	W. W. Thompson. Warehouse Pt.,	J. B. Noble, Warehouse Point,	Mrs. K. E. Stoughton, Warehouse Pt.
Jewett City, 96,	W A Edmonds, Griswold,	Mrs. Z J. Huntington, Griswold,	Arthur Patrick, Griswold.
Hamden, 99,	Milo N. Wooding, Hamden,	Mrs. Lizzie M Clark, Hamden,	Oscar L. Smith, North Haven.
Taghannuck, 100,	Mrs. A. C. Buckley, Amenia, N. Y.,	Mrs. Caroline Palmer, Sharon,	Mrs. Ella B. St. John, Sharon.
Mashapaug Lake, 101,	Levi M Reed, Stafford Springs,	Mrs. Nancy Howard. Stafford Spr'gs,	H. R. Howard, Stafford Springs.
Beacon Valley, 103,	J A. Downs, Westville,	Mrs. Delia B Sansford, Naugatuck,	R. C. Fowler, Naugatuck.
Somers, 105,	S D Percival, Somers,	C. J. Parsons, Somers,	Miss Ida R. Kibbe, Somers.
Litchfield, 107,	W. F. Webster, Litchfield,	R. C. Baldwin, Litchfield,	F. L. Sharp, Litchfield.
Woodbridge, 108,	Henry E. Baldwin, Westville,	Miss Eunice R. Augur Westville,	Leroy C. Beecher, Westville.
East Hampton, 109,	Otis H Goff, East Hampton,	Mrs. A. J. West, East Hampton,	Miss Myrtle Bradley, East Hampton.
Preston City, 110,	G. Warren Davis, Norwich,	Mrs. N. H. Hall, Norwich,	Herbert F. Brown, Norwich.
Hebron, 111,	Henry A Spafard, Turnerville,	Arthur E. Hutchinson, Gilead,	Mrs. Flora E. Buell, Gilead.
Killingly, 112,	Arthur D. Tripp, Danielson,	Mrs. Rosa Warren, Dayville,	C. Ella Day, Dayville.
Highland, 113,	Warren Thatcher, South Killingly,	Mrs. Emma Vaughn, So. Killingly,	Mrs. Fralie A Sanderson, Moosup.
Wethersfield, 114,	Dudley Welles, Wethersfield,	Miss Alice Adams, Wethersfield,	Dudley Wells, 2d, Wethersfield.
Rocky Hill, 115,	Frank G. Sherwood, Rocky Hill,	Mrs. Edna Button. Rocky Hill,	Fred L. Belden, Rocky Hill.
Bristol, 116,	John B. Matthews, Bristol,	Mrs. Edna W. Robbins, Bristol,	Mrs. Mary C. A. Perkins, Bristol.
Unity, 117,	Ellsworth A. Lynde, Deep River,	Mrs. Mary L. Moore, Deep River,	Mrs. Flora M. Dudley, Deep River.
Beacon, 118,	C. S. Hulme, Thomaston,	E. A. Hopkins, Thomaston,	Miss Leila L. Peck, Northfield.
Morris, 119,	Wm. F. Kirchberger, Thomaston,	Silas E. Stockman, East Morris,	Edwin H. Clark, East Morris.
Bethlehem, 121,	A. F. Johnson, Bethlehem,	Mrs. Geo W. Percy, Bethlehem,	Geo. W Percy, Bethlehem.
Watertown, 122,	Alfred H. Mattoon, Oakville,	Mrs. Grace S. Smith, Watertown,	Miss Mabelle Woodward, Watertown.
Westbrook, 123,	Horace E. Kelsey, Westbrook,	Margaret A. Buckbridge. Westbrook,	David C. Dibbie, Westbrook.
Higganum, 124,	Rutherford S. Chalker, Higganum,	Mrs. Rowena Spencer, Higganum,	Eugene O. Burr, Higganum.
Hollenbeck, 125,	Miles L Blodgett, Falls Village,	Miss Nettie M. Call, Falls Village,	Robert Pendleton, South Canaan.
Pleasant Valley, 126,	Watson Frisbie, North Woodbury,	Arthur E. Knox. North Woodbury,	Mattie E. Barnes, North Woodbury.
Goodwill, 127,	Alfred E Hollister, Glastonbury,	Mrs. Rose E. Goodale, Glastonbury,	Harold B. Waldo, Naubuc.
Orange, 128,	A. S Crosby, Orange,	Mrs. E. H. Newell, Orange,	Irving A. Andrew, Orange.
Pohtatuck, 129,	John J. Northrop, Newtown,	Allison P Smith. Newtown.	Miss Hattie M. Northrop. Newtown.
Farmill River, 130,	Frank E. Beard. Shelton,	Mrs Stephen Tucker, Shelton,	Miss Eleanor L. Wooster, Shelton.
Columbia, 131,	Geo A. Fuller, Chestnut Hill,	Herbert P. Collins, Columbia,	Amelia J. Fuller. Columbia.
Wichita, 132,	Frank Volsard. New Preston,	Mrs. Belle Johnson. Cornwall Bridge,	Miss Amy M.Hoffman,Cornwall Bdge.
Greenfield Hill, 133,	Simeon Pease, Fairfield,	Frank Whiting, Fairfield,	D. Frank Brown, Fairfield.
Trumbull, 134,	B. S. Beach, Trumbull,	John L. Beach, Trumbull,	E. T. Nichols, Bridgeport.

OFFICERS OF THE GRANGES.— Concluded.

Name.		Master.	Lecturer.	Secretary.
Subordinate Granges.— *Cont.*				
Silver Lake,	135,	Geo. B. Hamlin, Sharon,	Mrs. Grace Brazie, Sharon Valley,	Miss E. D. Scott, Sharon Valley.
East Canaan,	136,	W. W. Howland, East Canaan,	Miss Clara Bottum, East Canaan,	Mrs. Minnie Howland, East Canaan.
Middlebury,	139,	Arthur F. Greene, Woodbury,	Miss Addie J. Fenn, Middlebury,	Mrs. Martha E Judd, Southbury.
Plainfield,	140,	Jason P. Lathrop, Plainfield,	Fannie Bishop, Plainfield,	A. H. Matthewson, Plainfield.
Brookfield,	141,	Miss Florence S.Griffin,Brookfield Cr.	Geo. Graeter, Brookfield Center,	Juliette W. Sagendorf, Brookfield C.
Rock Rimmon,	142,	Geo. W. Burton, Beacon Falls,	Mrs. Hortense Rice, Beacon Falls,	Mrs. Jennie Burton, Beacon Falls.
Goshen,	143,	George Cooke, West Goshen,	Miss Heppie M. Miles, Goshen,	Karmi Kimberly, Torrington.
Prospect,	144,	Charles S. Fenn, Prospect,	Mrs. Mabel Griswold, Prospect,	Mrs. Sara S. Talmadge, Waterbury.
Rippowam,	145,	Cyrus Sarles, Springdale,	Miss Sadie Walker, Stamford,	Mrs. Sarah Sarles, Springdale,
Norfield,	146,	Iverson C. Fanton, Westport,	Mrs. Charles Scofield, Westport,	Arthur C. Bradley, Westport.
Lyme,	147,	F. S. Fosdick, North Lyme,	Mrs. F. S. Fosdick, North Lyme,	Mrs. Martha E. Huntley, Hamburg.
Westport,	148,	Geo. Fairchild, Westport.	Mrs. D. B. Bradley, Jr., Westport,	H. B. Fairchild, Westport.
Easton,	149,	Samuel B. Turney, Fairfield,	Miss Marilla Rockwell, Long Hill,	J. Arthur Sherwood, Long Hill.
Woodstock,	150,	Chas. H. Killiam, Southbridge,	Mrs. J. S. May, Putnam,	C. E. May, East Woodstock.
Enfield,	151,	Harry A. Gowdy, Scitico,	Mrs. Ellen L. Killam, Thompsonville,	Sophia L. Copley, Hazardville.
Cannon,	152,	Arthur Little, Wilton,	Mrs. Mary Ambler, Cannon Station.	Nelson Hurlbutt, Cannon Station.
Bridgewater,	153,	Albert B. Mallett, Bridgewater,	Henry C. Sanford, Bridgewater,	Willis E. Frost, Bridgewater.
Kent,	154,	William K. Stone, Kent,	Miss Carrie L. Stone, Kent,	Miss Mildred S. Page, Kent.
Danbury,	156,	William M. Hawley, Danbury,	Mrs. Francis Curtis, Danbury,	Mrs. Jessie D. Ryder.
East Lyme,	157,	Irvin E. Watrous, East Lyme,	Eunice Burch, East Lyme,	F. O. Ernesty, East Lyme.
Chester,	158,	Edward B. Lynde, Chester,	Hattie G. Smith, Chester,	William P. Holden, Chester,
Salisbury,	159,	Chas. S. Phelps. Chapinville,	Mrs. Hattie R. Hendrick, Salisbury,	Wm. E. Pettee, Salisbury.
Aspetuck Valley,	160,	G. W. Squires, New Preston,	Mrs. G. N. Abbott, New Milford,	Israel B. Smith, New Preston.
Bozrah,	161,	E. Judson Miner, Fitchville,	Miss Alice A. Bishop, Yantic,	Chas. A. Johnson, Fitchville.
Old Lyme,	162,	Robert H. Noble, Old Lyme,	Georgianna Clark, Old Lyme,	W. F. Ashley, Old Lyme.
Redding,	163,	Emory P. Sanford, Redding Ridge,	Mrs. Elizab'th Bradley, R'dding Ridge,	Mrs. F. O. Sanford, Redding Ridge.
Bethel,	164,	William H. Ferry, Bethel,	J. S. Mayhew, Bethel,	E. A. Underhill, Bethel.
Ridgefield,	165,	Albert C. Innis, Ridgefield,	Mrs. Lydia Innis, Ridgefield,	Arthur W. Northrup, Ridgefield.

REPORT OF THE TREASURER.

CHAS. A. THOMPSON *in account with*

STATE BOARD OF AGRICULTURE.

1905			DR.	CR.
July	1.	Balance amount in treasury,	$3,192.38	
Sept.	16.	W. F. Andross,		$13.45
"	"	Geo. D. Curtis,		5.95
"	20.	E. H. Jenkins,		19.14
Dec.	7.	To Railroad fares of Delegates,		100.00
"	14.	C. S. Hooker,		25.00
"	"	N. S. Platt,		9.46
"	15.	Thomas Shaw,		75.00
"	"	C. Helmold,		56.50
"	"	James F. Brown,		53.57
"	"	Norwich Bulletin Co.,		12.50
"	"	Sara Walrath Lyons,		35.00
"	"	C. S. Hooker,		131.50
"	"	L. H. Healey,		17.67
"	"	Elsworth & Pullen,		7.50
"	"	Hall & Bill Printing Co.,		9.50
1906.			DR.	CR.
Jan.	11.	N. G. Williams,		19.50
"	"	W. L. Davis,		21.43
"	"	I. C. Fanton,		17.20
"	"	D. Walter Patten,		2.54
"	"	Chas. F. Roberts,		16.75
"	"	James F. Brown,		678.11
"	"	E. G. Seeley,		22.50
"	"	J. B. Palmer,		16.05
"	"	Chas E. Chapman,		19.37
"	15.	T. F. McGrew,		47.67
"	"	G. G. Tillinghast,		15.00
"	"	C. D. Smead,		46.98
"	"	Rockville Journal,		7.50
"	"	Chronicle Printing Co.,		23.00
"	"	Farmer Pub. & Printing Co.,		10.00
"	"	H. J. Wheeler,		53.64
"	"	Windham Co. Observer,		2.50

Jan.	15.	A. F. Hunter,		13.40
"	"	H. J. Spalding,		22.40
"	"	Seaman Mead,		16.30
"	"	Railroad fares, delegates,		38.23
"	17.	Chas. A. Thompson,		39.89
"	22.	D. Walter Patten,		28.49
"	"	Chas K. Graham,		2.50
"	"	One-half state Appropriation,	1,250.00	
"	"	Geo. V. Smith,		3.20
Feb.	23.	A. C. Hawkins,		18.50
"	28	A. F. Hunter,		10.00
"	"	A. T. Grosvenor,		1.50
"	"	Lewis McLaughlin,		5.00
"	"	W. R. Graves,		12.32
Mar.	17.	Chas. F. Roberts,		86.94
"	26.	Chas. K. Graham,		13.12
"	31.	Harrison L. Hamilton,		5.00
Apr.	2.	W. H. Skinner,		4.00
"	"	Sara Walrath Lyons,		12.59
"	"	G. E. Adams,		18.46
"	9.	Annie W. Brown,		1.28
"	19.	Edmund Halladay,		50.82
"	"	Windsor Locks Journal,		8.65
"	20.	T. P. Smith,		6.00
"	"	H. L. Hamilton,		10.00
"	"	E. H. Jenkins,		9.20
"	"	L. A. Clinton,		26.59
"	"	C. L. Beach,		9.81
May	8.	A. D. Shamel,		7.22
"	10.	C. K. Graham,		3.22
"	14.	H. L. Hamilton,		12.62
"	28.	W. E. Britton,		3.26
"	"	W. H. Barron Jr.,		3.00
"	"	L. H. Healey,		18.90
"	"	E. W. Crocker,		1.80
"	29.	Geo. V. Smith,		2.30
"	"	H. L. Hamilton,		5.60
June	6.	Edward H. Forbush,		41.25
"	26.	F. H. Stadtmueller,		3.00
"	"	One-half State Appropriation,	1,250.00	
"	29.	C. K. Graham,		9.65
July	2.	N. G. Williams,		21.45
"	"	James F. Brown,		661.74
"	"	W. L. Davis,		7.20
"	"	J. B. Palmer,		39.37

July	2.	Chas. E. Chapman,		23.50
"	"	Chas. A. Thompson,		46.71
"	"	H. L. Hamilton,		10.00
"	"	W. E. Britton,		400.00
"	"	Seaman Mead,		21.35
"	"	Conn. Poultry Association,		187.38
"	"	Balance amount in Treasury,		2,096.15
			$5,692.38	$5,692.38

This is to certify that we have examined the accounts of the Treasurer and found them correct.

SEAMAN MEAD,
D. W. PATTEN,
CHAS. E. CHAPMAN.
Auditors.

July 2, 1906.

INDEX.

	Page
Address of Welcome, by Mayor John P. Studley, New Haven,	19
" Response by Lieut.-Governor R. S. Woodruff, New Haven,	20
" Commercial Methods of Judging Milk and Cream, by Prof. L. L. Van Slyke,	169
" Diseases of the Potato, by Dr. G. P. Clinton,	215
" Introductory, by Prof. Charles K. Graham,	31
" by Mrs. Mabel Loomis Todd,	193
" by President Arthur T. Hadley, Yale University,	22
" My Friend the Hen, by Mrs. Mary Thorp Monroe,	75
" My Friend the Hen, by Herbert F. Collingwood,	94
" Poultry Diseases, by Dr. P. T. Wood,	35
" Sheep Breeding as a Factor in Connecticut Agriculture, by Frank D. Ward,	241
" Some Principles and Results of Plant Breeding, by Edward M. East,	114
" The Gypsy Moth in Connecticut, by Dr. E. W. Britton,	140
" The Most Economical Sources of Nitrogen for Plant Food, by Mr. L. A. Clinton,	153
" The Future of the Small New England Town, by Rev. John Calvin Goddard,	279
" The Horse, by Frank D. Ward,	228
" Twenty Years' Experience as a Poultryman, by Fred Almy,	51
Agricultural Fairs in Connecticut, 1906,	292
Convention Called to Order,	17
Discussions,	41, 56, 78, 107, 130, 152, 160, 179, 222, 257
Finances of Agricultural Societies, 1906,	286, 287
Granges, Officers of the,	295-298
Invocation, by Rev. Watson L. Phillips, New Haven,	17
Number of Animals Exhibited, 1907,	291
Officers of the Granges,	295-298
Official Directory, Patrons of Husbandry,	293
Official List of Agricultural Societies Holding Fairs in 1906,	285
Patrons of Husbandry, Official Directory,	293

	Page
Phillips, Rev. Watson L., Invocation,	17
Premiums and Gratuities Paid,	288-290
Record-Breaking Crops,	28
Report of Agricultural Fairs in Connecticut, 1906,	284
Report of Treasurer,	299

New York Botanical Garden Library
3 5185 00258 5600