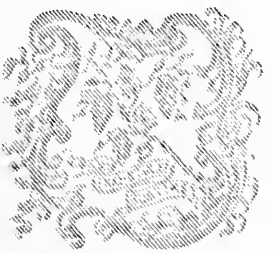
THE CONNECTICUT POMOLOGICAL SOCIETY

1901-1902



Connecticut's Fruit Exhibit at the Pan-American Exposition—Buffalo, 1901.

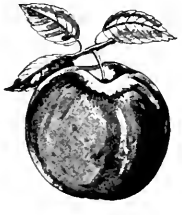
REPORT

OF

The Connecticut Pomological Society

FOR THE YEAR 1901

WITH PROCEEDINGS OF THE ELEVENTH ANNUAL MEETING, 1902



PUBLISHED BY
The Connecticut Pomological Society
1902

Officers of the Connecticut Pomological Society.

1902.

President.....NORMAN S. PLATT,
395 Whalley Ave., New Haven.
Vice-President.....JOHN C. EDDY, Simsbury.
Secretary.....HENRY C. C. MILES, Milford.
Treasurer.....ROSWELL A. MOORE, Kensington.

COUNTY VICE-PRESIDENTS.

HARTFORD—A. C. STERNBERG, West Hartford.
NEW HAVEN—E. M. IVES, Meriden.
FAIRFIELD—A. C. INNIS, Stratford.
LITCHFIELD—JAMES M. WHITTLESEY, Morris.
MIDDLESEX—C. E. LYMAN, Middlefield.
NEW LONDON—STEPHEN P. STERLING, Lyme.
WINDHAM—H. B. BUELL, Eastford.
TOLLAND—PROF. A. G. GULLEY, Storrs.

STANDING COMMITTEES.

Injurious Insects.

Prof. W. E. BRITTON, New Haven. Connecticut Experiment Station.
J. H. PUTNAM, Litchfield.
HARVEY JEWELL, Cromwell.

Fungous Diseases.

Prof. A. G. GULLEY, Storrs.
A. B. PLANT, Branford.
N. H. SHERWOOD, Southport.

Markets and Transportation.

J. H. HALE, South Glastonbury.
JOHN R. BARNES, Yalesville.
C. S. BREWER, Hartford.

New Fruits.

GEO. S. BUTLER, Cromwell.
STANCLIFF HALE, So. Glastonbury.
H. L. FAIRCHILD, Bridgeport.

Exhibitions.

E. MANCHESTER, Bristol.
JOSEPH ALBISTON, South Manchester.
WALTER H. BALDWIN, Cheshire.

Membership.

ORRIN GILBERT, Chairman, Middletown.

Legislation.

J. C. EDDY, Simsbury.
EDWIN HOYT, New Canaan.
A. C. STERNBERG, West Hartford.

Auditors.

W. E. WALLER, Bridgeport.
FRANK N. PLATT, Milford.

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Constitution and By-Laws of the Society.

CONSTITUTION.

ARTICLE I.—The name of this Association shall be THE CONNECTICUT POMOLOGICAL SOCIETY.

ARTICLE II.—Its object shall be the advancement of the science and art of pomology, and the mutual improvement and business advantage of its members.

ARTICLE III.—Any person may become a member of this Society by paying into the treasury the sum of one dollar per annum. If the annual fee remains unpaid for two years, the membership shall cease and the name be taken from the roll.

ARTICLE IV.—Its officers shall consist of a President, First Vice-President, one Vice-President from each county in the State, a Secretary, and a Treasurer, to be elected annually by ballot, to hold office for one year, or until their successors are duly elected.

The President, First Vice-President, Secretary and Treasurer shall constitute the Executive Committee of the Society.

ARTICLE V.—The Society shall hold its annual meeting during the month of February, the time and place to be decided by the Executive Committee, at which time the annual election of officers shall be held, various reports submitted and an exhibition and discussion of fruits take place; also other necessary business be transacted. Other meetings for special purposes may be arranged for and called by the Executive Committee whenever it is deemed advisable. Printed notice of each meeting to be sent to every member of the Society.

ARTICLE VI.—The following Standing Committees of three members each, on the following subjects, shall be appointed by the President, to hold during his term of office; the appointments to be announced at the annual meeting of the Society:

Business and Legislation,
Membership,
Exhibitions,
Injurious Insects,
Fungous Diseases,
New Fruits,
Markets and Transportation,
Two Auditors.

ARTICLE VII.—This Constitution may be amended by a vote of two-thirds of the members present at any annual meeting.

weather conditions caused in some orchards a very little of curl leaf on the peach. Curl leaf of the peach is a disease with which we in Connecticut are troubled but very little, but in some sections it is very serious, requiring a spray of Bordeaux in early spring to keep it in check.

There was a short, sharp drought in June followed by drenching rains and humid air, continued well into the ripening season of the peach. These conditions in the latter part of the season worked havoc with the large peach crop by breeding monilia to an alarming extent. For the successful ripening of the peach we need a dry, clear air. This we usually have in September, and hope we may have in future years, if there are any peaches to harvest.

The productive powers of the peach are wonderful; cold winds, clouds or rain do not prevent pollination, only frost will do it and this we seldom have after our fruit trees are ready to blossom.

The peach crop of 1901 in Connecticut was a full one, and much the largest of any yet produced. The N. Y. & N. H. R. R. reported that they carried out of the State 162,760 baskets and 3,678 crates of peaches; allowing 250 baskets to a car this would make 660 cars. As a matter of fact, many more cars were used, as many small shipments were made using only the bottom of the car. These, I suppose, were all shipped north and east, and mainly to the large cities.

I am assured that another season it will be possible to ship to New York City in train loads and have them arrive in time, a thing which up to the present could not be done. In shipping to the north and east we get quicker and more reliable service than in former years; the railroads showing a desire to aid us where they can. I cannot but think that we ought to ship in car lots to greater distances and to a greater number of points than heretofore.

A full crop now in Connecticut means much more than it did three or four years ago, and I hear of large plantings to be made the coming spring, so we are likely to be put upon our mettle in disposing of our crops.

The European market as an outlet for our peaches is in sight, but is still untried. If season favors, probably some trial lots will be sent over the coming summer.

Labor Day, coming as it does on Monday just as we are well started in our peach harvest, causes a bad break for us, making three days in succession in which little or no fruit can be sold, and on Labor Day of last year, and the year before, some of the railroads would haul no fruit, making the situation extremely hard and causing large losses.

I earnestly recommend that this Society take up this matter and endeavor to obtain relief where needed, by getting the railroads to haul our peaches on Labor Day the same as on other days.

The interest in apple culture still continues; commercial orchards have been planted during the last five or six years and more are planned for in the immediate future.

This is in sharp contrast to the preceding period of thirty or forty years, during which very little planting was done.

The autumn exhibition of fruit held in New Britain at the beginning of October, notwithstanding the unfavorable season, was, as an exhibition, a pronounced success. Certain districts, notably Bristol, New Britain and Middletown, were able to, and did show, a large variety of apples every way worthy of the Connecticut Pomological Society.

A good exhibit of grapes was shown, also a fine lot of peaches from all parts of the State. This was the fourth of its kind, and, as exhibits, all have been successful.

They have been helpful no doubt to those who have attended and to the exhibitors themselves, but as an educator of the general public they have not been a success, as the general public does not attend.

Unless we can secure a better attendance I doubt the economy of continuing them.

Our committee on fruit packages and transportation did good service last year in advertising our orchards and bringing solicitors and buyers among us. I have no doubt this will continue and will be a help to us, the want of which has long been felt. The railroad men assure me that for our next crop we will have solicitors and buyers from New York City as well as from Massachusetts and Rhode Island.

Our legislature last winter passed a law for the suppression of insect pests and appropriated $3,000 annually to carry out its provisions.

It is aimed particularly at the San José scale, which each season keeps bobbing up in new localities, where its presence has not been suspected before. It multiplies so rapidly that it soon injures both tree and fruit, and its control has up to this time been so difficult, that this provision by the State offering assistance as it does, can only be a wise one. Take notice of its provision and make use of its help.

It makes it the duty of the State Entomologist to visit and inspect any grounds upon request, or any grounds which he has reason to suspect are infested with serious pests. Prof. W. E. Britton of the New Haven Experiment Station is the State Entomologist, and he is thoroughly in sympathy with the work of the Connecticut Pomological Society. Fellow members, this new enemy, the San José scale, is one of the hardest to manage of all our orchard problems. One of our members who has been battling with it the longest, says: "Our plans for orchard work in the future will have to be made over new and made with reference to it."

I have not yet been confronted with it on my own grounds, but my advice would be to any one finding a new colony, to use vigorous measures to prevent its spread. I would rather fight one colony than six, and six is what you will have (and perhaps more) if you neglect it a little while. Spraying for insects and disease seems just as important as ever.

The results are just as evident. The coming season is likely to inherit from the last a bountiful supply of spores, of monilia, and probably apple and peach scab and other fungi, the products of a wet season. It behooves us to look well after these things, and where we can do so, remove the cause of trouble.

We have a full program before us, perhaps too full, for I believe in having a free interchange of thought and in asking and answering questions, when opportunities come. Be ready to express yourselves and to draw out information by questions. The question box is also before you, and I trust will be utilized freely.

THE PRESIDENT: The next matter will be the report of the Secretary.

Mr. President and Members of the Society:

The increasing interest in fruit culture that is manifest all over our State: the number of acres devoted to and the capital

invested in fruit crops, which is increasing every year, and the growing demand among consumers of fruit for the best in kind and quality—all these things are reflected in the growth and importance of the organization representing this industry, now recognized everywhere as the Connecticut Pomological Society.

Or to put it another way, and this is probably the correct one. Through the efforts of this Society, beginning in 1891, in securing protection to the peach growers from "yellows," and continuing year by year in educating its members, in disseminating useful information, in securing protecting legislation, in short, by advancing the "science and art of pomology" by every means at its command—by all this effort the fruit-growing interests of Connecticut have been largely developed and the people of the State stimulated to a greater appreciation of fine fruits. But whatever point of view you take, these two facts stand out—the rapid development of fruit culture in our State and the steady growth and prosperity of our Society.

The past year has been the most successful in the history of the Society.

The interest of all our members has been held, more new names added to the roll, our meetings have been better attended and our efforts extended over a wider area.

The Membership. From February 1, 1901 to February 1, 1902, we have received 94 new members; 4 have withdrawn and 4 deceased; total number of names on our list is now 398. We have 368 members in good standing.

Although the gain for the year is encouraging, yet it is not as large a showing numerically as I hoped we should be able to make at this time.

The excellent work of our Committee on Membership, headed by Mr. Gilbert, has resulted in securing a list of over 900 names of farmers and others interested in pomology and should lead to a rapid gain in numbers and influence.

Our plan has been to obtain a large mailing list of reliable names in every town in the State and thus extend the circulation of our programs and other publications.

This Society *ought* to have at least 500 members within the next year, and we can accomplish this readily, if each member will back up the work of our committee and take it upon himself to speak a good word for the Society at every hand.

During the past year I have received from membership fees and other sources $355. This has been turned over to the Treasurer. I have drawn orders for the payment of bills to the amount of $827.75, besides the distribution of $397.25 to winners of premiums at our annual fruit exhibition.

The increase in our appropriation to $1,000 per year, granted by the last General Assembly, was most gratifying to the Society. The additional funds have been a substantial help in carrying on the work of the organization. It has enabled us to secure more talent for our meetings, to carry on institute work and to issue creditable publications to our membership.

During the year a report of the Society's work in 1900 has been prepared, and, with the proceedings of our last annual meeting, published in the shape of a book of some 250 pages.

Meetings. Besides the tenth annual last February, the Society held ten meetings during 1901. By invitation of the Granges in different parts of the State, five institutes were held: At Whigville on March 5; Hamburg, March 15; Litchfield, March 19; Shelton, March 21, closing with Cheshire, March 27. Every one of these was a success, both in point of attendance and lively interest. No feature of our work brings the Society into closer touch with the people and gives it the opportunity to benefit so many as do these institutes, and the best reason I can give for continuing them is to tell you that we now have on file ten invitations for future institutes.

Three very enjoyable and profitable field meetings were held last summer. June 24, by invitation of E. Manchester & Sons, the Society visited their fine dairy and fruit farm near Bristol; the occasion taking the form of a "Strawberry field day." July 30 our worthy President (Mr. Platt) acted as host and welcomed some 200 of our members at his West Haven peach orchards. A shore dinner at Waverly Grove was also a feature of that day. The largest field day of the season was on August 22 at the Connecticut Valley Orchard Co.'s farms in Berlin. This was a very interesting event for all who attended, the inspection of the extensive orchards and Manager's Molumphy's hospitality combining to make a pleasant and profitable meeting.

Preparations were begun early for the fourth annual fruit exhibition, and the event took place in New Britain, October 1-2. The exhibition was a splendid one, fully up to the stand-

ard of previous years. Fifty-three members contributed exhibits and the awards amounted to $397.25. An excellent speaker was provided, but unfortunately the attendance was far below what such an event should call out.

It is becoming a serious question with your officers as to whether these fall exhibits *really* pay. The last one cost the Society about $148 outside of the premiums paid. Was it worth what it cost? Educationally, yes! but otherwise probably not. Some different plan must be considered if we are to continue these exhibitions in the future.

Lastly the recent institute with Middlebury Grange, January 29, rounded out a year of activity and usefulness.

The Society has not undertaken any new lines of work the past year, except to gather data for a fruit crop report, which led to our publishing a forecast of the apple yield for 1901. Both this and the work of the Markets and Transportation Committee in trying to bring about a better and more profitable distribution of the peach crop, are certainly steps in the right direction and if begun earlier in the season would result in a big financial help to our members. I would suggest that this Society follow the example of fruit growers' associations in other states and pay more attention to helping its members in a business way. If the fact that we, as fruit growers, are organized and mutually bound together, gives us any power, then why not make use of that power in marketing our products, in treating with transportation companies and in purchasing needed supplies?

Let us realize the advantages our organization gives us and utilize them to their fullest extent in advancing our business interests.

Another suggestion in conclusion, and that is that our county vice-presidents be asked to visit noteworthy orchards and fruit farms in their respective sections of the State, and report to the Society such facts in relation to culture and management as may be of general interest.

This has been a year of activity in the Secretary's office, and the correspondence has grown month by month. The number of inquiries received from other states (and even foreign countries) would indicate that Connecticut pomology excites the interest of a wide circle. We have sent out upwards of 5,000

programs, circular letters and other literature, with the result that our name and fame is widespread.

With sincere thanks to the Society and to all who have so kindly assisted me in the work, this report is

Respectfully submitted,

H. C. C. MILES, *Secretary.*

THE PRESIDENT: I will call the attention of those who have come in to the exhibits of fruits that we have on the tables at the rear of the hall. They certainly look quite nice. I have not looked them over carefully yet, but I think you will find among them some new apples which we are all watching with interest. We shall all be interested in looking these over when we have leisure.

We will now ask the Treasurer for his report.

Treasurer Moore then read an itemized account of the receipts and expenditures for the past year, of which the following is a brief summary:

Report of Treasurer.

1901.	*Received.*	
Feb. 1.	Cash on hand	$152.23
	From State of Conn.	818.51
	Members' fees	356.00
	Other sources	3.25
		$1,329.99
1901.	*Paid.*	
Feb. 1.	Premiums	$397.25
	Speakers and Expenses	211.93
	Printing	322.51
	Salary and Ex. Sec. office	167.86
	Rent of halls	81.00
	Miscellaneous expenses	44.45
1902.		
Feb. 1.	Cash on hand	104.99
		$1,329.99

R. A. MOORE, *Treasurer.*

We have examined the foregoing account of the Treasurer and the vouchers thereof and find it correct.

A. C. STERNBERG,
H. E. SAVAGE, } *Auditors.*

HARTFORD, CONN., Feb. 4, 1902.

THE PRESIDENT: The by-laws provide that the President shall appoint annually two auditors to audit the accounts of the Secretary and Treasurer, and I will appoint at this time for that work, Mr. A. C. Sternberg of West Hartford, and Mr. H. E. Savage of Berlin. They will please audit these accounts and report later.

Are there any inquiries you would like to make of the Treasurer? If not that finishes the reports of the elected officers, and the reports of the committees will now be in order. The first is the report of the Legislative Committee: Mr. A. R. Wadsworth of Farmington.

MR. WADSWORTH: *Mr. President, Ladies and Gentlemen:* I would say, as most of you know, that we got through at the last session of the Legislature an increase in our appropriation from the State of $500, which makes the income of the Society, at the present time, from that source, $1,000. We also secured, Mr. President, for the suppression of the San José scale, and the other insect pests of the State an appropriation of $3,000, which has been turned over to the Experiment Station at New Haven, and the work is now under the charge of Prof. Britton. You will remember that we had quite an argument whether that should be placed with the Agricultural College at Storrs, or with the Experiment Station at New Haven, but it was found that they were not prepared at Storrs at that time, and in such a condition that they could carry on the work to as good advantage to the fruit growers of the State as they were at the Experiment Station at New Haven, and so it was placed with the Station at New Haven. We believe that the passage of that bill will result in a great deal of good to the public, and especially to the fruit growers of the State.

THE PRESIDENT: According to that report there has been considerable done for our benefit during the last year. These two appropriations,—one of money appropriated for the Society's use, and the other the appropriation for the suppression of insect pests like the San José scale, and others—that was a very important matter to us. We shall have more to say about that later on in the proceedings.

The next report in order is that of the Committee on Membership.

MR. ORRIN GILBERT: Mr. President, when my predecessor

handed over the office to me, he said that he believed that we already had nearly all the fruit growers in the State as members of this Association that could be gotten in. I hardly thought that was the case, and I thought we must look over new fields if we were to add to our membership, and after spending a good deal of time one way and another trying to find out how to add to our list, I finally decided that I would mail a request to every member of the Society asking him to be so kind as to forward the names of his neighbors, and those of his friends all over the State, who were interested in fruit growing, but more particularly those in his immediate neighborhood. I think we sent out about three hundred and fifty of such appeals, but I think I have received replies from about a hundred only, but from those we have succeeded in getting pretty close to a thousand new names, and the Secretary promised, so far as possible, to send to them a program of this annual meeting. I think he has sent out seven hundred and fifty odd. It seemed to me that in this way we ought to interest a good many new friends, and increase our membership largely. I think it has had a good effect, and I am glad to see so many new faces here, and I hope they will all be inclined to join the Society before they leave for home.

THE PRESIDENT: We will be glad to have as many more new members as we can get to-day, and you can see Brother Gilbert or the Secretary. Either of them will be ready to make you a member of the Connecticut Pomological Society. Brother Gilbert has devoted a good deal of time and thought in an effort to bring the Society to the attention of new people, and there ought to be a good number added to our membership as the outcome of it. Besides having a good attendance here, we ought also to add a lot of new members to-day, and new members in the future from it.

MR. GILBERT: I would be glad to receive returns from those who have not already written me. Letters are coming in every day with new names, and I think if you will all take hold and help out in this matter we can get nearly all the names of those in the State who are interested in growing good fruit. There must be ten or fifteen thousand people in the State who have land from which they are or ought to be growing fruit, and who would be benefited by membership in our Society. If we

all take hold of this work a large part of them, I believe, can be brought into the Society.

MR. J. H. HALE: Mr. President, I do not like to see these valuable reports come in to us without their receiving a word of recognition. Now I know from personal experience that the work that Mr. Gilbert, as a committee, has done to add to the membership of this Society during the last few months has been a most valuable aid to our work. He has done some remarkably good work. He has advertised our Society to people throughout the State that have not been reached before, and he comes in here, and tells in his modest way of what he has done, and we simply pass it. We ought to do something more than that. The worthy chairman of our Legislative Committee, through his interest in this Society, and because he was in a position last winter in the Legislature to do so, got through some legislation which is going to be of the very greatest benefit to us. He was able to secure for us not only an additional appropriation to expend in the work of this Society, but further than that, the San José scale law was passed, which carried with it an appropriation of $3,000,—all of which was not only in the interest of this Society, but in the interest of the whole State, and it was done at the instance of this Society, and by men representing this Society. I move you, Mr. President, that we accept both of these reports, with thanks, for the good work that these committees have done.

SECRETARY MILES: I wish to say a word in behalf of Mr. Gilbert. He has not only done a great deal which will be for the benefit of our Society, but we have not received any bill for the work which Mr. Gilbert has put in on this effort to increase the Society's membership. I understand that Mr. Gilbert intends that his pocketbook shall bear it all. I think we should adopt this motion by a rising vote.

Motion seconded and passed.

THE PRESIDENT: Now we are ready for Mr. Butler, Chairman of the Committee on Exhibitions.

MR. G. S. BUTLER: Mr. President, our annual exhibit at New Britain in October was probably the largest exhibit of good fruit ever gotten together in Connecticut. Your Treasurer has drawn checks for about $400 to pay the prizes awarded at that exhibition. I have been asked if the exhibition paid?

Paid whom? The exhibitors, the Secretary, the Treasurer, the Committee, or the lookers on? Although, personally, my check was not very large, I believe the exhibitors received a fair return for their services rendered. Officers and committees always work for love, and the measure of their profit is whether they can still maintain friendly relations with the recipients of their gratuitous services. On this basis I believe the second class in pomology found the meeting profitable, and now if the third class, who are principally ourselves, learned to respect, honor, love and help one another more, there can be no question but the exhibit which drew us together in friendly competition and intercourse was of lasting benefit and profit. The exhibition was the largest we have ever held, and the class of exhibits very creditable, all things being considered, although not an improvement on those shown in 1900. As conditions were much less favorable, an improvement could hardly have been expected.

The prizes were all awarded to citizens of the interior counties, with the single exception of C. I. Allen, who possibly carried off honors enough for the whole four border counties.

We hope these exhibits will be continued, that the competition will be closer and larger, and the exhibits even more profitable to all interested.

THE PRESIDENT: What will you do with this report? Will you act upon it now?

Motion made and seconded that the report be accepted.

Passed.

Now if there is nothing more about this report of Mr. Butler's we will call on Mr. Hale to report as Chairman of the Committee on "Markets and Transportation."

MR. J. H. HALE: *Mr. Chairman, and Ladies and Gentlemen:* Your Committee on Markets and Transportation has never seen any very important work to do until this last season's large peach crop throughout the State convinced us that perhaps we might do something to see if the crop could not be handled more readily. I thought something ought to be done, especially as a large number of the growers were handling a crop for the first time. To do good work in this line it was necessary to ascertain as nearly as possible the volume of the crop, and so, early in August, I wrote a personal letter to a

hundred and thirty-two of our members, and others who own peach orchards in our State, asking them to send me an estimate of the size of their crop, and also to send me the name of any of their friends and neighbors who might have a crop, and for an estimate of that. I sent out those letters and asked for a prompt reply. I received replies to about 62 per cent. Some came in later. It is of no use, if you are doing business in the fruit line, unless you are prompt. About 62 per cent. replied promptly. The others took longer. Some of them took two or three weeks. They might just as well have not replied at all. But there were only about 62 per cent of the replies which were of any value, and the estimates from those showed that there were a little less than one million baskets of peaches on the trees in the State at that time. The estimates from the other replies which came in later showed that that figure would have been increased two or three hundred thousand baskets. After I got an estimate of the size of the crop which was to be moved to market, I went at once to see the officers of the New York, New Haven & Hartford Railroad Co. and received very courteous treatment, and they offered to do all in their power to handle this crop, but they told me that with the exception of two growers (and then I think it was the 8th or 10th of August) no one had notified them that they should want any cars to transport the crop in. They had made no special arrangements to ship anything out of the State, and yet there was a million baskets of peaches which were liable to be thrown into the market and for which transportation would be demanded within a short time. They were glad to get this information, and they at once took the matter up with the stations at different points, and the whole thing was taken up, and the best done that could be under the circumstances.

Then after I had gotten this information in hand I compiled it and sent it to the fruit trade journals of New York, to the Commercial Bulletin, and to the fruit trade papers of Boston, and also to the leading papers of our own State, and to the agricultural papers circulating in this territory, and also with the papers forming the Associated Press, so that news of the condition of the crop throughout Connecticut was promptly distributed throughout the country. It resulted in bringing

into this State a large number of commission men from various cities, and it brought also a number of buyers into the State who purchased quite an amount of the crop; but the lack of proper transportation facilities, of refrigerator cars, prevented buyers from a distance from handling as much of the crop as they otherwise would have done. I know of buyers from Central New York who came here, and in one instance a buyer from Ohio, and one from Philadelphia, but, as I said before, the lack of any provision for refrigerator cars prevented those men from buying the fruit because they did not feel that it could be safely marketed. And further than that, the lack of transportation in connection with the New York market was such that the New York, New Haven & Hartford Railroad could not give us any direct service within twenty-four hours, or at least deliver the fruit the next morning after it was picked, and this prevented much if any of the fruit going to that market. There was a little of it that was sent by express, and some of it went into the New York market by steamers, but the bulk of the crop had to go to commission men in Providence, Boston, Worcester and Springfield, and a few smaller outlying towns in New England. As the result of this lack of preparation the market in Hartford, Conn., Springfield, Mass. and Providence, R. I. was overloaded throughout the whole season, and the fruit sold there from 25 to 50 per cent. less than it did in other markets because those markets were overloaded.

That is about all I have to say, and I think that covers the situation. Another season I think the situation will be decidedly different. The volume of business in Connecticut was such as to have attracted the attention of the refrigerator car line people, and the next season, if there is any fruit crop here, both of the large refrigerator car lines of the country will be prepared with a stock of ice in the State, and with cars enough to handle the business, and there will be a chance for wider distribution to better markets, and with the consequent better prices to the growers. Our New Haven railroad will also plan to take our fruit, and get it into the New York market. Not to lay it down there the next morning, but to get it there by midnight. It must be there by midnight so as to be ready early for distribution the following morning. I can assure you that

this railroad, which has, practically, a monopoly of the business in our State, is, through its present freight department, in full sympathy with our desire to move the crop where we can get the best market, as the leading manager has told me that they wanted to do everything they could to serve the growers in a reasonable business way, and the only reason why there was a lack of cars, and a lack of the necessary facilities to move the crop promptly and handily last season, was because they did not know what was coming. None of us had notified them of the situation up to the time I went to see them.

The total expense, or of money paid out for this work, was $6.64.

MR. WADSWORTH: Mr. President, I move you that the report of the Committee be printed in our proceedings, and that it be accepted on our part with our thanks.

THE PRESIDENT: You have heard the motion of Mr. Wadsworth that this report of the Committee on Markets and Transportation be printed in our report, and the thanks of this Society tendered to the Chairman of it.

PROF. BRITTON: I move to amend that, Mr. Chairman, so as to include the report of the Committee on Exhibitions.

MR. WADSWORTH: I will be very glad to accept that amendment, Mr. Chairman, and I would like to further amend it myself by saying that the Committee be continued. I refer to the Committee on Markets and Transportation.

THE PRESIDENT: Then as I understand it, the motion is to accept the reports of both Committees with the thanks of the Society, and that the Committee on Markets and Transportation be continued.

Motion seconded and passed.

MR. WADSWORTH: My object in making this motion to have this report printed in our report is because I believe it will show, not only to our own members that we have such a committee at work for our mutual interests, such as caring for our surplus products, and finding an opening for them in the markets, but those who are not members, understanding this, it seems to me, will be glad to come in where they can have the privilege and the benefit of this work. I think the fact that we have a committee working on such a line as that, and that the Committee is doing work which is of such obvious benefit to us all, if that is

printed in our report it will tend to increase our membership. It is mutual interest that we are working for. That is what we are here for, and it is just such work as that which will tend to make the Society a success.

THE PRESIDENT: The next in order is the report of the Committee on "New Fruits." Mr. F. L. Perry of Bridgeport, Chairman.

MR. PERRY: *Mr. President, and Ladies and Gentlemen:* In response to the call of our Secretary, Mr. Miles, I have prepared this short report for the Committee on "New Fruits." I shall call your attention to, and try to speak of, just what I know about myself. When you stop and think of how many there are, you will see that I cannot do more.

New fruits, and the facts concerning their value as adapted for our climate and soil, is the subject open for discussion. If we happily find in our experiments *one* new variety that gives promise of satisfactory, paying results, we are well paid for whatever time or expense we may have been to, aside from the pleasure we have derived in this exceedingly interesting and fascinating employment.

My personal experience during the last three years has been principally with new plum creations. A hobby, maybe, but at the same time stimulated by the larger money value derived per acre from this fruit, and in less time, than from any other variety of fruit-bearing trees I have grown. We all know the "Abundance," "Burbank," "Red June," "Satsuma," and "Chabot" as market values. Have we anything better? I have invested in the last few years, $3, $5 and $10 per foot for grafting wood of Burbank's new creations, cross-bred, Oriental and American varieties of plums.

The "America" is a cross between the "Abundance" and "Robinson." A healthy grower, and very hardy. It has not fruited yet with me. It is represented as a glossy, coral-red, flesh yellow, and very delicious, but as it is from the same family as "Gold," and "Juicy," I cannot put much faith in it.

The "Apple Plum" comes next in alphabetical order. This is a strong grower, inclined to be flat-headed like the "Burbank," and equally productive. It is larger, however, and not so liable to rot before it is ripe. It falls as soon as ripe. A fairly good keeper, and is a little later than the "Burbank."

Color, a mottled brownish red, flesh pink and high flavored, firm, and desirable.

"Climax." This has been pronounced the King of Plums. It is as large as "Wickson," and more highly colored, and sometimes measures 6¾ by 7½ inches. The fruit is heart-shaped, color, vermillion red, flesh yellow, sweet, and delicious. It ripens with the Red June. It is the largest early plum known. The pit is large, but separates easily from the flesh. It is a good grower, and the form of trees is like the peach. I planted two hundred in my orchard last spring, and they show many fruit buds. Hundreds of acres are being grafted to this variety, as it gives promise of being a valuable market acquisition. The few that came to New York last year brought $9 per bushel.

"Chalco." This is a tomato-shaped plum, and is taken for a tomato at first glance. The fruit is large, brownish red, and the flesh yellow, rich and melting when ripe. It is a good keeper, an upright grower, and hardy.

"Sultan." This is a cross between the Satsuma and Wickson. A good grower, early, and fruits abundantly, the previous year's growth of wood being loaded with fruit to the extreme ends. It is free from rot, ripens before Burbank, falls like apples when ripe. The flavor is sub-acid, and delicious. I have a hundred set for fruiting.

"Shiro." This is the strongest grower of the lot. I had but one plum of this variety this year, and that was grown in the shade. It was very good. It was egg-shaped, a bright yellow transparent fruit. It is very transparent. The seed can be seen through the flesh.

This includes the few of the newest introductions that I have fruited. I am, however, anxiously waiting to see the fruit of the "Bartlett," the "Gonzales," and many other varieties of newer plums.

Of the new strawberries, I am testing the highest extolled new varieties besides my own new seedlings: these latter are pronounced by our largest fruit dealers the most delicious they have ever eaten. In shape they are conical, wedge-shaped, some have pink flesh, and some are a dark crimson. The largest fruit has brought me 18 and 20 cents per quart the past two seasons. One variety the past season produced at the rate of 14,000 quarts per acre, and without any special attention.

Another, one hundred berries on a plant set the September previous.

Of blackberries, Rathbun and Texas easily surpass anything I have heretofore grown, in flavor and size.

THE PRESIDENT: I want to introduce to you, at this point, Mr. Berry of the Hartford Cold Storage Co.

MR. BERRY: I have been instructed by the Superintendent of the Hartford Cold Storage plant to extend a cordial invitation to the members of this Society to visit our cold storage plant on Windsor street in this city. If you will come and see us we will show you the most modern and up-to-date cold storage plant located in Hartford, or in Connecticut. We should be pleased to have you come out at any time during your convention.

THE PRESIDENT: I understand that the Auditors appointed to examine the accounts of the Secretary and Treasurer are ready to report.

MR. STERNBERG: Our report is a very short one. We have examined the accounts of the Treasurer, and the vouchers therefor, and we find them all correct. This report is signed by both of the auditors appointed by you, Mr. President.

THE PRESIDENT: You hear the report of the Auditors, what is your pleasure to do with it?

MR. WADSWORTH: I move it be accepted, and the reports of the Secretary and Treasurer accepted as approved.

Motion seconded and passed.

MR. STERNBERG: I wish to offer a suggestion that after this the President appoint the auditors a year in advance, so that the report, or the accounts of the Treasurer, may be audited before his report is presented to the meeting. I think that is the proper way to audit accounts of this character.

A MEMBER: Mr. President, I make that as a motion.

THE PRESIDENT: I also think that is the proper way. I was a little bit surprised to find that it had not been the custom heretofore. I think it is the right way to do, and I would be glad to fall in with it.

A MEMBER: There is perhaps liable to be a little difficulty on

NOTE.—The above invitation was accepted by vote of the Society, and during the Convention many members availed themselves of the privilege extended to visit the plant.

account of the new incoming President. Might it not be well to amend that by authorizing the President of the previous year to appoint these auditors?

THE PRESIDENT: Whoever comes in as President has to appoint a number of committees, and this might go with it if it is so understood. I think it can be managed that way.

Motion seconded and passed.

THE PRESIDENT: It will be the proper thing to appoint the auditors hereafter with the other standing committees that are for the year.

The next report for us to hear is from the Committee on Injurious Insects. It will be by Prof. W. E. Britton of New Haven.

Report of the Committee on Injurious Insects.

It is expected that in a report of this kind the presence or absence of certain injurious species of insects will be noted. If the report covered the whole State, its value would be apparent, but the present report is based upon the observation of this Committee in a few localities and upon facts gleaned from correspondence with fruit growers in different sections of the State.

Pear Psylla. The pear psylla (*Psylla pyricola,* Forst.), which has been so abundant for three or four years, was much less abundant during the season. Expecting another serious attack in the summer of 1901, all pear trees at the Station were sprayed with the kerosene and water mixture (containing 15 per cent. of kerosene) on June 4th. No injury to the trees resulted from making the application on a fair day, but as the insects were not abundant in that vicinity the exact effect upon them could not be determined.

San José Scale-Insect. The San José scale-insect (*Aspidiotus perniciosus,* Comst.) is still the most important insect pest of the orchard, and it has increased with great rapidity during the past season. Experiments conducted by the writer in coöperation with some of the members of this Society, indicate that the scale may be held in check by spraying with either crude oil (having a specific gravity of not less than 43 degrees, Beaumè.) or with kerosene and water, the mixture containing 20 per cent. of kerosene, applied just before the leaves appear in spring. Fifteen per cent. of kerosene mixed with water was used on peach and plum trees in foliage with no appreciable

injury to the trees, and was in some cases quite effective in holding the pest in check. It remains to be determined whether or not the continued use of these oils upon the same trees may not result injuriously, even though a single application causes no apparent injury.

We are certain that the annual inspection of all nurseries in the State will be a substantial check upon the further distribution of the pest upon nursery stock, though we cannot expect that the danger from this source will be entirely eliminated by any system of inspection, however thorough, or any form of legislation however stringent. Most nurserymen are now provided with facilities for fumigating their nursery stock, and we strongly advise the members of this Society to demand that the trees which they may purchase from any nursery be properly fumigated before being shipped to them.

Fall Web-Worm. The season has been remarkable for the great abundance of the Fall Web-Worm (*Hyphantria cunea,* Drury.) during the summer and fall. Nearly all kinds of fruit and forest trees were attacked and stripped of foliage, and the injury extended all over this State and into other states. There are two broods each year, the first usually doing little damage, but the second brood of caterpillars begin their destructive work in August, and frequently cause much damage. They form little nests at the ends of the branches by drawing their silken webs around a few leaves, and inside, the young caterpillars feed, eating only the green portion of the leaf at first, but as they become partially grown they are able to devour the whole leaf except the mid-vein. The past season many large trees were entirely defoliated, and the nests are now to be seen on the trees of forest and roadside as we drive through the country or ride over the railroads. In the orchard, of course, injury will be prevented if the foliage is kept poisoned until late in the season. It is very easy, however, to remove the nests when first formed, as they are always at the ends of the branches, and may be cut off with a tree pruner and destroyed.

Hornets Injuring Fruit. During September, specimens of a large reddish-colored hornet were received at the Station, with the story that this species was responsible for considerable damage to ripening fruit by rupturing the skin and eating the juice and flesh. In the vicinity of New Haven, pears, especially, were injured, and the insect had not been observed in previous

seasons. Later the same kind of hornet was found on fallen fruit at the Station, and it proved to be the giant hornet of England and Europe (*Vespa crabro,* L.). It was accidentally introduced into this country many years ago, and established itself near New York. It has since multiplied slowly and has not spread very far from the spot where it was first discovered, but has been seen occasionally on Long Island and in New Jersey.

Fruit Injured by the Bumble Flower Beetle. Peaches and plums suffered some slight injury by the Bumble flower beetle (*Euphoria inda,* L.), which attacks the largest and ripest specimens of fruit and eats holes in them.

Snowy Tree Cricket. The snowy tree cricket (*Œcanthus niveus,* DeG.) has been rather abundant in some portions of the State. It injures raspberry and blackberry plants by depositing eggs in the canes, which usually break off at the incision. Young peach trees in nursery rows are also attacked, and twigs containing eggs were quite common in some nurseries during the fall. It will probably not become serious, but these twigs should be gathered and burned.

Yellow-Necked Caterpillar. Many trees including fruit trees were defoliated in September by colonies of yellow and black striped caterpillars. These caterpillars have the curious habit of elevating both head and tail when disturbed. The adult insect is a moth (*Datana ministra,* Drury.), and the larva is called the yellow-necked caterpillar. On account of the gregarious habits of this insect it can be best combated by gathering the caterpillars when they occur and destroying them. Paris green on the foliage will forestall any injury.

Red-Humped Caterpillar. The red-humped caterpillar (*Œdemasia concinna,* S. & A.) was fairly common on apple trees and allied plants during late summer and early autumn. This caterpillar has a peculiar appearance with tail elevated and a red hump on the back of the body near the head. The color of the head is also red, and the body is marked longitudinally with yellow, black and white lines. The remedy is the same as for all leaf-eating insects.

Hag-Moth Caterpillar. An occasional enemy of fruit trees was rather common in August and September, devouring the foliage of the pear trees. The caterpillar is a very curious one, and would scarcely be taken for a caterpillar at all. It belongs

to a group of moths whose larvæ have no feet and are called slug-caterpillars. It is brown in color, and has curious irregular projections, usually eight in number, four on each side of the body. The adult is a small, brown moth, with narrow wings. The scientific name is *Phobetron pithecium*, S. & A., and it will probably never be sufficiently abundant to cause serious injury.

Paris-green and hand-picking are the remedies.

Saddle-Back Caterpillar. Another slug-caterpillar, closely related to the hag-moth, feeds upon the leaves of fruit trees. I refer to the saddle-back caterpillar (*Empretia stimulea*, Clem.), which is so striking in appearance that one cannot fail to recognize it. The caterpillar has a brown body with tufts of spines along the sides. Two appendages at each end of the body also bear spines. The central portion of the body looks as if covered with a blanket of bright green color. There is a circular brown spot edged with white on the back. The spines are somewhat poisonous, or at least irritating to the touch. The adult insect is a small brown moth. Hand-picking and spraying with poisons are the remedies.

In conclusion, I desire to thank the members of this Society for many specimens of injurious insects and notes regarding them. With the increased activity of the Society, its large membership, and liberal appropriation from the State for its work, it would seem that the subject might receive even more attention from the members, and that much benefit might be derived from a careful insect survey of the whole State, with especial reference to those species attacking fruit plants. The last General Assembly, as you know, passed a law giving the State Experiment Station an appropriation for insect work. This work is now organized, and every possible assistance in the way of information and advice will be given to you all if you apply for it, and a personal examination of the orchard, garden or field will be made without cost to the owner, whenever the occasion seems to warrant it. Investigations and experiments are now in progress and will be continued to obtain more definite information regarding certain injurious species and the best methods of combating them.

All of which is respectfully submitted.

W. E. Britton, *State Entomologist.*
Chairman of Committee on Injurious Insects.

THE PRESIDENT: Does anyone wish to question Prof. Britton about insects at this time? Or Mr. Perry about new fruits? They have both reported to you.

MR. LIEGEY: I want to ask Prof. Britton one question. I had a letter from my brother, who is abroad, and he writes me that they say over there that the phylloxera was brought from the American plant. I would ask Prof. Britton to tell us about that?

PROF. BRITTON: The phylloxera has been with us for a great many years. It is true it is an American insect, but it does not affect our native fruit very much. There is one form of it that lives upon the leaves, and causes little galls to form, in which they live, and there is another form that lives upon the roots of the grape vine, and causes galls upon the roots. During the early part of the nineteenth century the attempt was made to grow the European grapes in this country, but the attempt failed, principally on account of the attacks of this insect, and it was not until our American grape-growing was based upon our native varieties that it made any progress. In California they grew the European species of grape, but the phylloxera has not been present there. I hear, however, that it has been taken to California, so that we may expect that it will cause some trouble. It was imported into Europe on grape cuttings, or plants sent over from America, and has done a great deal of damage in the large vineyards of Europe. In some cases where the vineyards have been so situated that they could be flooded for a portion of the year, these insects, when on the roots, have been drowned out. In other cases carbon bisulphite put on the ground around the vine has been a useful remedy. That has been only a partial success, however, for the roots of the grapevine run so far down that it is impossible for the gas to go through the soil and kill all the insects. The best remedy which they have, however, is to use American roots. If they graft the European varieties upon American roots, that will help matters a good deal. They are so hard and tough and the insect cannot injure them very seriously. That is being practiced in some portions of Europe at present.

Anything in the way of tobacco water is helpful. It is a good idea, in case you find you have it, to put light tobacco dust around them. That will have a tendency to keep them away.

MR. LIEGEY: I had some vines, and some of them were killed by the phylloxera. When I noticed them some of the heads were hanging down about an inch, and the next morning they were all down. I don't know how it got into my vines, but I think the insect must have been in the plants when set. A good many of my vines died just that way. Can the insects come in the plant?

PROF. BRITTON: The insect was probably present in your vineyard on some of the other vines. As I understand you, this was the European species of vine that it attacked?

MR. LIEGEY: Yes.

PROF. BRITTON: I thought so, and I doubt if you will ever be able to grow the European species on account of the insect. You will be able to grow the vine by a great deal of care and trouble, but not to any great extent.

THE PRESIDENT: Have you heard or seen anything of the Gypsy Moth in our State.

PROF. BRITTON: I do not know that it has ever occurred in Connecticut, although there have been reports several times to that effect. Upon investigation, however, it turned out that they were false alarms. There is a colony of them in Rhode Island not far from Providence, and we may expect at any time that they will be brought into Connecticut.

THE PRESIDENT: I suppose you and your assistants are prepared to smother them as soon as they make their appearance?

PROF. BRITTON: As soon as we know about it; yes, sir.

THE PRESIDENT: The matter of Pan-American exhibits, of course, has taken up a great deal of our attention, but as this is the first meeting we have had since the Buffalo Exposition closed, I think you will be interested to hear something about the exhibits of fruit which Connecticut made there. Prof. Gulley is here.

THE SECRETARY: Mr. President, I think Mr. Putnam is here, Chairman of the Committee on Fungous Diseases.

THE PRESIDENT: Then we will take that up first, as it comes in the regular order on the program.

Report of the Committee on Fungous Diseases.

By Mr. J. H. Putnam of Litchfield.

Mr. President: The work of your Committee on Fungous Diseases has not been very rduous during the past year, as there have been few inquiries or reports. In the following report I am much indebted to Mr. Plant and Mr. Butler for notes concerning the prevalence of diseases in their localities, and the results of treatment.

The apple rust and scab have been prevalent during the past season, and Mr. Butler reports the canker serious in some places. Owing to the light apple crop many growers neglected to spray as usual, and the very wet spring interfered with the operation and made what was done less effective. This gave worms and scab a glorious opportunity, and they improved it.

Mr. Plant reports that his crop of apples from an orchard that has been regularly sprayed for a number of years, while small, was very free from scab and bitter rot.

The apple canker has only recently been thoroughly investigated. It is caused by a fungous germ entering the bark where some injury, as a sun-scald or abrasion, has occurred. The same germ produces a twig blight, and black rot of the fruits. The New York Station advises a wash made of lime 30 lbs., tallow 4 lbs., salt 5 lbs., and water enough to spray easily. This should be applied to the branches and trunk to prevent sun-scald, and also spray with the Bordeaux mixture, and cut away the diseased parts. The Delaware Station recommends painting the limbs and trunks with Bordeaux thickened with lime like whitewash.

Mr. Plant reports that his pears were free from leaf-blight and scab, and that he has, by ten years of systematic spraying, totally eradicated them from his orchard, while they are very prevalent in orchards adjoining.

This leaf-blight must not be confused with the pear-blight. The leaf-blight, which also affects the fruit, the leaf-spot and the scab, can all be controlled by the use of Bordeaux. The pear-blight, however, can only be eradicated by the use of the saw and culture, avoiding a very rapid, succulent growth.

I believe that Prof. Townsend, who will address you later, has experimented with a lime and sulphur treatment, and may be able to give us something new on this subject.

Monillia, or the brown-rot of the stone fruits, has been unusually severe the past year, and was undoubtedly the most damaging of the plant diseases. Mr. Plant reports the disease more severe near the coast than in inland orchards, and no experiments with spraying in his locality. Mr. Butler reports it very bad on the fruit, but that it affected the trees less than in 1900. As there will be two papers at this meeting treating this subject I will not go into details. (By selection of certain varieties this trouble can be somewhat overcome by commercial growers, but it is aggravating to the amateur, who must give up his most cherished varieties, particularly of the European plums.) My limited experience leads me to believe that dilute Bordeaux,—2 lbs. copper sulphate, 2 lbs. lime, and 50 gallons of water,—can be used ordinarily without injury to the foliage of the peach and Japan plum, and that copper sulphate two ounces, or even four ounces, to fifty gallons of water can also be applied frequently with profit.

This treatment will control the scab too, and assist in controlling the leaf-curl, which can also be held practically in check by a thorough spraying with strong Bordeaux just as the buds are swelling.

Mr. Plant reports the peach leaf-curl doing much damage particularly to the Elberta, and the yellows also very troublesome in some localities.

There is no longer any doubt but that the black-knot can be controlled on European plums by Bordeaux supplemented by cutting and burning the knots. Mr. Butler reports an outbreak of the disease on the Satsuma variety of Japan plum. It may be an entirely different matter to control the knot, if the Japan variety are to be generally subject, as we cannot use full strength Bordeaux.

The black rot of the grape was very prevalent the past season. Selection of variety is a great help, certain varieties being much less subject to it, as a rule, than the hybrids, but here again, some of the best varieties in quality are the worst affected. I have had good success with the Brighton by bagging after thorough spraying, but this is hardly practical on

a commercial scale. Mr. Plant reports the black rot prevalent even where the vines were sprayed, and suggests washing the vines in the spring with a solution of copper sulphate in addition to regular spraying. Usually a thorough use of Bordeaux will control it, supplemented in bad seasons with the weak solution of copper sulphate,—three ounces to fifty gallons of water.

Anthracnose and mildew are controlled by the same application.

Anthracnose is reported as prevalent on the black raspberry, but less on the red variety. Keeping the young canes covered with Bordeaux, and cutting out the old canes as soon as done fruiting, is the best treatment.

Blackberry rust is reported in some sections. Cutting out the diseased plants as soon as they appear is the only remedy, Selection of resistant varieties is a great help.

Leaf-blight of currants and gooseberries has been prevalent in my vicinity for several years, but I find little difficulty in controlling it with two early sprayings with Bordeaux, and one after the fruit is gathered. It may be out of my province to remark here that I have usually included paris green in the second application, but this year I used Bowker's Disparne (which is but another name for arsenate of lead) with deadly effect on the currant worms, and no deaths reported from families using the fruit.

The mildew of the gooseberry is a disease where selection of variety counts for much, the American variety being little troubled while the European kinds are very susceptible. Potassium sulphide, one ounce to two or three gallons of water, is the best treatment, though Bordeaux is useful in holding it in check.

The mildew of the melon can be controlled by Bordeaux, but I have been unable to get any definite results in the treatment of the blight, and I trust some light may be thrown upon this most destructive disease during this meeting. Unless we get help we must give up growing the muskmelon.

In many sections the strawberry rust has caused great damage to crops. The new beds must be kept sprayed, and it is undoubtedly good economy to dip the young plants in Bordeaux before planting. It will do little good to spray old beds, or any bed where the rust is well established.

I am convinced that much time and money is wasted every year because of using mixtures improperly prepared, and not doing the work thoroughly, and hence I append a few general suggestions.

In regard to diseases: Fungous diseases are caused by fungous germs growing upon the leaf, stem or fruit: such are the scab, rust, leaf-blights, rots, mildews, black-knots, etc., and are prevented and controlled in a measure by the use of copper or other solutions which kill these germs.

Bacterial diseases are caused by a bacterial germ which usually enters the system of the plants, such as pear-blight, and probably peach yellows, and the melon-blight. The most satisfactory remedies yet discovered are a vigorous use of axe and saw.

In regard to mixtures: Bordeaux has practically supplanted all other fungicides in treating fruit diseases, with a tendency to use the weak solution of copper sulphate in place of the ammoniacal compounds of copper, and a dilute solution of Bordeaux,—one-half usual formula for the stone fruits where the Bordeaux would injure the foliage.

Application: Do not spray until you know what you are spraying for. It will not pay. Do not spray with materials improperly prepared, or with Bordeaux made of air-slacked lime. Do not fail to dilute the lime and copper sulphate before mixing, and mix vigorously. Do not fail to strain the materials. If you do, do not swear if the nozzle clogs. Do not spray when most convenient, or when it looks like a long fair spell; spray at the proper time.

As a rule the first spraying should be done when the buds swell, and again when the last petals fall, but weather and conditions, not date, control these to a great extent, and all subsequent applications, if necessary, entirely.

Don't forget to pay off that grudge against the codlin moth and other insects at the same time.

THE PRESIDENT: We are glad of this very full report by Mr. Putnam.

Now, if there are no further questions we will hear from Prof. Gulley on "Some Lessons from the Pan-American Fruit Exhibit."

Some Lessons from the Pan-American Fruit Exhibit.

By Prof. A. G. Gulley of Storrs.

It has been my privilege to have been connected with fruit shows, both large and small, on many occasions, but not before in running one for six months, and at such long range. To successfully carry on the work required more labor than I, at first, fully realized. Nearly one thousand miles of travel was made within the State and over two hundred letters written during the past season, wholly in connection with the matter and exclusive of all work done the year before in general preparation and putting fruit into storage. This last part, however, was very important. The action taken by the Board of Agriculture in 1900 was valuable in two ways. First, in making previous preparation, and getting material ready in advance, for the opening of the Exposition. In this we had the advantage of several other states that made exhibits. Second, in the method in which the State exhibits were made and for which I several times heard words of praise. That is, the agricultural and horticultural displays were made by and in charge of those particularly interested, and with no commission appointed by the State to have general charge, and perhaps with but little idea of the work in hand. Connecticut was alone in taking this plan. On the other hand, several states were there with top heavy expensive commissions, and in two cases, at least, that is all that was there. Another state had to adopt about the same plan before it was able to fill the space assigned to it in the Horticulture Building.

The idea of being prepared is well worth keeping in mind. Such expositions will be held in the future and it will be advisable for this Society to take initial steps very early in the matter. If this is done before the State takes action, there is more probability that the work would be left more fully in its hands.

To go back. I admit I was not fully aware of the results that had been attained in cold storage. It was with some anxiety that I awaited the opening of our stock before shipping, and was much relieved when our Secretary, who handled it at that time, reported that it had kept with but very little loss. But his opinion of its future success was expressed when he

added that it probably would not keep very long after being opened at Buffalo. President Platt also gave the same opinion when he saw it unloaded at the Exposition, judging from the very ripe odor given off at that time. We were all wrong. After shipping and restoring in cold house, then getting out again when needed, all kinds stood up well, two weeks at least, and some much longer. Some showed a scalded surface when first opened, notably the green varieties; R. I. Greening perhaps the worst. Roxbury Russet came out in practically the same condition as when stored, but soon began to shrivel. But Baldwin, Sutton, Ben Davis, Red Canada and Newtown Pippin all lasted from four to six weeks; some of the last remained on the tables from June 18th to September 1st. New York, Illinois and Missouri had 1900 apples on the tables throughout the whole exhibition, the first several kinds and the others two or three. New York made an interesting comparison of varieties by placing a barrel of each on the same table and noting the lasting qualities under the same treatment. Baldwin, Ben Davis, Esopus Spitzenberg and Yellow Bellflower, were still well represented when I saw them five weeks later. All of which goes to show that chemical cold storage of fruits is a success and that fruit so stored will readily keep till disposed of. Cold storage fruits will in the future be very prominent in pomological exhibitions. Had I the same work to do again, I should not hesitate to put up all our late fall apples to exhibit at least at the opening of the exhibition, only taking pains to pick early and store at once. The New York people will be able to make a full report as to the general keeping qualities of many of our prominent varieties. I regretted to learn that Wagener was among those that tended to scald. I believe even the small farmer can get much benefit from cold storage as now carried on.

A great deal has been said at different times about the difference in quality and color of the same varieties grown in different sections. There was a fine opportunity to study the matter at the Exposition. I must say, when the varieties came from places where they were grown largely, that idea was mostly a myth. There were at one time Elberta peaches from Ontario, Michigan, New York and Connecticut; at another Baldwin apples from the same sections as well as other prominent kinds. I doubt if any one after a most thorough inspection could have

correctly replaced specimens taken from the tables. But kinds taken out of their latitude varied much in color more then in quality, as Ben Davis from Missouri or New York. So far as brilliant color was concerned, the northwestern states led, but in varieties of very low value Gravenstein, Nova Scotia, produced wonderful specimens for their color, but not at a time to be compared with the same fruit from the States.

As to the success of the exhibit as a credit to the states, I judged fully as much from the opinions of people present as otherwise. I am pleased to say the decision was very favorable. In this I allude to the Connecticut State exhibit in its several sections in Horticultural Building. The remarks usually expressed satisfaction with the display as compared with other states.

It was not, however, unanimous. I allude now, of course, to visitors from Connecticut. In every case of complaint, however, the complainer had to admit that he, and usually his section of the State, had done nothing to help the display. None of those fault-finders did anything afterward to help the situation, although earnestly solicited to do so.

Perhaps the most interesting visitors were old residents of other states but born in Connecticut. These invariably expressed their pleasure at seeing their native state represented.

On the other hand, the disappointment and criticism expressed by visitors from states that had no display was very marked, particularly from one or two large states for which there was no reasonable excuse. A very near neighbor came in for her full share of this.

This of itself, to me, seemed a very good and sufficient reason to be represented upon such occasions.

The expense of making such displays is also interesting. Just here, so far as the pomological exhibit was concerned, we made a mistake; we did not use all of our appropriation. This may be a source of trouble to future applicants for help for the same purpose. This came about from the utter impossibility to get such supplies of fruit at times as would have been desirable. The very poor crop of apples and great loss of tender fruits from rot cut the supply short. Aside from this, the expense ran very close to the estimates made in the spring. The actual total expense paid by the State was $1,256.41, and

divided under four general heads as follows: Installing exhibit, $330.00; express on fruits, $172.75; collecting fruit, $405.00, and care of exhibit, $370.00, which totals, less proceeds of sale of material at close of Exposition, leaves the above amount as the expense of the exhibit, and which amount, in connection with that used in the other departments, was probably as profitably invested as it could have been in any other method of advertising the farm products of Connecticut.

MR. J. H. HALE: I think there is just one thing which, perhaps, was not made clear in Prof. Gulley's report, that it was impossible for him to get fruit shipped from the State. It was not due to the fact that there was no good fruit to send. The real trouble was, so far as I know, and I know it was the trouble with me and with many of my friends who had good fruit, and good-looking fruit,—the real trouble was, we had so much and such continued wet weather we did not dare ship it. Lots of people who would have shipped did not think it was wise to waste the express money because the fruit was very liable to get into a condition where it would go down in a few hours. The real trouble was the continued wet weather during the summer. The growers in Connecticut would have kept those tables piled up, and would have used up Prof. Gulley's surplus money, and more, too, if it had not been for the weather conditions.

PROF. GULLEY: We had had so much wet weather that the fruit this year would not stand up for the average time. Peaches, from twenty-four to forty-eight hours under the best conditions that we could get this year. Strawberries, from twenty-four to forty-eight hours, and in a few cases about three days. Blackberries, about one day, and raspberries, about one day. It was not safe to keep fruit any longer than was absolutely necessary for fear it would go down on account of the wet, damp weather.

MR. STERNBERG: I would say that I had a bushel of very fine cherries, which I had had picked with the intention of sending them to the fair, and the following morning after they were picked, when I was getting ready to pack them I found that about three-quarters of them had gone with the rot, so I concluded it was not best to ship them.

At this point the meeting took a recess until the afternoon session.

Afternoon Session---1.30 P. M.

Convention called to order at 1.30 P. M., President Platt in the Chair.

THE PRESIDENT: If you are all settled in your seats, I want to introduce to you a gentleman from New York City who used to be a commission man but is now an editor—Mr. Tuck of the "Producer and Distributor."

MR. TUCK: Ladies and Gentlemen: I had the pleasure of being in Hartford some two weeks ago and through my friend, Mr. Brewer, and also through my friend, Mr. Hale of South Glastonbury, my attention was called to the meeting of your Society which was to take place to-day. I, therefore, took it upon myself to pay you a visit, as I had heard that your previous annual gathering was productive of much good. After having been editor of the Fruit Trade Journal, believing that I had sufficient theoretical knowledge to enable me to engage in the commission business I took the opportunity and entered into that business in New York. We followed it up for two years, and until the finances got so low that I made up my mind that I didn't know anything about the business and I quit. So I drifted back into the newspaper business, and therefore came up to Hartford to report your proceedings. My predecessor in the other newspaper told me that your meetings gave a very good knowledge upon various subjects, but there are certain other things in connection with this business that I think it would pay a person to think over, and that is particularly if you are engaged in commercial fruit growing, or fruit and produce growing. It has sometimes been a surprise to me that the growers do not pay the same attention as to how their packages are put up as they do to the growing of the contents. In the present age of either over-production or under-consumption it behooves every fruit grower, or every grower of fruit for market, to pay some attention to this subject so as to be able to compete with almost every state in the Union, particularly so far as the trade in the large commercial cities is concerned. Take, for instance, New York, Boston, Philadelphia, and a few other cities of that same class. There is hardly a product of any prominence known in this line but what will reach any one of these markets, and they are there

brought into competition with each other. Now I heard one of the professors say to-day that the Connecticut apple was very favorably regarded in some markets, but that in some cities like New York, which is quite near to you, they like a Missouri apple. They come in competition with yours in that market, so that one of the questions for you to determine is whether you put up your apples as well as the growers in that state do. I am stating this question of apple-packing from the standpoint of the newspaper man, but I think there is an idea among the leading apple growers of the country in favor of using boxes instead of the ordinary barrel. An argument in favor of that is that it makes a smaller package, and it can be more readily handled by the retailer or consumer. And so it is with questions pertaining to other packages. You have no doubt heard Mr. Hale upon the question of the proper grading and packing of peaches. It is a question there as to what is the best package. I speak of this merely from the standpoint of the newspaper man as something which it has appeared to me should receive more attention.

Now, if I may be permitted to speak of the newspaper, and I hope you will pardon me for so doing because I happen to be engaged in the business. The trade paper has its advantages, and whether it's the paper I am connected with, or any other, I believe every fruit grower and every farmer ought to read such a paper of some character. He ought to read a tages, and whether it's the paper I am connected with, or any that he is engaged in. There are hundreds and thousands of newspapers that will produce articles or addresses from such well-known authorities as your Mr. Hale, who is a man of national reputation, or from Prof. Powell, and others, for fifty cents or a dollar a year. You have that paper coming to your door every week, and it is a great help and a benefit to you. It does not make so much difference what the character of the paper is so long as it is a good paper pertaining to the line of industry in which you are engaged. And that is one of the good things about the fruit growers. I fail to find many fruit growers but what will tell you that they are taking a number of such publications. I simply mention this as one of the things that ought to come to your attention. I thank you for your courtesy.

THE PRESIDENT: Would you like now to call up any of the questions on the question list? Here is a question from the box. "Do you advise spraying apples more than twice before the blossoms open?" It does not say what you are spraying for, whether it's for apple scab or something else. I should not suppose anyone would need to spray apples more than once before the blossoms open, for the canker worm, or anything like that. I will ask Mr. E. M. Ives for his experience. He has been one of our best managers in spraying.

MR. IVES: Some years ago when I first began to spray, I used to spray once when the blossoms were first opening, and I followed that up for three or four years, but I finally got all over that notion and sprayed twice after the blossoms dropped: once, immediately after the dropping of the blossoms, and again ten days or two weeks later putting in a separate spraying, but not spraying before the buds opened. I think after you have sprayed awhile you get rid of some of these fungous diseases, and you do not need to put it on quite so early. I shouldn't spray now until after the blossoming period, and I do not spray more than once. I used to do it twice, and I would now if I thought it was necessary. I do it once, and try to do it thoroughly.

THE PRESIDENT: You are talking about spraying with Bordeaux?

MR. IVES: Yes, sir.

THE PRESIDENT: There is no doubt a great deal in that fact that Mr. Ives speaks of, that after spraying a number of years the quantity of trouble from fungous diseases is lessened, and there is not so much need of it.

MR. IVES: And there is another thing; I find that I can use a less amount of material, and use it weaker. I have been working that down for some years.

A MEMBER: I consider it very important to spray thoroughly before the blossoms open because you then not only control the fungous diseases, or help to control them at that time, but there are several other things which are kept down better by spraying at that time, such as tent caterpillar, and some other pests.

THE PRESIDENT: Do you spray with Bordeaux?

ANSWER: Yes. Distribute it in the orchard all about. You cannot kill tent caterpillars after the blossoms open. That is my experience.

THE PRESIDENT: What do you find to spray it on? There are no leaves there at that time?

ANSWER: You want to get it on to anything that is there. You want to kill these caterpillars when they are little fellows. The tent caterpillar has hatched out from the egg, and you can get at them then to kill them better than you can later. We sprayed last spring and we killed out clean all the tent caterpillars.

MR. IVES: I would agree with what Mr. Hart says, that if one is troubled with tent caterpillars, it is better to spray before the blossoms open. I do not have them, and so I do not need to spray until the codlin moth come along.

MR. COOK: I would like to inquire if this spraying will kill the green aphis?

MR. IVES: I should think not. Not in my experience anyway. I used to spray, as I say, before the blossoms opened. I used nothing but sulphate of copper. You can get the spray in among the limbs, and it tends to keep them cleaner and healthier. You can get the spray in among the limbs of the trees at that time handier than you can later. It has that advantage.

A MEMBER: I would say that I have followed that method and used as high as twelve pounds of copper to fifty gallons of water. Of course that is excessive, and I do not think it is necessary, but there is one thing certain, it leaves the bark smooth and clean, and the trees are exceptionally healthy.

THE PRESIDENT: That would be the remedy for the peach leaf-curl. I used this particularly for brown rot in plums, and incidentally, the peach trees being in the same orchard received the same dose.

Question 13 on the list is this: "Has any one in the State tried the lime, sulphur and salt mixture for San José scale?"

That is a California remedy. Has anyone tried it in this State? There does not seem to be anyone here who has done so. It is reported from Washington that it did not answer in the eastern states. That opinion, I understand, was based on some trials of it which were made, but some people are beginning to think that that trial was not a very fair one, and one or two experiments that I have heard of this season seem to indicate that it does work in the eastern states.

PROF. POWELL of Springfield, Mass: Mr. President, I would like to say in that connection that we have had a report, which was received last Saturday, from New Jersey, that it had been tried in Burlington County. A large peach orchard there, which was badly infested, was sprayed last spring, and even after that one spraying, so far as an inspection this last fall could determine, the owner had cleaned out the scale, and he is so well impressed with the remedy that he intends to spray again this next spring so as to make sure that any which are left there will be killed. He is so pleased with it that he also intends to try it in his apple orchard. The result in that state seems to be quite favorable.

MR. HALE: In reply to that question, and further in regard to what Mr. Powell has just stated, it was stated at the New York State Association meeting that while it was generally conceded that lime, sulphur and salt would not work in the east, yet experiments this last year in Maryland, on a large scale, and in this particular case in New Jersey, and one other where it was tried on a smaller scale, and also one instance where it was tried in Canada, it has proven fairly successful. Last week at the peach growers' meeting in New York, it was further stated that in the vicinity of Millerton, in that state, it had been tried with success. That makes five distinct points in the United States where it has been tried successfully. It was further stated at the Central New York State meeting, that the general understanding that it would not work in the east, was all based on experiments which were made on five or six trees. All the entomologists said the dose would not work, but the fact seems to be they didn't have any foundation to base that on. I think that is the situation as it is to-day. I understand that the state entomologists of a number of states are going to make their first experiments with it this year.

Q. What proportion do you use of this lime, sulphur and salt?

MR. HALE: That is a regular stock preparation.

Q. Do you know what that is, Mr. Powell?

PROF. POWELL: I do not think I can give it to you here, but there is a standard for it that I think you will find in the reports of the Department of Agriculture. It is very cheap. It is said only to cost one cent a gallon.

MR. IVES: I would like to inquire how that is mixed.

PROF. POWELL: I think that the formula calls for 40 pounds of sulphur to 20 pounds of lime and 15 pounds of salt. It is boiled and then diluted, and then added to 150 gallons of water. The lime and sulphur are boiled together for an hour until thoroughly dissolved and then the other is added and boiled for five or ten minutes additional. In the experiment which was tried in New Jersey a different formula was used in which the proportions of lime and sulphur were larger. I think it was stated that it cost one cent a gallon when using the larger amount of chemicals.

THE PRESIDENT: Professor Powell is ready now with his address, and if you will be seated so far as possible, so as not to make any noise by moving around, we will proceed. This lecture is on "Cover Crops and Soil Conditions in Orchards."

Cover Crops and Soil Conditions in Orchards.

By Prof. G. Harold Powell, Assistant Pomologist U. S. Department of Agriculture.

Mr. President, and Members of the Connecticut Pomological Society:

I can assure you it gives me a great deal of pleasure to meet with the fruit growers of Connecticut, and to take part in the various discussions here concerning fruit growing. This is a time of very rapid activities in all lines of business, and the fruit grower who is willing to stay at home and depend upon his own resources alone for success is mighty apt to get left. The most successful fruit growers are the men who have studied their business, and who have kept up abreast of the new developments and practices of the times, as those things have a direct bearing upon their business. These conventions are among the most active influences, it seems to me, in educating the fruit growers in the various new lines of work as they are brought out, and it speaks well, it seems to me, for this State, that you are starting out at this meeting with such a large audience as you had this morning. I have been in quite a number of conventions in the last few weeks, where I have come in contact with one of your well known sons of Connecticut, and if I had believed all that was said to me, I should have begun to think

that there were just two states around which the horticulture of this world centered, and those were the two states of Connecticut and Georgia. (Laughter.) This is the first time that I have had an opportunity to come up here and see for myself. I was born over in a neighboring state, where the conditions are not unlike the conditions here in Connecticut,—right over in the neighboring State of New York; so that I feel that I know something about the conditions which you have to meet.

It also gives me a great deal of pleasure as a representative of the National Department of Agriculture, which is interested in every line of work which concerns the farmers and fruit growers of the country, and I extend with a great deal of pleasure the hearty greetings of the United States Department of Agriculture to this Connecticut Pomological Society.

I believe that I am to talk to you this afternoon about cover crops. I will not be able to take that question up in detail, but I wish to talk to you for a while about some of the fundamental principles of that subject. Now in order that we may see what an important place the cover crop plays in orchard economy, and also to bring into relief the present condition of many orchard lands, it will be necessary to pass in rather a rapid review some of the things that take place in the soil. I may say that all soils are made up primarily of a rocky basis; that is, the principal part of the soil is obtained from mineral substances which have become disintegrated through the action of the climate, water, and frost, and prepared for use through the action of numerous living organisms called bacteria. In it, of course, is a great deal of vegetable matter, and in that these living organisms. Now besides all this, there is a varying amount of water in every soil which the plants drink up, and I want to pass in review some of the functions of this so that we may understand a little more intelligently some of the things which take place in the soil, and so see some of the important points which have come to play such an important part in our modern orchard methods. I suppose there is no soil in Connecticut that does not have from 2,000 to 20,000 or even 40,000 pounds of potash and phosphoric acid, which are important elements of plant food, in every acre of ground. I suppose there is no soil that on an average does not have from 20,000 pounds up. In fact, there are no arable soils of which analyses

have been made, which do not show sufficient of this plant food to last for generations and generations to come. It is most of it, however, in an insoluble condition, and it is fortunate for us that the most of this plant food is in an insoluble condition. Now I want to emphasize that point right here, because the soils which bear profusely are the soils which are rich in quantities of phosphoric acid and other plant food elements, and which we think sometimes we must buy. This element in the soil is in this condition, and one of the most important problems before us is to learn how to liberate and make use of these stores of plant food provided by nature in the soil. Now in the breaking down of the vegetable material of the soil, that breaking down is due to the action of these myriads of bacteria of which I have spoken. I do not care to go into that process, but through this action the decomposition which takes place in the soil by which acids are given off, and these acids mix with other kinds of acids, and with the carbonic acids, and act upon the mineral portions of the soil, and the result of this action is to dissolve out portions of this insoluble phosphoric acid and potash, and to carry it back in solutions to the plants so that they may drink it up and grow upon it. So I would emphasize the fact that there is in our soil an immense amount of plant food that is in an insoluble condition, and that that food is liberated indirectly through the action of the bacteria in the soil.

I would also go one step further, and I would like to emphasize the importance of water in the soil of our orchards. There is no fruit grower here who cannot look back and remember the small amount which came into his pocket in certain seasons owing to the lack of moisture. There is hardly a year goes by that our fruit does not suffer from the lack of water just at the times it needs it most.

I will venture to say, however, that in nine years out of ten, enough water falls upon the soil during the spring and fall months to carry the most of our orchards through the entire season, provided that water could have been caught, or retained in the soil, and I think it could have been, provided the soil had been in proper condition.

Now it is one of the principal objects in our systems of culture in the orchard to provide for means to retain the moisture that goes into the soil. We suffer year after year on

account of the lack of moisture in our orchards, and we suffer from that lack of moisture more times than we think rather than from the lack of plant food. No matter how much plant food is present, the plants cannot make use of it unless there is plenty of moisture in the soil. I have no doubt you might send a chemist to examine your soils and that you might find a lack of as much phosphoric acid, or a lack of as much potash as you will find in some of your arable soils, but it will not do to condemn that soil: the trouble is, the conditions that are needed for the liberation of plant food for the growth of plants do not exist in that soil. So it is in many soils. We have there the plant food, but not the conditions necessary for plant growth except possibly moisture and possibly some of this vegetable matter. And, as a matter of fact, it is only through the introduction of some of the influences of culture that I shall mention, that the soil becomes productive. It may be rich in plant food and still be non-productive.

The soil may be in such a condition that these myriads of bacteria cannot live and work to the best of advantage under such conditions, and the soil, therefore, may be non-productive. There is a close inter-relationship existing between all the forms of life.

Now I want to say further, that besides furnishing the acids and thus contributing to the plant food, the vegetable matter in our soil has several other very important functions to perform in our orchards, and one of the most important which arise is in the matter of furnishing organic nitrogen.

Through the breaking down of the soil there is given off organic nitrogen which can be used for the plants. And right here I want to leave with you one suggestion, and that is, though the fruit grower is ignorant and often buys nitrogen, a kind Providence has provided all the nitrogen that is needed for the growth of all our important orchard fruits. I will develop that just a little later. And I would say one other thing about vegetable matter. One of the most important functions of vegetable matter in the soil is to increase the water-holding capacity of the soil itself. Soil filled with vegetable matter is like a sponge. It takes the water in slowly and it holds that which it gets. If the soil is hard, it can hold but little moisture, and it soon loses that which runs into it, so

that the vegetable matter not only has this influence upon the plant food, but it performs one of the most important functions in the soil, and that function is to give the soil a greater water-holding capacity.

I remember a few years ago we took some samples of soil from a field where a crop of clover had been turned under. It was turned under before the dry season came on, and that orchard, I believe, during the drought that followed showed about 15 per cent. of water in the soil.

In an adjoining field we took samples from a piece of land where the soil was of the same general character, but in which no crop had been turned under, and there was only about 9 per cent. water. That is to say, the other soil had not had vegetable matter turned into it. And so I have seen it time after time. Even where the land was so light that they had to put a mortgage on it to hold it down, extremely sandy light soil, and a soil that loses water very quickly,—I have seen those soils, after being filled with cow peas, produce crops without any apparent effect from drought.

The whole thing was brought about, I believe, by giving the soil a greater water-holding capacity, and by turning under this green matter which increased the vegetable matter in it. I cannot emphasize this too strongly. We have been cropping our soils generation after generation by crop rotation, and have not been supplying the quantities of vegetable matter that are taken out year after year by the growing crops, and so in New England, we have been burning up through successive crops the vegetable matter in the soil until the soil in many places is dead and hard, and does not respond so quickly to treatment because of its lack of water-holding capacity. It does not have the characteristics which are favorable to bacterial life, and therefore it is weak in those acids, the giving off of which is essential to the production of plant food. The plant food is not given off so readily as in soil where the vegetable contents have been continually maintained.

I have been emphasizing this, especially in its application to our fruit crops, because I believe that one of the most essential prerequisites to success lies in having this vegetable contents of the soil kept up through the green crops or cover crops. Our soils have become depleted of vegetable matter. I am con-

vinced from a wide observation that this burned out condition is the primary trouble with most of our non-productive soils.

We have seen analyzed many of these non-productive soils, and have seen it demonstrated that that, in all probability, was what was the matter. So I would emphasize right here to the fruit growers of Connecticut the importance of moisture in the soils in our orchards. No fruit can fill out well and get into fine condition without plenty of moisture just at the ripening time. Mr. Hale can tell you that, especially of the peach. It does its filling out largely in the last two or three days, and unless the soil is in such a condition, you do not get as fine fruit. If the moisture is absent we have these little hard peaches on which the skin is shriveled. They are nothing but peach pits with a little skin over them. I cannot emphasize this too strongly. It is one of the most important propositions that the fruit grower has to contend with—this question of the depletion of the soil and the deficiency of moisture in the growing crop.

Now vegetable matter may be maintained in our soils in quite a number of ways. Perhaps one method is by sod culture, but I will not say very much about that because I am to be followed by a gentleman who has produced this year one of the finest crops of apples that has been seen anywhere by an intelligent system of culture. His crop was one of the finest that I have known of anywhere in New York State. So I will not say very much about sod culture. Where there is an excessive amount of moisture in the soil, it may be well to exhaust the soil of some of that water.

You go north here, and there are many places where they keep the sod on the land for the purpose of pumping out the water that is in the land. I do not question but that under such conditions it may be possible to grow a fine orchard in sod; under conditions where there is too much moisture naturally in the land. But if the system of sod culture is followed and the grower continually grasses over his land, and leaves it on the ground so that in time it forms a mulch so that the vegetable matter goes back into the soil, there is no question but what that kind of soil culture may be a most economical way of supplying vegetable matter to the soil. But I would say this most emphatically; in the usual sod orchard where

the grower continually grasses over his land and leaves it, it is a practice which has caused this eastern part of the country the loss of a great deal of prestige in the markets.

I believe that sod culture is responsible for a good deal of the decline in our prestige in New York. The State of New York has spent a great deal of money in looking into the causes of this decline, and when they got through it was all included in one big word, "NEGLECT." And that included neglect of tillage, neglect of pruning, neglect of spraying, and neglect of all those things which are essential to be done by those who practice apple culture and expect to be successful in the enterprise.

So I say, that sod culture has caused this eastern country the loss of much of its prestige, and I believe it is going to cause the central west the loss of its prestige in a few years. In fact I have been through some of the great apple orchards out there, and with the neglect I have noticed, and sod culture, I have seen many of the trees looking as though they had seen their best days—so that I believe that sod culture out there, in a short time, will cause some of those apple growers the loss of their standing in the markets.

So that I warn you against sod culture. Now there are other methods by which the vegetable matter of the soil may be furnished economically, and I would develop right here the importance of the cover crop in the orchard. Its purpose is simply to maintain and increase the vegetable matter, or vegetable contents of the soil. After the cultivating season is passed, the cover crop is sown and it is allowed to grow until the fall months, and during the winter months, and it is plowed under the next spring. It is turned under at the same time of year when the tillage begins again.

Now there are two general classes of cover crops: one the great group, which not only furnishes vegetable matter to the soil, but which through the agency of these little organisms called bacteria have the power of taking nitrogen that is in the soil, and in the air of the soil, and converting it into use for the plants; into a form for the plants to use. Such plants as the clovers, beans, peas, and the vetches, and all such plants have this power. They have little nodules on the roots, and in these little nodules bacteria live, and they have the power

of making use of the nitrogen in the soil, or rather of converting it into a form for the use of the plants.

That type of plant is very valuable. The nitrogen is very stimulating. I have seen, however, too much nitrogen cause damage in a peach orchard. Too much nitrogen causes a too rapid growth, and it is a growth which is susceptible to winter killing, and which causes the fruit to ripen much later in the season, and it makes it soften and more susceptible to rot.

Too much nitrogen in a pear orchard causes an abundance of succulent shoots, the type most susceptible to pear blight. Too much nitrogen in an apple orchard (if applied year after year) may cause the foliage to increase very largely so that the trees become dense-headed, and the fruit on such trees is very apt to be light-colored and probably of poor keeping quality. Buyers get so they recognize this fruit in the market, and it is, of course, affected in price. On the other hand, where the land is well supplied with nitrogen, we have seen the Northern Spy produce a crop year after year for a series of seven or eight years without a break, and where previous to that it was hard work to get a fair crop every other year. So, if a grower understands the danger from too much nitrogen, and knows how to apply this stimulant, and when it is wise, and knows how to check over-stimulation,—it is the happy medium which we should all try to attain. There is no question, however, but with this class of leguminuous plants the orchards can obtain the supply of nitrogen which they need, practically without cost, and it is a supply which is ample for the purposes of the orchard.

Now, there is another great group of plants that we may call the non-leguminuous plants. That group is made up of rye, winter oats, buckwheat, sowed corn or broom corn, rape and cowhorn buckwheat, sowed corn or broom corn, rape and cowhorn turnips. These plants are very useful to use when the soil is hard, in order to get it into good condition. Hard, heavy soils should first be broken up with the non-legumes like rape, turnips or buckwheat, and after that, after the character of the soil is improved, then you can use the clovers, vetches, and peas. At the top of the golden scale of cover crops stands crimson clover, needing the most thoroughly prepared soil, and of the greatest value in orchards that have long been under tillage. Rye, rape,

turnips, cow peas and buckwheat, will grow on poorer soils and are useful as forerunners of the crops mentioned.

The most useful cover crop is the one that lives through the winter, and the least desirable is the one that dies with the first fall frost. Therefore the clovers, vetches, rye, winter oats and rape are more desirable than cow peas, soybeans, or turnips.

A MEMBER: What does that vetch seed cost?

PROF. POWELL: Vetch seed at the present time is high. It costs five or six dollars a bushel. It seeds along in June.

A MEMBER: How much of that seed is required per acre?

PROF. POWELL: About three acres to a peck.

THE PRESIDENT: I think I fully agree with what Mr. Powell has said as to the general desirability of adding humus to the soil and of conserving moisture in it. I think, however, there is need to use good judgment, as either of them in excess tends to make green-looking, soft and easily-rotting fruit.

The last season, particularly in the latter part, we had too much moisture and would have been glad to have got rid of some of it.

PROF. POWELL: That is where sod culture would have come in. It might have paid you to have had something which would have pumped the soil out to some extent.

THE PRESIDENT: We would have been glad of most any way to get rid of it.

[Here a large number of pictures were thrown on the screen, and the lecture by Professor Powell, which it is impossible to reproduce, and of which the following discussion formed a part, was continued.]

A MEMBER: Don't those long-rooted plants help to pump it out?

PROF. POWELL: Those long roots on such plants as you see here help to get the soil into condition so that it can hold more moisture. I believe one of the mistakes that our orchardist sometimes make, is in allowing cover crops to grow too long in the spring. Of course, that is something which has to be guarded against. If a crop is allowed to stand too long, it pumps out an immense amount of moisture. We have seen instances where, by allowing crimson clover to grow too high before it was turned under, it might have pumped out so much water in that time that on account of the loss of moisture there was a damage to the crop.

A MEMBER: I was going to say that under the same conditions I would use sod culture. If I had an orchard on my farm, and it was on a piece of land that was heavy, and had more moisture on it than I thought was absolutely needed at all times of the year, then I might let that orchard go into sod, but I believe nine times out of ten, the man who allows his orchard to grow in sod, does it at the expense of the apples. I believe under those conditions, such as have been described here, if I had them on my place, I should certainly grow the orchard in sod. As I say, under those conditions it might be a good thing, but I should not want to recommend sod culture as a general thing.

PROF. POWELL: If there is an excessive amount of water, of course it might be well, but I would not by any means have it understood here that I was here to recommend sod culture. Under some conditions though, I am not saying but it may be a good thing.

MR. HALE: Why wouldn't you drain the land first before you undertook to raise an orchard on it, instead of practicing sod culture after you got the orchard going, which most of us believe is bad?

PROF. POWELL: It might not be necessary if there wasn't an excessive amount of water.

MR. HALE: But you are talking about an excessive amount of water. Why wouldn't you drain the land first? Then there would not be a chance for a difficulty of that kind.

PROF. POWELL: It might not be necessary. Of course you would have to be guided by the conditions that existed. If I had a cover crop which I could use to regulate the amount of water that might be sufficient.

MR. HALE: You don't answer the question. Don't try to dodge now.

PROF. POWELL: Under those conditions, I believe I could maintain my orchard cheaper by sowing once or twice a year than I could by cultivating it. Under those conditions I might be willing to do that.

MR. HALE: You think it would be cheaper, but what would be the final result?

PROF. POWELL: I would take my chances on the result. I think probably when Mr. Hitchings talks he will show you

some results that will open your eyes. I don't want to have you understand, for a moment, that I am recommending sod culture. It is the last thing I will recommend for nine growers out of ten. It is not adapted to their conditions in my judgment, and they probably would not understand how to use it successfully. Some of them would probably cut off the hay and put it in the mow. But under the conditions I mentioned in my talk, I believe it has lost the eastern fruit growers their prestige.

MR. MERRIMAN: Is there any danger from the sand vetch, or some of these other plants from turning out to be obnoxious weeds?

PROF. POWELL: Not if a man is a good cultivator; I should not think there would be. If I understand you, I do not think there is any danger at all of the vetches becoming weeds. I do not know of anything that is dangerous, except alfalfa, in the orchard. If alfalfa is allowed to grow in the orchard I should not want to take my chances.

MR. MERRIMAN: I don't think you understand my question. The reason why I asked was this: in sowing some of this in my orchard, while I supposed I had the seed of what I wanted to sow, yet what I really obtained was a noxious weed from Delaware. I don't want to take the chances of getting something else besides the vetch.

PROF. POWELL: That is true. They have sent out stuff that they ought not to send. Of course you are liable to strike those seeds in any part of the country. As I understood your question, it was whether there was any danger of these plants running into weeds. There is no danger at all.

MR. MERRIMAN: If there is any such thing that has proven to be a weed, I would not have it for a thousand dollars on my land.

PROF. POWELL: A man, of course, runs that danger in planting or sowing seed from anywhere.

MR. FENN: Ever since the introduction of cow peas as a cover crop, the newer varieties are being introduced all the while, and it has got so it is pretty hard to tell just which is the best or what you want. I'd like to ask Mr. Powell if he recommends any particular variety?

PROF. POWELL: That is true. There are about a hundred different varieties of cow peas. I saw some seventy or eighty varieties growing together a couple of years ago. Of course the cow pea growers, like the fruit growers, want to get better varieties if they can, and I think they are being improved all the time. Out of this mass of new varieties there are coming every year some that are much better than others. I think for a cover crop the Early Black is one of the best.

MR. HOYT: What do you think of sowing barley, or oats, springs oats, as a cover crop?

PROF. POWELL: I should not want oats on the ground if my land was adapted to crimson clover, on account of the fact that the crimson has the power to catch moisture and nitrogen that might otherwise be lost. I would also rather have a crop that would live through the winter. But more especially I would rather have a crop that has the ability to gather up nitrogen, and it is a well known fact that these leguminous plants that I have mentioned do have that power. However, in Delaware winter oats have been used to some extent as a cover crop. One of our most successful growers down there uses winter oats as a cover crop for his orchard.

MR. HOYT: You were talking about crimson clover, where it grows, and it is all well enough in its way, but I want some crop that I can grow that will cover the ground, not so much to catch nitrogen as to protect the soil.

PROF. POWELL: Then why not take rye?

MR. HOYT: The trouble with that is that it will get ahead of you in the spring if you do not look out.

A MEMBER: We have found a great advantage in crimson clover, especially under those conditions where you cannot grow oats, buckwheat or turnips and winter oats. Where you cannot get a nitrogenous crop I would earnestly recommend to you a trial of cowhorn turnips. That will grow where clover will not.

THE PRESIDENT: We have another speaker to go right on this afternoon to talk on orchards. He is going to take up a very interesting subject for our Connecticut people. This is Mr. Grant G. Hitchings of South Onondaga, N. Y. He will talk to us on

Novel Methods in Apple Growing.

By Mr. Grant G. Hitchings, So. Onondaga, N. Y.

Mr. President, Ladies and Gentlemen:

It was with some degree of reluctance that I consented to come down here and talk to you, but thinking that perhaps some of these theories of mine, and some of these methods employed by me as a grower, would be interesting to you, I consented to come. In order to make a continual success of fruit growing, it is necessary to thoroughly understand certain underlying principles and then to vary the practice and treatment of your orchard as your particular soil, location, and climate seems to require. In my talk to you this afternoon, these principles, and the different methods I have adopted to conform to them, will be described, and also the results of the several methods as I have seen them practiced and worked out on my own farm. I will describe the methods practiced upon my own farm, from the planting of the trees to the marketing of the fruit. Now, there are three main principles to observe, and the most important of the three is, how to retain the moisture in our soils. The next is, how to keep up the supply of humus or decaying vegetable matter in our soils, and the next and third is, how to maintain healthy foliage on our trees.

Now in regard to these three principles, it is necessary to thoroughly understand the reason for them. When I commenced to observe and think about this thing, I made up my mind that what we wanted was some plan which would give us a profit and enable the work to be done the cheapest, and at the same time get good results in the quality of the fruit. Whether I have been getting good results or not from my methods I will leave you to judge after you have heard the little I have got to say, and perhaps look at some samples of apples which I have brought over with me. I have tried to follow the plans of these professors, and in most things I agree with them. But what I am doing is almost revolutionary to what they say ought to be done or to what they recognize as a correct method. It is a complete turnabout. It is almost directly the opposite. Now the importance of moisture in the soil has been thoroughly explained this afternoon, and that a tree in order to grow must take its food from the soil through its roots in liquid form, or

rather in the form of a solution, and hence the importance of a continual supply of moisture in the soil. That means from spring until fall there must be a continual supply of moisture. Of course, an excess of water in the soil, as Mr. Powell said, is to be avoided, as well as a deficiency, and what we want to know is, how can we best maintain a proper amount of moisture so as to get the best growing conditions to the trees.

Now my friends are saying to put on a cover crop in the fall and stop cultivation, and that is where I claim it is a mistake. It allows the ground to dry up, because the cover crop takes the moisture out of the soil that your trees need. The growth of the cover crop takes this moisture that your trees need. The fruit buds in the orchard for next year are formed during the fall, and at that time you want your moisture that is in the ground in your food for the trees. You do not want to subtract without the Lord will guarantee you enough ahead.

Two years ago we had a drought in the fall, a serious drought. What was the result? When you were trying to grow your cover crops your moisture got away through capilliary attractions, and the result of it was, there was no strength furnished to the trees to make a good set of fruit, and in the spring, while some of the trees blossomed out good, there was not the fruit there ought to have been. Some thought it was the rain that caused the blasting of the young fruit, but in my orchard we had just as much rain as my neighbors had, and I had the most perfect crop of fruit I ever had. Now what was the reason of that? I simply had mowed my grass during the spring. They say, you should cultivate in the spring so as to furnish plant food so the trees will grow. I say that is wrong. I say that you want to retard that growth. You want to take some of the excess moisture out in the spring with your grass and then cut it. I cut it and place it around the trees, where it acts as a mulch and assists the bacterial action in the soil, which is necessary, and which was so plainly described by the speaker before me, and so also to assist in holding the moisture in the fall. If you have barren ground there is a constant evaporation going on, and with the evaporation, it is gradually using up the humus in the soil which you want to keep. If you have this mulch on the ground the moisture will stay there for weeks and you can get the advantage of it. It helps to keep

the moisture in the ground through the fall when the young fruit sets, and the result is you will get a good crop of fruit buds and you give the trees vitality to set the fruit, and the result, as has been demonstrated in my experience many times, is a good crop of fruit. So, in that respect, my plan is revolutionary. It is directly opposite to the practice of what the professors teach.

Now my plan is also a very cheap plan. We are told that it is necessary to cultivate in the spring. If I was a nursery man and was selling trees, and wanted to grow large trees, I should certainly cultivate in the spring, but with the fruit grower it is not wood that you want, it is fruit. What we want is to give the trees strength and vitality while they are forming the fruit buds, and that is where I claim my practice helps. I think somewhere at Cornell perhaps, and I don't know but what it was Professor Beach, through the use of a microscope, has shown that along in June you can commence to discover the new fruit buds or the elements going into those buds that form the fruit. The fruit begins to form in June. The trees are reproducing, and I claim it is good sense if we are growing fruit to stimulate those fruit buds through the fall. You want to get a good strong fruit bud. If you want to get a strong set of fruit you must have strong fruit buds in order to do it. Now there is another advantage to it.

By having my grass in the orchard that way, I haven't got to stop in the spring to attend to the orchard, except to spray or something like that. When I go out onto my farm in the spring, I have got a lot of other work I want to do, and I don't want any more than I can avoid, and by having my grass growing in the orchard it gives me a lot of spare time so that I can grow a crop of strawberries or corn or early potatoes, while that grass is growing in the orchard.

To the man that is on a farm and who is paying for his farm that means a good deal, because you can devote your labors to something else. Now all this time your grass is taking out some of the excess moisture, which is just what you want, and then along in July when you get the work out on your farm well enough along so that you can attend to it, then you can go in there with your mowing machine and cut this grass and place it around over the roots.

Now I want to say, in order to have it successful it is necessary to have a soil filled with humus or decaying vegetable matter. So I say when you first set an orchard, try to get ground that is as full of humus as you can. It is just the same as though you were trying to grow a good crop of corn. You have got to work at it and put it where it will do the best. There is the soil, and you want to get as much humus into it as you can. You want land that has got as much of it as you can have, because that is what makes the trees grow.

When you set your trees, you want to mulch them with straw or something like that so that the ground around those trees will not dry up; this helps to keep the supply of humus and moisture in the soil. You don't want to cultivate around it. Cultivation exhausts the humus. Cultivation causes the humus in the soil to be burnt up much faster than it otherwise would be and it destroys the sponge-like condition of the soil which is so much desired, and that is one thing that makes it necessary, as some think, to grow cover crops to restore the humus. There is no need of my repeating that. So I say, when you put out these young trees, mulch them first so that the roots can get hold of the soil, and so that the soil will not dry up. And then in July cut the grass in the orchard and place that around the trees. Continue this for about six years. Do not pasture that land or remove that grass in any other way. Just cut the grass and put it around the trees, because by doing that you are accumulating humus, and that is what Prof. Powell says we need in our soil. By doing that it gets the soil into a condition which is just right for perfect fruit. I found that out. I found out the advantage of that when the trees commenced to bear. I have had several years' experience, and these trees when they get up to be five or six years old commence to bear, and in the six years' experience I have had, I know that they have each year been doing better than they did the year before. That is the result. It is an easy way. It's cheap. In the spring, when you want to be about other work, you haven't got to stop and attend to your orchard as I said before. You are free to attend to other crops. All you have got to do is to wait until the grass gets up and then mow the grass and put it around the trees.

I believe that my plan, my system, is responsible for the success I've had. Some of them say it is my soil. I do not care what kind of soil it is, I believe you can get it into condition better for fruit growing, much better by that treatment. Perhaps it is my soil. I do not know about that, but even if it is, I believe that the treatment helps it. Some say it is the soil and the location of my orchards. They say there is a good deal of moisture in my land, but I believe that will work just as well where the ground is dry, because there are some parts of the orchard which are dry, and previously we found that the crops would dry out there to some extent, but since we have been able to increase and hold the humus (and I have taken particular pains to watch it to see), I do not see any difference in the result or in the fruit where we have applied those conditions. Perhaps it is well to cut the grass there a little earlier, but as a rule, you want to let it grow in the orchard through the spring and thus stimulate the fruit bud formation through the fall, and as the grass decays through the fall it makes a mulch all over the roots, and that is just what you want.

A tree, you know, is a continuous crop on the ground. It is not like a crop of corn. The tree stands there all the while demanding this plant food, and you must keep putting it there if you want good, strong healthy trees. So I say, accumulate humus when the trees are small.

Now a great many men who want to set out a young orchard say, let's cultivate that one year. You are robbing the trees of something that they need if you do that. Accumulate humus, and accumulate this decayed vegetable matter, and so get the soil into proper conditions for plant life. That is the secret of it. That is what we need more than anything else.

Now I have always found that to stimulate the orchard with nitrogen is a wrong thing to do. I have been observing what these men who have been sowing leguminous plants get from it. They begin by telling me that their fruit does not color enough. At the Western Association meeting some of the men got up there and said that if they could have waited until January they would have had some nice apples. Their fruit did not color well up to the time they had to pick it. What is the reason of that? What had those men been doing in their

orchards? They had been plowing under leguminous crops all the while to secure nitrogen. The nitrogen stimulated the wood growth. That is what happened in the orchard. The orchard was so stimulated with nitrogen that they could not get good colored fruit from those trees. That is a condition of things we do not want.

Now I never have any trouble to get the finest kind of color and to get it every year. If we can get that color by that system, why not have it? Our friend Hale would get that color if the color could be gotten in any way, but as good a grower as he is, I don't believe that he can show as fine color as I have seen obtained under this system. And some of us are not so strenuous as he is. Some of us like to take it a little slower, and so I have been trying to adopt a plan whereby I can get the result without so much labor and expense. And so this plan that I am describing applies, particularly, to those engaged in farming who want to make some money out of their farm work. There are other ways of doing these things, but they are too expensive for us fellows who want to make some money out of our farms. I am not talking to men who do all these fancy things. We want to make some money. That is what we are in the business for. There is no use in having to do three or four things and go through a lot of hard work to get a result when one will do it. We want to save labor and expense if we can.

Now these bacteria in our soil; how do they work? What do they need to work on? Those are questions we want to find out. Let me give you an illustration. If you will take a few boards and put them into a pile and let them lay through the summer, and in the fall you take up the boards direct from the ground, you will find that it is all wet and damp underneath. Now if you plant that spot you will find that you can see where those boards lay all summer just as far as you can see. Now there was something under there that did that. What was it? All you did was to favor bacterial action just at the time, perhaps, when it is needed. Now what do you do when you mulch your trees or put that grass around during July or August? In doing that you favor bacterial action just at the time when the fruit buds are forming, just when they need what is in the soil to make them strong and vigorous.

Now if that system does that, why is it not a good practice? In the spring you are growing the grass there in your orchard when you want to take out some of the excessive moisture, and when your trees do not need this so much. It may restrict the growth to some extent. So much the better. We do not want too much wood growth. But by doing that, by restricting that growth, by shading the ground, you save your moisture when you want it, and it is a cheap method, and it is a method which produces good results. If that is so, then why is it not a good practice?

Now let me commence at the beginning of the orchard and explain in detail down through, as there may be some good points that I may not have thought of.

Now in choosing a location for the orchard, it is well to get a location where the ground is a little higher than the surrounding country if you can, and it is better if you can get a northern exposure. There are several reasons for this. You get the cold air and the orchard will drain off in the morning quicker. The foliage will dry off quicker and earlier in the morning and this will have a tendency to lessen the danger from fungous troubles. And not only will that be the case, but it will not affect your fruit buds, so it is better on the ground. Another thing: when the sun comes up in the morning the rays will strike over into the foliage the first thing if it is on high ground, and the sooner the orchard dries off in the morning, the better. Then, in the middle of the day, the sun rays do not strike so direct and that is a point in your favor, especially in the winter time, because, if it happens to be a warm day, sometimes the buds will swell and upon the high ground the air is cooler and there is more apt to be stirring, and the reflection of the sun is not so great and consequently there is not so much danger. So you see that it is a reason, notwithstanding the fact that you can grow good fruit the other way.

Now an orchard that is protected by woods is a pretty good thing. The heat, the hot air of summer, sometimes injures the trees when the hot air strikes your trees; for where the warm drying hot air of summer strikes your trees it sometimes injures the trees and the fruit, and if you have got your orchard in a location where you have got some woods against it, it tempers it, cools it somewhat, and I think it is a benefit.

Now our grandfathers did not have any trouble about growing good crops of fruit. Why did they not have trouble? They grew it, and they got it, and they did not have so much trouble from many sources as we do. New ground, you say? Well, I think we should do the same thing if we can. I think we should select a field for new orchards, as I said before, with as much humus in it as possible or decaying vegetable matter. New land is best. We want to select land that has got humus in the soil and it is more often that we find that on new land. When you find it on old land, if the land has been cropped, it has been put in in some way. On land that has not been used and where the vegetable matter has had a chance to decay and accumulate, that will make the best for orchard purposes. You sometimes have taken up an old crooked rail fence. Maybe it has been down fifty years, and when you plowed it up and put in the crop, you found it was some of the best land you had. It is the same principle, the action of bacteria working there. The land has rested, it has been kept in a condition where the bacteria had a chance to work, and it has been kept going. New land is best, but if you cannot get that it is a good plan to put on a seeding of clover, timothy and redtop, equal parts, so as to get it in the next best condition.

Now in selecting varieties, it all depends upon your market. If you have got a good local market you want some fall and winter varieties, and particularly you want some good early fall apples. I will mention a few that I have found best. The first that I should take is the red Astrachan, and the Gravenstein. That was mentioned as doing well in Nova Scotia. We can do just as well with it as they do. It is one of the best apples we can grow. And then the McIntosh. If you can grow some good McIntosh apples you are all right as to market. The Northern Spy also, and your Baldwin, and the Sutton, and the Rhode Island Greening, those are about the best four for winter apples that I know of. I have not seen anything that beats them much. So much for the varieties.

I should advise placing the rows all of 38 feet apart and putting the trees from 28 to 36 feet in the rows. I think it is a good plan to vary the distances in the row so as to break the force of the wind. Then I would try and select the best places in the rows for the trees; to take the best places or the best

ground. I vary the distance anywhere from 26 to 30 feet and often more, so as not only to get a better place for the trees but to break the wind. There are two points well worthy of being taken into consideration. In digging the hole to put your tree in when you are setting them out, there is a point there that I would like to emphasize. Most everybody thinks they understand how to set a tree. My plan is to dig the hole and place some mellow soil in the bottom of the hole and then pack the soil over the roots very firmly. It will start the trees better than it will in any other way. The reason for packing the dirt firm around the roots, and for having mellow soil under the roots of the tree is because the roots of the tree will start in the direction of the least resistance and that will be down.

If you will put mellow soil down under your tree and pack it firmly on top, you will get a much better start for the tree. As I say, the roots will follow in the direction of the least resistance and if the soil is packed hard on top of course they will go down. I should prefer even to get a tree out of line a little in order to get it into a good place and so get it into good shape and get a good start.

Immediately after planting the tree you want to put some mulch around it. Do not do too much cultivating around the tree. That is one thing that I have mentioned. Every time you cultivate you tend to exhaust your humus. That means something. That is what you want to put into the soil instead of taking it out of it. Some of these men that advocate cultivating forty or fifty times if necessary—they are using up the goose that lays the golden egg, because they are using up the humus by cultivation. I find that the longer you cultivate the less effectually you can hold the moisture or prevent capillary action. You have all heard of that. That works very nicely for a while, but after you have followed that up this humus becomes burned out and then you can cultivate all you have a mind to and you cannot keep that in the soil where you want it. The soil moisture will get away in spite of you. Through this plan of mine I claim that you are accumulating humus all the while.

Now a word in regard to spraying. Some do not think it pays. Some say it is not necessary to spray but once. But I believe in spraying at least three times. Spray every year

whether there is any fruit in sight or not. You never can get healthy fruit buds without perfect foliage, and your fruit buds are already formed now for next year's crop. The first spraying should be done just as the leaf buds are breaking. Then is the time to use the Bordeaux mixture. The next time is just before the blossoms come out. If you have got any insect pests in your orchard I claim that that is the best way to keep them in check. By putting on the spray in this way you do it just at the time when it is most effective to destroy these different pests that you have got to reach at certain times if you are going to do any good. They are more readily killed then. Then, you want to spray again after the blossoms fall.

My plan is to repeat that last spraying if it rains before the petals close up. It may be that sometimes it will be necessary to spray more than three times in order to keep some insects in check. Some of them are very much more readily killed when the worms are small. You take the canker worm that is first cousin to the tent caterpillar, and he is a bad fellow to handle. We had some experience with that fellow and we had to spray a number of times before we killed them out. We found by taking a pound of paris green and putting it into the mixture and then spraying after a rain—we sprayed one year seven times in the month of June—we were able to control this pest. Of course, if you are going to use a strong dose you will have to use an excess of lime. I put in about three times the amount of lime that is needed before the foliage comes on. We tried it with a smaller quantity of paris green but it did not work, and we finally put on a pound and by using plenty of lime it did not hurt the trees. We had to do something or be eaten up.

And then the last time, in spraying for the codlin moth, spray after the blossoms fall. That is thoroughly understood and it is explained by the Experiment Station just how to do that. The main thing is to know how to mix your Bordeaux mixture. It is very necessary to do it just right. If you do not you are apt to have trouble.

It may be necessary sometimes to drain your orchard. The work of drainage is an important matter. An excess of water is just as harmful as a deficiency. You want to look out for that when you start your orchard. You do not want to put an

orchard on land that is too wet. Of course after you get your orchard going and in good shape, it will drain off some every year; but that is an important matter, to get land where you can keep the proper amount of moisture in the soil to the best advantage.

Now I have preferred to describe the methods that I follow. I have brought some apples here which will show you how the size and color run, and give you a general idea of the results that I can get by this system. I claim that by this system you can produce as finely colored apples as there are grown. These apples that I have here were kept in cold storage. They were put in cold storage as soon as they were picked, and kept there until the 20th of December and then taken out and kept in an ordinary cellar until now. And that is a point I want to bring up. If we can put our apples into cold storage it will be a good point for us. You can keep the apples better, and save more of the crop so that it will be cheaper, and it enables us to keep the apples in better condition until we can find the right kind of a market. I have brought some of the Wealthy, Spitzenberg, and the Northern Spy, and I shall be glad to have some of you people test them.

THE PRESIDENT: I presume that there are a good many who will be glad to ask Mr. Hitchings some questions now.

MR. HITCHINGS: I should be glad to answer any questions, if I can.

MR. KELSEY: I would like to ask the speaker if he would advise any man to allow water to run in the holes when he is setting trees? In other words, is it a good plan to set the trees in where you have got water in the bottom of the hole?

MR. HITCHINGS: I have set trees in that condition, where we had to take the tree and put it right into the muddy water and soil at the bottom of the hole and it did just as well.

MR. KELSEY: Well, do you advise taking that kind of soil for an apple orchard, or would you advise that it should be drained off?

MR. HITCHINGS: Certainly. I should say to let it drain out if you can. As I said in my talk, an excess of water is about as harmful as a deficiency.

THE PRESIDENT: What was the temperature of the cold storage where these apples were kept? (The President referred to samples exhibited by Mr. Hitchings.)

MR. HITCHINGS: I think about 36.

MR. IVES: How much annual wood growth could you expect to get from the first beginning of the young trees under your system?

MR. HITCHINGS: If you will take notice from the pictures that have been shown—those trees were from five to six years old, and the annual growth would vary from 6 inches to 8 inches. But in some of them it would be a good deal more than that. You will get all the growth that is necessary. I try to restrict it. You see if you have got an accumulation of that vegetable matter there, it forces them along until the grass gets started in the spring. You want time for the blossoms to develop.

MR. FENN: How many apples did you get on those trees the fifth year from the setting?

MR. HITCHINGS: There were some trees that had a bushel and a half on. They ran from a bushel up to a bushel and a half.

MR. IVES: On the fifth year, as I understand you, they were mostly Jonathan, Wealthy, Spitzenberg and apples of that kind?

MR. HITCHINGS: I will tell you what I got from six-year-old Northern Spy. That is an apple which usually does not bear very strong. Six years from planting I had 150 I guess, and a good many of them had half a bushel of Northern Spys. Some of them are here. I stimulate the fruit-bud development and restrict the wood growth. By stimulating the fruit-bud development on trees nine years old, and on those eleven years old we have had at least fifteen bushels per tree. Sometimes when a tree is eleven years old—on certain trees we have picked as high as twenty bushels.

MR. FENN: And with no other fertilization other than what they got by your simply mowing the grass and putting it around the trees?

MR. HITCHINGS: That is all. Never was a pound of fertilizer put on the orchard. It has been spoken of by somebody that they did not think the trees would live. Right in this orchard there are trees that have been standing there a hundred years. There are quite a number that were set a hundred and four years ago. An old lady, a neighbor of mine, told me she could remember seventy-five years and she says that never

in that time did she know of a failure in that orchard. Right around amongst those trees I have set young ones.

MR. MERWIN: What kind of grass do you use in your orchard when you make your planting of trees?

MR. HITCHINGS: In planting an orchard if you can get new land, that of course is best, and I would say to use red clover, timothy and redtop. That is when you first set the orchard. You will get quite a crop from helping the bacterial action in the soil. And if you have not got the grass to put around, the redtop will help because it makes a very fine aftermath.

MR. COOK: I would like to inquire about your orchard—whether the hills are high there? I read in a paper some time ago about raising apples in the hilly country. I think it stated that that was the best place; that there they grew best. The description was of a side hill. I should think there would be a good deal of wash come down from the hills, and from that description that there would be a good deal of water get into the land.

MR. HITCHINGS: Of course there would be some water if you have got it on a side hill with higher land above the orchard. Perhaps there would be an excess of water run down at certain times. I think if you can, when you are selecting a location for an orchard, it is a good thing to get it on pretty high ground. I explained about that in my talk.

MR. COOK: I rather thought that those apples showed an excess of potash. I should think so.

MR. HITCHINGS: You do not want too much nitrogen. If you have too much nitrogen in the land you will get pale color. As to the potash, I don't know.

A MEMBER: How deep is that mulch which you put on?

MR. HITCHINGS: When you first start you want more mulch, especially until you get your grass growing. After that the less you need it you can spread it out thinner. After your trees have got well started, you will find that they need a very light amount and it is better to spread it out well, especially before the harvest time. You will save more of the fruit that way.

MR. COOK: Did I understand you to say that you sprayed when they were in blossom?

MR. HITCHINGS: No, sir. I think I said to spray immediately after the blossoms fall. I meant to say that.

Now on the question of mulching. When you first commence put it about the tree, and then spread it out as they continue to grow larger. As the trees in the orchard get larger you will find a little go a great ways. And right here is another point. By this method we can leave your apples on the tree and you needn't be afraid of the rain knocking them off when they commence to ripen. So you can leave the apples on the tree until they have got ripe.

If a storm knocks any of them off it don't hurt them any. I have picked them right up off this mulch in that way and taken them to Syracuse and got a dollar and a half for a bushel. You see they do not get into the dirt when they drop off. They drop into a clean place, and it's soft, and it does not hurt them any. If they dropped into the dirt some of them would be an entire loss. That is a great advantage because you can leave your apples on until they get into a condition just as the trade wants them, and then when you can go into market that way you are a pretty good fellow. It strikes me anything you can do to get that condition you had better do it. You can get just what is wanted, and when the people get a taste of them they are sure to want more.. That has been my experience. It is quality you are after. As the trees grow I keep carrying the mulch out a little ways so it is all around. When the fruit commences to come then you see there is a lot of fine grass formed in the whole orchard and the apples will drop anywhere and it don't do them any damage. If the apples fall they are not broken. Of those that drop at least nine-tenths of them would be marketable.

THE PRESIDENT: Do you get size enough on your apples?

MR. HITCHINGS: Yes, sir, plenty of it.

THE PRESIDENT: Do you get a good yield? What is the yield if you can tell?

MR. HITCHINGS: Well, of course it varies, but about 300 bushels to the acre. Most of these trees have been set some time. I commenced with 180 trees and have been setting since. Those that are in full bearing yield about 300 bushels to the acre.

MR. TUCK: About what price do you get on the average?

MR. HITCHINGS: About $1.50 on the average. It depends upon the market of course. If you have got the right kind of

quality you can set your own price. There are not many apples grown right around Syracuse and so there is no trouble in getting a good market. That is why I spoke of the McIntosh. They begged me to bring them in by the dozen if I did not have them by the bushel.

A MEMBER: Would those keep as readily for cold storage? I mean those that you have been describing that you picked up and took to market?

MR. HITCHINGS: No, sir. There is a certain stage at which the apples should be picked for cold storage. If you let them go beyond that stage they do not keep so well. If you pick them at the right point you will have apples that will keep perfectly. There is a point in the way you take care of them when you are picking. If you place them out in the sun they are not apt to keep so well in cold storage. If you pick them right, then you can keep them well. Of course that is something everybody has got to learn by experience.

MR. MORGAN: I should like to inquire of the gentleman if this land of his that is under sod culture is mellow land?

MR. HITCHINGS: Some parts of it would be as hard as rock and you know what that means. Sometimes when there has been no rain it will get quite hard, but where the mulch is put round it conserves the moisture and there is no chance for it to dry up.

MR. J. H. HALE: I think we have all been highly entertained by the address of our friend Hitchings and by what he has said about his apple orchard and the results that he has got from them. However much we may differ with him in ideas, or as to what has been the cause that has brought about the desirable results that he has evidently got, I think we can feel sure of one thing and that is that his enthusiasm in the cause and his faith in his methods of work have had something to do with the results. I should have to differ with him very sharply on the general principles that he has laid down. He has made about as good an argument perhaps as can be made for sod culture, but a large share of that success he has had—and he certainly has had marked success—has its basis in the man himself. He believes in himself; he believes in his methods, and a man with his enthusiasm will be successful anywhere.

Most any man who will give the care and attention to his orchard, and spray as often as he has done, is bound to get fine-looking apples. That is one great secret of it. A man with his faith in the apple tree would be a success on almost any line. But on top of all that he let the cat right out of the bag when he said that right alongside of these trees, and he says he has got trees a hundred years old that have borne fruit; and that is where he let the whole thing out.

It shows that there is some particular virtue in Hitchings' land. There is no doubt but what he has got an exceptionally good piece of land, and it would grow apples if the sod was up to the top of the trees. That is plain enough. It is plain enough that God Almighty made that particular piece of land to raise apples on and Hitchings simply landed on that particular spot and has taken advantage of it.

He says it is all due to sod culture. That sod culture theory of his is all nonsense from start to finish. Your fathers and grandfathers tried it here in Connecticut, and for 200 years, and made a miserable failure of it. Most of them mowed their grass and left it there. But some of them carried it to their barns and fed it.

Dr. Fisher up in Pittsfield, Mass., tried that sod plan and he kept at it until he was almost old enough to die. Then he finally learned better and he put his orchards into rational culture and then he got better apples and more of them.

I can cite a host of instances. Mr. Morrill, the Michigan peach grower, eleven years ago was working as a laborer for other people when he started his little orchard, and to-day he is worth more than one hundred thousand dollars. He has made it because he has everlastingly been turning the soil.

MR. HITCHINGS: Let's see about that. Friend Hale came up to our meeting in Syracuse and he told us about growing fruit and cultivating, and before he got through he said the finest apples that he saw anywhere in the country were grown up in Maine where they never cultivated; where the soil was all held down so that they couldn't cultivate it. It was mulched with rocks and sod. (Laughter.)

MR. LOOMIS: If my friend Hale will come over and see us I will show him two orchards in which I know that the grass has been mowed, and the trees mulched in very much the same

manner as Mr. Hitchings has described, for forty years, and one of these orchards is the best orchard I know of in Tolland County.

PROF. POWELL: I just want to point out the danger of drawing a general conclusion from a single example like the one which has been cited here by Mr. Hitchings. I can take you down almost anywhere in this country and show you plenty of orchards in cultivation which have been changed from sod culture, and where the growers are getting from 50 to 75 per cent. more fruit than they ever got from the other practice. On the other hand, I can take you up in Maine and show you orchards in sod that are bearing the finest types of fruit.

Down in the mountains of West Virginia, where they cannot cultivate, I have seen some of the finest colored fruit ever grown, and yet, you go down in our part of the country, through Virginia, Maryland and Delaware, and I venture the assertion that you will travel many a day before you will find a single orchard in sod that is giving anything like fair returns. I want to say that there is a great danger in this. I gave you my ideas. I believe in sod culture under some conditions, but I want to point out to you the great danger of taking a single example, whether it be from a man like Mr. Hitchings or from any other man, and trying to draw a general conclusion from their success. You must work this thing out for yourselves. Nobody can work it out for you. There is not an experiment station in the country that can work out your salvation. You must do as Mr. Hitchings has done,—work it out for yourselves. There is not a successful grower in the country but what will tell you that after all success in a large measure depends upon the man. I will venture the assertion that a dozen men might go and locate right next to Mr. Hitchings and attempt to grow an orchard as he has done and make it a failure because they are not Hitchings. A man might locate right by the side of Mr. Morrill and even cultivate more times than he does, and still not have his success because he was not Morrill. Nobody can work out a man's own system so well as the man himself. And there is where the value of a discussion of this kind comes in. It is to point out some of the general principles of orcharding, but you must be very careful how you attempt to make these principles applicable to your conditions. Of course there are

certain principles that are generally applicable, but what I want to point out is the fact that because Mr. Hitchings has been very successful through a system of sod culture, it does not follow that the same success would follow the general application of his methods. Mr. Hitchings seems to have struck it just right, but what I want to do is to throw out a warning against the idea that because Hitchings can do it anybody can do it.

You must work things out for yourselves. If your conditions are such that you need tillage you will not be successful without it. You must adapt your system of culture to the conditions which surround you.

Right over on my father's farm, not very many miles from here, there is an example. My father was one of the successful growers and he used to grow under sod, but he used to draw out load after load of manure to get a good crop.

On other orchards, even when well manured and with the best sod culture, it would be hard work to get a biennial crop, so that I say it would be very unwise to draw a general principle or a general conclusion from a single or even a number of successful examples, that sod culture was the thing. You must apply these principles to your own conditions and in a measure use your own judgment. Don't bank on sod culture and don't bank on tillage. Use your judgment as to what is best under the conditions which surround you. Work it out for yourselves. It does not lie in what somebody else will tell you. It lies in yourselves to apply certain fundamental principles to supply what is necessary for bacterial life and for plant life, and after that it is the man behind the gun that does the work.

MR. EDWIN HOYT: I do not believe it depends altogether upon the man behind the gun. Of course the man is an element, but what is necessary to produce good apples like some of these we have been shown here to-day? You must have moisture, and you must have plant food. You must have both. If Mr. Hitchings is getting plant food by his system he will get apples and fine apples, provided that he destroys the enemies that hinder their perfection. I do not care how able a man is, if he does not give his trees plant food he will not get fine apples.

You may give a pig all of some kinds of food it can eat, but if you do not give it some corn it will not get fat. If you do not give fruit trees the kind of plant food which they require you will not get fine fruits.

This gentleman is evidently getting the plant food that his trees want, but he says he is not feeding his orchard. Can we raise apples in Connecticut on our worn-out soil without plant food? Can we set out an orchard and let the grass grow in it on most of our lands, and without plant food of some kind will our land grow clover without petering out the soil? Very few soils can do it until we apply fertilizers.

He says that he puts back all the grass in the way of grass. What he takes out of the soil is apples. He may put on his vegetable matter and mow his grass and keep it there, but in time unless he has got an inexhaustible supply of plant food he adds nothing to his soil. He adds nothing, but he is taking out apples all the time. If he adds anything he adds nitrogen, which he is opposed to. In the decomposition of that vegetable matter he gets nitrogen and he gets potash and he gets phosphoric acid. But where does that come from? It comes out of the very soil that the grass does.

Now so long as the plant food in that soil keeps up he will have apples, and he will have them by mowing his grass and putting it back again. It is an easy way. It's a cheap way. But on our Connecticut soils, on the most of our soils let us not forget to put on the materials that the apples want. If we do that we shall be safe. Under his method I think we shall be unsafe. Another element in his success is being able to get rid of the enemies of the apple. He says that he sprays three times any way and that sometimes he sprays five or six times a year. We can get apples in Connecticut as good as he has in New York State if we are as careful as that. All we want is the food, and the soil, and the trees. Put the food into the soil and nature will place it in the apples.

MR. HITCHINGS: I think there is potash and phosphoric acid enough in a great many soils if it is handled right. I do not have any trouble in getting the very best color and my method is cheaper than by buying artificial stimulants to obtain it.

PROF. POWELL: I hope you will excuse me, Mr. President, for talking so much, but I just want to say one thing. I have

just handled 75 bushels of Mr. Hitchings' fruit and he certainly deserves a great deal of credit for what he has done. I have selected specimens from a great deal of fruit that he had in storage this year. On our government experiment we had some 75 bushels, and I noticed in looking over these specimens that they were not exaggerated specimens at all,—they were about his average. I am glad to say that. After handling over 75 bushels of them I felt that I got fairly acquainted with them. And I want to tell you another thing.

Here is one of the secrets of his success. When I went up there on one occasion he was away from home. I went out in the orchard on his place wth some members of his family. Two little fellows took me all around and they pointed out the different varieties. One of them was six and the other eight. It was astonishing the knowledge those little fellows displayed. As they went through the orchard with me they would say, "Here is McIntosh," "here is Jonathan," "here is Ben Davis," and so on. They pointed them right out to me. And they made comments too. "Here is one of the finest apples on the place." "And here is another."

Let me tell you, friends, that there were two boys, one six years of age and the other eight, telling me all this, and it did not take me long to come to the conclusion that there was a Pomological bent in that whole family.

I agree with what Mr. Hale says. A good deal of the success of Mr. Hitchings is due to the fact that he is just chock full of pŏmology. He is just chock full of good apples. He can't raise anything else.

THE PRESIDENT: Do we want to follow up this apple question any further?

MR. T. S. GOLD: Here in Connecticut, and I suppose it has never been denied, we have the largest apple tree grown in the United States. Where was that grown? In a plowed field or in a cultivated field? So far as I can learn, it was grown in soil which had never been disturbed from the time the tree started to grow, and it grew to be a great, magnificent specimen when it had reached its full maturity. It was over here in the town of Cheshire, and it lived to be over one hundred years old. It grew where the plow had never touched the soil and where nothing had ever disturbed the soil about its roots.

There is an argument which may be in favor of sod culture that these gentlemen have not advanced. I believe that there is a certain amount of truth on that side of the question.

THE PRESIDENT: If there is anything more that you care to ask Mr. Hitchings about his methods, I will ask him to stand right up here in front and tell you all he can; if not, we will go on with the regular program. I think we are now ready to hear from Mr. A. G. Sharp of Richmond, Mass., on special question No. 1, "What are the essential points in profitable small fruit culture?" Mr. Sharp is as able to tell you about small fruits as Mr. Hitchings is to talk about apples. As it is, I think we had better go on and I will introduce to you Mr. Sharp.

MR. A. G. SHARP: *Mr. President and Fellow Members of the Connecticut Pomological Society:* Your question asking for "The essential points in profitable small fruit culture" I will try to answer under five heads.

First—A good stock of plants of a few choice varieties. It is almost as impossible to obtain good results from weak or diseased plants as it is from poor seed to get a good harvest. Having a few good varieties, your goods soon become known, and you have less occasion to mix varieties in the same shipment. Keep testing in a small way (by the dozen or hundred) the new varieties. Fruit must be bright and smooth and of good average size of its kind. The quality must be good, if not the highest, and you must learn what does best on your soil under field culture by the side of older and well 'tried varieties. My specialty is the Cuthbert raspberry. I have grown many new kinds by the side of that variety for the past twenty-two years, but I have found none as good for me and my trade. Some other kinds may be better for another locality, as the Cuthbert will not do well everywhere.

Second—Well prepared soil and thorough and continued cultivation. It should not be too deep. This is of as much importance as an abundance of fertilizer without it. Though we want a sufficiency of well-balanced fertilizer, it is better to cut it short than the cultivation. Give your plants plenty of room. We are apt to crowd them by this intense system of culture, which does not pay in all respects, and we have got to see to it that the plants have the proper amount of room.

The top of the ground should be kept fine and loose. The last season I increased my yield of potatoes one hundred bushels per acre above former yields though I used no more fertilizer. The crop was 25 per cent. better for the extra cultivation.

Spraying is now a necessity. The best fruit cannot be grown without it. No matter what the variety of small fruits, perfect foliage always precedes the best. Spraying must be thorough and at the proper time in order to obtain the best results. The trimming and thinning must also be done with care. No one set of rules will fit all cases. Trim and thin according to growth of plants, strength of soil and distances between hills or rows. I set raspberries and blackberries five and six feet.

Third—Knowledge of the best markets. It is essential to know what is wanted by the people who are best able to pay for high-priced goods. The point is how best will suit their case, or to catch the eye in the market. Usually the best dealers have not the time to praise your goods. You must make them as attractive as possible, and put them up in convenient-size packages. Much of the finest fruit in the garden is sometimes spoiled in appearance before it reaches the sight of the consumer by careless handling, or packing in inconvenient shape for forwarding. Observation is one of the best features. We must visit the markets occasionally and see what others are doing, and have a talk with the dealers. They usually know best what will please the public especially in their locality.

Fourth—Square dealing: it takes many years to establish a reputation and it is just as essential to keep it as it is to build it. This cannot be done without personal attention to details of the business. You can lose in a few days by a little carelessness that which it has cost years to establish, and when it is once lost you cannot regain it. Be sure that the surface is a fair representation of the entire package, or lot of goods, whether they are graded in size or not. The grower and dealer must have a perfect understanding and work together to obtain best results, having perfect confidence in each other. I have never needed much help from the commission men and could sell at the farm, or railroad station near it, direct to retailers more than three times the amount of fruit I can grow, and usually make the price myself f.o.b. at the farm.

Fifth—Perseverance or endurance in the effort to raise the

best that can be grown: I began 22 years ago with these intentions, and have endured 20 years longer than some of my friends and neighbors predicted at the start, and that in spite of the fact that I have been working on a rocky, heavy, clay soil on a farm situated from 150 to 200 miles from all the best markets.

If brother Hale had given up the year before he struck his first big crop of peaches, I fear the birth of this valuable Society would have been delayed many years, and there would have been several hundred thousand less peach and other fruit trees than there are now upon many of the hills, and in many of the valleys of Connecticut. In Massachusetts to-day it is very essential that we have a love for the business, are willing to work, and are not content to stop short of the top. The top is something which keeps getting higher as competition increases and the insects and plant diseases become more difficult to handle. Our business is now in such a situation that it requires constant watchfulness and study through the entire season.

Sixth—Profitable small fruit culture: the profits in this as in other lines of business often depend much on the supply and demand. Some 12 or more years ago Hale Brothers were putting up "Yankee Jam" from the last pickings of their red raspberries because of low prices and people getting tired of the fruit. I put up nearly a ton one year rather than sell the fruit at 10 or 12 cents per quart. I have here three photographs of a field of Cuthbert raspberries taken July 1st, 1901, or about three weeks before picking. The fruit from this field last season sold at 19¼ cents net f.o.b., and the year before that at 17½ cents net f.o.b. For the entire crop there were no commissions paid or other expenses to come out of the amount received. The first shipments brought 20 cents in Boston and the last two crates 24 cents wholesale. The field is six years old. You will notice the perfect foliage, and while the canes are tied close to the stakes, shading them completely from the sun's hot rays, the fruit is all on the surface of the hills, getting all the sunlight possible to make color and quality perfect, and enabling the vines to quickly dry off after a shower, and therefore ready to pick.

Fine red raspberries will be scarce and high for some years to come or until some of their many enemies can be overcome, for there are so many ways they can be used by those who like

them, put up as well as fresh. The great difficulty of getting plants free from root gall and the increasing depredations of the wasps and yellow jackets are discouraging to smaller growers. About all they are able to do is to grow enough for their families and the birds without selling a surplus. Of course a good many have turned a surplus into the market. One who had been selling from seventy-five to one hundred dollars worth yearly from his garden plot told me that if the bees kept at them he would never set out any more, and I have heard many others say the same thing. Then, too, others will not take the trouble to spray in order to protect the foliage from the diseases and insects that prey upon them. Of course there are different ways of looking at these things. Otherwise there would be no use for us to gather here to discuss them.

I consider it an honor to be called here, now for the third time, to address this society on small fruit culture.

THE PRESIDENT: Now is the time to draw out from Mr. Sharp all the information you can, to learn how to raise your berries, and all about it.

MR. SHARP: If there are any questions which you would like to ask me, I will answer them so far as I can.

MR. SMITH: How do you keep your vines healthy?

MR. SHARP: By spraying them.

MR. SMITH: When?

MR. SHARP: I spray in the spring before the buds start. Spray foliage just before the fruit buds open.

MR. SMITH: What do you spray with?

MR. SHARP: Bordeaux mixture, using a quarter of a pound of paris green to fifty gallons of water. Of course if you are spraying foliage it will not do to use too strong a mixture without putting in some lime. I usually put in about two pounds of lime.

A MEMBER: How do you protect yourself from the attacks of hornets and bees?

MR. SHARP: I try to sprinkle water on them. I have not got any way of protecting myself entirely from them. About the only protection that I know of is to have the piece large enough so that you can get some fruit for them and yourself too. The only way to do is to have raspberries enough for all. I think you will have to feed them as we do the birds

until they find something that they like better than they do raspberries.

A MEMBER: Are you troubled with the leaves blighting or drying up?

MR. SHARP: I have laid that to root-gall. I have found some of that, but I have attribtued it to root-gall.

A MEMBER: The canes die out the second year after that makes its appearance, don't they?

MR. SHARP: I have not been troubled any more the second year after than I have the third or fourth.

A MEMBER: What I mean is, that when they come up the next year after this trouble makes its appearance, there is usually a pretty poor prospect of the crop amounting to anything.

MR. SHARP: We do have that occasionally, but I have laid it to root-gall. It has not been bad with us, and probably my experience is a good deal more limited than many others.

A MEMBER: It is something which is entirely new with me. I have a great deal of it; and there are some other plantations that I know of that have been troubled that way. It is entirely new and it is very fatal as I understand. I did not know that it was due to root-galls.

MR. SHARP: Have you examined the roots?

SAME MEMBER: I don't think I have with reference to that.

MR. SHARP: I think you will find that it is due to a gall on the root.

A MEMBER: Has raspberry growing received the attention it deserves, and if not, why?

MR. SHARP: I endeavored to answer that in my paper partially. It is because of the depredation of these insects, and the necessity for spraying for the various diseases, root-galls and other things like that. It is certainly not because the fruit will not sell if it is in good condition. There is certainly as much demand now as there has been for years.

A MEMBER: How do you like the Loudon raspberry?

MR. SHARP: It does very well in some localities. I have seen some that were very good. They are not very much cultivated, however. I do not think they are equal to the Cuthbert.

A MEMBER: Do you think they have as good a flavor as some others?

MR. SHARP: Oh no, I do not. There is nothing that suits my taste so well as a Cuthbert.

MR. MOORE: Do you pinch back the young canes or let them grow?

MR. SHARP: Here is a photograph that will show you how they look now. Of course we hold them back so as to prevent too much growth.

MR. MOORE: I would like to ask also, if the gentleman is troubled with the disease called anthracnose?

MR. SHARP: Not on the red raspberries. I have seen it on the black.

MR. MOORE: What varieties do you raise mostly?

MR. SHARP: That's what I was speaking of a minute ago. The Cuthbert does the best with me.

MR. MOORE: And as I understand, you cut back the canes. How much do you cut them back in the spring?

MR. SHARP: I think it is a good plan to keep them down to about five feet if you can. The canes will run up sometimes eight or nine feet high in good ground. If you pinch the canes back too much it makes a very stocky bush and then there is a little pendage which comes out. It is our practice to hold them back as much as seems best. In Berkshire County we sometimes take off four or five inches, unless the field is on exceptionally high ground and is well protected.

I have been growing the Cuthbert now for a good many years.

A MEMBER: How do you grow them, that is as to distance between plants in a row, and how far apart are the rows?

MR. SHARP: I have grown them every way. Five feet each way and 4 by 6, and 4 by 5, but I have come to the conclusion that 5 by 6 is the best.

MR. INNIS: What is the best variety of red raspberries now?

MR. SHARP: I do not know. Of course a good many would differ about that. The best I have ever found is the Cuthbert. That has done the best with me. It bears well, and I think as a rule it is more hardy.

A MEMBER: Are you familiar with the "Munger" black raspberry now being advertised by some of the nurserymen?

MR. SHARP: I have known about it for a good while but have not tried to grow it for ten years. My soil is a heavy

clay soil and I get that anthracnose I think very readily on such varieties as that. I do not think it is as good as some of the other varieties and it usually brings about half price in the market.

On motion of Mr. Hale, duly seconded and passed, the Society voted to commence the morning session on Wednesday at 9.30.

Evening Session—7.30 P. M.

President Platt called the meeting to order at 7.30.

THE PRESIDENT: First we will take up some of the questions on our list. "Is the Jonathan apple preferable to the Baldwin or Sutton for Connecticut orchardists? if not, what is?"

Does anyone know enough about the Jonathan apple to answer that? One of my brothers has some trees 25 years old in Milford. He seems to think they drop early. It is a very high colored apple, however. They are the only trees I know of.

PROF. POWELL: I might say just a word on the Jonathan. In New York, in some parts of the State, for the last few years they have been including the Jonathan as one of their main apples in planting young orchards. It is an apple of very high quality and under proper conditions does very well. It is an apple that keeps in storage well and out of storage well. It keeps into February or March. It is not a very strong growing tree. It is rather of a drooping habit, yet you can make a very strong tree out of it. People like the Greening or the Sutton, but when you can get this fruit they are good strong bearers and it is fruit of the highest quality.

MR. KELSEY: I would like to say that some few trees that we have are doing very nicely. I believe it is a good apple, but I would not advise anybody to set out the young trees. I think top-grafted trees will give better results than the Jonathan. I think if it is top-grafted I have every faith that it will prove to be a very valuable apple in the State. I know that it has kept well and I believe that it will keep as well as some of the other varieties. That is a desirable quality, and it is a bright, shiny, well-appearing apple. I am very much pleased with it. I believe the Sutton is worth a good deal more if you can make it grow well. If it's going to be mean about that we have got to have something to take its place. I have some

doubt about that. The Jonathan is not so well established, but I believe with proper culture it will make a very valuable apple.

PROF. POWELL: That is our practice at home,—to top-graft. We have succeeded in getting a great deal more vigor into the trees by top-grafting, especially in the Northern Spy. When it is put upon Spy stock it makes one of the most vigorous and strongest growers of any apple in New York.

I was in an orchard the other day and was looking at some Sutton Beauties and I thought if I was to start an orchard I would start it down within a short distance of the ground. I think if I was to start again I would start down within 18 to 20 inches of the ground. That makes the trees very much handier to get at.

THE PRESIDENT: A part of this question says, if it is not as valuable as the Sutton, what is? There was a gentleman here to-day that I wanted to have speak about some of the new apples, as he comes from the West. He said that he did not like to say anything about them because "I have not had them long enough." That is one great trouble in trying to say anything about new apples. Just one crop does not permit us to really make up our minds what they are.

One of the southwestern apples that looks well and takes well,—I think it's on the table here, I am pretty sure it is,—is the Senator. There is another name for it, but I think you will find that name on it. It is a very bright-colored apple, of good size and finely marked. It is as fine as the Sutton. At least, I call it so. It is a promising apple.

MR. FENN: Has your brother fruited it?

THE PRESIDENT: I don't think so. The exhibit on the table came from Manchester.

PROF. POWELL: The Senator is not a very late keeping winter apple. It is an early winter apple. It is usually out of the way by the first of the year. It is not like the Ben Davis, and it will not keep like a good many of your eastern varieties.

A MEMBER: Will it keep equal to the Baldwin?

PROF. POWELL: Probably not. The Baldwin is usually a very good keeper. I have seen this apple in cold storage, and it is good now. It is firm and hard and it is still keeping well in cold storage. They have been in since last September, but these I am speaking about were grown on very high altitude

in West Virginia. It is a very fair quality of apple and a very good apple.

THE PRESIDENT: Another question—"Is there any profit in Connecticut in trying to grow for market, peaches earlier than the Mountain Rose?"

MR. SMITH: I have not had much experience. We orchardists, if we can raise a few trees that would be earlier, it might be very nice to have them for market, but, as I say, I have not had much experience. I think, Mr. President, Mr. Barnes knows a good deal more about that than I do.

MR. BARNES: Mr. Chairman, I never had much faith in the early ripening varieties, so I never planted them. We have the Triumph, but we have tested these kinds only in a very small way. Just a trial, and from what experience I have had I have not changed my opinion any. I have no faith in the early ripening varieties whatever.

MR. SMITH: I judge our season is very unfavorable for early fruit, the fact that some years there is so much rain which damages the crop. That is the trouble with these varieties. It may be due to climatic influences, but their weak point is a tendency to rot.

THE PRESIDENT: Last spring I cut out one hundred Early Rivers trees that were healthy and in good condition to bear. One of our members in Branford has been trying the Early Rivers, and is preparing to cut out the trees. They will bear and are large enough. We tried to carry them to market, and although they had rather rot than to keep, when we got them to market we found that they were rather sour, and rather green-looking, and the market men were scolding about them all the time, so we got tired of it. I have seen some very early ones that were very good flavor, however.

THE PRESIDENT: I think we will have to drop this question at the present time and take up the order of the evening. Our first lecture on the programme is to be an illustrated one on "Ornamental planting about the rural home," by Prof. F. W. Card of the Rhode Island Agricultural College at Kingston.

Ornamental Planting About the Farm Home.

By Prof. F. W. Card, Kingston, R. I.

The first object in ornamental planting should be to produce a picture. The growing of a plant for its flowers is not landscape gardening. Neither is the growing of plants to form a pattern bed, in itself, landscape gardening. These things may play a part in the picture to be produced, but in themselves are not the picture. To produce such a picture requires artistic instinct equal to that demanded in the expression of any other kind of art. Indeed, it presents difficulties which other arts do not present. Compare the painting of a landscape upon canvas and the painting of one upon greensward. The landscape painter chooses first his point of view and compels the one who would look upon the picture to accept that point of view. The landscape gardener must make a picture presentable from many points. The landscape painter may heighten the effect of his production by the introduction of a stately tree, a winding river or a mountain summit. The landscape gardener is debarred from such possibilities. The artist upon canvas completes and paints his picture as it is to remain. The gardener must conceive a picture which will be always changing, never complete, yet always artistic and beautiful. He must expect his effort to be often thwarted by accident and disease, yet when rightly conceived and carefully carried out, his living picture may appeal to the highest artistic instinct. It is a picture which presents and interprets nature; a picture of life and activity, painted by the hand of the divine Master of the universe.

Landscape gardening, like all other arts, had crude and simple beginnings. In the olden days, when man's house was his castle, and that castle was surrounded by a strong wall to keep out his enemies, gardening at its best could but be cramped and artificial. The natural result would be that the planting should partake of the artificial and geometric character of its surroundings. Straight lines and sharp angles prevailed. A bed on one side would be balanced with a bed on the opposite side. Greensward, the canvas upon which the modern gardener paints his picture, played little part or was entirely wanting. As time passed on the surrounding wall was no longer needed, but the

dooryard fence and the mathematical style of gardening long remained. A reaction set in against this style of planting, and the pendulum swung to the opposite extreme. Apostles of natural gardening arose who would place the house in a pasture and plant dead trees to simulate nature. Out of the controversy has come our modern style of gardening. This aims to interpret and emphasize the beauties of nature, but to eliminate her faults.

The two types of gardening still persist, the geometric or artificial, with its wealth of pattern beds, exotic plants and

FIG. 1.—Gracefully massed shrubbery—Nature's own planting.

ornaments, and the natural, with its more easy and graceful lines and lack of pronounced features. Two expressions suggest themselves as possible in the natural treatment of a place. These are known as the picturesque and the beautiful. The picturesque is in keeping only upon rough or rocky surfaces, or where the trees give evidence of battling with the elements. The beautiful is in keeping with smooth and grassy slopes, spreading trees, wealth of foliage and flowers. It is the expression to which most farm homes more easily lend themselves.

That landscape gardening is a fine art, offering scope for the highest artistic faculties, should not deter the one who is not

an artist from making any attempt at planting a home picture. A few simple principles will render the development of such a picture comparatively easy. The first of these is the need of preserving ample stretches of open lawn. The lawn is the canvas upon which the picture is to be painted. It should not be frittered away in meaningless planting. Out of this principle grows the second, that planting should be in masses rather than scattered. To avoid stiffness and formality, the third principle arises, which is, that planting should be irregular and avoid straight lines. The group is the unit of artistic planting. It emphasizes the good qualities possessed by single specimens, and adds features which no single specimen can give. It should be in the highest sense irregular, both in ground outline and sky outline. It should be dense enough to afford abundant play of light and shadow, but open enough to provide for proper growth of the individuals composing it. To plant such a group seems easy, but the common mistake of the novice is to make it too dense and regular, to produce a formal clump rather than an easy and graceful group. The use of the group does not prevent the development of individual specimens and the highest enjoyment of those specimens. They may best be placed at prominent points or projections in the outline of the groups. Care should be taken to choose plants which harmonize in their foliage and character of growth in arranging the group.

A prominent feature of modern gardening consists of bringing in the beauty which lies beyond our own borders. Our enjoyment of beauty on another's ground does not prevent his enjoyment of that same beauty to the fullest extent. Groups should, therefore, be arranged so that attractive features outside should be open to view. Oftentimes a scene not especially attractive in itself becomes so if partially shut off from view. This the group can do. It can also be used to hide or mitigate unattractive objects, a service often of the greatest importance.

Walks and drives are often a necessity; they are never an ornament. They are for use. They should, therefore, go where they affect to go in a direct and business-like way. This does not mean that they must go in an absolutely straight line. Few men will walk across a field in a straight line, perhaps none, unless aiming to do so. A walk may curve to present

an attractive line of beauty, yet be direct. If planting can shut off from view what is ahead, so much the better. In small grounds drives are always objectionable, and should be omitted if possible.

Water enters but rarely into the composition of the home grounds. When it does, it may be easily spoiled. Nature handles it wisely; man may well take pattern. She never borders it with a stiff and rigid band. She lets it wander carelessly down in its own way, and fringes it with plants as carelessly placed.

FIG. 2.—A walk may present an attractive line of beauty.

The application of these principles, and a little effort, to the rural school grounds of our country, would work a vast change in their appearance. I recall passing a schoolhouse in the midst of a beautiful farming region, within five miles of one of the great nursery centers of the United States, some years ago. That house stood close to the highway, flanked by its hideous out-buildings, and with not a tree or shrub anywhere about the grounds. Bold, bare and cheerless, it stood there, an eyesore to the whole region, yet at that nursery center doubtless

FIG. 3.—Nature and the Artist, hand in hand.

every year hundreds of ornamental trees and shrubs go on to the brush pile. What a change a little effort on the part of those interested might make.

Applied to the home, these principles carried out would add greatly to the attractiveness and air of prosperity of the place. It would also add much to the enjoyment of its occupants. It would provide a stretch of green lawn reaching away from the house, with glimpses of most desirable views in the distance from most frequented windows. It would afford, by the massing of groups about the boundaries, a proper setting for the house. It would, at the same time, afford ample opportunity for love of individual trees, shrubs and flowers. In a word, it would often transform a harsh, forbidding scene into a beautiful and inviting picture.

THE PRESIDENT: We have another lecture, an illustrated one, but whether it will be as pleasing as this one we have just had I cannot say, but we ought to get considerable instruction out of it to carry home. This is to come from Prof. Britton of the Experiment Station of New Haven, on "Injurious Insects."

"Injurious Insects."

By Prof. W. E. Britton, State Entomologist.

Mr. President, Ladies and Gentlemen: This question of injurious insects is a very important one, and one that is growing yearly more important. This afternoon our president told you of a large apple tree which never had been cultivated. He might also have said that the tree was never sprayed. It was very old, but we do not believe that the lack of care increased its longevity. As a matter of fact, we had fewer insect pests at the time that this tree was coming to maturity than we do at the present day. It might be well for me to pause for a moment here, to say that these pests are increasing constantly with the progress of our civilization. As our commercialism has grown, and we are sending out steamships and railroad trains all over the globe, and shipping produce from one end of the earth to the other, it has become a very easy matter for these pests to find lodging in freight, and upon these trains and steamships be carried from one part of the world to the other. That is probably the reason why pests are more numer-

ous to-day than ever before, and consequently, we must fight them more vigorously than ever if we expect to be rid of the damage which they cause. We hear a great deal of complaint about them on every hand, and yet we might as well recognize the fact that they are with us, and we cannot expect to drive them out without a lot of hard work against them. It may be interesting to some of you if I should, at this point, say something of the development of the remedies which are used now in fighting insect pests. Previous to 1829 tobacco water was known as an insecticide.

I think it was in 1840 that the Massachusetts Horticultural Society offered a prize of $120 for the cheapest and most effective method of destroying the rose beetle. Two years later this sum of money was awarded to a Massachusetts gentleman for a remedy which had been tried by the committee and found to work fairly well. This remedy consisted of whale-oil soap, two pounds to fifteen gallons of water. It was not until about 1868, however, that Paris green was used as an insecticide. Its use was developed more especially in connection with the Colorado potato beetle, which formerly lived in the Rocky Mountains and began to work eastward soon after the potato crop was first cultivated in that region. This is a field crop, and was cultivated of course for a long time in the eastern states. As the great West became settled, potato fields were planted each year further and further westward, until they finally reached the Rocky Mountains, and the potato beetle, which fed on the wild plants there, began to feed upon the cultivated ones. About 1874 it reached the Atlantic coast. Various materials were tried, but after some experimentation it was found necessary to use insecticides which were more powerful than any that had been used previously and it was found that Paris green would answer the purpose very well. From the use of this poison at that time many of our modern methods of fighting insects have sprung. It was in 1878 that Paris green was first used as a remedy against the canker worm, and as its success was shown, it was then used for other insects. One man in New York State observed that the trees which had been sprayed were freer from the codlin moth than other trees which were unsprayed, and so it has gradually come about that at the present time no grower expects to obtain a crop of

fruit without spraying his trees with poison, in order to kill off the leaf-eating insects, and some of the other pests which infest our orchards. At the present time, as you know, there are several things which are used, such as the Bordeaux mixture, and kerosene emulsion, each for a specific purpose.

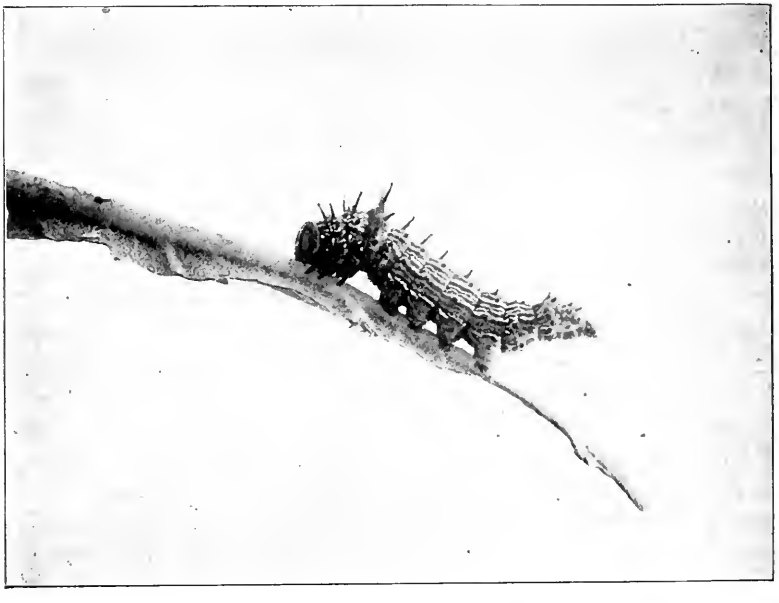

FIG. 4. — The Red-Humped Caterpillar, *Oedemasia concinna* S. & A.; natural size. Feeds upon apple foliage.

This picture represents the red-humped caterpillar *Oedemasia concinna* S. & A. It feeds upon the foliage of the apple tree, sometimes doing considerable damage. Of course any of the arsenical poisons will kill it. It does not occur in large numbers, but occasionally does some damage.

The whole question of fighting these insects depends upon the structure of the insects; that is, upon the different kinds of mouths or mouth parts which these insects have. An insect with a sucking mouth has a long tube which it thrusts into the tissues of the plant and sucks the sap of the plant for its food. Against sucking insects we must apply something that kills by contact, like whale-oil soap or kerosene, in order to

destroy them. We can also kill them by placing them in a tight house, tent, or box and generating some poisonous gas that will suffocate them. Many other destructive insects obtain their food by biting the leaves and parts of the tree. Insects belonging to this latter class can be readily killed by the use of the arsenical poisons, but it is of no use to poison plants as a remedy against sucking insects.

If we are asked to advise treatment against a certain insect it is always necessary to find out first whether it bites or sucks its food in order to know how to treat it.

FIG. 5.—The Plum Curculio, *Conotrachelus nenuphar* Hbst.; enlarged.

Probably very few of you have seen the adult of the common apple worm, or codlin moth, *Carpocapia pomonella*. It is a very pretty brown moth. This moth lays usually its eggs upon the apple and sometimes upon the leaves. The eggs are very minute and it is interesting to examine them when they are highly magnified. The marking or sculpture of the egg is very pretty. While this moth may lay its eggs upon the apple or upon the leaves, it almost always enters the apple at the calyx end. The full-grown larvae is what we usually find inside the apple when we try to eat it.

The illustration shows the proper condition of the young fruit for spraying. Just after the blossoms fall the calyx end of the apple stands upright. If we apply the poison at this time we are sure to get some of it into the end of each little apple, if the work is carefully done. As I said before, the little insect usually enters the apple at the calyx end, and if we are able to put the poison there we are sure to kill him. A little later on in the season the calyx begins to close up and if we spray then the poison cannot enter the calyx end so readily.

Still later the calyx is almost entirely closed, so that it will be impossible for the poison to enter. As the fruit develops the apple gradually turns downward instead of standing upright, as it does at first. The calyx will not then hold the poison. While we can always combat this insect by spraying, we can also kill many of the pupæ by placing around the trunk of the tree a band under which many of the larvae will crawl and transform. The band should be removed occasionally and the pupæ destroyed.

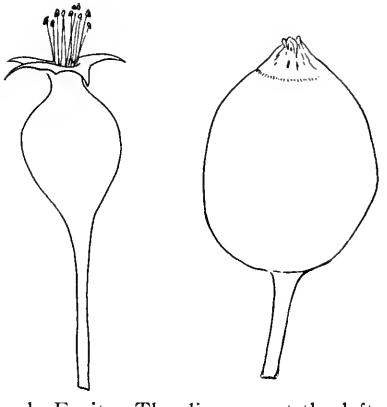

FIG. 6.—Young Apple Fruit. The diagram at the left shows the proper condition for the first spraying; the calyx is wide open. The figure at the right shows the calyx nearly closed; too late for first application.

Hazeltine's moth trap is a piece of apparatus much advertized for protecting apple orchards. It is claimed to do great things. This has been questioned by many entomologists in the country. I was reading the other day a statement that it caught in an entire season only one or two specimens of certain noxious insects, and many which are beneficial, and which we do not want to kill. On the whole, therefore, I think it has been decided that the injury was far greater than the benefit from the use of a trap of this sort.

You are all familiar with the common peach borer, *Sanninoidea exitiosa,* which attacks our peach trees. The eggs are laid during June and July and the larvae work in the trees, usually becoming full-grown the following spring. They are often found in the masses of gum which exude from the

injuries of the trees. The adult female is black with two orange-colored bands across the body. Among the experiments which have been tried in order to discover an effective remedy for the peach borer, Prof. Slingerland has found that a coating of gas tar placed about the base of the tree is quite effective, but this sometimes injures young trees and is not therefore safe to apply. Hydraulic cement, wire netting, tarred paper, and many other things have been used on the trunks of peach trees without success. After all, the only sure thing is to dig them out. The only successful preventive is the gas tar, and that is dangerous on account of the damage to the trees.

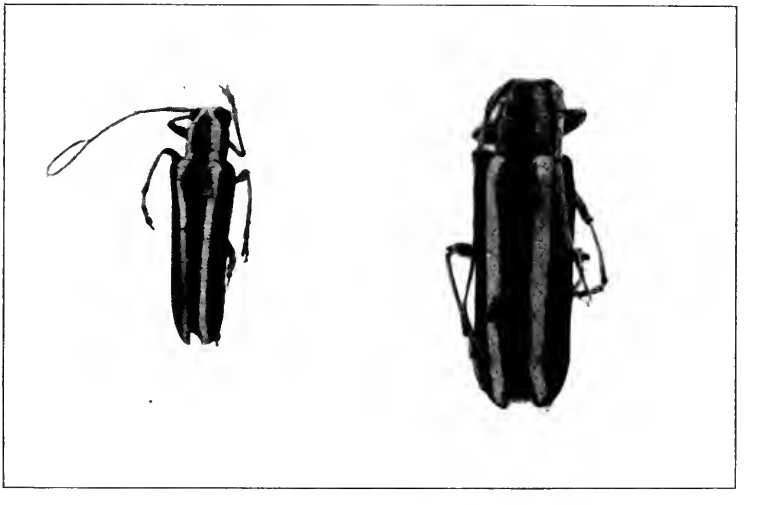

FIG. 7.—Round-Headed Apple Tree Borer.

A serious pest is the common fruit bark beetle or shot hole borer, *Scolytus rugulosus,* which attacks the peach and Japanese plum, often killing trees. The round holes are where the adults have issued from the bark. If we remove the bark we find a large number of tunnels where the larvae have been reared, most of them, however, not descending into the hard wood. All the transformations take place inside of the bark. These adults sometimes feed upon the small twigs in June and July, occasionally causing a good deal of damage. They bore in at the base of the twigs, which soon die. This can probably be prevented if the tree is well sprayed with Paris green.

The illustration shows the adult of the common round-headed apple-tree borer, *Saperda candida,* which attacks apple trees and tunnels in the trunk near to the surface of the ground. It is dark grey in color, with two white stripes along the back. Three years are required to complete its life history. The only sure remedy is to dig them out. Sometimes we can kill them by injecting a little bisulphide of carbon in the tunnels and stopping up the holes. This will kill them by suffocation.

FIG. 8. — The Hag-Moth Caterpillar, *Phobetron pithecium* S. & A.; natural size. Eats the foliage of the apple and pear.

The apple-tree tent caterpillar, *Clisiocampa Americana,* forms nests or tents on the trees in May. The young come out in the morning to feed and later go back into the nest, where they remain at night and in stormy weather. It sometimes does considerable damage by defoliating trees. It is well to destroy the nests if it can be done at a time when the young are in the nests and before they have done much injury. This insect can be readily controlled by spraying the foliage with Paris green or arsenate of lead.

The illustration shows a curious insect called the hag moth caterpillar, *Phobetron pithecium*. It is brown in color, and would hardly be taken for a caterpillar at all. It has no legs, and crawls about in much the same manner as the snail. The body is provided with curious appendages, irregular both in

FIG. 9. — The Yellow-Necked Caterpillar, *Datana ministra* Drury; natural size. This caterpillar was common in 1901 and devours the leaves of all kinds of fruit trees. A full-grown caterpillar is shown at the left.

shape and in number. Wherever this insect causes injury—and it frequently does to the pear—it can be prevented by an application of the poison to the leaves. As a matter of fact it is seldom abundant enough to cause serious damage.

One of the species abundant last season was the yellow-necked caterpillar, *Datana ministra*. This is found upon nearly all of

our fruit trees, and also upon the trees of the woodland. It is a very easy matter to kill these by crushing them, as they are usually found upon young trees, but an application of poison to the foliage will prevent injury.

FIG. 10.—Saddle-Back Caterpillar.

Some will recognize this as the saddle-back caterpillar, *Empretia stimulea,* which we sometimes see upon fruit trees. Like the hag moth caterpillar, it has no legs. It seldom is sufficiently abundant to do serious damage, but if it becomes necessary to treat it, Paris green is the remedy.

A plant-louse, the Wooly Aphis, *Schizoneura lanizera,* is a common pest in our nurseries and apple orchards. There are two forms of this insect; one living upon twigs and branches, where it forms curious enlargements, and the other upon the roots. While this is a very serious pest, yet the form which attacks the upper part of the tree is very easy to control. It can be controlled by thorough spraying with kerosene emulsion or kerosene and water (15 per cent. kerosene), and even by common soap and water (1 lb. to 8 gals.). Upon the roots, however, it is more difficult to kill because you cannot get at it, and some orchardists now place ground tobacco about the roots in setting young trees. This is good practice.

The San José scale : We now come to the scale insects, and of these the San José scale, *Aspidiotus perniciosus,* is by far the most injurious. The cut shows you the appearance of a tree infested with it. This is a most interesting insect. The spots as shown in the picture simply mark the places where the scales are situated. The insect itself is underneath the spot or covering. If we lift up one of these coverings the insect can be seen though it is exceedingly small. The insect itself secretes

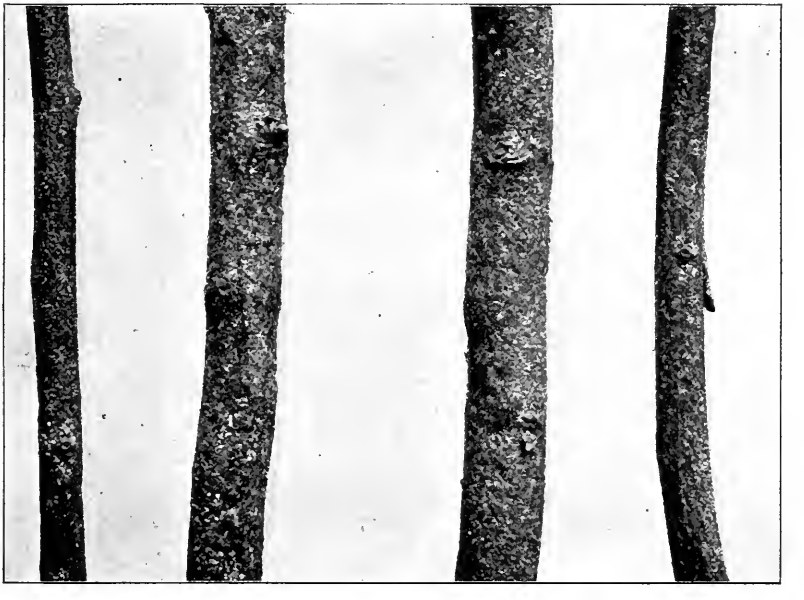

FIG. 11.—Plum Twigs nearly coated over by San José Scale. Natural size. Appearance of Infested Twigs.

a wax-like substance which make these coverings and we find that the scale is attached to the bark by very slender hair-like appendages on the under side. These form the mouth parts or sucking tube. An interesting thing about these scales is that they are not hatched from eggs like many insects but they are born alive. The young scales after being born crawl about for a few hours until they find a suitable place to settle. As soon as the young scale has settled in a satisfactory place, it begins to pick out slender wax-like filaments from its back. After a few days it molts and these filaments unite with the

cast skin to form this covering, which we call the shell or armor. The female is unable to move afterwards and soon loses legs, eyes and antennæ. Nothing but the mouth parts and the reproductive organs remain and these are very strongly developed. In the male we have an entirely different develop-

FIG. 12.—Infested Peach Twigs. Mature females and young scales clustered in a groove of the twig may be seen at the left. A female with shell or covering raised is shown at the right. Considerably enlarged.

ment. The mature male has antennæ very strongly developed; it has eyes, legs, large wings, but strange to say it has no digestive system and therefore cannot take food. It has only to mate with the female and die. That is its whole mission in life. The San José scale is exceedingly prolific and therefore spreads very rapidly. It was discovered in Connecticut in 1895, but it has become very widely distributed all over the State, having been found in over one hundred localities.

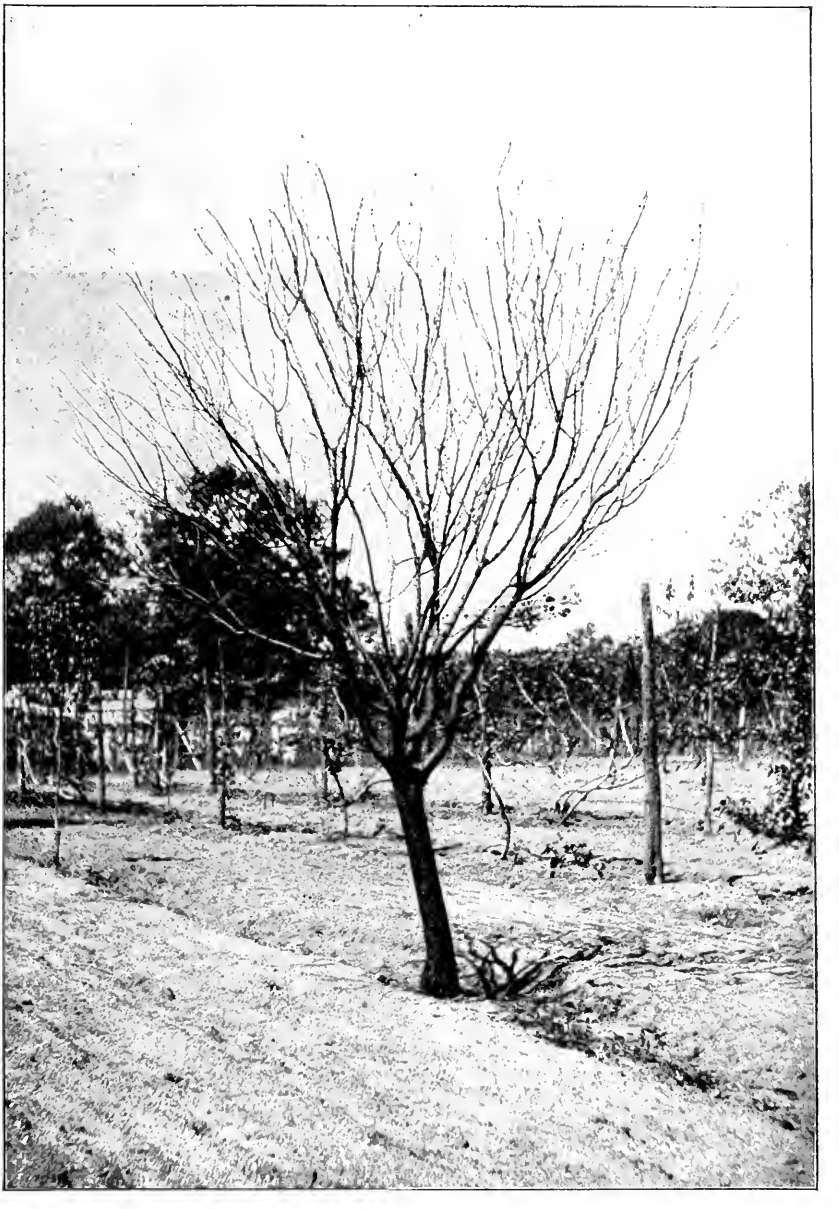

FIG. 13.—Plum Tree killed by the San José Scale-Insect. This represents a plum tree in New Haven which was killed by the scale. This was photographed in July, possibly in June, but at a time when the other trees were in full foliage.

Fig. 14 shows the appearance of the insect upon apples. Around each insect there is a reddish discoloration, whether it is upon the bark, the fruit, or the leaves. Of course upon dark heavy bark you cannot see it so well, but upon thin light bark it is apparent. When a tree is badly infested we find the insect not only upon the twigs and branches but upon the trunk and fruit.

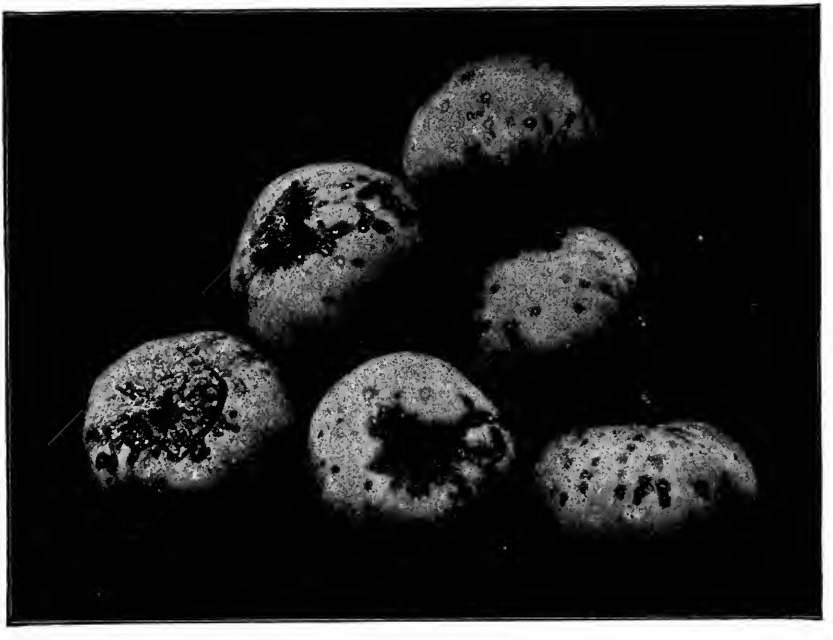

Fig. 14.—Infested Apples showing the discoloration around the Insects. Appearance of Infested Fruit.

This insect gets on both the upper and under surfaces of the leaves, and usually gathers along the veins on both sides, as you will see. Frequently the leaves seem to become completely covered and drop off. I have seen them dropping from the tree in July.

Now what can we do to save infested trees and kill this insect? So serious a pest surely must require drastic measures. Some of these little lady beetles, which we know are our good friends, feed upon the scale. Several species are enemies of

the scale and one feeds upon it almost wholly, yet they have not held it in check in Connecticut. Most of these bright little beetles, usually red in color, with conspicuous spots, are beneficial because they feed upon other insects and especially upon plant lice and scale insects. We cannot expect, however, to hold the San José scale in check by this means only. It is necessary to treat the trees in some other way to kill this insect in order to save the trees. We have found that here in Connecticut, if we spray the trees just before the leaves appear in

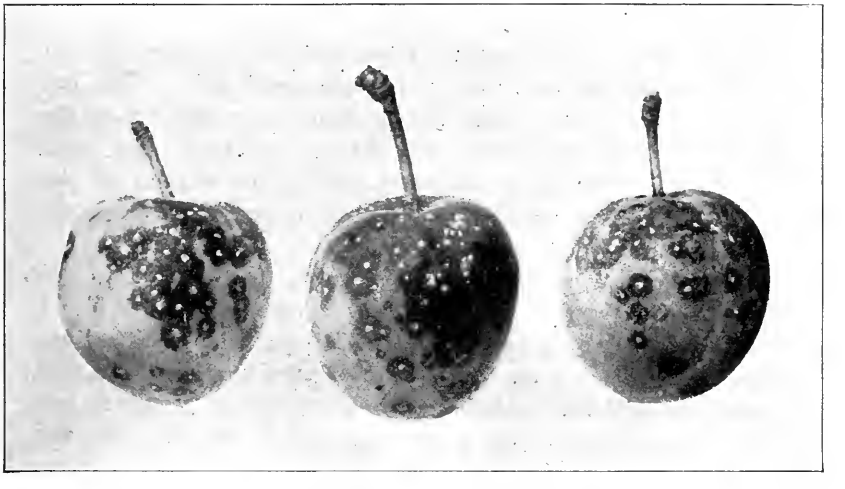

FIG. 15.—Plums showing the reddish discoloration caused by the Insects.

the spring with a mixture of kerosene and water, using 20 to 25 per cent. of kerosene, we can kill nearly all the insects upon a given tree. Crude oil may be used in place of kerosene and either should be mixed with water under pressure by means of a pump for the purpose. We can kill nearly all of the scales, but it is impossible to kill them all because we cannot bring this preparation into contact with them all. It is almost impossible to spray a tree so thoroughly that some will not escape. But the application is so effective that in some instances less than one per cent. of the scale have been found after this treatment. Of course what I have said does not apply to trees in foliage because if we were to use this strength of kerosene and

water on such trees we should be liable to injure the tree seriously. If it is applied to dormant trees in proper weather, which means a bright day, and there is not too much put on, it will not injure the tree. At least that is what our experiments show and we have reason to believe that this is correct. Crude oil may also be used undiluted but we must be sure to use only certain grades of oil. It was found that oil by the Beaumé hydrometer test showing a specific gravity below 43 degrees would not do. Anything above 43 degrees is safe to use, but the higher we go the more expensive the oil becomes, and anything below that is apt to injure the trees.

There are also other effective methods of treatment, one of which is fumigating with hydrocyanic acid gas. This has been used in California and also in Maryland and some of the other states, but so far, in Connecticut, we have not done much of anything with it in orchards, largely on account of the expense. Nursery stock is now being fumigated in Connecticut quite extensively.

We can use kerosene and water, using 10 per cent. of the oil upon the trees and foliage in the summer time. We found that 15 per cent. of kerosene could be applied to peach trees when in foliage. With that proportion we found we had a few leaves fall, and here and there a peach would be destroyed but there was no great injury to the tree, and we feel now that the trees can be sprayed at that time with the preparation containing 15 per cent. of kerosene. I should not want to go above that. It is doubtful if a 10 per cent. mixture will kill all the scales, but it kills many of the young ones. We found it may make a difference when we apply it. In two experiments where the trees were sprayed, one, I think, the 19th of June, and the other the 26th, we only killed about half the scale insects on the trees. In another instance where the spraying was done on the 24th of July less than one per cent. of living insects remained. It may be that at the time the adult scales are ready to give birth to the young, they may be harder to kill than at other times.

It is quite important that the oil and water should be well mixed. There is quite a variety of apparatus on the market for that purpose. Some of the apparatus which appears in some of the pictures I have shown does the work very well.

A barrel pump should be used for orchard purposes. The small bucket pumps are excellent for small work, but they are usually not large enough for large trees.

Fumigation is a method which is coming into vogue among our nurserymen. The trees are placed in an apartment of the house, and the fumigation is carried on by means of a gas made of cyanide of potash, sulphuric acid and water, taking for each 100 cubic feet of space 20 grams, or a little less than one ounce of the cyanide, one and a quarter ounces of strong sulphuric acid to two ounces of water. Dilute the acid and put this into a stone jar. Of course it is necessary to see that the house is well and tightly closed. Put this generating jar inside the door of the house and drop the cyanide into the jar and move away quickly. The trees should be left in the gas for about half an hour. Then we can open the doors and the house should be well ventilated before anyone enters. The doors and ventilators should be made so that they can be opened from the outside. If this work is carefully done it is the surest way of killing San José scale, and is especially adapted for nursery work. Some of the states, as you know, have laws prohibiting the entry of nursery stock which has not been inspected or fumigated. I advise every member of this Society to demand that stock be fumigated when purchasing from any nurseryman.

Of course in orchard work, where the growing trees are being treated, in order to use this method it is necessary to have a tent to cover each tree.

Several questions were asked of the professor, after which the very interesting evening session was brought to a close and the Society adjourned to Wednesday at 9.30 A. M.

The session was marked by a large attendance, including many Hartford people.

Second Day---Morning Session, Wednesday, Feb. 5.

The meeting was called to order at 9.30 A. M., President N. S. Platt in the chair.

THE PRESIDENT: Now if you will please come to order, we will, according to our plan, begin with some of our exercises. We have some papers left over from yesterday and a lot of questions, and we have some short essays or speeches from some of the members of our own Society that must come in to-day.

You will be gratified to know that the Secretary says that he took in yesterday over $100 for membership fees. I suppose they were largely renewals, and we hope there will be much more taken in to-day.

The day will be full of interesting matters to us all, and even if we did not have anything on the programme we would be able to take up the time fully with questions about what we want to find out from our own people, and the people who are here.

[At this point Vice-President E. M. Ives was called to the chair.]

A MEMBER: I would like to inquire whether Mr. Putnam has had good success in using arsenate of lead as an insecticide?

MR. PUTNAM: I used this in connection with spraying. I have used it even on gooseberries. It is not really arsenate of lead. It is a preparation put up in a finely concentrated form. I use it on potato bugs sometimes. I always use a pound of lime with the mixture in spraying for potato bugs. It was not very satisfactory, but I think this form of arsenate is a very good form in which to use it. I have used it on currants as well as gooseberries. It was used with very satisfactory results in those cases.

MR. INNIS: In accordance with our usual custom, Mr. President, would it not be wise at this time to appoint a committee on nominations for officers for the coming year?

THE PRESIDENT (Mr. Ives): I should prefer that the nominating committee be appointed by the regular chairman.

MR. INNIS: I think it has been the custom, Mr. President, for such committee to be appointed by the President.

A MEMBER: My idea of it is, Mr. President, that it would be a good idea to make these nominations from the floor.

MR. INNIS: In order to determine that I will make a motion that the President appoint such a committee.

Motion seconded.

THE PRESIDENT: The question is called for on the passage of this motion of Mr. Innis, to have the President appoint a nominating committee. Those who are in favor of this motion will manifest it by saying "Aye." I will call for those who are opposed. It seems to be a unanimous vote, and the motion is carried.

I think perhaps we had better take up now some of these special questions on the programme. We will call for the second question on the list: "What have we learned about Peach Growing and Selling in 1901?" I understand that that special question was assigned to Mr. J. Norris Barnes of Yalesville. I presume he has something for us, and if so we will be pleased to hear from him.

MR. BARNES: Mr. President and Gentlemen—In considering special question number 2, which has just been referred to by our President, the latter part of same has been given a prominent part, for it has seemed especially desirable that at this time, when so many of common interest are brought together, consideration should be given to certain facts that were emphatically brought to our attention during the season of 1901.

It will have to be admitted, to start with, that the numerous damp, sunless days, as well as heavy rains, presented adverse conditions to the full and proper development of the fruit crop that few preceding crops have had to contend with, and which it is encouraging to believe may not again soon repeat themselves in so marked a degree. Possibly some of us, in fact many of us, may feel more or less dissatisfied with some features of the work required to handle the 1901 crop of fruit—either as to the labor in handling, packing, transportation, packages for the fruit, or the markets, and not the least of these, the wastes of the orchard, and all of which may well be considered from an economical standpoint in perfecting plans for future use.

I wish to refer, if you please, for a moment, to my own town, Wallingford, for a statement of conditions that existed in one of the large and growing centers of peach production in Connecticut, season of 1901, and some items of which may be of interest and value to others. It is estimated that one hundred

thousand baskets of peaches went to market from here, at least double the quantity ever sent out before. Some of the most extensive and finest young bearing peach orchards in New England are located in this vicinity, as well as many younger ones not yet of bearing size. It is estimated that upwards of forty thousand peach trees will be planted out near this center this coming spring.

The fruit of this locality was mostly sent from two shipping points, Wallingford and Yalesville. At the first mentioned place, a storehouse and trackage was obtained, a capable man placed in charge, who took care of the loading and shipping of the fruit, and a certain sum charged the shipper per basket for services rendered. Here buyers from different places came in, saw the fruit as brought in, and secured their supply for shipping. At the other place of shipment, Yalesville, in the same town, a similar plan was pursued, the owner of the fruit being expected to pay a small sum per basket to cover items of expense, such as boards, nails, labor, etc., putting into car, and a small per cent. commission on sales for office work involved in looking after shipments, telegrams, telephone service, etc. In both places the services of experienced men were obtained, and the general working of the plan was satisfactory to all concerned. Several of the large peach growers of the State made every effort last season to obtain shelf-refrigerator cars, but, I think, without success. Refrigerator cars without shelving could have been had in limited numbers, but as arrangements had been made to pack the fruit in 16-quart baskets, no great use was made of these cars.

It would seem that the Connecticut peach shippers cannot longer do without ice cars. They are a necessity, and must be had if we expect to successfully market our fast yearly output of fruit. We must have more market room, as well as avoid, as much as possible, the necessity of rushing sales the moment the fruit reaches its destination, on account of lack of keeping qualities. Our railroad people, while seemingly disposed to help the fruit-shipping interest, fail to comprehend the situation, by not providing suitable cars except in small numbers; and, consequently, the bulk of the crop went to market in tight-boxed cars, with results gratifying to no one, unless to the carriers. Several parties urged repeatedly the matter on the railroad officials, to prevent, if possible, this very

condition of affairs. An effort was made to arrange with the express company to take out our fruit on regular express service trains, and with a fair chance of a successful deal, when it was learned that no cars could be furnished to the express company for such a purpose. And so, of course, that ended that negotiation, and forced us to accept whatever was offered in the way of cars—mostly of the sweat-box type. I believe that the efforts made to secure favorable consideration were made mostly in an individual way, and, therefore, may not have carried as much weight as some other and more united effort would have done. It is too much each one for himself, and as long as we are without any business organization as growers and shippers, it may be hard to exert any greater influence. If better car service cannot be provided, if we have to take refrigerator cars without shelving, if we have any, then a change may have to be made in the form of the fruit package, and this may be quite desirable in so far as it may prevent the spilling and thieving which shippers have had to put up with so long.

As to markets, we found that just three good distributing points outside of our peach growing section were available, namely, Boston, Providence and Springfield. New York City could not be satisfactorily reached, although one of the nearest distributing points to our fruit growing section. I believe that the matter of transportation, of securing better and faster train service in order to reach more distant markets, is well worth a united effort on our part to obtain. I believe the fact should not be lost sight of that local markets were, and are, likely to be over-supplied, and shipping out the best is a necessity.

There is not a doubt that fruit men from the large distributing centers like our fruit, and if we pack it properly we have no competition to fear from other sections of the same time of ripening as ours. Several times since I have been growing peaches, Connecticut has been one of the few states where peaches could be had, and the big markets were open for any reasonable supply at good prices, and I expect to see such conditions come again. The record for twenty years back proves that the Connecticut man sometimes has peaches when the others do not.

What shall we do with the class of fruit not good enough to ship—the over-ripes, the slightly decayed ones, and the small and imperfect, of which there will always be some? The orchard man usually has enough to do in taking care of the better fruit, and certainly he did have the past season. It would seem that any locality that might serve as a fruit center would very properly have a fully fitted establishment to make use of this class of fruit, as well as of a better class—can the best, evaporate or otherwise make use of some, and obtain the juices from the remainder of the fruit. I see no other way that seems practicable of making use of the orchard wastes.

I have always held that it was wise policy for the peach grower, as much as possible, to isolate his orchard in order that slackness of management on the part of would-be neighbors might not prove a source of annoyance and loss to him, but I am ready to admit that under present market conditions, a large quantity of fruit in the locality convenient for shipment from a certain point is an advantage, for when it becomes known that good fruit in abundance can be had, buyers and receivers will fairly hustle one another to get it.

The fact should not be lost sight of that, at the present time, the fruit from an orchard of medium size can be disposed of more readily in a locality where the business is well established than it can in a position where improved shipping facilities cannot be taken advantage of, and the place is not readily reached by prospective buyers.

No doubt we all desire to produce fruit that will class as "best"—there is more pleasure in it and it is more profitable. One very important quality such fruit should possess, is color that is attractive. I believe that is the most important quality to work for; then texture and size. From some experiments made in the past, and from noting conditions surrounding certain individual trees, I am inclined to believe that mulching sufficiently to keep down vegetable growth and retain moisture, will tend to give better color; that a tree that is growing very fast, either from the effect of very persistent thorough tillage, or the effect of heavy applications of fertilizer, will tend to be deficient in color. There is no doubt that soil has very much to do with fruit color, and applying either of the above mentioned, or the lack of so doing, might seem to be negative in

results. If by mulching our bearing trees in part with any convenient material we can maintain sufficient vigor of the tree, improve the color of the fruit, and save a part of the tillage and fertilizer bills, it would seem a desirable thing to do, especially if we may make the small stones, which are so abundant on some of our orchard lands, serve as a mulch, a permanent one, and costing nothing but the labor in placing them there. We know that some things which tend to lessen vigorous growth of trees, seems to cause fruit to be produced of higher color, and possibly of earlier maturity, such as partial griddling by a wire or other means. The work of borers and the new (to us) disease of the peach which seems to, in effect, lessen the tree vigor by a kind of griddling, gives earlier maturing fruit and beautiful color, although off in flavor. These suggestions are offered merely as pointers towards certain conclusions. We are done with the tall-growing fruit tree of any kind, and the first favorable opportunity will find the tops of many such trees coming off, to be thereafter kept down, and all young orchards will be grown low headed, for from almost every way of considering the matter the advantage seems to be with the low headed, wide spreading tree form.

MR. PLATT: There may be some questions on this. Could you tell about your plan of partial cultivation, or cultivation the fore part of the season, and mulching?

MR. BARNES: My idea of mulching is to keep down the grass and conserve the moisture.

MR. PLATT: Have you ever used covers for your baskets in shipping them out?

MR. BARNES: Not largely. I have very little doubt but what it adds to the value of a shipment of fruit. There may be two or three cents involved, but if you are handling two or three thousand baskets of fruit a day it is one of those things which adds to the labor, and it is a burden for somebody to carry. That is one reason, I think, why but little has been done in that line. If the market demanded it, and it would pay, doubtless we would do it.

THE PRESIDENT: In a wet season how much cultivation should you give to a peach orchard?

MR. BARNES: I cannot give an opinion on that. I should say that in everything I do with the orchard or anywhere else, I calculate to have a reason for it, but I should say that that was

a question which each one has got to settle according to his own conditions. In the first place, on peach land, I would not take land that was wet enough so that any ordinary amount of moisture would make any difference. Further than that, if in a wet season there is a lot of growth of vegetable matter, probably the amount of moisture that growth would take would not make any difference because it would not be enough, and so in that respect at least tillage would be all right. As a matter of fact, in our orchard we calculate to till, rain or shine, and I don't know but what it's all right. At the same time, judging of the behavior of some of the old orchards we have in the last two or three years, and particularly in the growth of fruit they have given, I think there may be such a thing as over-tillage. I am not sure that is the reason, but I know there is something wrong. I am inclined to feel, perhaps, that the soil has had its vegetable matter largely burned out of it, and something has got to be done to restore it. That is a theory of course, and I cannot prove it.

A MEMBER: I would like to ask, Mr. Barnes, for the information of peach growers, what desirable variety we can grow that will come on the market after the Elberta?

MR. BARNES: I have always been myself very much inclined to favor the Late Crawford class of peaches. They have always made us a lot of money excepting in some years when we lost all the buds. The young orchards that we planted last, we planted very heavily of Chairs Choice, and they have fruited for us two years. This last year in particular we had a very fine showing and I think a good deal of them, but whether they are better than the Crawford Late peach, I am not prepared to say. They are a little smaller and seem to be a litttle later. They are fine colored and handled nicely. That is a good point in a market peach. You must have something that will handle well, and at the same time grow to a good size and give us plenty of them. I do not know that I can recommend anything that I think will please better, provided your soil is right, than that class of peaches. They want a good strong soil that is dry, and good treatment of course.

A MEMBER: What conditions are the buds in now? Do they stand the cold the same as the Elberta, or as well?

MR. BARNES: I think not quite so well.

A MEMBER: What varieties of peaches do you include in the Late Crawford class?

MR. BARNES: We have three varieties. The Wheatland, Chairs Choice—I spoke of that more particularly, and we have the Crawford Late. So far we have picked very few Wheatlands. They are a beautiful peach when you get them, but we get but a few of them so far. We have got quite a large block of them.

A MEMBER: What about the Iron Mountain?

MR. BARNES: We have not had them in fruit.

MR. COOK: I have a peach called the Emperor which fruits from the 5th to the 15th of October. It is a large, yellow, freestone peach. The only trouble that we have with it is that it is quite liable to have the yellows. It is a fine peach and it comes later than any other. I had a market in New Haven for about two or three weeks and got as high as $2.00 a basket, wholesale. Last fall they nearly all rotted, and a good many have been killed out by the yellows. I bought two hundred new trees, but I do not know what they will do.

A MEMBER: Mr. President—Can we take special question number 5?

PRESIDENT: Question number 5 is called for. Are the two gentlemen who are to speak on this subject present, and ready to report? If so, we will hear from Mr. Molumphy first. Mr. Molumphy is to speak on the question, "Have the Returns from Plum Culture been Sufficient to Warrant Further Planting; if so, what kinds?"

Mr. President and Fellow Members:

Several years ago, when plums were considered one of the most difficult fruits to successfully grow in this state, a question like this might have required very different treatment. At present if the "results" meant simply plums, the first part of the question could be quickly answered in the affirmative, for it has been pretty thoroughly demonstrated during the past few years that we can grow plums to perfection, and in wholesale quantities, here in Connecticut; they can be depended upon to bear quite as regular crops as our other standard tree fruits—apples, peaches, pears or cherries.

The real point to the question, however, is, will our markets take increasing quantities at prices that shall be satisfactory to the growers?

Having fruited a large number of the European varieties, as Lombard, Bradshaw, Green Gage, Damson, and others, also the Chickasaws and Americanas, and after several years' experience with the Japanese, I do not hesitate in stating as my opinion, that there is no encouragement to plant anything in plums outside of this last named class of the "Japs." Taking them in order of ripening, Red June is early, handsome, salable, quality not very high, but still not really bad. Would keep this on the list for profitable planting until something better shows up for its season, which is July 25th to August 1st, ordinarily. Last year it was ten days behind time with me.

Next, Abundance, when properly grown, is good enough for almost anyone, but if allowed to overbear, take it away—small, insipid, worthless. However, as this inclination of the variety to set too much fruit can be readily remedied by a proper system of pruning and thinning, it can hardly be considered a fault. Burbank is another kind that overbears and rots and needs lots of attention, but is a grand market plum when at its best. Wickson comes later, is large, handsome, and will do to plant quite extensively. Satsuma, one of the finest of all, ripens in September, and when well known, nearly every family in the state will want a few bushels each year for canning and preserving. In fact, if the "Jap" plums could be advertised in the way some of the breakfast foods and health preparations are, by distributing free pamphlets and calling attention to their merits, it is probable the demand for this fruit could be largely increased.

Besides the few I have mentioned there are a number that have some good points but fail to meet all the requirements of our markets. The Hale plum, when fully ripened on the tree, is of the highest quality and the tree itself is a wonderfully strong grower, but does not seem to be as productive as is desirable.

Normand is large, bears well, and is a good plum, but is yellow, and somehow yellow plums are not popular in our markets. A large number of new ones are being tested, some of which are very promising.

To aid in developing this infant industry of commercial plum culture, the market situation should be carefully studied. A package suitable for shipping the very finest should be selected by a committee of experienced growers, and used as the standard Connecticut plum package. The common peach basket will answer very well for the bulk of the fruit as commonly grown, but for the fancy ones something special is desirable, and it would be of great benefit if a suitable package could be brought into general use.

In conclusion, the future for the plum-grower who keeps up to date on varieties, and attends carefully to the details of the business, is quite as promising, judged by the experience of 1901, as that of the fellow who sticks to any other line of fruit growing.

THE PRESIDENT: Perhaps we had better hear also from Mr. Butler on this subject, and then have the discussion on both papers. I will call on Mr. G. S. Butler.

Mr. President and Fellow Members:

The returns to the skillful plum grower have been sufficient to warrant further planting, but perhaps it would be better to ask, will the returns continue as satisfactory if the average farmer continues to plant, care for, and market in the usual way? The market is already over-supplied with Burbank plums of the size of our meadow plums, or nearly as large as Marianna grows naturally, and with no interesting flavor until cooked. The Abundance and Chabot can be grown on the same plan, but many of these growers are already finding the returns are not equal to those of the average potato crop. The continual presence of this inferior fruit in the market cannot but injure the price of good fruit; still our plums sold for an average of 50 per cent. above the price of peaches the past season, the peach market being injured by the same condition of affairs.

The grower who will produce the best fruit, whether peaches, apples or plums, will always find a market for it at profitable prices provided his conditions are favorable, and he will certainly acquaint himself with the natural conditions before he launches very heavily into any matter dependent on nature.

I seriously doubt if there are many spots in Connecticut where the Domestica or European plums can be produced at a profit, with the competition now offered from Japanese and Japanese

Hybrid varieties, which cost less to produce and are of more attractive color. Most of the Americana varieties depend on the culinary art to produce a market, but I believe a limited supply would always find a ready market at paying prices, although the long fruiting season habit of these varieties makes picking more expensive.

Of the four original useful Japanese varieties, Abundance, Burbank, Chabot and Satsuma, probably Burbank will prove least valuable in future, but there will be a strong market demand for the other three for some time to come at paying prices.

Of the newer varieties October Purple is most attractive to us, with possibly Gonzales as second choice.

Many of Mr. Burbank's new inventions are promising, but promising is not always performing, leaving the promise in worse shape than if it had never been made.

Two early varieties were introduced, one under the name of Maru, the other as Wasse Botankio (now renamed Lutts). These are entirely out of the way before Red June begins to ripen, are good lookers, but small size, and the Maru is quite eatable, and would probably sell to a limited extent, and until we get something better they may do very well for early plums. With us the Red June lacks so much in flavor that it has not been satisfactory. It is not a rapid growing tree and it is not productive. I am inclined to think that the Burbank is one of the plums we will soon get through with. Then there is the America. This giant plum is about an inch in diameter at its base, and the quality is about like that of the average Americana. The Apple plum can be sold in any market for the Satsuma. It is a trifle more blunt in shape. It ripens a little early and rots a good deal worse, but the tree, I think, is a little hardier, more of the Burbank style of tree, and it is a plum which I think will prove fairly satisfactory where the Satsuma is not doing very well. The October Purple has proven excellent in quality and large in size. The color, however, was a long way from purple.

The Hale plum rotted very badly with us until this year. We never have grown a respectable crop of it before. This year the fruit set quite heavily and grew to a nice size. There has been for the last two years a faint suspicion of a blush on the cheek of the Hale plum.

The Climax and Sultan we have not fruited, but friends over on the Hudson River tell us that both are going to be good plums.

A MEMBER: How about the Wickson?

MR. BUTLER: With us it has not been satisfactory. The tree is not as it should be. The fruit is not satisfactory in size. The color is very good, but we have been troubled a good deal with the rot; in fact, more so with it than on other plums of its season.

MR. INNIS: Do you spray for the plum rot?

MR. BUTLER: We cannot spray after the leaves are out. I believe it would be all right to spray next month (March). But we have done nothing but pick off the rot as fast as it has appeared. We have gone over our orchards many times in the early fruit season to get off the plums that were beginning to show signs of monilia.

MR. INNIS: Do you find that the spraying in any way lessens the rot?

MR. BUTLER: We have depended entirely upon picking.

MR. BECKWITH: Is there any difference in the effect of the winter on the Abundance and Burbank?

MR. BUTLER: Why, I should not say there was any difference. Both of them seem to be perfectly hardy. There are times that the Abundance has been affected more by late frosts than the Burbank. But so far as winter is concerned, it has not affected either of them with us, but with one exception, and that only very slightly.

A MEMBER: Mr. President, can we take up question 7?

THE PRESIDENT: "What is the Best Stock on which to Bud the Japan Plum?"

MR. BUTLER: I am perfectly satisfied that the peach is the best stock to bud on. I think the union between the peach and the Japan plum is more satisfactory.

MR. INNIS: I should just like to say in regard to budding on peach and plum stock that my experience is right the reverse. Those budded on the plum give a good crop while those budded on the peach have never given me anything at all. I do not know how to account for it.

A MEMBER: I would like to inquire of Mr. Butler, is there any difference of the life of these when budded upon one or the other?

MR. BUTLER: In our experience the Japan plum will live longer and bear better, and die happier on the peach than on the plum.

MR. STOCKING: My experience is that the plum on the peach will die of peach yellows just as quick as the peach tree will. Just the same.

MR. J. H. PUTNAM: I wish to say, that we have a paper here by Professor F. C. Stewart of Geneva, N. Y., which is right in line with this subject. As Professor Stewart was unable to be here he sent the paper in to the Secretary. Out of courtesy to him we thought it proper to announce that we had the paper. The programme is very full, but if it is desired this paper can be read. If not, it will be incorporated in the report just the same. The paper is very short and it is devoted entirely to the prevention of brown rot in stone fruits.

PROFESSOR TOWNSEND: I would be glad to hear this paper, as I am to speak a little later on this subject. You can see, Mr. President, that I am especially interested, and I will therefore make a motion to that effect.

Motion seconded and passed and the paper of Professor Stewart was then read by Mr. Putnam as follows:

The Prevention of Brown Rot of the Stone Fruits.

By F. C. Stewart, New York Experiment Station, Geneva.

The brown rot fungus, *Monilia fructigena*, is very destructive to plums, peaches, apricots and cherries. It destroys the blossoms, kills the smaller branches and rots the ripening fruit. Although long recognized as a disease which is more or less destructive every season, often causing losses of 50 per cent. or more, there is to-day no well established method of treating it. Everywhere, growers of the stone fruits are asking, What shall we do for the rot? And no one can answer the question in a satisfactory manner.

On the different fruits the problem is somewhat different, but in all cases treatment by means of sprays is hampered by the danger of spotting the fruit; and with peaches, apricots and Japan plums there is the additional disadvantage that the foliage is liable to injury. Consequently, regular and thorough spraying with our standard fungicide, Bordeaux mixture, is impracti-

cal; at the most critical time it can not be used. Spraying must be supplemented by other combative measures.

Since the rot fungus comes from fungus spores in the same manner that weeds spring from weed seeds, care should be taken to keep the orchard as free as possible from the spores. As with weeds, the more thoroughly the disease is kept down the less labor it is to control it. It is more profitable to fight the disease faithfully every season than it is to fight it hard one season and allow it to go unchecked the next. Where rot has had its own way for a few years, every part of the orchard is so thoroughly seeded with the disease that even the most radical measures may not be able to eradicate it in a single season. Success is attained only by eternal vigilance and constant warfare.

The first thing to be done is to carefully collect and burn all the mummied plums and peaches hanging on the trees. All agree that this is a profitable practice. It should never be neglected. These mummy fruits harbor the fungus, and in the spring become a source of infection. The usual practice is to gather them some time after the leaves fall and before growth starts in the spring, because they are then easily found; but the results would certainly be much better if they could be gathered as soon as they show the first signs of rot, and before the fungus has had a chance to form and scatter multitudes of spores. This would necessitate picking over the fruit at frequent intervals during the ripening period and would, perhaps, be more expense than the results would justify. With cherries it would, most likely, be altogether impracticable, but on the other stone fruits it seems worthy of trial. If thoroughly done it must be very effective. The fallen fruits should also be gathered and removed from the orchard.

Before the buds begin to swell in the spring spray thoroughly with strong Bordeaux mixture (6-4-50 formula). Just before the blossoms open spray again with Bordeaux, this time using a weaker mixture (2-2-50 formula). These two sprayings will lessen the injury from blossom blight and subsequent attacks on the twigs, and act as a check on the disease throughout the season. On the *domestica* plums and Morello cherries the early sprayings will serve the additional purpose of discouraging the spring attack of the black knot fungus; while on the peach they will prevent leaf curl.

On the *domestica* plums two or three applications of weak Bordeaux mixture (4-4-45 formula) should be made while the trees are in foliage, but before the fruit commences to color. After the fruit begins to color substitute ammoniacal copper carbonate solution for the Bordeaux. This will serve the double purpose of controlling the leaf spot and checking the rot.

But with the other stone fruits I am loth to make any recommendations for spraying while the trees are in foliage. On this matter there is much difference of opinion, and experiments in different parts of the country have given contradictory results. Briefly stated, the situation is this: While the spraying of the foliage of peaches, apricots and Japan plums with fungicides containing copper has been successfully practiced by various parts of the United States and by some recommended for the prevention of fruit rot and other diseases, it has, in other cases, often resulted in serious damage and is not to be recommended in Connecticut (according to the investigations of Sturgis)* and only in a very limited way in New York. It is a worthy subject of investigation.

Of the fungicides which do not contain copper, potassium sulphide solution is especially promising. In the experiments made by Dr. Sturgis† potassium sulphide, at the rate of one pound to fifty gallons of water, caused no injury to peach foliage and decreased the amount of rot by nearly 20 per cent. The chief difficulty is the frequency with which it must be applied.

Thinning the fruit, also, will undoubtedly assist somewhat in controlling fruit rot. One of the most successful peach growers in Western New York, who has very little trouble from rot, attributes his success to regular and severe thinning and his practice of never allowing a single mummy fruit to remain over winter on the trees.

At the recent meeting of the Western New York Horticultural Society in Rochester, Mr. George T. Powell stated that during the past season he has used plain copper sulphate solution (three ounces to fifty gallons) for spraying sweet cherries in the Hudson River Valley. While the fruit was ripening the trees were sprayed every day for about ten days. There was no injury to the foliage, no serious spotting of the fruit and about one-half

*Sturgis, W. C. Conn. Agr. Exp. Sta. Rep. (1900), 219–254.
†Loc. cit., p. 253.

of a full crop was obtained. Since there were no unsprayed trees of the same varieties, it is impossible to determine accurately the benefit done by the spraying; but Mr. Powell is of the opinion that had the trees not been sprayed the crop would have been a total loss.

A MEMBER: I should like to say, Mr. President, that I have used a diluted solution of copper sulphate. I have used it on Japan plums and on peaches as strong as four ounces to one hundred and fifty gallons without damage, and then again I got damage from that proportion. I never have had any damage from two ounces to fifty gallons. The results were not as positive because it will not remain on the branches as well. In the weather that you get the worst rot it is not likely to stay there. You can put the spraying apparatus into a field and keep it there all the time. It is very easy to use. Even if you have to use it, or put it on every day, it is worth experimenting with, because it is so nice to use. I think good results would follow if that solution was used more generally in Connecticut.

MR. HALE: I am glad that this paper has been presented, because to my mind it is one of the most concise and practical statements of the situation that we have ever had. A few years ago it was a very common thing for some of our scientific friends to recommend us to spray in the summer for monilia, and the consequence was that a good deal of trouble was brought about. Many of you know of the serious results in our orchards by the dropping of the foliage. My plan here in Connecticut has been to gather the affected fruit as fast as it has appeared. In handling an orchard of any considerable size you will most always have labor that cannot be used throughout the orchard. And if you keep a little more than you want it can be used very usefully to gather such fruit. I think it is a very good plan to make it a point to go over the orchard and gather all the decayed mummy specimens. It is our practice in Georgia to go over our orchards every day. All the rotten and decayed fruit is picked and burned every day. It is considerable of an expense, but we believe it pays. Last year there was an excessive amount of rain, and in the season of 1900 it caused probably a loss of 40 per cent. of the Georgia fruit crop by rotting upon the trees. It grew many spores in the trees and although we picked it faithfully through the growing season, at the end there was an abundance of it in

all my neighboring orchards. Last year we sprayed these trees with 5-5-50 in February and March. It is something that you must follow up. Last year towards the ripening season we made some change and sprayed with 2-6-50. We sprayed single rows, and then crossed over a block to see what the result would be, and we have had less rot there where we did the summer spraying. We had so much less that I was well satisfied that by picking off the rotting fruit in the growing season, and with a strong spraying in the spring it would keep the trouble down in a large measure. The best way to do though is to pick off the rotting fruit. There is no way that will compare with picking off the rotting fruit and cutting off the little branches that are infected. Go right through with the pruning shears, and prune the branches and the whole business. The first thing you want to do is to spray just before the buds swell in the spring and then follow that up by summer pruning and picking just before the fruit begins to ripen. Go right in with the pruning shears in good bright weather. It will help to give color to the fruit and keep down the rot. I think summer pruning before it appears is one of the best preventives, and one of the surest things we can have to keep down the rot. That is the thing to do on peaches and plums, but of course with cherries it is more difficult.

A MEMBER: I would like to ask Mr. Hale, why he burns the mummies? In some cases it would be a good deal more convenient to bury them. If they were well covered would it not be just as well?

MR. HALE: Some people have been known to rise from the dead. If you bury them they may rise, but if you burn them you get rid of them, and rid of them finally and for good. So I believe in cremation. I presume if you bury them it may be all right, but burning is absolutely sure.

THE PRESIDENT: This is an interesting subject, but our programme is very full and we must hurry on. I think perhaps we had better now take up the regular programme. I have the pleasure of introducing to you Mr. William H. Hart, who is a very large grower of apples and has his own cold storage plant. He will now address you on

Cold Storage: Preparing and Storing the Fruit.

By William H. Hart of Poughkeepsie, N. Y.

I would stand before you with great diffidence if I supposed you looked upon me as an authority. Like nearly all of you, I am a fruit grower and learner in the matter of cold storage, an art which is yet in its infancy, and in which much is yet to be learned. I hope you may glean some useful facts from what I say, and if I make any misstatements you will not hesitate to discuss and correct them.

Many think that any food product placed in cold storage may be kept without change for months or years. This is not usually the case. Cold storage retards the process of ripening or decay, which would proceed more rapidly under average conditions of temperature. The time during which fruit of any kind may be kept with profit depends entirely upon the variety of fruit stored, and its condition when placed in storage. Let us consider, therefore, the preparation of the fruit for cold storage.

We must consider first, the variety of fruit; second, the soil, exposure and climate where grown, and the character of the particular season; third, culture, fertilizing, spraying and pruning; fourth, time and manner of gathering and conveyance to storage.

First. In general terms some fruits are peculiarly adapted to cold storage while others do not really yield a profit by this process. The apple is suitable above all other fruits for prolonged keeping in cold storage. The pear and the grape are each kept in large quantities commercially and for a considerable time. The peach is to some extent held for a shorter time, but with doubtful results, unless selected and handled with judgment; while the whole list of summer fruit, plums, cherries and small fruits, need scrupulous care as to conditions of storage but may not usually be carried in any large way over to a higher market. Lemons and other tropical fruits may also be held with varying results.

I will now speak especially of the apple. In setting an apple orchard, if we wish to grow winter varieties suited to prolonged keeping in cold storage, we should select a very short list, choosing the kinds which keep well, and which are likely to be stored

largely to meet a popular demand in the future, and avoid such kinds as scald in storage, and are not attractive in appearance. At present, the four great leaders now stored in large blocks in a commercial way are the Baldwin, Ben Davis, Greening and Spy. In the near future Gano will rival Ben Davis in a small way commercially, and the Sutton may be a substitute for the Baldwin, but is not likely to supplant it. It is better to plant leading kinds to meet the public demand, and to grow the best possible fruit of these kinds rather than to set a long list of choice amateur varieties, and try to educate the public to use them. Any kind not a leader is an annoyance in storage, and will always bring less money in proportion to its quality than a leader.

Second. The selection of the proper soil, exposure and elevation for an apple orchard determines largely the future value of its output for cold storage. An elevated site, with strong soil, retentive of moisture and with good air drainage, will yield firm, close-grained, high-colored fruit with well developed oily skin, and such fruit will keep long and well in storage; while fruit grown in a mist-laden valley will be of a coarser, open texture, and the moisture will cause the protective oil of the skin to be destroyed by fungus growth. Such fruit will shrivel and decay in cold storage, and such a site should be avoided. The aggregate summer heat in a low-lying valley also forces fruit into ripeness long in advance of the hill tops. In selecting fruit for storage the nature of each individual season, whether wet or dry, hot or cool, must be considered by the buyer.

Third. Culture, fertilizing, spraying, pruning,—all these are needed to produce apples best suited for cold storage. Culture must be given perhaps by the newer way of mulching, or by the more usual and approved mode of plowing and harrowing. Fertilizing must be kept up in part by turning under cover crops, and in part by applying manures or chemical fertilizers, supplying the elements needed to cause heavy yields of large, finely colored, solid fruit.

Spraying is of vital importance, as properly sprayed apples will keep very much longer than fruit from the average farmer's orchard. Beyond a question, within a very few years, at the present rate of planting, apples from young commercial orchards of leading varieties and thoroughly sprayed, will practically

drive out of the market the wormy, gnarled fruit from old neglected orchards, and of unfamiliar kinds.

Pruning also lets in sunlight and produces larger, firmer, better-keeping fruit.

Fourth. If perfect control of temperature is assured through cold storage, it is better to gather winter apples earlier than formerly, or so soon as well colored and developed. In our latitude, Greenings are usually ready for gathering for cold storage from the 15th to the 25th of September, or as soon as nearly full grown. Gathered at this season, they remain green and bright. If left until October they may become yellow or clouded. Red fruit may require to be left rather later to color, but all varieties should be gathered as soon as condition of fruit is right, regardless of temperature. My own practice is to gather apples so long as men are willing to work, whether wet or dry. The pickers are told to keep out all showing decay, but all the rest are slid out of the picking baskets into large storage crates holding a barrel each. These are hauled soon as possible to the storage and tiered up nearly to the ceiling, with small spaces between them at intervals for air circulation. All moisture from dew or rain soon evaporates in the dry air of refrigeration. The fruit is graded and barreled at time of marketing at a season of comparative leisure. Whether this method is better than the usual way of grading and barreling or boxing the fruit ready for market before placing in cold storage, I am not prepared to say. On the one hand, the fruit is more bruised and injured in grading, and in the other system more imperfect specimens may remain to work injury to the rest. I am unable to say whether apples tightly barreled shrivel much less and keep longer than in open crates. These details are controlled by adjustments in temperature, humidity and ventilation, and much is yet to be learned. In my particular case, my system gives me satisfactory results which, in a great commercial warehouse, it would not be policy to follow.

After much thought and some little experience, I conclude that the average fruit grower can do better by growing more and better-keeping fruit, and selling it to the men who store on a large scale rather than by attempting to build and operate a small cold storage plant himself. I believe that mechanical cold storage on a large scale is far better and more economical per

barrel than natural ice cold storage on a small scale. I believe that the bulk of the cold storage business will be done in the cities close to transportation and the consumer. The great store houses in varying seasons may be filled from widely separated districts. The equipment for cold storage is so very costly that it cannot afford to be idle part of the time. The smaller houses in the producing regions should have a capacity nearer the minimum rather than the maximum crops of such localities. Thus they may be always filled and the surplus go to the great warehouses where the temperature, humidity and ventilation can be regulated to a nicety impracticable in the small plant.

I would not like to put mechanical refrigeration into a house of much less than 10,000 barrels capacity, while a 50 or 100,000 barrel house, if you can afford it, is more of a business proposition, location being right. In such a building you may run the machinery continuously and refrigerate all food products at a far less cost per cubic foot and with more uniform results than in a smaller house. Natural ice storage has its place in a small way, but hereafter must stand second to mechanical refrigeration in storage.

In gathering fruit for storage I keep it out of the sun, and as cool as possible until put into storage. Refrigeration by rail or steamers in transit is yet in its infancy. When this is perfected, we will have a vast outlet for our food products in other countries, a trade as yet but little developed. He who plants fruit at present must consider conditions which will prevail when his fruit shall come into bearing, and grow such varieties and under such conditions as to compete with all other districts for this trade.

THE PRESIDENT: This has been a most interesting paper, and I think we are to be congratulated in having Mr. Hart with us to-day. Are there any questions? I hope you will improve the opportunity and ask him some if you have any in mind.

A MEMBER: How do strawberries keep in cold storage?

MR. HART: With great difficulty. They are kept best by protecting them with cotton batting to prevent circulation of air.

A MEMBER: Will you please tell us the degree of ripeness of apples that is best adapted to give them good keeping qual-

ities. I mean, how shall we judge of the degree of ripeness that they should have in order to be put in cold storage with the best results?

MR. HART: From the point at which the tissues of the apple are filled up. If the apple is gathered before that it will shrivel more and it will not keep as well. It should not be quite ripe. It should be comparatively green but advanced sufficiently towards ripeness so that the flesh or tissues of the apple are well filled out.

MR. INNIS: Do you find any difference in the keeping qualities of fruit when there is a difference in the temperatures at which it is gathered? For instance, if you gather fruit on a cold day and put it into cold storage or gather it on a warm day, is there any difference in the keeping qualities?

MR. HART: That varies with varieties. Generally speaking, it is better for the fruit to be gathered on a cold day, and to be kept cold until put into storage. I think as a general thing it is always well to be careful to place the package on the north side of a tree where the sun will not strike it, and to keep it in the shade until it is under cover. I have always done that. I would rather fruit would be out two nights than one day, especially if it is very warm.

MR. FENN: I would like to ask Mr. Hart if the density of the atmosphere in ice-cold storage is not objectionable somewhat as compared with the dry atmosphere which we have found in the plant which we visited yesterday. (The Hartford Cold Storage Company.)

MR. HART: There is much to be learned in regard to that. I saw a quantity of fruit stored in a storage house in New York in which there was a great deal of dampness, and yet it was keeping well, and would not be opened for some time. The atmosphere, however, ought to be dry. It is best to confine the fruit in a dry atmosphere; that is, ice-cold storage should be so dry that you can lay a match on any piece of wood in the building, and that is the case in a small storage plant I know of at Highland, N. J. It is always dry enough to light a match anywhere on any piece of wood. That is the object sought for in mechanical plants, and with ice-cold storage, while, of course, it may not be practicable to obtain the same degree of dryness, yet it should be obtained so far as possible.

MR. FENN: I knew of a house in which it was undertaken to store some apples, but there was so much dampness there that it ruined the fruit. The apples were not headed up. They were in open barrels. But the density of the atmosphere settled on the top of the apples, and the chill, or something of that nature, caused a great many of the apples to burst open. Even those that were down in the center of the barrels were affected to some extent. I calculated it was owing to the dense atmosphere. It was very cold, but at the same time there was something that was wrong in principle. That was, of course, in the early days, and before as much advance had been made in the business as there is at present.

MR. HART: It may be that while it seemed cold it was not cold enough. One of the most important things about cold storage houses is not the ice nor mechanical refrigeration, but it is one of the things which we do not see when we go in, and that is the insulation; making the walls perfect non-conductors. It is a difficult thing to perfectly insulate any building for cold storage. Many of them have failed for that reason. The insulation was not perfect. While they get a low temperature, yet it would be a temperature of from 35 to 38 degrees when perhaps it should have been as low as 32 or 33. I think if you were to know about the construction of this house here in Hartford you probably would find that they had buried at least $50,000 simply in the insulation of those walls. That is something which you do not see at all.

MR. FENN: A friend of mine who has constructed a small cold storage plant put in I don't know how many loads of cork in order to get proper insulation. In his plant I know there is a double thickness with paper between, and paper on both sides. This is an expensive thing to do. He told me that he had spent $5,000 in there, and the room was not half as large as this hall. He had the building and this was simply in preparation for making a thorough cold storage department. That is one of the problems of the cold storage business, and it is certainly a very expensive one.

THE PRESIDENT: I think it would be well to hear what Prof. Powell has to say at this time about any facts which have been brought out during the experiments with cold storage which have been conducted by the U. S. Agricultural Department.

PROF. G. H. POWELL: Mr. President and Gentlemen—There is no more important subject that could be discussed by those who are interested in the keeping of fruit and farm products than this subject of cold storage. In fact, the profits of the apple business and the pear business hinge primarily upon the ability to keep those fruits longer than through their natural seasons by means of cold storage. The cold storage business, as developed within the last decade, is one of the most important auxiliaries that the American fruit grower has to-day as an aid to his business. We hardly appreciate, I think, how much cold storage means to the fruit growers of America. Out in our western country, where they have a long, hot fall, it is impossible for them to develop the fruit business without the aid of something to carry the fruit through the warm fall months and over to the time when proper markets can be found for them. This business has developed so largely within the last three years, and so perfectly, that the cold storage men themselves have made every effort to develop their houses to a high degree of perfection. There are many cold storage houses in this country that will carry an atmosphere for from six to nine months, without the variation of a single degree, right through the season. On the other hand, there are a great many difficulties that the cold storage men have to contend with. They are not as yet agreed as to the temperature which is best adapted to certain types of fruit. You will find that the storage men are not agreed as to the temperature at which they want to keep pears. They will vary several degrees in their estimations; some advocating from 35 to 38 degrees, and others from 30 to 33 and 34. To some extent that is also true of apples. Then the fruit itself varies as to its condition.

For instance; a cold storage man has a shipment of twenty carloads a day, and the fruit comes in, all apparently in the same or similar condition so far as the eye will tell, and yet one carload goes down in three months and another carload will keep a year; and so the storage men have come to feel that there is a good deal to be learned about this subject, and the growers, on the other hand, feel that there is a good deal that ought to be worked out in regard to the matter. Now I want to say right here that the growers as a rule, when their fruit does not come out in good shape, are like some types of

growers who are very apt to blame the commission men if they do not get a good price; they are apt to blame the storage men, and say the trouble lies in the house.

Some growers seem to feel, as I have observed, that there is something magical in cold storage; that cold storage is a plan by which first-class fruit can be made out of second-class fruit. They put in a lot of stuff that ought to go to the pig-pen and then kick up a row if it does not come out in first-class condition. They wonder why the fruit does not come out good. That has been the feeling, and that, very generally, the condition of affairs, and so there came to the Government requests, not only from the storage men, but from the fruit growers also, to make a comprehensive study of the various questions that affect the keeping qualities, and also the conditions that affect the growth of fruit which is to be placed in cold storage.

Now I wish to briefly outline the work which has been taken up by the Department. Congress appropriated a small amount of money last year for an investigation of the keeping qualities of fruit in cold storage. That was a start for the work. The Department of Agriculture outlined some experiments along this line. First, we wanted to know something about the proper time, or maturity of fruit for cold storage, and we wanted to determine something about the temperatures in which certain fruits kept best. Working along that line, we took up the question of the keeping qualities of pears. We experimented with the Kieffer pear—the great pear of the southwest—with the view to determine its degree of durability in cold storage, and I want to say in regard to that pear, that the storage men had absolutely refused to receive it because it almost invariably went down. Cold storage had not seemed to keep the fruit in good condition. So this year we made three different pickings of these pears. The first was made about the first of October, another the 10th, and another the 20th; and of each one of these pickings we made two storages: one on the next day after picking, another some ten days after the fruit had ripened out, and some while still hard and firm when it went in. Under each of these it went in at 32 and 36. Now I will just sum up. We found this: that the Kieffer pear must be picked when it is firm and hard and green, and be put into storage as soon as you get it off the trees. Every day that is lost after the pear comes off lessens its durability after it is put in storage.

Now I have some pictures here which illustrate what I am trying to explain. These pictures are all hand-painted, and show the condition under which a great deal of this fruit went in. These paintings will give you a little idea. Now the trouble with this pear has been that it turned brown at the core, while the fruit has remained yellow on the outside. As you will observe from this picture, there is a beautiful yellow pear on the outside and all brown at the core. There is a picture showing the fruit as yellow on the outside and all discolored inside.

Now we found that the discoloration takes place from delay in getting the fruit into storage after it is picked from the tree, and we also found that in nine cases out of ten a temperature of 32 degrees is better than a temperature of 36 degrees. There is a great necessity for handling the fruit just as soon as you can after it is in the proper condition of ripeness. That is one of the important conclusions which we came to; that the fruit must be placed in cold storage at the proper time, and as soon as possible after picking, and also that it wanted to go in at a low temperature, even down as low as 31 to 32 degrees. All our experiments showed that it should go into a temperature down as low as 31 to 32 degrees. At that temperature you can hold this pear right over into the next summer, provided the fruit is in proper condition when it goes in. That is, you must be careful to put in only perfect fruit. Imperfect fruit will not keep in storage.

A MEMBER: Has anything been done by the Government on Bartlett pears?

PROF. POWELL: We have not taken up the Bartlett pear yet for an experiment, but we are going to take up that variety this year. Our funds were so small that we were able to take up only two or three varieties at present.

Now I want to run over just a little of what we are doing in apples. We went out into Missouri and Arkansas and we took two pickings of apples, just as we had of the pears, one when the fruit was firm and hard and in the condition that Mr. Hart has described. We stored a part of that immediately, and we let a part of it stand on the ground for two weeks and then we put it in at 32 and 36.

We made another picking in two weeks and treated it in the same way. We made these pickings from the southwest, in Missouri and Arkansas, and then we came to Illinois and obtained other fruit, and then to New York, where we got quite a number of varieties from Mr. Hitchings, and also some fruit from Lake Ontario region. We took a part of it and stored it immediately, and a part of it was stored later. Then from West Virginia and Virginia also we obtained some fruit and stored it in the same way. Now I have been making an investigation recently and can report what we found up to date.

We have found that the lower you get your temperature with safety, the longer the fruit keeps; that is, a temperature of 31, or even lower sometimes, the longer you can keep your fruit. If it is kept at a temperature of from 34 to 36 its durability is much shorter. We have found also that the more perfect the apples the longer their durability in cold storage. We have found also that number 2 fruit never will turn into number 1 fruit by being placed in cold storage. The storage of number 2 fruit does not pay, as number 2 fruit always goes down very much quicker. It does not pay to put wormy apples into cold storage if you want to hold them up.

Now there are one or two other points that I want to refer to. Scald always appears upon the mature side of the fruit first. On the Greening it will always appear on the side, or down around the base of the apple away from the sun. We have found up to date this: that those conditions which are most favorable for the long keeping of varieties in storage are not the conditions which prevent scald. That those conditions which will favor the longest keeping of the varieties also favor the most scald. We found also that in a temperature of from 34 to 36 there is five or six times as much scald as in a temperature of from 31 to 32, and that those which were put in in a hard and firm condition are not scalded as much.

Now let me say this: the Rhode Island Greening apples which we got from Mr. Hitchings seem to be keeping better than some we got from western New York, but these Greenings are scalded much worse than those we got from western New York, but I would not dare to say that sod culture adds to the good keeping qualities, nor would I dare say that sod culture increases the scald. We simply found those facts, and in this particular line

it would be unwise for me to take a single example like that and attempt to draw a general conclusion for you fruit growers and farmers. There is a great deal to be learned in this. Some of the storage men feel if they get fruit from young trees that it is very doubtful whether that will keep very well, or whether it will keep as well, and also whether it will keep as well when the fruit come from high land as from low land. There is also the question of the keeping quality of the fruit from tilled land versus land under sod culture, and from sprayed trees as against unsprayed trees, that is, of course, where the condition of the fruit is the same. It is the intention of the Department of Agriculture to make a comprehensive study of all these various problems, and especially with reference to their effect upon fruit for storage, and to see what can be ascertained for the guidance of the growers and storage men.

Our ability to carry on our studies in these lines depends upon the liberality of Congress in appropriations of money, but we feel and hope that Congress will be kind to us, and give us the necessary money so that we will be able to follow out this line of work, so that in time the apple and storage business may be put on a more certain basis with regard to some of these questions than it is at the present time. Our storage men feel that we are doing them some good, and the growers feel that we are doing them a great deal of good by taking up this work from this standpoint.

I am very glad to make a report of progress, and to give a little inside view into the lines of work that the Department has taken up in this connection. If I had more time I would be glad to tell you more about the special lines the Department will develop, and especially with reference to what we are doing with a view to developing the export trade.

The shipping of fruit abroad is an important matter, as affording an outlet for our surplus stock in foreign markets, and of course, as has been well known, the great difficulty has been to lay the fruit down in foreign markets in a good salable condition. I am hopeful that very much can be done to improve conditions in this direction.

The Kieffer pear has been sent across this year for the first time, and very successfully. Some peaches were got across this year and we hope that the time is not far distant when we shall

be able to introduce them by the carload and partial carload lots into European markets. We are studying the conditions under which these products can be sent abroad and we are hopeful of doing something which will be of substantial benefit to the growers of this country so as to enable them to develop these markets for our fruits.

MR. SMITH: Have you been able to ascertain under what degrees of temperature the fruit should be taken out so as to be able to hold up well in the market?

PROF. POWELL: The Kieffer pear in coming out of a temperature of 33 held up for three or four weeks. This pear coming out at a temperature of 36 will not hold up nearly so long. We found, as I think I said before, that the lower the temperature the longer the fruit will keep after it comes out of storage. The Kieffer pear will not hold up longer than three or four weeks when it is taken out at that temperature. At a high temperature it will not hold up as long as that. It will go down quicker. I think one reason why the fruit goes down so quickly out of cold storage, is because we take it out when it is almost dead ripe; then the fruit goes down quickly. But if the fruit comes out in good, firm condition, and has been kept under proper conditions, it seems to hold up well. There is a good deal to learn in relation to this subject.

I have a little statement which I would like to refer to, showing the result on an export shipment. It is a little statement of the result obtained on a shipment of ten barrels that were sent across by the Government, and which was packed under growers' conditions. They netted the growers back in Virginia $3.57 a barrel. That is, after all the charges had been paid.

MR. HALE: While Prof. Powell was talking about the Kieffer pear and of cold storage, I have been thinking what on earth was the use of all that. The Kieffer pears will keep in a pig-pen.

PROF. POWELL: The Kieffer pear would not keep this year three days in ordinary storage, and it would not keep that long in a pig-pen. Even after it had been in it would not hold up more than three or four weeks at the outside. The season, of course, has a good deal of effect.

MR. COOK: I cannot keep them longer than that. If you want to raise Kieffer pears you want to plant them in with the Bartletts.

A MEMBER: I would like to ask Prof. Powell, or Mr. Hart, if they can tell what degree of humidity is advantageous for cold storage?

PROF. POWELL: At this time I do not know anything about it, and I do not know as there is anybody that knows anything about it. I believe that we shall come to know by experiment just how much humidity is advantageous. We can gain a little idea of it by the feeling of the people who have had experience, but we shall probably gain a great deal more knowledge on that by actual experiments. It is a subject upon which it is important to gain much accurate information; more than we have at present. I have seen a cold storage man take a hose and just wet the rooms right down at the bottom for a short time. It is something which experience in a cold storage man enables him to handle. He seems to know instinctively. It is a question which the experience of the cold storage man may give a little light on, but it is a question I cannot answer. If there is any storage man here he may be able to tell you how he determines when the room gets too dry. There has been no scientific work as yet to determine what degree of humidity is advantageous.

A MEMBER: I have a friend in New Jersey, who for many years was in the habit of putting his pears into cold storage at once, as fast as picked, and his method of cold storage was to put them in a shed where ice was stored overhead. There was a constant drip of cold water all the time down into the room where the pears were, and the result was that they were kept wet as well as cold all the time.

He practiced that with entire success for many years. As soon as he got through picking, then he began to take out, taking out two or three loads a day all the time, and, so far as I know, his losses were very small, even nothing to speak of. That is a method which could not be generally adopted, and it is not in accord with the ideas of modern cold storage, but it was successful in his case in keeping the fruit in good condition for a short time.

MR. HALE: Right along in that line, I think myself that the cold storage men have been trying to get too dry an atmosphere. I think a good many of you gentlemen can look back to your boyhood days, when you went around among the

neighbors' cellars with the other boys, and knew very well where to find the best apples, and I think if you will stop to think of it, you will remember that the cellars which had the most water in them were always the cellars where you found the most good apples late in the spring. That was my experience, and I think if you will think it over that you will remember, or a good many of you will, that the neighbors' cellars where you got second-class apples, along towards spring, were not the wet cellars. It was the wet cellars that had the plump, sound apples in every time.

THE PRESIDENT: I think Mr. Berry, of the Hartford Cold Storage Company, is still with us, and if he has anything to offer on this interesting subject, we will be glad to have him take the platform. As many of you know, he is one of the proprietors of this new cold storage plant in Hartford, and we shall be glad to have him speak to us if he will.

MR. BERRY: The question has been raised here in regard to humidity, etc., in regard to the storage of apples, and it has also been remarked that dampness and moisture in the apple room is a point that is not favored by the storage men. From our experience so far (and we have been in that particular branch of the business), it is absolutely without any question, that is something we have got to learn a good deal about. But as regards humidity or dryness in the modern cold storage plant, it is a matter which can be regulated. We have our system under absolute and complete control as regards the dryness or humidity of the atmosphere. We use in connection with our cold storage plant a chloride-calcium system for preventing too much dryness and also too much moisture. That is something which is always within the control of the superintendent of our plant. The control is maintained by an instrument which measures the amount with mathematical accuracy, so that the amount can be reduced or increased as the necessity of the case requires, by the application of the chloride-calcium to the refrigerating surfaces, and that, of course, is in the discretion of the superintendent.

PROF. POWELL: That is a matter of judgment.

MR. BERRY: Altogether. There is a scale on this instrument which indicates the change or variation, and, therefore, enables the superintendent, by reading the registration of the instrument, to regulate and control that matter.

PROF. POWELL: How low will that work?

MR. BERRY: At an atmosphere of 31 degrees. That is the lowest. Anything below that is not shown.

A MEMBER: I would like to ask Mr. Powell this question: How long have the pears been kept in storage that you say have kept up two or three weeks after being taken out?

PROF. POWELL: Why, the last withdrawal I made was of Kieffers, and was on the 15th day of January, and from an atmosphere of 32 degrees. Those were pears that were treated immediately after picking, and when I left home they were still in a perfectly firm, good condition. It looked as though those would hold up about a month in a temperature ranging from 50 to 60. We try to put them in a condition that the fruit growers would have had to have kept them in, but as a matter of fact, in a temperature of 36, we found that even though the pears were stored, those pears had reached their limit of storage durability by the first of the year, but with a decline of the temperature it looks as though they would keep until well along in the spring.

A MEMBER: Are the pears any better in January than in December? In other words, does it pay to hold them?

PROF. POWELL: Well, I doubt whether it would be advisable to hold them. I should not want to advise that without looking them over to see. The object of cold storage is of course attained when they can be carried over until a good market can be obtained for them.

A MEMBER: I would like to ask something which it seems to me is of interest to us all, and that is, it seems to me that this is largely a question of how we can carry these pears so as to have them good to eat at this time of the year, and I have been asking myself if we do not make a mistake by trying to keep them too long. The question after all is, is the condition that these pears can be brought out in so as to make them in good condition to give to the public to eat. Now one great trouble, it seems to me, has been that in late years when they have come out of cold storage they were hard, and they have had to be put in some warm place so as to bring them up to the proper degree of mellowness, and in doing that they have been almost invariably injured; two-thirds of them in some cases.

PROF. POWELL: I have no doubt but that is true with regard to the Bartlett pear, but in our experiments we have not as yet touched them. I would state this, however, that I think one of the things which will help to ripen up these hard pears is to push the fruit room where the temperature is, or should be, about 31, up to 40. I think the Bartletts can be kept at 31. In fact, the more I see of pear storage the more I begin to feel that we have been holding our pears at altogether too high temperatures. I have seen Bartletts held at 31 right up to date. In fact, I know that they will keep in a temperature of 31 or 32.

A MEMBER: Don't they freeze?

PROF. POWELL: No. The freezing point of fruit under such circumstances is not the same as the freezing point outside. Just what is the freezing point we do not know. The natural freezing point, which is unsettled, runs from 28 to 31. No work has been done in America to determine accurately that exact point.

MR. COMSTOCK: What is the advantage of closed or ventilated packages when the fruit is sent to cold storage?

MR. BERRY: I would like to say in regard to that, that I have been in a position to recommend to different growers as regards the style of package that they should use when sending fruit to cold storage, and I have taken that matter up with one party in particular, and recommended that he ventilate his apple barrels before packing the fruit into the barrels, and to allow them to go to cold storage in that condition. I recommended that he bore five or six augur holes at different places in the barrel, say of half an inch bore. I have kept watch of those apples and find they are decidedly better than those that came in without that small system of ventilation in any of the barrels. The sweat that the growers think is produced after being picked, is allowed to form while laying in the orchard, and I think that is avoided in great measure, or to some extent, by ventilation in that way.

MR. SHARP: At our Massachusetts meeting last year one of the professors from our experiment station had several samples of apples packed in different ways, boxes, barrels, half-barrels, etc., and they were examined at our meeting in March, and it was decided that perfectly tight packages, as near air-

tight as possible, and the fruit packed in those packages right from the tree, was the best way, because the less decay the less shrinkage in weight there would be. Those apples were weighed and examined afterwards and, as I recollect it, that conclusion was borne out.

THE PRESIDENT: We have still one other topic for the morning session, and we have pursued this subject quite a little, as it has been very interesting, but I think it may be well to take up something else now, so as to finish our programme. We have with us Prof. Townsend from the Department of Agriculture at Washington, and he will address us on the subject of "The Fungus Diseases of Fruits: with Special Reference to Fruit Rot, or 'Monilia.'"

Some of Our Common Fruit Diseases, with Special Reference to the Brown Rot of Peaches and Plums.*

By C. O. Townsend, Washington, D. C.

Mr. President, Ladies and Gentlemen: The treatment of plant diseases has come to be one of the important factors in fruit production. It is to be regretted that more is not known in regard to the cause and treatment of many of our fruit diseases. Nevertheless, remarkable progress has been made along this line within the past few years. Plant pathology is one of our newest sciences, and it is to be remarked that this subject has received widespread attention within the past decade. People are no longer inclined to blame Providence for the failure of fruit and other crops. It is also gratifying, especially to those of us who are studying plant diseases, to know that the scientist and the producer are now working side by side for the solution of the many problems that confront the fruit grower. Science is simply the classification of knowledge, the gathering of facts and putting them into shape for practical use, and those who are interested in the development of the fruit industry will realize that new truths are being

*This address was illustrated with lantern slides showing the different stages of the various diseases mentioned and, so far as known, the organisms that produce the diseases. Much of the value of the address is lost in not being able to supply the pictures; hence parts of the address are published only in abstract.

gained and that these truths are being adjusted to practical uses day by day and year by year. It is true that we cannot, all of us, work along both the practical and the experimental sides of these problems, but by coming together and comparing our results from time to time we shall gain much that is of practical value to all who are interested in the advancement of the fruit industry.

It is not my purpose to overestimate the importance of combating plant diseases. This is only one of the important factors in the development of fruit and other farm products. But if we are to have healthy plants, the same rule holds as in the animal kingdom—we must start with healthy stock. That is a principle which cannot be too strongly and firmly impressed upon the mind. It is true we must pay proper attention to the preparation of the soil, and to the cultivation of the trees after they are placed in the ground; they must be fed and pruned, the insect pests must be kept under control, and at the same time the various diseases to which our fruits and plants are subject must not be neglected. The only problems in connection with fruit growing that we shall now consider for a little while are some of the more common diseases, their nature and their prevention. The first disease to be considered is the peach-yellows.

Although this disease has been known in this country for more than one hundred years, neither the cause which produces it nor the remedy for its eradication are known, but through the painstaking work of Dr. Erwin F. Smith, of the United States Department of Agriculture, much is known in regard to the communicability of this disease, and we are able to keep it in check and to encourage the growers to a very large extent by the prompt removal, and destruction by burning, of all trees as soon as they show signs of the yellows. The unmistakable symptoms of this disease are a premature ripening of the fruit, followed by a production of fine willowy shoots on some parts of the diseased tree. Those of you who have been growing peaches undoubtedly have had the misfortune to meet the yellows in your orchards, but by a united effort among a number of growers living upon adjacent farms you will be able to keep this disease in check by removing and burning the diseased trees just as soon as the disease appears.

The question is often raised as to whether we can plant a tree in the same soil from which a tree affected with the yellows has been removed. I would answer emphatically, "yes, if the proper precautions are taken." By digging away some of the old dirt at the root and putting in some new earth and then planting healthy stock, there is little, if any, danger of perpetuating the disease. In some sections of the country trees have been planted for ten years or more in soil from which other trees diseased with the yellows had been taken out, and they were just as healthy and just as productive of good fruit as any trees in the orchard.

Much might be said respecting the methods pursued in some of the States in combating this disease, but we must pass on to the consideration of some of the other forms of plant diseases.

In regard to plant parasites that produce disease, there are three main classes, viz: bacteria, slime moulds and thread-like fungi. One of the most important fruit diseases produced by bacteria is the pear blight. In practically all pear-producing regions this disease has been more or less destructive. The organism producing this disease attacks the twigs or branches of the tree and the only known remedy consists in cutting out the diseased parts. Usually, just after blossoming time, you will see the blossoms or the newly formed pears wilt and die. The disease gradually spreads from the blossom to the twig and down the twig into the larger branches, and unless its progress is stopped, the disease often extends down until it reaches and girdles the trunk. In cutting out this disease, care must be taken to cut far enough below the diseased area to remove all the organisms that are capable of producing the blight. Some growers, who have tried to rid their orchards of this pest by cutting out the affected twigs and branches, have found at the end of the season that they had more of the disease than at the beginning. This was owing to the fact that they did not cut low enough to remove all the disease-producing organisms. The organism producing this blight is very readily distributed, being carried, undoubtedly, by the wind and by bees from tree to tree and from orchard to orchard. The organism multiplies very rapidly and usually passes through its life history in a very limited time. It is spread in the tree

through the sap, usually downward, but sometimes upward in the twigs or branches. Of course a few of these in a tree or twig would do very little damage, but the organism multiplies so rapidly that the danger of ruining the tree and of infecting surrounding trees is great unless prompt measures are taken for its suppression. The pear blight represents only one of many forms of plant disease produced by these small organisms or bacteria.

The second class of disease-producing organisms is represented in the disease known as the crown gall. It is possible that the disease is not serious in Connecticut or perhaps it has not appeared here at all, but in some states it has become a serious pest. It should be looked for first in the nurseries, as it is more quickly and easily found on nursery stock. In some sections it is not uncommon to find it on the older trees. When this disease attacks a tree it produces one or more galls or knots just at the juncture of the roots and trunk. In some instances the galls appear farther down on the roots or several inches above the surface of the ground. The organism producing this disease has been worked out by Prof. Toumey of the Yale Forestry School and, as already indicated, is one of the slime moulds. This peculiar mould works into the tissues of the root and produces enlargement at the point of attack. These knots injure the appearance of the nursery stock and consequently interfere with its sale. The affected trees are usually shorter lived and less productive than trees produced from healthy stock. All fruit trees seem to be susceptible to this disease; hence a careful examination of the stock should be made before planting, and all affected trees should be discarded. Whether the crown gall is serious or is not serious in this State, it is well to be on the lookout for it. In some sections it has caused a great deal of damage, and there is no reason why it will not thrive here if it is once established. In some stages of the disease, it has been thought that these galls could be cut out of the trees and the disease removed by that method, but thus far this practice has been without satisfactory results, since the galls soon grow again. It is well to prevent, if possible, the propagation of these trees, and only healthy stock should be relied upon for the orchard.

Now we pass to the third form of plant parasite, the thread-like fungus. This form is probably the most common, but in all cases the great difficulty in fighting the various forms of disease-producing organisms lies in the fact that in most cases they are so small that we cannot see them with the naked eye. A great many of our insect pests are beautifully illustrated and described and, being large enough to be seen with the naked eye, become familiar objects, and in them there is something tangible to combat. One fact, however, should be strongly emphasized in this connection, viz., that these disease-producing organisms are just as real, and just as definite in their structure, as if we could see them with the unaided eye. If we examine closely one of these fungi of the third class, we shall find that it is made up of one or more thread-like bodies which are hollow, and which are sometimes divided by cross walls into compartments. These organisms are really plants of a very peculiar structure and possess peculiar methods of reproducing themselves. The reproducing bodies that are formed are called spores. These bodies differ in appearance in different fungi, but their function is always the same, viz., the reproduction of their kind. Wherever these little bodies find a place where the conditions are favorable, new threads will be sent out, and a new fungus plant will be produced. These reproducing bodies are usually too small to be seen with the naked eye and are easily carried about by the wind or upon the feet of insects. Many of these spores are protected through unfavorable seasons by a provision of nature, and they are thus enabled to live through the winter or through seasons of excessive dryness. As it is, a large number of spores are destroyed, but enough survive to perpetuate the species and often to cause untold damage.*

The thread-like structures that develop from the spores force their way into the tissues of the plants upon which they grow and rob them of their nutritive substances. It is in this way that these parasitic plants obtain their food, and at the same time they impart to their hosts more or less poisonous material.

The bitter rot of the apple, for example, is produced by one

*Slides were exhibited, showing methods of spore formation, the manner in which the fungus is produced from the spore and the way it feeds upon its host plant.

form of thread-like fungus. If a spore of this fungus lodges upon an apple it germinates under favorable conditions and produces a thread-like structure that grows into the tissue of the apple and causes it to decay. One may readily become familiar with the disease from the appearance of the affected spot and by the bitter taste of the diseased parts. The fungus grows very rapidly, with the result that even in a few days, through its ready means of distribution, it will be quite generally spread through the orchard. These spores multiply rapidly by a pinching off of the ends of the fungus threads.*

It is apparent, therefore, that cedar trees should not be allowed to grow in the vicinity of apple orchards or, at least, they should be kept free from cedar apples. In addition to this precaution the trees should be sprayed several times during the season with Bordeaux mixture. The matter of spraying is something which must be taken into account in connection with orchard management.

There is another disease of the apple called the Brown Spot. The cause of this trouble seems to be different in different localities. In some cases the spots are full of a thread-like fungus, while in other instances no parasite is found in connection with the discolored areas. It is difficult to distinguish the former from the latter except by the aid of a microscope. If the discolored spots are full of fungi, the disease may be controlled, to some extent at least, by spraying with Bordeaux mixture, just before the buds open and just after the blossoms fall.

Those of you who are interested in the culture of quinces know that both the fruit and the foliage are sometimes affected with a scab similar to the scab of the apple. This has been found to be entirely controllable by the use of the Bordeaux mixture and other fungicides, and in view of the efficient remedy very little may be feared from this disease.

Some of our fruits, especially apples, pears and quinces, sometimes have discolored bands or spots upon their surfaces.

*NOTE. Apple rust and scab were also described, and it was shown that these diseases were also due to the action of thread-like fungi that grow into the tissues of the fruit and foliage. Attention was called to the fact that the peculiar growths sometimes found on cedar trees and known as cedar apples, are one stage in the life history of the apple rust fungus.

These discolored areas are caused by frost or other unfavorable conditions, and are not due to the presence of a parasite.

The disease known as black knot, common on cherry and plum, is easily recognized. The knots are usually brown at first, but become black as they get older. Black knot is produced by a fungus that attacks the twigs and branches of the wild as well as the cultivated species of both the plum and the cherry. These knots should be cut out as soon as they appear, and the trees should be thoroughly sprayed with a copper fungicide.

In connection with all fungus diseases, too much emphasis cannot be put upon the importance of thorough work in spraying. Some growers have sprayed with very satisfactory results, while others have been less successful. A failure to get good results in spraying is often due to an improper preparation of the fungicide or to a lack of thoroughness in its application. It is true that the kind and condition of the tree, the stage of development of the fungus, and the state of the weather, are all important factors which contribute much to the success or failure in the use of fungicides.

The black rot of the grape is probably the most serious pest with which the grower of this fruit has to contend. Under ordinary conditions the disease may be controlled by the use of Bordeaux mixture. Usually five or six applications during the season are necessary. It was in connection with the black rot of the grape that Bordeaux mixture was discovered in France, near the town of Bordeaux. No fence being between the vineyards and the roadway, travelers in passing along were in the habit of running into the vineyards and gathering a few bunches of grapes to eat as they went on their way. The large number of travelers in that section carried away a considerable quantity of fruit during the season and the growers determined to make the grapes appear to have been poisoned. Accordingly they mixed together some bluestone and lime, and threw it into the vines near the roadway. That year there was a serious outbreak of black rot in those vineyards, but it was noticed that those grapes which had received bluestone and lime mixture were nearly free from black rot, while farther back from the roadway, where this substance was not applied, there was considerable disease, and from that small beginning Bordeaux mixture has come into general use as a fungicide.

Another fungus disease which often troubles our grapes is the anthracnose. This disease is well known, and can be successfully controlled by the use of the same remedy that is employed in treating the black rot; simply by spraying four or five times during the season with Bordeaux mixture.

Finally the brown rot of peaches, plums and cherries is produced by a thread-like fungus *Monilia fructigena.* As the name of this disease indicates, the affected fruits assume a brown color, but in a short time the surfaces of the diseased fruits become gray or ash-colored. This is due to the formation of the spores of this fungus. As soon as these newly-formed spores find suitable conditions, they germinate and produce slender, thread-like structures which penetrate the tissue of the peach, cherry, plum, etc., causing a diseased spot to appear within a few hours. The fungus needs no assistance from insects or other agents in penetrating the surface of the fruit. When once within the tissues of the fruit, the fungus grows rapidly and produces a new set of spores in from thirty-six to forty-eight hours, or even in a shorter time under favorable weather conditions. The rapidity with which this fungus grows and produces spores accounts for the great amount of damage that it may produce in a short time. It should further be noted that this fungus is capable of living over the winter in the diseased fruits that are allowed to remain over in the orchard, so that when the warm, moist days of spring come the fungi that have lain dormant in the decayed and partially dried fruits, renew their activity and produce new spores. These spores, like those of the previous year, are carried by the wind or other agencies onto the limbs and branches of the trees. With these facts in regard to the life history of this fungus established, the all important question is, What steps should be taken for the suppression and control of this pest? First, all partially dried or mummified fruits, as they are usually called, whether on the tree or on the ground, should be gathered and burned. This should be done in the fall or winter, the earlier the better. It is recommended by some that these fruits be buried, but it is always far safer to burn them as soon as gathered. Second, the fruit should be properly thinned. In no case should two or more fruits be allowed to remain in contact with each other, since the point of contact furnishes an excellent place for mois-

ture and spores to collect. Third, as soon as the rot appears, the affected fruits should be gathered and burned. This process should be repeated with sufficient frequency to prevent the fungus from producing spores. Fourth, the trees should be sprayed thoroughly with Bordeaux mixture before growth begins in the spring. There is considerable difference of opinion in regard to subsequent sprayings. It is known that the application of fungicides will prevent the rot, but frequently considerable damage is done to the foliage, especially of peaches and Japan plums, by the use of Bordeaux mixture. Hence, if subsequent applications of Bordeaux are to be made, the amount of bluestone should be reduced and the amount of lime increased. The speaker has had good results in the majority of cases in using two pounds of bluestone with from six to eight pounds of good lime in fifty gallons of water. If the trees are sprayed after the leaves appear, there should be from three to five applications, depending upon the weather and upon the variety. It is apparent that the spraying should be continued longer upon the late as compared with the early varieties. Fifth, remembering that this fungus is capable of growing upon a number of fruits, attention should be given to the conditions surrounding the orchard, so that, while one is combating the rot in his peach orchard, for example, the spores are not being brought into the orchard from nearby plum or cherry trees. In this connection it should be suggested that fruit growers upon adjacent farms should combine against this common foe. While a single fruit grower may do much in combating this disease, much more satisfactory results may be attained by keeping the fungus reduced to a minimum in the entire neighborhood, since the spores are capable of being carried long distances.

MR. STERNBERG: I think we have listened to a very instructive address, but as it is dinner time I would suggest that we now adjourn to 1.30, and then come back and continue the discussion. A good many of our friends, no doubt, will want to ask the Professor a good many questions, and we shall be glad to continue this subject after dinner.

President Platt announced the following Committee on Nominations: Mr. Edwin Hoyt, Mr. A. C. Innis, Mr. A. W. Saunders, Mr. H. B. Buell, and Prof. W. E. Britton; and a recess to 1.30 was then taken.

Afternoon Session, February 5th, 1.30 P. M.

The Society came to order at 1.30 P. M., President Platt in the chair.

THE PRESIDENT: The lecture this morning was cut short, because the dinner hour arrived just as Prof. Townsend had finished showing his pictures. Now I do not doubt but you will want to follow this subject further, and if there are any questions which you wish to ask Dr. Townsend there will be an opportunity now.

DR. TOWNSEND: I wish to add just a word to what was said this morning. By adopting and practicing the methods suggested this morning for keeping down the monilia, the results will be better the second year than they were the first, and the third better than they were the second, and so on, that is, the effects are cumulative. This is a general principle that applies to plant diseases of all kinds. It is of the highest importance that each step in combating this disease should be carried out with promptness and with thoroughness. There are two things which often explain the lack of success in spraying. One is because the mixture is not made with proper care, and the other is because it is not properly applied. Care must not only be taken in these particulars, but also in the promptness and thoroughness with which the work is done. The trees must be well covered with the fungicide. And, finally, remember that spraying is only one step in the struggle against monilia. The mummified and decaying fruits should be picked off and burned.

THE PRESIDENT: Suppose this decayed fruit is left laying around like old apples. I suppose it decays like any other vegetable matter, doesn't it, and why isn't that the end of the monilia spore?

DR. TOWNSEND: The peach does not always decay and disappear like other vegetable matter, but it dries down and the monilia fungus remains in these dried peaches and the following year the fungus is capable of producing a new set of spores. For this reason, the mummified fruits should be destroyed by burning.

THE PRESIDENT: Will the fungus live in the soil no matter how much water there is in it, or how moist the soil is?

DR. TOWNSEND: If the soil is constantly water-soaked and the partly-decayed peaches are in the soil, the fungus would be destroyed, but these dried peaches are not easily soaked through and, remaining on the tree or on the surface of the ground, as some of them do, they soon dry off and the fungus is protected. A great deal of the fungus as well as a large part of the fungus spores are destroyed, but enough survive to perpetuate the fungus from year to year.

MR. WAKEMAN: Does the weather have a good deal to do with it, as to the amount of it that we have during a season?

DR. TOWNSEND: Yes, the weather has a great deal to do with it indirectly. It is said that warm, damp weather aids the rot, and that is true, since the germination of the spores and the subsequent development of the fungus depends upon weather conditions. If the fungus or its spores were not present the weather alone would not produce the brown rot. Hence the weather is only indirectly responsible for this trouble.

MR. BECKWITH: I noticed among the pictures that were shown was one in regard to the growth of the plant knots on the roots. I would like to understand a little more about that.

DR. TOWNSEND: I will say that the knots commonly called crown gall, are liable to appear on our common fruit trees, such as apples, peaches, pears, plums, etc. These knots vary in size and usually occur at the crown of the roots. As shown by Prof. Toumey in his work on this disease, these knots are produced by a slime mould. Sometimes knots are produced on the roots of certain plants by a small worm; in other cases they are produced by an aphis, hence we should learn to distinguish between the knots or galls of different kinds. The crown gall is often found on nursery stock, care should, therefore, be taken in selecting trees for planting to avoid this disease. No remedy is known by which a tree affected with this disease may be cured. It is true that a tree affected with the crown gall may live for several years and even come into bearing, but the general experience is that such trees are unprofitable.

A MEMBER: I would like to ask the Professor if he will kindly go over what he said this morning in regard to the treatment of monilia; if he will briefly go over that again.

DR. TOWNSEND: I shall be very glad to go over the different steps in the treatment of monilia. In the first place, see that

all the mummified fruits are gathered from the trees and from the ground and burned. Do not bury them. It might be all right if they were buried, but they are liable to come to the surface through the process of cultivation, and the fungus will live for several years in the partially dried fruits. The next step consists in picking the decaying fruit from the trees as soon as it begins to rot. I believe I called your attention to the fact that the spores may begin to germinate in twenty-four hours. The spores may even produce a complete fungus plant in that time, and from a single spore may come hundreds and thousands of spores in a few days. So, just as soon as a rotten spot appears on the fruit, destroy it so that no spores can be produced. If all decaying fruits are destroyed promptly there will be no mummies. At the proper season for thinning the fruit, see that this work is properly done. Regardless of disease you would thin your fruit in order to get a good quality. From the standpoint of disease, the fruits should not touch each other on the tree, and the farther apart the fruits are the safer they are. While the trees are still dormant in the spring, spray them thoroughly with ordinary Bordeaux mixture. While there is some question in regard to the advisability of spraying after the leaves are out, it seems to me that the chances are in favor of spraying at intervals of from ten to twenty days with weak Bordeaux mixture. For these subsequent sprayings it does not seem advisable to use more than two pounds of bluestone, with six or eight pounds of good stone lime, to fifty gallons of water. It would not be safe to depend upon spraying alone to control this disease. The decaying and mummified fruits must be destroyed. The spores may be carried through long distances; hence look to the surroundings of your orchard, see that no decaying fruits are found in adjacent fields. Finally, induce your neighbors to join you in your struggles against this pest.

A MEMBER: Professor, can you prescribe some treatment for what is called "Gummy Ooze" on the peach? You might know it by some other name.

DR. TOWNSEND: No. It is quite common. I have seen a good deal of it, and I am sorry to say I know of no remedy. The cause of that gummy ooze is not known, and the remedy is not known. I remember in one orchard of some thirty thousand trees there was an outbreak of it, and it looked for a time as if

the trees would die, but they came out of it all right after a time. I was unable to trace any cause for it. That particular section of the orchard where it appeared was lower than the rest, and there was some considerable moisture there, and there was somewhat of a frost in the spring. It seemed to be a weather condition, but I do not know as it was due to that. No one has been able to trace the cause of it.

THE PRESIDENT: While the Committee on Nominations are deliberating we will take up question No. 4: "What are the respective advantages of close and wide apart orchard planting?" I believe Mr. George H. Hale of South Glastonbury is to give us something on that.

MR. GEORGE H. HALE: *Mr. President and Gentlemen*—I shall talk more on the close planting of trees than on wide planting. Although I now believe in wide planting, I have practiced to quite an extent for twenty years the close setting of trees. In 1879 my brother and myself planted an acre of peach trees fifteen feet apart. In 1880 we planted eight acres, and in 1881 some twenty acres, all of which were set fifteen feet apart each way. That gave two hundred trees per acre. Our first crop of peaches was produced the fourth year when we received about a basket per tree. Our first crop netted us 56 cents a basket. Now if we can get one basket per tree, on two hundred trees to the acre, and set fifteen feet apart, as ours were, if we can set them thirteen feet apart it will give us two hundred and fifty trees to the acre, which means two hundred and fifty baskets per acre. Or, in other words, if we are getting $1.50 a basket, it is $75 an acre more, and money is what we are after. We planted no more trees until 1890, and then we planted about twenty-five acres at thirteen feet apart, which gave us two hundred and fifty to the acre. In 1891 we planted ten acres at thirteen feet, and in 1893 twenty-five acres at thirteen feet apart, and they all produced good results at thirteen feet apart each way, and we thought at that time that that might be considered as a sort of a standard distance for setting, but this last year, when it came to 1901 (we dissolved partnership in 1896), I had a large number of trees which almost covered the whole ground when set at that distance, and I said that the next time I would plant them as far apart as twenty feet. It does not pay in the long run to set them

close unless you are short of land. I do not think it pays in the long run to set them less than eighteen feet apart. I believe you will obtain more money in the end than you will by planting them thirteen feet, or fifteen apart. At the end of the fourth year you will obtain just as many baskets from your trees fifteen feet apart as you will from those set eighteen feet, and when it comes to the second crop about as many, and in the third a little less, and so on. In other words, we have had trees that have been set twelve years from which we have picked as high as twenty baskets. That is large. If you take an orchard of ten thousand trees, if it will average four baskets of marketable fruit to the tree it is a big yield. Of course, I do not know what my brother would say on this. He has generally done the preaching for the family, but I have had considerable to do with the business, and, as you are well aware, I was a nurseryman up to 1896, and if I had been telling you this little story five years ago I might have said to plant your trees thirteen feet apart. A nurseryman, you will always notice, will tell you any thing in order to sell trees—every time. I don't suppose there are any nurserymen here to hear me say that, but that does not make any difference.

A MEMBER: Brother Hoyt is here.

MR. HALE: When they get out of the nursery business they will all come back here and tell you the same thing. Now figure it up a little on the basis of trees fifteen feet apart. Now you take the trees in a peach orchard, and they will die out some. A peach tree at best is comparatively short lived, and I should advise everybody, if they think their orchard is not going to last, to plant them thick; and that is one trouble, you don't know. But I should say not to plant your trees less than fifteen feet apart, and, if possible, make them eighteen feet apart. At twenty feet it will only give you a hundred and sixty trees to the acre, but I have noticed in places in an orchard where there was plenty of sunshine that you got finely colored and developed fruit. I had an orchard that I planted in 1897, setting them fifteen feet apart, and they are all grown in together, and this year I had a lot of fruit from that orchard which was green and small, a lot of fruit which was second grade. Occasionally through the orchard there was a space where one or two trees had died, and I noticed that the trees

right around there bore beautiful peaches. They were finely colored. Fine, handsome peaches, and that only goes to show that we must give them sunshine. I believe that an orchard planted from fifteen to twenty feet apart will live longer. Why? Because there is more room, and there is less liability to disease, and there is more sunlight and air among the trees. I believe such an orchard will last longer. Of course there are a good many of you who may differ with me. Some may want them thick, and some may want them thin, and you may be sorry if you do, and sorry if you don't. If you put them in thick and your orchard plays out in six or seven years you will be sorry you did it. I think on the whole it is better to set the trees the wider distance apart so as to get as much benefit from sunlight as you can. The orchard will live longer for it, and it is just as profitable, if not more so, in the end.

THE PRESIDENT: Of course, if you head them back you can plant them thicker. It wants a man of good judgment to prune the trees.

The order of the day now would be the election of officers, but the Nominating Committee is not quite ready to report, and, as the next speaker is in a hurry to get away, I would now like to have that speaker, Mr. Foster, address you.

Domestic and Foreign Fruit Markets, and Their Requirements.

By Mr. Charles Foster of New York City.

Mr. President and Gentlemen: Through the courtesy of your secretary, I have been asked to address you upon the subject of "Domestic and Foreign Fruit Markets and Their Requirements." It is one that has had wide discussion, and requires broad handling to lift it above the level of purely local, and oftentimes, narrow interpretation. Within the limited scope of a paper of this kind, I shall endeavor briefly to treat the question from the viewpoint of the distributor in the home and foreign markets—the necessary factor in a business of such magnitude, whose contact with producer and consumer offers opportunity for a fair study of conditions that make for mutual success or failure. The proposition "what to grow and how to grow it," takes first rank in the discussion at issue, as success primarily

rests with the producer, who should seek to know what is wanted most in the markets that he may exploit, and in what manner it should be presented to the consumer to command the most profitable returns.

I think it may be stated with fairness that twenty-five per cent. of the present supplies of fruits and vegetables coming to the markets of the country could be eliminated without loss to anyone but the carriers. If the producer needs proof of this let him consult his returns, which almost invariably disclose little or nothing received for an important percentage of his product, with time and labor actually lost in preparation, and hauling to railway or steamboat. That the process is kept up year after year attests the sluggishness of the average agricultural mind in properly sizing up the situation. As a rule, he satisfies himself with wondering why, and blaming his commission merchant. The fault rests with himself. With no high standard to govern him, he grows his produce poorly, preferring an acre badly cared for to a half acre well fertilized and generously cultivated; and if it be strawberries or raspberries or currants, the result is an excess of undergrade stock, all of which goes to market as it is, because it cannot stand grading, and the returns, as stated, are disappointing and unprofitable. Had one-half the acreage been put out, I venture the opinion that the same fertilizing and care as that bestowed upon the larger patch would have brought returns almost identical. It is not that the smaller, and logically, finer product, would bring so much more money, but it would all be sold, whereas a heavy percentage of the poorer stuff finds no ultimate market, but is thrown away and lost. It has been stated, with some degree of truth, that the great mass of consumers (the common people) enjoy little advantage from an over-production of fruits and vegetables. It is, I think, due largely to the fact that, while at such periods of excess the grower and huckster buy more liberally, the ultimate waste due, as stated, to poor quality, demands an averaging up in prices on the best to make him safe against loss. One of the largest of our retail dealers in fruits and vegetables in New York, who will put out as high as two hundred bushels of berries to his Saturday trade, recently stated that it is never the quantity that bothers him. If the fruit were graded better, and his percentage

of rubbish eliminated, he could buy even more liberally and sell cheaper. How often when most liberally supplied with goods, the commission merchant finds the trade will float past him, because he has not what they want, and are willing to pay for. The knife is put in, the wagon boy or huckster gets the goods; the commission man works for little or nothing, and the shipper gets what is left.

Turning from our home markets to those of the United Kingdom and the Continent, and we have the same problem to face. Our average annual export of fresh apples from the United States and Canada during the last twenty years has been 1,000,000 barrels. For the last several years it has averaged 1,250,000 to 1,500,000 barrels. During the big season of 1896-7 it reached 3,000,000 barrels. It is a trade well worth conserving, and, by reason of geographical position, means more to New England than to any other part of our commonwealth. Here again we find grading and packing defective, but, by reason of European sales being almost entirely at auction, where samples are dumped, thereby disclosing the entire contents of packages, irregularities are quickly uncovered, and goods are sold more nearly for what they are worth.

One of the most interesting sights in the world to the lover of fruits is the Liverpool Auction Room, where, in addition to oranges, grapes and other seasonable products, as high as 50,000 barrels of apples have been sold in one busy day. How absolutely essential is it, therefore, that fruits going abroad should be properly graded and packed. It is only within a twelvemonth that some of us have listened to the reports of Canadian commissioners sent abroad by their government to investigate the methods of sale, with a view to the betterment of conditions and the enlargements of markets for Canadian food products. Their recital of the irregular methods of Canadian apple packers (largely growers of fruits) was both interesting and instructive. It displayed the Canadian grower as one very far removed from him who gives much that little may be received in return. The exhaustive report of these fearless emissaries of the Canadian government was one of the severest arraignments of irregular methods ever listened to. As a result of it all, and with an eye to the interest of a business that was rapidly losing caste abroad, a most drastic law was passed by

the Canadian Parliament covering the grading and packing of apples which, if only fairly administered, means much for the life of that industry. To-day in Canada, apples must be selected and packed in conformity to governmental standard, any infraction of the law carrying a penalty sufficiently heavy to be a burden to wrong doing. It is said, after a season's trial, that this law is not working satisfactorily, but it at least suggests a governmental foresight superior to that of the individual Canadian fruit grower, who, impeded by a restrictive American tariff at his border, can logically look to but one market for the distribution of his important and constantly expanding crop surplus. Who that has stood in any of the markets of the world to which our special lines of perishables find their way has not blushed at the sight of offerings unworthy of the name? It was but last spring that a prominent commission firm at Liverpool wrote of a certain consignment of Russets from New York: "It is a shame that any American of character should send such trash to the English markets with the expectation of satisfactory sale. The whole invoice after removal of the top layers is little better than culls." A society of horticulturists as prominent as this, and which is bestowing so much time and thought upon the subjects of conservation of soil, elimination of insect pests, and the general physical up-building and expansion of orchard and garden cultivation, can well afford to supplement its good work by allying itself strongly upon the side of honorable methods of marketing the developed product. The exalted standard adopted by your distinguished colleague, Mr. J. H. Hale, of South Glastonbury, should be an inspiration to all serious-minded horticulturists. His scientific skill in the growing of fruits is only exceeded by a studied choice of the most marketable varieties, while his methods and style of grading and packing have given him a name beyond reproach in all markets he has entered. We have another in our own State of New York, in the person of Mr. George T. Powell of Briarcliff Manor, who, in addition to the study of how to produce, is ever foremost in the discussion of how best to market his fruit crops.

Honesty of method is the prevailing instinct which dominates the work of high-minded, practical men in all departments of industrial life. The United States may well be proud of the great galaxy of talent devoted to the elevation of fruit growing,

from the haphazard standard of former days to that of the scientific culture which gradually but surely is making its influences felt in every rural community. The great cry of the distributor in the fruit markets of the world at large to the horticultural societies, of which this is an honored representative, is, "Come over into Macedonia and help us." The average grower of fruits and vegetables needs just as much education upon the secondary proposition, how best to market his product, as upon the primary one of how best to grow it. The distributor, or dealer, to whom he may consign, withholds suggestions for fear of being misunderstood. To criticize a shipper's methods too often means the loss of a more or less valuable client. It doesn't pay, and is therefore considered not worth while. The grange meeting and the county and state convention is where work of this kind can be promoted without fear of misrepresentation.

What the markets require is, quality first, and quantity next. Let the peaches be well graded with but one variety in a package. Give generous measure. A crate of raspberries or strawberries scantily filled never brings its real value. Avoid the "pony" package, and let the package be new whenever and wherever possible. The apple barrel adopted by the National Apple Shippers' Association is the standard of the country, and will sell in any market at home or abroad. The stove-pipe barrel of the Hudson River can go to Europe or to New York, where they don't want it, but the great West will have none of it. When using the generous second-hand flour barrel always wash and dry it thoroughly. Flour dust upon apples, pears or quinces means a cut of twenty-five or fifty cents in the price to make the stock sell. It represents a poor economy of time and labor. Use a stencil for the different varieties of fruits. It costs but a trifle, and indicates care and interest in the details that is always appreciated. Don't be ashamed to have a brand of your own, and pack up to it. The No. 2 stock will sell under a second brand, which can be understood. Shake apple barrels often while packing the fruit, and the attendant pressing need not then be too severe to bring it to market tight and in good form.

And now a word about a few other requirements of the home and foreign fruit markets: A generous government has recently

set apart a fund for investigating this field, and particularly the latter, with a view to its enlargement. It has been my pleasure and privilege to come into practical contact with Prof. W. A. Taylor, under whose special direction some of these investigations are being made. We coöperated in the shipment to England last fall of Bartlett and Kieffer pears, packed under the supervision of a government inspector, with results, that in the latter case especially, were most flattering. It looks to-day as though we had found a market in Europe for some of the dreaded surplus of Kieffers, about 4,000 barrels of which, during the past season, have sold at good prices in the market of the United Kingdom. Perhaps it may yet prove a fairly profitable, if not satisfactory, substitute for the rapidly degenerating Eastern Bartlett of fragrant memory. It certainly looks, too, as though we were going to give a large place, in both home and foreign markets, to the Ben Davis apple, about which some of the horticulturists grumble so fiercely. In this season of Eastern shortage of red fruit, it is proving itself a wonderful seller in all the markets of this country and Europe.

It is not the purpose of this paper to say what to grow and what not. The markets of the world want the best, and will always pay a fair price for it. The commercial instinct is strong, and markets clamor for what will sell best. It were well to remember that in the development of new varieties an eye should be had to all the essentials that make for success. On these latter we may honestly differ, but all will agree that the higher the level of production of anything, and the more honestly it be marketed, the greater the chance for success and profit to all concerned.

(Vice-President Sternberg was called to the chair.)

Mr. Foster: Now Mr. President, I would be very glad, if there are any questions along our line of business, to answer them if I can. It is very hard to either prepare a paper or to make an impromptu address upon the subject of what the markets require. The markets require so much, and such a variety of produce, that it is very hard for any distributor to say what is best, or what should be done, or what should not be done, but if there are any of you gentlemen who would like to ask me specific questions which I can answer, I shall be very glad indeed to give you any information I have. I may say that of

the crop of 1896 we distributed about 650,000 barrels, but this year only about 350,000 in the three markets of Liverpool, London and Glasgow. The export of fruit to the old country is a great and growing industry. The Agricultural Department at Washington, through its agent, Prof. Taylor, is investigating this field with a view to finding means for its greater development, and it is a field which offers great opportunities to the American horticulturist, and especially to the men who will use new and improved scientific methods. The man who selects, and grades, and packs his fruit in the most tasteful and taking manner, is the man who is taking the business, and at good prices. That is the way that California has won its way, even in the New England markets, with its fruit, and yet, I think we will all agree that the California fruit does not compare with our eastern products, but the point of it is, and particularly the beauty of it is the fact that it is their packing which has enabled them to meet the world, and to compete successfully in the foreign market. They meet the French, who are the greatest packers in the world, and they have fought their way against the French product, and against the English markets, and they have won out. So that to-day the Bartlett pear, and the Kieffer pear, and the California plums of certain varieties have won their way in England, and are selling there profitably. We have not been able to do very much from our eastern seaboard cities by reason of the lack of available cold storage facilities, or space upon our steamers. The California men export their product by coöperation with the steamer lines, and they have been able to take over all the space on a certain steamer each week during certain periods of the year. They are able to ship in large quantities, the shipment sometimes involving a matter of five or ten carloads. We in the East cannot afford to experiment in that way, and that being so we cannot expect our business to develop rapidly, but from time to time we have been able to use a part of that space, and have sent over some goods. Last fall there was sent quite an important consignment of Western New York pears, packed in boxes and half-boxes. The half-boxes took the best in the English market. We sent over several varieties until we flooded them, and it was not a very good thing to do because the quality of the stuff was poor, and it was not very attractive, but until we flooded them the returns

were exceedingly good, and above anything that we could get for them at home. We realized as high as four to five dollars a barrel. The barrel packages we were successful with only in a limited way. The half-boxes were what took in the English market. Some of the consignments arrived in poor condition, but those that arrived in good condition competed with the English varieties, and realized good money. Of course to handle this trade successfully we must have the benefit of cold storage on ship-board, and the trouble with shipping in cold storage on the steamers is the same as the trouble with cold storage in the field. I understand that the question of cold storage was discussed in your convention to-day. I should have liked to have been present at that discussion, and have heard the different opinions in regard to it. There are certain things in regard to cold storage which we have got to understand as absolutely necessary. The fruits must be gotten into cold storage as rapidly as possible, and the temperature must be kept even. The mistake of even a degree in temperature may cause loss and serious trouble.

MR. J. H. HALE: You spoke of using tasteful packages, and advised against the use of common flour barrels. If we can't get anything else what shall we do?

MR. FOSTER: Why, Mr. Hale, that question is almost a superfluous one, simply because in districts like Ulster County, N. Y., and the back districts in Connecticut they cannot get new barrels as readily as you can, and they have to depend upon the common flour barrel, but it would pay many of those growers to obtain new barrels. The difference in price is only a matter of ten or fifteen cents at the most, while a good second-hand barrel can be made all right to use; in a good many cases it is not done, and it operates against the price that the fruit brings. Why, I have seen fruit come into the New York market so covered with flour that you could hardly recognize what it was, and it was very hard to convince the shipper that the fruit had arrived in any such condition.

MR. MERRIMAN: I would like to know if a bushel package or box would not be better in shape for the London market?

MR. FOSTER: Well, in one way it might, but the bushel box costs in proportion a great deal more than the barrel. Unless for fine varieties I should say not. For fine varieties, such as the King and that class of fruit, I should say "yes."

A MEMBER: How about the Baldwin?

MR. FOSTER: Well, there are so many Baldwins. The Baldwin is the standard export apple, but there are so many of them that I should say, unless they were landed after the rush is over, it would not be wise to pack in boxes as against the barrel.

MR. INNIS: What is the best style of package for berries for the New York market?

MR. FOSTER: We like the 32-quart crate. That is about as good a crate as we have, and it sells about as well as any other.

MR. STERNBERG: What is the prospect of our being able to ship peaches to Europe?

MR. FOSTER: I do not think there is much of any prospect at present. I am sorry to say that, but we have been so disastrously unsuccessful with shipments of peaches that I should say that we could not do much in that line. They do not seem to reach there properly. Those that reach there sound are chilled through, and when they come from the steamer's cold storage they are perfectly black and worthless. What we want is better grading, and better selection. That all goes, you know, to help the fruit to stand up, and it is also helped by cultivation, and spraying, and proper fertilizing. I think it cannot be too strongly impressed upon horticultural societies of this kind that to get the best fruit we have got to give it the greatest amount of care.

MR. STERNBERG: I want to ask if there is any special way that you recommend apples to be packed for the English market; that is, as to the way in which they are put up in the package?

MR. FOSTER: The best way to pack apples for the English market is to do it in the orchard, in the field, of course, and to pack immediately from the trees. A platform about the size of that table is the best thing that can be used, and in its absence get a large, stiff plank to lay under the barrel. Take the barrel and turn the face side down, which would be the head of the barrel. We double face them. They look better when opened. Then after facing them double we pour in a basket or two baskets of apples and shake them, not too freely but just enough to jar them and to settle them. Then put in another basket or two baskets, and so on, jarring and settling as you put in each basket until you have got it filled up to about two inches above the chime. Then put on the press. In that way the barrels do

not need as much pressing, and you get good tight barrels. If you have tight barrels the fruit will go to Europe all right. It doesn't do to have slack barrels, or loose barrels. Here we sell the whole bunch from a lot of fruit together, but over there they sell it by sample and largely by auction, and they separate it into four or five different grades. The buyers come down to their great markets from all parts of the country, and if it is slack they have no way of tightening up the fruit to get it home. What they want is good tight fruit that will go home all right.

Now in regard to varieties. Of course red fruit is the standard in the English market. They grow in the United Kingdom a good many apples, but there are very few of them of the red varieties. Most of them are white and green varieties. They have only three or four varieties of red fruit, and grow them only in a small way. They have the Duxbury Red, and one or two other varieties. Therefore they want our common American and Canadian red fruit more largely than they do green fruit. And right in that connection it may be interesting to you gentlemen to know that the old time Greening apple is coming again into favor in the markets, both in England, and in our home markets. I had an inquiry from our people in Chicago yesterday, asking me if we could ship them a good grade of Greening. They said if we could, they would guarantee six dollars a barrel for them. If I was to start to plant an apple orchard to-day, I should plant twenty-five per cent. of it with Greenings, some red fruit, and then the rest Greenings. It is one of the best apples we have got, but it has been allowed to degenerate. It is just as much a coming apple as any variety we have, and by generous cultivation and care it can be made just as profitable. We are getting $5 for it without any trouble, and we are also getting $5 for Baldwins.

MR. STERNBERG: What are the keeping qualities of the Greening as compared with the Baldwin?

MR. FOSTER: From the 1st of February we calculate to have our Greenings marketed. Everybody is afraid of Greenings after the 1st of February, and it is because the Greenings will scald. So will the Baldwin, but the Greening will scald quicker, and shows it quicker as it is a white skinned apple. Even the Ben Davis will scald. (Laughter.) After it has been in about so long it will scald just as well as the rest of them. But the

life of the Greening is not so prolonged, or the marketability of the Greening is not so prolonged as the Baldwin or Ben Davis. Do not be afraid to plant the Rhode Island Greening. It is all right.

A MEMBER: What do you think of the Pecks Pleasant?

MR. FOSTER: It is an excellent apple. It is not an apple that is grown very freely. Unfortunately it is taken a good deal for the Newtown Pippin. There are tricks in every trade but ours, you know, and we do it when we can.

MR. COOK: I have got some fifty trees that I bought for Newtown Pippins. I bought fifty trees. I have been trying ever since I have been farming, or for more than 32 years, to get some Newtown Pippins, and I supposed I had some, but talking with a friend one day, he says: "Cooke, have you got the Newtown Pippin?" I told him I supposed I had, and he looked at them, and he says: "They look very much like the Newtown Pippin," but he says, "they are just like what I have known as the Peck Pleasant." I told him that I did not think they were, but I have found out since that they were. But they are a fine apple. They have borne every year continuously for more than twelve years. It is eighteen years since we set them out. It is a good, bountiful bearer, and I think one of the finest apples I have got.

Years ago I had some old-fashioned Rhode Island Greenings that came from Vermont, but they overbore, and didn't amount to very much. I didn't know anything about thinning fruit at that time. Since we have learned more how to handle fruit, I have bought several kinds of trees for Rhode Island Greenings, but I never have got what I called the real Rhode Island Greening tree until lately. I have got some growing now, and bearing the fine, handsome, round and smooth apples such as we used to see.

MR. MERRIMAN: I would like to know about packing the apples for shipment. You say to raise them about two inches above the barrel. What is the object of that?

MR. FOSTER: I think an inch and a half or two inches. Some packers claim if you pack them an inch above the chime it is enough, but two inches is not too much.

MR. MERRIMAN: I have packed a good many thousand barrels of apples and it seemed to me that was a good deal. Do you use any cap and cushion? Do you recommend that?

MR. FOSTER: Yes, I think that is one of the best things to do; to use the cap and cushion. It helps to protect the fruit very much from the damp.

MR. MERRIMAN: I think they press the apples very much less.

MR. FOSTER: They do indeed. I did not know what you might think of the Ben Davis here, and when I spoke of it I saw some smiles cross the faces of some of you good people, but let me tell you when you talk about this great Arkansas apple, or the Ben Davis, as a degenerate, it is having a great sale, and is commercially one of our leading apples. I should not wonder if there would be a million of barrels of that kind from the West. I think you would be surprised at the quality of some of these fine Arkansas Ben Davises, and the magnitude of the cultivation of them in the West is something beyond our Eastern comprehension. Their methods of cultivation are such as are to be envied, and very much to be sought after and imitated by our people here in the East.

A MEMBER: I would like to state for the benefit of the gentleman from New York, that in Connecticut we regard the Ben Davis apple somewhat the same as the dairymen do oleomargarine.

MR. FOSTER: Well, I do not think that anyone who is intelligent and honest can differ much on the question of oleomargarine, but the comparison is hardly a parallel.

A MEMBER: It's simply a fraud on the Baldwin, that's all.

MR. FOSTER: The Baldwin is a good apple to bank on, but you understand, of course, that I am speaking of the Ben Davis from the standpoint of the fruit distributor. It's an apple that stands up well, looks well, and sells well, and the demand for it is very large.

MR. HOYT: What is the cost for freight on it from the West? What is the expense per barrel for shipping from Arkansas to New York City? The expense per barrel or per carload from Arkansas?

MR. FOSTER: Well, sir, on a seven thousand barrel lot which were loaded around Lafayetteville, and in that territory, the cost was just about a dollar and one cent a barrel. The rate from St. Louis to New York is 56 cents per barrel by the carload, and from Arkansas it costs between 90 cents and a dollar a barrel through to New York. A few years ago we had a very happy

experience. Late in the spring, we had fifteen hundred barrels of my friend, the Ben Davis, sent from St. Louis. It was just about the 15th of April or the 1st of May. These people out there had them, and they were anxious to get them to market, and they were willing to take desperate chances, so they gave us a consignment of nine carloads of Ben Davis apples, and we got a rate through to Liverpool under refrigeration of something like $1.25 from St. Louis. Those apples sold, almost all of them, at an average of 24 shillings in the English market, or just about $5.75.

MR. HOYT: What is the usual freight rate from New York to Liverpool?

MR. FOSTER: At the present time, for this season, it has been two shillings, and five per cent. primage. It is about 53 or 54 cents. Coöperation for the benefit of the country on the part of the trusts has now become a part and parcel of the policy of the steamship lines, and they have given notice of an advance in freight, so we shall have a two and six freight rate now, which will be about 65 cents. But that is not a high rate. The freight rate from Buffalo to New York is 24 cents a barrel, so that really the steamer rate of 65 cents for a trip of 3,000 miles is not so bad. From Boston the rate is much less. We sent apples from Boston for one and six pence, or about 40 cents a barrel from Boston to Liverpool. Boston gets lower rates than we do from New York.

MR. J. H. HALE: As I understand Mr. Foster, he is speaking in relation to the Ben Davis apple from a commercial standpoint; from the dealers' standpoint to-day?

MR. FOSTER: Entirely.

MR. HALE: And we realize the fact that with any reasonable number of barrels on hand you can find a ready sale for them. But on the other hand, every one who has ever tried to eat one of these so-called fine Arkansas Ben Davises, knows that it is not a good eating apple. I don't know of a man living who ever saw a man eat two of them the same day and live. But plenty of people somehow or other buy them, and that is the reason Foster is handling them. He speaks about their being planted in the West by the hundreds and thousands, but we don't want to let that tempt us to go to planting Ben Davis here. We want to raise some good apples, and you can imagine what will hap-

pen to the Ben Davis when the people get enough of a really good apple.

A MEMBER: And there is another thing we must remember here, and that is, that the Ben Davis is not a long-lived tree. It maintains a great product of fine looking red fruit, which every one is fearful may shut out our fruit, but it is not a long-lived tree. The life of the Ben Davis is not over ten years. That ought to be a great comfort to some of our people here.

MR. HALE: The Lord is on our side there.

MR. FOSTER: Please do not misunderstand me about this. I am not here to try to elevate the character of the Ben Davis apple, but I am speaking from the standpoint of the man who distributes fruit, from a commercial standpoint entirely, and from that point of view I say that the Ben Davis is a money-maker. Now that fact cannot be belied, it is a money-maker because there is a great demand for it in the markets, but I am not here to advise you to plant it. It is not an apple that we should plant in the East, because we can grow better varieties. Our Baldwin of the East is a splendid fall apple. Our Baldwin of the East is a standard apple which we can all bank on. But what have you people in the East been doing? What have you been doing with many of the good varieties which you can grow and find a good market for? You have allowed them to degenerate. Take the Greening. You have allowed it to degenerate until much of the crop is unsalable through careless methods of culture. I think the scald can be sprayed out. I do not know, but it appears to me as though care and attention would eliminate this blight on the Greening. The demand for it even now is increasing. It should be properly cared for. It is one of the grandest apples you have got to market. There is no better apple in the world than the Greening.

A MEMBER: There is no danger from that Western Ben Davis apple. While it may be true that some of our Eastern varieties have not been held up where they belong, yet that Ben Davis has got to be renewed three times while your Eastern stock is under generous production.

MR. HOYT: The trouble is they have all been after red apples. That is the reason why the Ben Davis has been so popular in the market. Because it is a fair looking red apple. The Rhode Island apple is a grand apple, but there has been no demand for it. That makes the difference.

MR. FOSTER: The appearance of fruit always helps to sell it. A peach that may not be of the finest quality, if it has a beautiful skin and an attractive appearance, it will sell well. Look out around in our cities, and see the California oranges. They do not compare, in my judgment, with the Florida or Jamaica fruit, but they sell readily because of their good appearance. And that is what makes the Ben Davis such a ready seller.

MR. J. H. HALE: Are the people always going to be fooled that way? You know what Abe Lincoln said: "You can fool some of the people some of the time, and some of them all the time, but you can't fool all the people all the time."

MR. FOSTER: Because that apple is a taking one in the market there is no reason why you should not try to raise good fruit in Connecticut. There will be plenty of market for it. I do not think we need to be afraid from over-fruit production. The great question to-day is to grade, and to so market the fruit as to make it attractive and salable. Very much of it is put upon the markets to-day which does not realize anything except for the people who bring it to market,—the carriers.

MR. J. H. HALE: You have said here that you thought it unlikely that peaches from our Eastern country could be shipped successfully to the English market. Now that is a matter which very greatly interests a large number of growers. Connecticut is getting to be one of the great peach states of this country, and there is a great desire in the minds of the orchardists in this State to be able to find a market abroad. Now I am informed that Mr. Brady, who is in some way connected with the Hamburg-American Line has, for a number of years, made shipments, but I suppose he has had extra good treatment.

MR. FOSTER: They will give him space which they have for the preservation of their meat.

MR. HALE: That is just the point. What they can do for him in that kind of a way can be bought for money.

MR. FOSTER: We have not been able to develop it. It is going to be an expensive matter unless the steamship companies will cut up their storage space into apartments, but I wish to say now that our firm would be willing to help try the experiment, and will stand a good share of the cost of taking peaches to the English market.

MR. HALE: I think it would be found that from twenty to thirty orchardists would send all there was during September and October each year, and there might be a good many more than that. I am sure there is a desire on the part of our Connecticut growers to reach that market. We are growing peaches here such as you never saw before, and we are going to ship some of them over there. I didn't want you or anybody here to run away with the idea that it couldn't be done.

MR. FOSTER: I would be willing to say to you people to-day that our firm will contribute a goodly portion of the expense of carrying on an investigation of that kind if we can in any way get the steamship companies to coöperate so that it will not involve too much delay. This is not new. The Californians have tried it. They have shipped them to the other side without success. Of course they have had the journey of seven days across the continent to contend with, but they have had an offset in a climatic condition which fills their fruit with a juicy sponge and water which our eastern peaches do not have, and it makes them better to carry. But they have tried the experiment and they could not make it go.

A MEMBER: You remember that the White Star Line was asked for their refrigerator space for an entire season, don't you?

MR. FOSTER: No.

A MEMBER: They were asked what they would take for their entire refrigerating space on their steamer, and they wanted $35,000 for the season.

MR. HALE: Connecticut peach growers are willing to pay that all right.

MR. FOSTER: The cold storage space upon all steamers going from New York is largely owned under contract by the big meat companies—Swift and Armour, and the others, and the only way we can get that space is by sub-letting it from them, and as our stuff goes at just that period of the year when their meat is not going forward it is possible to get that space occasionally. They take it by the season. The packers hire the space, and are responsible for it whether it is filled or not. That is the reason why we are handicapped so much in the matter of space. Prof. Taylor of Washington has done a vast lot of good in this direction, and I hope you people will encourage the work that he is

doing. He is a splendid worker, and a very intelligent man, and he is doing a lot to help develop this fruit business, especially in the matter of small fruits, and in pears. I have no doubt the government, next fall, will coöperate to test what can be done relative to this peach question.

MR. HOYT: Did I understand you correctly, that you had an order from Chicago for Rhode Island Greenings?

MR. FOSTER: Yes, sir.

MR. HOYT: Is it usual for you to receive orders for other varieties of eastern apples to go to Chicago? If so, it seems to me that is significant.

MR. FOSTER: No. They are sending some to Chicago from Western New York. They are sending some Baldwins, and such local varieties as that. There is a scarcity in Chicago of Greenings, because it is an apple which has been neglected.

MR. HOYT: What I wanted to find out was whether Chicago people wanted eastern apples in preference to those raised through the West?

MR. FOSTER: The Chicago market is paying $4.50 for Baldwins, against $3 to $4 for their finest Ben Davis. The Baldwins in the western market always will be ahead of the Ben Davis. Of course it is the western Ben Davis which has flooded the market this year. Our sending fruit out there is simply an incident in the development of the business. Of course, it is governed by the crop out there to some extent. Last year we were shipping apples to Omaha and Kansas City. This year they are coming from that way here.

MR. HOYT: When they have a scarcity there, of course, you ship there. The prices are better I suppose?

MR. FOSTER: Last year they did, yes, sir.

MR. HOYT: I thought it was quite significant if they wanted eastern apples out there in the face of their own big crops. That would be saying that the eastern apples were the better.

MR. FOSTER: My dear sir, let me assure you that the Maine apple has brought, and will bring in the markets of the United Kingdom, if it is properly cultivated and taken care of, the highest price of any apples. Eastern apples have been allowed to degenerate. The Connecticut apple has been allowed to run down. And it is not only so here, but it is so all over this eastern section of the country. I can ride for a hundred

miles in the Hudson Valley and see orchards which have not had any care in years. I have in mind an orchard of four thousand trees, which has been in sod for the last twelve years. It is an orchard which ought to produce eight or ten thousand barrels, but which does not produce over twenty-five hundred or three thousand. I cannot get the owner to do anything. He is afraid of disturbing the roots. It's an orchard in the prime of life, but it's of no use to talk to some of them about up-to-date horticulture. I think I could run some of their orchards better than they do.

A MEMBER: I understood Mr. Foster to say that the demand in the European market is for a red apple. I would like to inquire of him if he thinks the prejudice against the green apples, such as our Greening, will be overcome in the European market.

MR. FOSTER: I must say to you, that there is no prejudice. The Greening comes to them at a period of the year when they have others in greater quantity; when their own apples are coming upon the markets there, and they are mostly green and white. They are all out of the way by the first of December, and then we have a market for our surplus goods, but if our green apples go to them during that period, they come in direct competition with their green apples, and apples like our Greening at that time do not bring a fair price. If we could get a good green apple to put on the market at the proper time, we could do well with it.

A MEMBER: How is the Newtown Pippin?

MR. FOSTER: That is an apple which, in the Hudson River valley, has been allowed to degenerate. But I may say to you that I had one invoice of Newtown Pippins this last November, which brought 45 shillings sterling in Liverpool. They brought back just about $7.00 a barrel on the New York dock. The Newtown Pippin is as popular as ever. California is producing immense quantities of Newtown Pippins. There were nearly 250,000 boxes sent from California this last year, and this year there will likely be 300,000 boxes shipped. Some of them have been graded badly, and have been an awfully degenerate lot of stuff, with the result that they have been a loss to the Californians. They are learning their lesson rapidly, however, in the matter of shipping Newtown Pippins to the

English markets. They ship in boxes. The boxes are sixteen inches by eleven by ten. Those are the dimensions of the California apple box, and they grade their apples in three grades.

A MEMBER: How about the Roxbury russet?

MR. FOSTER: That, of course, is another excellent apple. It is not so long lived as the Golden russet, but the Roxbury russet to-day is bringing from 18 to 22 shillings sterling, and is a splendid apple to ship as it's practically an all-winter apple. The Golden russet is a still better shipper.

MR. STERNBERG: Of all the good points brought out by the speaker, I think the most valuable one is what has been said in reference to the Russet, and the Greening. I am sure that some of our friends would like to know if they can get hold of some old-fashioned Greening trees, and I call on Mr. Hoyt to state to this meeting whether he has any in his nursery?

MR. HOYT: Plenty of them, and always have had. I have had to burn up thousands of Greening trees while we have been short of Baldwins.

THE PRESIDENT: Is the Committee on Nominations ready to report?

MR. A. C. INNIS: Mr. Chairman, I did not suppose it would devolve upon me to make this report, but Mr. Hoyt, the Chairman, is obliged to leave. *Mr. President, Ladies and Gentlemen,* your Nominating Committee begs to submit the following nominations:

For *President*—N. S. Platt of New Haven.
Vice-President—J. C. Eddy of Simsbury.
Secretary—H. C. C. Miles of Milford.
Treasurer—R. A. Moore, Kensington.

County Vice-Presidents:

Hartford—A. C. Sternberg, West Hartford.
New Haven—E. M. Ives, Meriden.
Fairfield—A. C. Innis, Stratford.
Litchfield—James M. Whittlesey, Morris.
Middlesex—C. E. Lyman, Middlefield.
New London—S. P. Sterling, Lyme.
Windham—H. B. Buell, Eastford.
Tolland—Prof. A. G. Gulley, Storrs.

THE PRESIDENT: You have heard the report of your Committee, what is your pleasure?

A MEMBER: I move that the Secretary be instructed to cast one ballot for the list of officers as submitted by the Nominating Committee.

Motion seconded and passed. The ballot was cast by the Secretary, and the officers as per the above list were declared elected for the ensuing year.

MR. INNIS: Mr. President—There is one thing that the Connecticut Pomological Society, in my humble opinion, is somewhat backward in, and that is its *institute* work, and for this reason. If you will notice where our institutes have been conducted throughout the State, you will find that they have been held among the more interested fruit growers. I believe that we want to get out into those localities where the fruit growers are not now connected with this Society. As one of the County Vice-Presidents, each of us working in the various counties as Vice-President, I believe we ought to try to have some of these institutes held in those localities where there is but little interest now. Take it in my own county, for example, the whole northwestern part of the county is almost without representation. I believe there ought to be some missionary work done in those localities, and I would make that suggestion.

THE PRESIDENT: You hear the suggestions of Mr. Innis, and I think they are very important. I hope the officers will bear them in mind.

We are now to have the last paper on our program: "How to attain success in Canning and Preserving Fruits," by Mr. Charles E. Steele of New Britain.

How to Attain Success in Canning and Preserving Fruits.

By Mr. Charles E. Steele of New Britain.

MR. STEELE: *Mr. Chairman and Gentlemen*—I think I talked to you two years ago on this subject, and I told the Secretary, when he asked me to prepare a paper for this meeting, that we always learned something new in relation to this subject, and that I would be perfectly willing to say what I had in two or three points, and then be willing to answer any questions you might wish to ask. I have wished very much that somebody might represent the great interest of tin-canning here, because the firm with which I am connected only cans in glass, and there is such a vast amount of fruit that goes to waste in the orchards in our State, and as there is a great deal of it that is of value, it has always seemed to me a shame that it could not be properly preserved. I have hoped very much that somebody would put in a tin-canning plant of their own so that which is now going to waste could be saved. I hoped that a company might do that. I think that every great orchard region should have not only an evaporating plant, but a preserving plant in tin or glass, or both.

And I want to say further, that the interest which was shown at the recent fall meeting of the Society in New Britain, in this line, was so great, and the exhibits were so beautiful, that I think it shows that a great deal of thought is being given to preserving in glass. I venture to say that you can look the country over and you cannot find any handsomer goods than were exhibited at New Britain. The ladies who exhibited there were the most experienced ladies we have, and they deserve a great deal of credit for the appearance of their goods. It is such an attractive business in itself that it is a hard thing to find a market for the highest class of goods when packed in glass. Every lady is putting up her own fruit, and I am rather glad of it, because it is for the general interest of the fruit business, and it makes for the health of the people. I thoroughly believe with my friend, Mr. Hale, that the fruit business ought to be so encouraged that everybody could have all they wanted, and in a great many cases it would be a great boon to health. A friend of mine, and a very valuable friend, said to me a little while ago, that he had been in poor health, and hardly able to

attend to his business, but when he was talking to me he said that he had not been so well in ten years, and he laid it to eating fruit. Instead of eating a few peaches, as people usually do, he had made a meal of them before breakfast, and he told me that he hadn't been in such good health for years, and he said that he was going to follow it up, and eat freely of every kind of fruit that he could find in the market.

Now I want to touch upon just about three points, briefly, in regard to what is necessary for success in fruit canning in glass. Some of the principles hold true equally as well when applied to canning in tin. In the first place, have good cans. The only thing that was attractive about some fruit that I saw put up in old Mason cans, was the *fruit* itself. Don't put beautiful fruit in old, rusty, unsightly-looking Mason cans. We would not use them if they were given to us free of all expense. There is too much risk of loss, besides the appearance of the cans. I have brought along a couple of jars to show what I consider a perfect can. The old process of turning a jar upside down to see whether the syrup oozes out is not a perfect test. I have seen bubbles come up through where a drop of syrup could not come, and in a week or so that can would be spoiled. Even though there might not be any syrup or air get out, the can might become imperfect afterwards, owing to the fact that the rubber may shrink, or there may be some slight imperfection in the rubber, which may gradually let in the air. And then again, if you do not cook the fruit just enough you take a good deal of risk that way. Any of those things will result in fermentation, and the fruit is spoiled. Now here is a can that I wish to speak of which has certain advantages. I think it is a good looking can. It is patented by a party in New Britain. It has got a cover fastening that is very convenient. The advantage of that fastening is that you can put it on a hot jar of fruit, and not touch the jar at all, and then lift it up anywhere. And then there is a spring attached to it so that you can gradually tighten it, and when you have tightened it as much as it is safe to do, it is at the point of the greatest firmness. It is sealed up, and you never can get it any tighter. That fastening is certainly a very convenient thing.

Now I would like to call your attention to a method of pineapple packing which our firm has been following up. With

the pineapple, if you put it in slices, very often you cannot use enough, and if you cut it in big pieces it does not look so well, but by cutting it on a board before it is put in the cans, drawing a long knife across it both ways, and cutting it into pieces about half an inch square, it will, in shrinking, get down to about three-eighths, and it makes better preserves, and looks very pretty. It is very attractive in the market. It sells in the market very readily indeed.

Now the second point is to get the best fruit possible for canning. If you put poor fruit in tin cans nobody can see it, but they will not be apt to buy much more that you put up. When it is put up in glass the fruit shows right up, and you have got to put in good fruit. It's bad policy, of course, to put poor fruit in either, but you can cover it up in tin where it cannot be done in glass. And that is one beauty of the glass package. It helps in the selling, but your lasting hold on the market depends on your putting up such good fruit that they will call for it year after year. Have it good. To do that, you want your fruit fresh, and you want it ripe, and you want it sound, and you must have your fruit supply close at hand. Since we went out of tins we have had more difficulty in getting the best fruits, because some of the growers nearby us do not have enough for our use of the right quality. By going a little distance from our establishment, however, we have been able to get first rate goods for our purpose.

Another point: In my judgment I should say that the 48 and 60 quart crates were better than the 32-quart crates for carrying fruit into the market just right. The 32-quart crate is objectionable, because the shaking of the car is so great that the wobble of the crate at the time will shake up the top layer so you would hardly recognize the fruit, but you take the 48 and 60-quart crates and the top does not seem to be disturbed at all. That is something worth having, as it gets more of the fruit to market in first-class condition. But the 32-quart crates are much better than nothing. We have had dealers come in with several crates of fruit that were spoiled in that way, particularly raspberries and strawberries, and wanted us to take them. They thought we could use them in our canning. We told them we would not have them; that we could not afford to risk our business by putting up any fruit which was not the very

finest. We must have the very best fruit for all glass work. The market is flooded with the poorer stuff, especially in the various grades of goods sent out in tin cans, but for glass work only the very best should be used, especially if you expect a high-class trade at good prices. Some may claim that there is no money in putting up fruit in glass. Just now that is true to some extent, but it is going to have its future, however. The people are getting tired of so much sweet stuff put up as so much of the stuff on the market is, and they will soon be willing to pay the increased price for a good article. The people can eat two or three dishes full of these goods put up in glass, put up with just enough material to bring out the flavor of the fruit. Of course they will, because it is so good. We want to have them eat it, and the people can afford to buy it because its wholesome, and it's something they can enjoy. I believe that fruit put up in glass when it is put up in the best manner, and of the best quality of fruit, is going to have a future, and there will be much more of it sold than there has been.

Now the next question that I want to emphasize is not to allow yourselves to buy any fruit that is not warranted against salicylic acid. All honor to the Connecticut Experiment Station, which is doing such grand work for honest foods. I hope the people themselves will respond to this.

THE PRESIDENT: We have neglected our visitors from other states. We have visitors here from Massachusetts and New York. There is one gentleman that I want to introduce to you for a moment. It is Secretary Hall of the Western New York Horticultural Society.

MR. JOHN HALL: I want to say to you simply a word or two. I am glad to bring from the old Western New York Society its greetings to your Connecticut Society. We celebrated our 47th anniversary three weeks ago. I was delighted with the meeting here yesterday, for it seemed so much like our own, spirited discussions and good papers. I count it a good deal of an honor to be associated with such an association as ours, because of what it has done for horticulture, and because of the relations it has had with names that have become historical, such as Charles Downing, and several others. I want to say to you that we are gaining year by year in our membership, and I feel that the officers of our Association would be very glad

indeed to know that I was here, and represented them before you, and gave you their hearty greeting. We have become pretty well acquainted with some of your Connecticut men over in our country, and appreciate their quality. When we want a little spice at our meetings we send over here to South Glastonbury, and we are always glad to see Brother Hale, as he never fails to give us some good things. I thank you very much.

THE SECRETARY: I have a little matter that I wish to announce. We have had on our membership list for the last three or four years a gentleman in Middletown, who joined the Society on the invitation of Brother Gilbert—Mr. Samuel Russell, Jr. This morning this Society was presented with a check for $25 from Mr. Russell, and I think we should recognize it by a direct vote of thanks. And I wish to say further, that on talking with some of our leading members, the suggestion has been made, and it seems to me as though it might be a good plan to use this gift to start a fund with for some special object. Not to put this $25 into the general funds of the Society, but to make it the nucleus of a fund for some specific purpose. I move, Mr. President, that we present our thanks to Mr. Russell for this gift.

Motion seconded and passed.

PROF. BRITTON: I would move, Mr. President, that this sum of $25 be placed upon interest, the income to be used for some specific purpose, which may be determined later.

Motion seconded and passed.

SECRETARY HALL of Western New York Society: This suggestion of your Secretary reminds me, that the year before the late Patrick Barry died, he presented our Society with a donation of $2,000, to be placed at interest, and the interest to be used for some specific purpose. We had a committee appointed to see how the money should be used, and they designed what is known as the Barry medal, valued at $50. This year, two of those medals have been presented. About the same time we had another donation made to us of $2,000, the interest of which was to be given in three prizes, one for the best plan of a country home, another for the best plan for caring for an orchard, and another for some new plant or shrub which had good recommendations with it. Following that, the fund was supplemented by subscriptions, which aggregated some $1,500

or $2,000, so that the entire sum is kept and is used for these specific objects.

The following resolutions were offered by J. H. Hale:

Whereas, the Connecticut Pomological Society has been greatly interested and instructed by the address of Prof. G. Harold Powell before this meeting, in relation to the cold storage of fruits, also in the careful experiments now being conducted by the United States Department of Agriculture on that line with our leading commercial fruits, and

Whereas, these cold storage experiments, and also investigations in the development of foreign markets for American fruits now being carried on by the Department of Agriculture, promise to be of great commercial value to all our fruit interests, and further accurate information along these lines will be awaited by Connecticut fruit growers with deepest interest; therefore be it

Resolved, that the Connecticut Pomological Society would express its grateful appreciation of this valuable work, and would urge upon Secretary Wilson the importance of continuing this work on even broader lines than already attempted, believing as we do, that the few thousand of dollars so intelligently expended will, in a few years, be worth millions to the fruit growing interests of this great country.

MR. HALE: Mr. President: I do say, with a full appreciation of its importance, that it is a grand work that they have just started, but it's just under way, and the Committee of Congress are always a little shy about taking hold of any new thing. They may think it's poor policy, but it's really a matter of vital interest to us fruit growers. The information which was given to us by Prof. Powell has stimulated us wonderfully along cold storage lines, and it was just what we needed. It's getting at the very foundation of the thing. And think what a work Prof. Taylor has been doing in opening up foreign markets, and in connection with the steamship companies, finding out what they can do. By and by when the steamship companies learn that the expansion of this export fruit trade is going to be a valuable thing for them, they will give us space. I trust that this resolution will pass, and that the Secretary will see that copies are sent to Secretary Wilson of the Department of Agriculture, and another copy to the Chairman of the Agricultural

Committee, and to our representatives from Connecticut. I believe they will be glad to know what is wanted for the furtherance of the interests of the Connecticut growers.

Resolution seconded and passed unanimously.

PROF. BRITTON: I have a little resolution which I think best to introduce at this time. You heard some of the remarks which were made regarding the delay in the publication of our proceedings. Now we all know that our officers have a great deal of work to do, and our Secretary has a very small salary for his work, but we also know that it is very easy to put off a thing from one day to another, but usually if we are obliged to get a thing done by a certain day we manage to do it. Now I believe that our proceedings should be published just as soon as possible after the annual meetings are over, and if our officers are not able to take the time to put them in shape, I think, with the appropriation which we now have, they ought to be able by securing assistance to get them ready for publication. I therefore offer this resolution:

Resolved, That the proceedings of this annual meeting be printed not later than April 1st, 1902, and that the Executive Committee be instructed to carry out this plan accordingly.

Resolutions seconded and adopted by the Society.

MR. STERNBERG: I move that all the exhibitors who have contributed exhibits at this meeting be extended a vote of thanks.

Motion seconded and passed.

MR. HALE: There is one other thing. While our exhibitors will in the future, as they have in the past, be entitled to credit, and to our thanks, yet all of us cannot attend these meetings. Some of our members cannot leave their business so as to be here, and many who would be glad to be here are obliged, for various reasons, to be away from the meetings, and they are largely dependent upon the public press for information as to what goes on here; and I would like this meeting to pass a vote of thanks to the leading papers of Hartford, that is, the *Courant*, *Times*, and *Post*, which have given very full and complete reports of these meetings thus far, and have quickly distributed the contents of our program not only to our fellow members, but to all the citizens of the State who are interested.

MR. STERNBERG: I most heartily second that, but I think we ought to go further and include in this vote all papers. If Brother Hale will accept an amendment including all the other papers which have been represented here, I will be glad to second that.

A MEMBER: I will second that motion.

Motion seconded and passed.

MR. STERNBERG: We have had quite a number of distinguished speakers here, and we have had quite a number of our own members who have done a great deal to make this meeting successful and interesting, and I beg to offer a "blanket" resolution, one thanking all those who have participated in making this meeting so interesting.

MR. HALE: Just a resolution that we love everybody?

MR. STERNBERG: Yes. Including Mr. Hale.

Resolution seconded and passed.

THE PRESIDENT: We have not finished our program yet, and we shall not have time to unless we take it up now.

MR. STERNBERG: I believe that we have had such an excess already that we shall only mar the results by protracting the session, and I move, sir, that the reading of papers of other kinds be dispensed with. And I also offer a resolution extending a vote of thanks of this Society to our officers, one and all, who have served this Society with so much fidelity and vigor, and whose good work has contributed so much to our successful meeting.

Resolution seconded and passed.

MR. HALE: Mr. Chairman, there are one or two special questions on this list which have not been touched, and which some of our members have prepared themselves to answer. Now it may be that someone has come here looking for an answer to some of those questions, and it would be too bad to have them go away disappointed.

THE PRESIDENT: Well, here is question No. 3 on the special question list. Let us take hold of that. "What are the chief factors in producing fruitfulness in apple orchards?" I see that Mr. J. H. Merriman and Mr. E. M. Ives are to answer that.

What are the Chief Factors in Producing Fruitfulness in Apple Orchards?

By Mr. J. H. Merriman of Southington.

There are three things I shall note as essential to the fruitfulness of our apple orchards. Cultivation, to promote actively the forces of nature; pruning, to let in the sunlight to give color and richness; and fertilizers, or food to supply nature's wasted energies.

These principles apply first, to the man, and then to the orchard. The man and the orchard are the two factors we are to consider.

By cultivating the man, the mind, is the field; cut away the useless rubbish of past ages: do not use the useless plowshare of ignorance and ease to break up the field, but let the plowshare of thought of study and perseverance turn up to sunlight God's eternal laws of truth, that have so long slumbered in the bosom of ignorance. This is an age of progress and he who will not awaken from his lethargy, and become a worker in the great hive of nature, is only a useless drone in society. Knowledge is power: the mightest offensive and defensive weapon known among mankind. Knowledge comes only to the diligent student. The great laboratory of nature is open before him. Science has come to our assistance and the key of knowledge has unlocked and revealed to the world many a hidden secret, whereby the whole human race has become enlightened. The chemistry of soils, plants, trees, and fruits, also fertilizers (the necessities of one for the other), has given us a few principles to appropriate for our advancement and the success of our calling.

Botanists have revealed to us their researches in the field of trees, plants and flowers, how they suck the potash and phosphoric acid from the soil, breathe in the nitrogen from the air; the chemical changes, as they combine to produce carbon; the wood growth: how the flowers are pollenized and made fertile, to produce the fruit.

The mind must be the pruning knife of foresight, to cut away the dead limbs of prejudice, arising from long continued practice of our forefathers; the low and scragly branches of

ignorance, always in the way, and nonproductive, and let in the sunlight of knowledge to fructify, beautify and adorn the mind.

These principles we cannot appropriate in their intricacies, but we can and should at least have a rudimental knowledge that we may apply understandingly if we would be successful in the culture of fruit. The fruitful mind must be the successful horticulturist; we must grasp mere ideas, and be on the alert for every lurking foe. A healthy mind must be fed with useful knowledge: it strengthens, beautifies and adorns, and will fructify in a truer enjoyment, a higher conception of the beauty, harmony, and economy of God's eternal laws.

This intellectually answers the question how to make our apple orchards productive: the same principles, cultivation, pruning and fertilization, practically applied, are the requisites of success.

Cultivation should be practiced until the trees are fifteen or twenty years old and then should be cultivated, two years out of three, the remainder of their life, which in Connecticut is about eighty years.

Reciprocity then is a fixed principle in the laws of nature.

Thinning of fruit is necessary if you wish annual fruitage. Fruit buds form in August; if then they are loaded with fruit, all the energies of the tree are required to perfect the fruits, when if half the apples had been picked off in June, the trees would perfect the fruit and also form buds for the next year's crop.

The law of reproduction is nature's own law: if we aid nature and work in harmony with her, success will crown our efforts. As well might you expect an ignorant boy to address an audience with entrancing eloquence, as to expect a neglected tree to produce luscious fruits.

God helps those who help themselves. That is also God's law.

The foliage should at all times be of a dark, healthy green color, and the trees should annually make a growth of 10 to 15 inches. A too vigorous growth is sometimes at the expense of fruitage. If the ground is plowed once and then harrowed occasionally with a spring tooth or disk harrow several times before July, it can then be left till the following spring. Pruning is also a necessary adjunct to success. It is the sunlight

that paints our fruits in their beauty and gives that richness of flavor that pleases the eye and tickles the palate; the sunlight must permeate every portion of the tree, and also give warmth and comfort to the soil.

It is a law of nature that "you cannot get something from nothing"; trees must be fed, if they are to produce fruit; the expended energies must be supplied with proper food to restore those energies to their normal condition.

THE PRESIDENT: Now we will be glad to hear from Mr. E. M. Ives of Meriden.

MR. IVES: Mr. President: My chief factors, perhaps, will be grouped under five or six heads. First and foremost, I believe, is annual wood growth, full and healthy foliage, checking fungous diseases and insects, pruning, and thinning.

Get your wood growth first. I don't care how you get it, but get it. Some have got it one way, and some another. You must have annual growth in order to develop fruit buds.

And full and healthy foliage. I believe that is very essential for the full maturity and development of the fruit, and particularly in reference to its keeping qualities. The fruit is dependent upon good foliage for that.

Then again we want perfect pollinization. We may get it by assisting nature. I think many times we attribute the loss of our fruit crop to other conditions that have nothing to do with it. If we have imperfect pollinization we may think it's a lack of constitutional vigor, and the failure of the crop has been attributed to conditions which had nothing to do with it whatever. I believe this. Many times we do not get at the root of the matter. The true condition is neglected, and it may not be the condition of the weather altogether.

Of course, the checking of fungous diseases and injurious insects is very necessary, and we have had that pretty thoroughly discussed. If we allow our trees to go unprotected, our insect enemies are so numerous they are sure to do considerable damage. The depredations of the codlin moth, and the work of the apple scab, which we have had illustrated here, attack the leaves and cause a good deal of injury to the foliage, so that by harvest time we have little or nothing, and especially is it due to neglect of those simple essential conditions and allowing these insect depredators to go on without being checked.

Pruning is also essential. We must have some of that work done in order to get good fruit. If we want finely-colored fruit we must not allow too much old dead wood, or allow the growth to become so rank as to shut out the sunshine. Fruit must have sunlight to get good color. Potash in the soil may have much to do with it, but at the same time I believe it is the sun that gives the color.

Then again, if we are taking pretty good care of the orchard by cultivating, and thorough spraying, and we have got to look out for these fungous diseases—and we are apt to have along with them a very heavy set of fruit—that involves another condition, for in order to get high grade fruit we must resort to thinning.

Now as to some results if we apply these factors in the cultivation of fruit. Taking my orchard, which is thirty-five or forty years old, and which for a long time was somewhat neglected, but going back fifteen years, I have followed up a record of the sales of the crop, and have figured up to see what better care has done for that old orchard. And it is a fact, as can be shown from my record back to 1886, the seven years previous to 1894, and comparing those with the seven crops since 1894, and taking the total crop of those seven years, and taking the average annual production of the seven years since 1894, there were only twenty-four bushels produced for those whole seven years more than there were previous, in any one year, that is, taking the average since 1894. I first began to spray with London Purple, but I soon gave that up because of its uncertain quality, and the uncertainty of the amount of poison it contained. Of course, it was new, and we did not know very much about it, and I did burn the foliage some. If I had used some lime, I think I would have got along better. Beginning with 1895, I started in to use the Bordeaux and Paris green, and that year the crop was very marked for the improvement in the quality of the fruit, and for larger production over previous years. And then in 1896 there was a large yield, which was general throughout the country. Up to that time it was the largest yield we had any record of. Then in 1897 and 1898 there was a pretty fair crop in each year. In 1899 there resulted the largest crop that had been produced in the orchard, exceeding that of the year 1896 by something like

164 bushels. Then following, in the years 1900 and 1901 there were still larger crops than followed the year 1896; that is, comparing the two crops following 1896, which was the largest up to that time, with the two crops following 1899, and the figures show that there were nearly 150 barrels more produced, following the large crop of 1899, than there were for the two years following the crop of 1896. After the large production of 1899, it was followed by a larger production by 150 barrels over the two years following 1896. And right in there may come an interesting question on the subject of thinning. Beginning in 1898, it became necessary to take off some of the fruit in order to get reasonably fair-sized apples. Perhaps that has had something to do with the increased annual crop since 1898, for it does show a high percentage of increase over the period when just simple spraying was practiced, and no thinning attempted. Now take the seven years up to 1894 and the seven years since 1894, and we find that the increase in the seven years following 1894, as compared with the seven years up to 1894, is actually 670 barrels over the production of the earlier period, and owing, it must be, to better spraying, something to better fertilization, and also to thinning. The figures show it was due to something anyway, but whether it was due to one thing more than to another of course cannot be told. I am carrying on the records, and some time in the future they may show something more of a change than they do now, but the figures do show that under this practice there is an increased production of fruit. Of course a tree may grow a little more, and in comparing the seven years back of 1894 with the seven years this side of it, there may be a slight change in the productive area of the tree, but that would have nothing to do with the marked increase in productiveness of the later period over the earlier one.

Mr. Sternberg: I think there is one thing we should do before we close, and it is a very important one. We all agree that this Society has been very prosperous, and we must acknowledge that we owe a great deal to the efforts of Secretary Miles. We are heaping more work on him every year, and I think it is only in fairness that we should increase his salary by a small amount. I beg to offer a resolution that we raise the salary of the Secretary to $100 for the ensuing year.

MR. IVES: I would like to second that motion myself, and I do so heartily. I realize, as perhaps most of us do, the work involved now in the Secretary's office. We are holding so many meetings, and so many other things are coming in, that it is a great deal of work to carry on that office, and I think it is no more than right that we should pay something for what we are getting. We have no right to expect to get something for nothing. I think it is unreasonable to expect it any longer.

MR. INNIS: I shall most heartily second that also. I don't know whether our worthy Secretary is willing to take that other $50 with the kicking he is likely to get, but I hope the vote will pass just the same.

MR. BUTLER: I want to second that too. I was just going to do that myself.

Motion duly put and declared carried by a unanimous vote.

SECRETARY MILES: I will not take up the time with any extended remarks on how much I appreciate this action. It has come without the least thought on my part. I do feel, as you know, the deepest interest in our success, and I think that has been the greatest reason why I have tried to put so much effort into the work. I have been willing in years past to do this amount of work without expecting very much for it, but as our Society has grown, and our funds and opportunities for work have increased, it does seem as though the outlay of time must be more each year, and I appreciate your action very much. Your kindness, and the encouragement which my friends have always shown me, is worth a great deal more than any salary, and I assure you the success of the Society is due very largely to that. I thank you.

THE PRESIDENT: Mr. Edwin Hoyt, and Mr. A. B. Plant of Branford, who were to discuss the question, "What are the reasons for the decadence of pear culture in our State," have gone, and Mr. Hale has also gone. He was to discuss the eighth question, "What are the most effective implements of culture, and what improvements might be made?"

A MEMBER: Give us the last question, Mr. President. I believe it is one of the most important, and Mr. Moore is here.

THE PRESIDENT: The ninth question is called for. "Does the amount of fertilizer applied have any effect on the rotting of orchard fruits; is cultivation also a factor?"

MR. R. A. MOORE: Mr. President and Members: When Dr. Redmond was once addressing an audience which was very sympathetic, after he had spoken he asked if anyone would like to ask him any questions and a gentleman asked him one, with the result that they carried him out on a shutter to the hospital, and a policeman came in and quelled the disturbance in the hall. And after it was all over the chairman rose and said, "Is there anybody else that would like to ask Mr. Redmond a question?" but no one ventured to do so. Now I want to say in regard to the first part of question number 9, "no," and in answer to the last part "it does," and I hope that no one will ask me any further questions.

A MEMBER: Mr. President, I see by the program that there are several who are down to speak on these questions, who have probably prepared papers which they would have read if there had been time. I move that they be requested to hand in their papers to the Secretary so they can be incorporated in our printed report.

Motion seconded and passed.

PRESIDENT PLATT: I will now announce the members of the various Standing Committees that have been selected to serve for the ensuing year: Injurious Insects—Prof. W. E. Britton, J. H. Putnam, Harvey Jewell; Fungous Diseases—Prof. A. G. Gulley, A. B. Plant, N. H. Sherwood; New Fruits—G. S. Butler, Stancliff Hale, H. L. Fairchild; Exhibitions—E. Manchester, Jos. Albiston, Walter H. Baldwin; Membership—Orrin Gilbert (and each County Vice-President); Legislation—J. C. Eddy, Edwin Hoyt, A. C. Sternberg; Markets and Transportation—J. H. Hale, J. R. Barnes, C. S. Brewer; Auditors—W. E. Waller, F. N. Platt.

It now being nearly 5 P. M., and a majority of the members desiring to leave on the early evening trains, on motion it was voted to adjourn, and with concluding remarks of a congratulatory nature from the President, the Eleventh Annual Meeting of the Society was declared closed.

SPECIAL REPORTS.

The special committees appointed early in the session to examine and report upon the exhibits made at this meeting handed in the following very complete reports, which, owing to lack of time, were not presented for action by the Society.

Report of the Committee on Fruit Exhibit.

The fruit on the tables does not show the variety usually displayed at our annual meetings, but last season's short crop of apples accounts for this. Of the exhibitors in apples, Mr. E. M. Ives of Meriden, has Baldwin, Peck's Pleasant, Black Gilliflower, Pound Sweet, R. I. Greening, Roxbury and Golden Russet, Fallawater and two or three sorts not named. All good specimens and in good condition.

Joseph Albiston of South Manchester displays several of the new Southwestern apples, including Springdale, Arkansas Black, Senator, Collin's Red, also Winter Pearmain, Flushing Spitzenburg, and one or two others better known. It is very doubtful if any of the new kinds will be equal to those already tried in this State. They evidently are good keepers.

H. E. Savage of Berlin shows R. I. Greening, Newtown, Spitzenburg, Baldwin, Peck's Pleasant, Limber Twig and Roxbury Russet. All in good condition.

W. L. Hannah of Whigville has Roxbury Russet, and also exhibits a bunch celery. The latter out of our line, but a good sample. H. P. Lowry of the same place has R. I. Greening, Roxbury Russet, Smith Cider, and a sweet variety, possibly Green Sweeting.

E. Manchester of Bristol has R. I. Greening, Golden Russet and Hurlbut, of the fine class of apples that he always shows.

J. H. Merriman of Southington shows some good Baldwins.

G. G. Tillinghast of Vernon presents a supposed seedling of fine flavor, having good keeping qualities.

T. S. Gold of West Cornwall shows some good Newtown Pippin, also American Golden Russet and Peck's Pleasant.

G. W. Staples of this city makes an attractive exhibit of a number of varieties, all grown in Maine, which have been in cold storage since October. All very fine of their kinds. This list embraces Fameuse, Gravenstein, Twenty Ounce, Wolf River, Hubbardston, Seek-no-further, Fallawater, Yellow Bell-flower, Northern Spy, King, and Wagener. None of the specimens show scald.

After passing our native fruits we come to a large collection of fruit and plants from our new possession—Porto Rico. We do not attempt to name or describe, but it is well worth a thorough examination, as probably most of it is entirely new to our people here. It is, however, evident that our fruit growers are not to be troubled with competition from that section. For this very attractive and unique exhibit, the Society is indebted to one of its leading members, Mr. George F. Platt of Milford, who is spending the winter on the island.

The State Experiment Station at New Haven shows a case of specimens of injurious insects, also samples of several scale insects, a study of which will enable one to recognize the several injurious species.

All of which is submitted.

A. G. Gulley,
J. T. Molumphy,
Committee.

Report of the Committee on Exhibits of Implements, Etc.

The committee appointed to examine the implements, etc., placed on exhibition, finds the display a most creditable one as regards the quality of the articles shown, though less in quantity than usual. The most striking one is that of the Cutaway Harrow Company of Higganum, Conn. This company shows three most excellent orchard tools, viz., the California Orchard Harrow, the Double-Action Harrow and the Extension-Head Harrow. The first named is much used in the large orchards of California, and is coming into use and proving just as effective here in the East. It is a large and powerful machine, built on the well-known cutaway principle, throwing the earth toward or from the trees as desired.

The Double-Action Harrow has an all-steel frame and four gangs of cutaway disks; one pair in front of the other, one pair throwing the earth one way and the rear pair throwing it the other, thus thoroughly and deeply stirring and pulverizing the soil, and at the same time leaving a smooth and level surface, a result long sought after. This machine is capable of being extended in width so as to work under the limbs of trees, making it equally desirable, both for open field and orchard work.

The Extension-Head Harrow is a modification of the well-known Cutaway, so arranged as to be used as an ordinary harrow for field work, or it may be quickly extended so as to work under the branches of trees. The gangs may be reversed so as to throw the soil either way. These machines are all made in different sizes and comprise a class by themselves, having as we believe no successful competitors for orchard work.

No spray pumps are shown this year, but the Standard Oil Company displays a sample of the crude oil used in spraying for the San José scale. This we understand can be obtained of the Standard Oil Company in Providence, R. I.

The Bowker Chemical Co., Boston (branch at Hartford), showed samples of insecticides, and photographs of fruit illustrating the benefits of spraying.

The Adler Chemical Co. of New York City advertise green arsenoid, a highly recommended substitute for Paris green.

Coles & Co. of New York City exhibit the ordinary style of peach basket which they handle, also the so-called Georgia fruit carrier containing six till baskets for peaches, etc., also two styles of picking baskets, for peaches and grapes, and two kinds of strawberry baskets; one clean and white of standard size and one not so good, a "short" package which honest growers have no use for.

G. S. Butler of Cromwell also showed some good sample peach baskets in different sizes, made by Isaac Hoffman of New Jersey. We understand that Mr. Butler is to have the State agency for the baskets shown by the Saginaw Basket Co. of Michigan. These excellent baskets are of the same general style as the well known Climax grape basket, but made of veneer throughout, and in different sizes, holding from five to twenty-five pounds of fruit each; handled and provided with either a tight or slatted cover, strong, yet light, and reasonable in price.

This seems to be a very serviceable and convenient package for marketing grapes, pears, plums, peaches, melons, etc. The largest size holds the same amount of fruit as the standard peach basket now in use, and when its merits become better known may displace it in marketing that fruit, as it possesses several distinct advantages over any other package on the market.

We recommend that members be more free to show at these meetings any simple labor-saving devices of their own making, which may be helpful to others, and thus help on the good work of our Society.

Respectfully submitted,

HARVEY JEWELL,
A. B. PLANT,
Committee.

A Group of Connecticut Fruit Growers at a Field Day of the Society with President N. S. Platt, July 30, 1901.

Condensed Report of Institutes, Exhibitions, Field Meetings, etc., Held in 1901.

Following the annual meeting of 1901, the proceedings of which were published in full in volume III, the Society conducted five institute meetings during the month of March. These institutes were held on the invitation of the granges in the various towns, and as a means of developing an increased interest in fruit culture among the people of the State, proved very popular and successful. Each meeting was well attended, a lively interest in the work of the Society was manifested and the speakers were eagerly questioned on practical points in the growing and marketing of fruits. The social and fraternal spirit so often lacking in agricultural meetings, was evident in these gatherings, making them thoroughly enjoyable occasions.

INSTITUTE AT WHIGVILLE.

March 6, 1901.

The first institute in the 1901 series was held at Whigville, Wednesday, March 6th. The meeting was held in the cozy hall of Whigville Grange, where the corps of speakers, after a long cold ride from the railroad at Bristol, found a hearty welcome and a goodly number gathered for the discussion of fruit culture in its various branches; the presence of many ladies was especially gratifying.

The following order of exercises had been prepared by the officers of the Society and the Grange, and was well carried out:

PROGRAMME

OPENING AT 10.30 A. M.

Address of Welcome .....E. F. Gaylord, Master of Grange.
"Some Insect Pests of the Fruit Grower" ....Prof. W. E. Britton, Conn. Experiment Station, New Haven.
"The Profitable Production of Berries" .....Geo. S. Butler, Cromwell.
"Practical Points for Peach Growers" ...A. C. Sternberg, West Hartford.

Recess

AFTERNOON SESSION AT 2

Question Box

"The possibilities of Apple Orcharding in Connecticut"..... Edwin Hoyt, New Canaan.

"How to increase the profits from our orchards"..... Prof. A. G. Gulley, Conn. Agricultural College.

"Experiences with Cold Storage of Fruits".....C. I. Allen, Terryville.

A Question Box will be open to receive any inquiries on fruit topics, to be discussed as time permits. All participate in this feature.

After President Platt had called the meeting to order, E. F. Gaylord, Master of the Grange, welcomed the Society in well chosen words, emphasizing the point that the organization is needed to represent the fruit growers of the State.

Prof. W. E. Britton was the first speaker, handling the subject of insect pests in a practical manner. He said that the spread of injurious insects is increasing, and is largely due to cultivation and transportation. A large part of his address was devoted to a discussion of the San José scale, which Mr. Britton said was on the increase in our State. There is no hope of growing fruit in Connecticut without taking this pest into consideration and being prepared to fight it by spraying. Its natural enemies may hold it in check in time, but it is not safe to wait for that.

Vice-President A. C. Sternberg of West Hartford spoke next on "Practical points for peach growers." The speaker was of the opinion that there was plenty of available land in Whigville well suited to peach culture and advised the young farmers to make a start in this line of work.

In planting your orchards stick to the old and well tried varieties, such as Oldmixon, the Crawfords, Stump, Morris White, a fine canning peach, and Smock. Set the trees fifteen feet apart each way and every third tree should preferably be an apple. In this way you will secure a valuable apple orchard, after the peach trees have ceased to be profitable; a crop may be grown between the trees the first two or three years, but do not plant nearer the trees than four feet. Mr. Sternberg emphasized the necessity of thinning the fruit in seasons of abundant crops—aim to grow only large fruit. The crop should average a dollar per basket to be profitable and there is always a wide market for first class peaches. Careless packing and grading of the fruit

will never pay, but attention to these particulars is most important. Mr. Sternberg's favorite fertilizer for the peach orchard is ground bone, applied at time of setting and freely in after years.

"Fruit growing is enjoyable, is profitable and has increased the value of our farms besides being an incentive to our young people to stay on the farm."

A lively discussion followed the address, showing the interest aroused by the speaker. It was pointed out that to ship our peaches to distant markets we must make use of coöperation; the single small grower is at a disadvantage.

Mr. Sternberg thought potash was not needed for the peach crop in his soil; others differed with him and favored the use of potash in the form of unleached wood ashes. Prof. Britton thought the lime in the ashes of even more value than the potash. Mr. Hoyt said his soil must be fed with potash to grow good fruit crops.

At this point a recess was declared and the company were invited to the hall below to enjoy a bountiful dinner. The warm hospitality and good cheer and the excellent dishes provided by the Grange ladies combined to make this feature of the meeting a success.

At 2 P. M. the meeting was resumed. A discussion of the fruit on the exhibition table was first in order. Some excellent specimens of apples shown by E. M. Ives of Meriden attracted special attention and numerous questions brought out some practical information from Mr. Ives. The scald which is so prevalent in certain varieties of apples, Mr. Platt thought could be checked by spraying. The Carter apple and Smith's Cider were two varieties recommended for planting in Connecticut. The first speaker of the afternoon was Mr. Edwin Hoyt of New Canaan, one of the enthusiastic believers in the possibilities of fruit growing, especially apples, who read a very comprehensive paper on apple orcharding in Connecticut. Mr. Hoyt began by urging all to join the Pomological Society, thus helping to extend the interests of fruit growing. In closing he predicted that better days are coming for agriculture: capital is waiting to be invested in fruit farming; coöperation will play an important part in the farming of the future.

President Platt called attention to the fact that Connecticut had the record for the oldest and largest apple tree in the country.

Mr. Ives asked how to manage the cold storage of apples? Mr. Hoyt advised coöperation through the grange or otherwise and to locate the storage house near the railroad to facilitate shipping.

Continuing the cold storage question, Charles I. Allen of Terryville gave his experience with a small storage house, or "cooler" on his farm, where perishable products are stored before shipping to market; asparagus, berries and the like are often successfully held over a day or two until the market is ready for them. He explained the construction of such a house cooled by ice and strongly recommended its use on fruit farms, and where the grower desires to take advantage of the changes in the markets.

In the absence of Prof. Gulley, who was to have spoken on the profits of orcharding, Mr. Paul Thomson of West Hartford was asked to tell of his experience with the apple crop of the past season. Mr. Thomson said his orchard is fifteen years old, and last year bore a crop of very fine Baldwins. He tried the plan of packing his fruit in boxes, wrapping each apple in tissue paper—120 apples to the box,—packed in layers, like oranges. This method was quite satisfactory, his fruit netting him at the rate of $4 per barrel; the boxes cost about 15 cents each and should be made with a partition in the middle for strength. His trees were sprayed twice with the prepared "Boxall" mixture, once before the leaves opened and again when the blossoms had fallen. He practices pruning his trees in midsummer.

Following this very interesting bit of "new apple culture," the Society, on motion of Mr. Sternberg, passed a vote of thanks to the Whigville Grange and the meeting closed with music.

INSTITUTE AT HAMBURG.

One of the pleasantest as well as most profitable institutes of the winter was that of the Society with Lyme Grange at Hamburg, March 15, 1901.

PROGRAMME

OPENING AT 10.30 A. M.

Address of Welcome ..... H. B. Sisson.
"The Outlook for Profitable Fruit Culture in Connecticut" .....
Pres't N. S. Platt.
"Some Insect Pests of Orchard and Garden"..Prof. W. E. Britton,
Conn. Experiment Station, New Haven.
Question Box.

Recess

Dinner served by the Grange

AFTERNOON SESSION AT 1.30

"Fruits for Connecticut Farmers"..... Geo. S. Butler, Cromwell.
"Important Points for Connecticut Orchardists" .....
Prof. A. G. Gulley, Conn. Agricultural College.
"Experiences of a successful Apple Grower"..... E. M. Ives, Meriden.

The village of Hamburg, a portion of the quaint old town of Lyme, is nestled prettily among the rough hills that stretch back from the winding Connecticut River. Its broad farms, adapted to grazing and the raising of cattle and sheep, which products have for generations been its chief pride, are now gradually being devoted to general staple crops as well as considerable fruit growing. These rough pasture lands invite the planting of extensive apple orchards and a new interest in such crops is showing itself; hence a hearty welcome was accorded the State Pomological Society on the occasion of the first fruit growers institute held in New London County.

The meeting opened soon after 11 o'clock with President N. S. Platt presiding.

An address of welcome from Mr. H. B. Sisson only emphasized the feeling of hospitality already so much in evidence. The Secretary of the Society responded on behalf of the visitors and took the occasion to sketch briefly the history and work of the organization.

President Platt then presented a paper on the Outlook for Fruit Culture in Connecticut, which is reproduced here in full.

Conditions and Outlook for Profitable Fruit Culture in Connecticut.

By N. S. Platt of New Haven.

Well, what is the matter? Is anything the matter with our climate? Does it kill out our apple and cherry trees by the wholesale in the winter like it does in some parts of our country? Are we obliged to plant ironclad varieties to escape the winter's cold? After spring is well along, with sap rising fast and blossoms opening, are we likely to have freezing temperature and wipe out the labor of years and our hopes alike? Do we have hot monsoon winds drawing out moisture from leaf and plant and tree faster than roots can supply it?

Other districts have these troubles, but we do not. If we lose a tree or a few trees by winter's cold we think it unusual. We are not obliged to plant ironclad varieties, which are usually inferior, but may plant the best without hesitation. Spring does not begin here so early as to run our trees into great danger of being frozen up afterwards.

Our climate is about right, I think, for fruit growing. It is as reliable as any and more reliable than most. We can grow successfully almost all fruits belonging to the temperate zone. But we started with the question as to its being profitable.

We can grow them successfully and profitably, provided the market will take them and pay us enough, and if we can get them to market cheaply.

Some fruits the markets delight to receive and are slow to get tired of, and it sometimes seems as if they could never get enough. Berries and peaches are of this class, the demand increasing steadily year by year. The cities will have them if they can get them. Our cheap lands and nearness to markets put us in good position to supply the New England towns. When one can get pickers to gather the berries, the other conditions necessary, namely, land, fertilizers, etc., can usually be found readily enough, and one need not fear to grow the berries in just as large quantities as he is fitted to take care of. Along

the Shore Line Railroad, in Branford or at New Haven, growers send cars of berries to Boston, and have done as well the past season as they have ever done. In Springfield, Mass., the largest wholesale merchant there was lately complaining to me that growers in that neighborhood failed, because of careless methods, to furnish first-class strawberries. There are ups and downs to the market for berries, but after all, the fluctuations are more apparent than real. That is, in a plentiful year when berries are low and profits small, we might be apt to think it would never be any better, when just as likely as not the next year or two will be the best for profit that there has been in a number of years. It is not every one who can grow berries or any fruit successfully and *cheaply*. It is strange that the proportion is so small. It means there must be closer application and more intelligent care. It has been so for years and years, and is going to be so for years to come. Three or four years ago a city fruit dealer, who had been in the business for thirty years, said to me that "Connecticut people were planting too many peach trees, were going to overdo the business, etc." The trees he had in mind have borne one crop and there has been no sign of a glut as yet.

A New Jersey grower who was at the annual meeting of the Connecticut Pomological Society said that for forty years the cry in Jersey had been, "we are planting too many peach trees, the fruit will never sell," but the time has not yet come when fruit properly cared for does not sell at a profit, and it is not likely to come either.

Knowledge increases year by year, and it might seem as though there was not much more to learn, but we all have to begin at the bottom and, though knowledge is abundant and its gifts seemingly to be had for the taking, yet not all are able to apply it successfully.

The careful, the intelligent worker among our fruits in Connecticut need not fear overproduction, either of berries, or peaches or apples. For aught I can see, the prospects for profitable production and sale of these fruits is as good as it ever has been, and the young man who wants to go into fruit growing may do so just as fast as his ability to care for it will allow.

A short discussion followed this paper, during which, in referring to the destructive work of peach borers, Mr. Post of Essex said that he practiced using unleached wood ashes about the base of the tree, also washing the trunks with a solution of potash. These methods had largely prevented the borers from getting into the trees.

Prof. W. E. Britton told the audience about the insect pests of garden and orchard, and suggested best methods of fighting them. In closing he said many insects are friends of the fruit growers rather than enemies, as they play an important part in the pollination of our fruits. Investigations are now being carried on by the Experiment Stations along this line of the successful pollination of fruits, and we are learning much about a subject that has received attention only in recent years. After the professor had answered a number of questions, a recess was taken for dinner. Here again the unbounded hospitality of the good people of Hamburg showed itself and the hour was enjoyably spent in partaking of the excellent dinner prepared. The visiting pomologists, especially, did full justice to the spread.

When the meeting was resumed a grange song was first on the program, after which the question box was introduced and as usual at these institutes proved one of the most valuable features of the day. Among the good points brought out were the following: European plums may be sprayed to prevent the attacks of the curculio, as the foliage will withstand almost any insecticide. Mr. Platt suggested that a grange might purchase a complete spraying outfit for the use of its members. This would be one very helpful form of coöperation and especially so in the case of the more expensive machinery used for spraying for the San José scale. Prof. Gulley did not advise buying the knapsack style of pump. Barrel pumps are in every way better for general spray work. Fresh home-made spraying mixtures, such as Bordeaux, etc., are cheaper and better than the ready-made mixtures now on the market.

The first paper of the afternoon was by G. S. Butler of Cromwell on the topic, Fruits for Connecticut planters, and was in part as follows:

Connecticut Fruits for Connecticut Farmers.

The first native fruit to greet us in early June is the strawberry. The old saying: "God *might* have made a better fruit than the strawberry, but he never did," has been ascribed to many truthful persons from George Washington down to Billy Bryan, and still it is true.

By a proper selection of varieties and different methods of care, we may have this delicious fruit in perfection for about six weeks, making our wives good-natured, the children happy and contented, reducing both the grocer's and doctor's bills. Two dollars invested in strawberry plants, if properly cared for, will produce more solid comfort to the square inch than anything I know of, not even excepting whiskey and tobacco.

Following strawberries, we have raspberries, red, black, yellow and purple, with variations in flavor to suit all tastes and covering about all of the month of July. Two hundred plants will produce about 200 quarts under good care; enough for an average family for daily use during the month, with a surplus to can and jam for winter use.

Currants appear during the raspberry season; few families care for large quantities of the fresh fruit, but the jelly has a reputation as well as a desirable flavor, while the fruit insinuates itself into our jams with other berries, and neither seem injured by the combination. Fifty plants will produce over two bushels of fruit, and few families care to use more.

Following the raspberries, or in fact soon after raspberries begin, we have the dewberry, blueberry, whortleberry and blackberry. The whortleberry and blueberry have never been cultivated successfully here, but as long as the portable saw mill continues to lay low our native timber, we can find enough of these delicious berries to float in our milk and make an occasional pie. The dewberry has been cultivated with profit by some during the past few years, and the special varieties grown give large delicious fruit. Neither are perfectly hardy here, but if covered in winter would undoubtedly prove profitable or at least enjoyable in the farmer's fruit supply.

The high blackberry was brought prominently to public notice many years ago by the introduction of the Lawton, an immense, sour berry. Most blackberries are still sold in city markets as

Lawtons. This berry was not profitable, not being hardy although a rampant grower, as my father said it cost him $5 to get it into the garden and $50 to get it out. Similar experience about the same time made the cultivation of blackberries unpopular in the farmer's garden. We now have several hardy varieties of good quality which do not sucker as badly as the old Lawton, and any farmer can easily supply his family with this fruit with little outlay for plants and labor. The season of some varieties lasts two months.

About the beginning of the blackberry season our pickers are noticed eating apples, pears, peaches and plums. Doubtless they produce some pangs, but the act reminds that the season of such fruits is about at hand.

Pears may be had from the middle of July to the middle of January, but are not very valuable on either end. A good hungry family can keep the product of a dozen or twenty trees from going to waste.

The peach season only lasts about two months, but what a "hog" a man can make of himself during those two months; there is practically no limit to his capacity. Dr. Smith would probably recommend the crop from one tree each week for each member of the family, or eight to ten times as many trees as members.

Of plums there are an untold number of varieties, in fact a great number of families or groups of varieties, but only a few of them do well here. Most of the Domesticas rot and knot so badly the average farmer does not care to bother with them, although in quality they are among the best.

The Japanese vary from good to indifferent and positively bad, but all things considered are the most satisfactory plums for the Connecticut farmer to supply his family.

The Americana are hardy and useful, but small and mostly quite acid at the pit.

There are many gentlemen at work crossing these two last named species and the results, we hope, will prove better than either parent.

The apple we may have for twelve months if we choose, but kept in our cellar they have never proved popular in strawberry time, but from early August to May we can eat a number of good apples. No one cares for more than one tree of a

variety of the early apples, but should have an assortment of both sweet and sour, and plenty of winter fruit. If properly educated, each member of the family will dispose of about four barrels.

In conclusion, if each and every farmer's family would devote from one to two acres of land to fruit for their own use, they would find it the best use they could possibly put it to.

Points in the discussion following were that more gooseberries should be grown and better care given them. Their best use is when in the green state.

The Kansas blackcap raspberry is about the best of all around sort in cultivation to-day. The Abundance is the best eating plum of the Japan kinds. Satsuma leads as a canning variety. Those who have not eaten this plum when canned have missed a treat. Mr. Butler has had eight years experience with plum trees on peach roots and prefers such trees rather than those grown on plum roots. He reported that bees, when other food is scarce, often injure plums and peaches by puncturing the skin and suggested as a remedy to grow some food crop that the bees will like better.

When asked to name best strawberry for family use, Mr. Butler recommended the Brandywine. Clyde is also a good berry and Ridgeway is fine for canning.

Many of the ladies present took part in the discussion on how best to preserve strawberries.

Prof. A. G. Gulley of the Connecticut Agricultural College was next introduced and gave one of his usual bright practical talks on important points for orchardists. He said the apple orchards of Connecticut are not generally in the best condition; they have been neglected, and many of these old orchards will not pay to renovate. The most money is to come from the new orchards to be planted. The idea that apple orcharding in Connecticut will not pay is erroneous and the near future will see much capital invested in this branch of fruit growing, with every prospect of success. The speaker then reviewed the essentials in good apple culture. The demand is for *low-headed* trees in order to accommodate better cultivation, spraying, thinning and picking the fruit. Don't mix different kinds of fruit in same orchard. If it is an apple orchard grow apples, and

apples only. Hogs in the orchard may solve the problem of cultivation on some rough lands. For varieties, plant the standard kinds of winter fruit and use such varieties as Duchess, Wagener and that class as "fillers," to be removed later when the trees begin to crowd. Fall apples often pay well; Sutton Beauty is a profitable apple, but will overbear unless properly headed back. Ben Davis and Northern Spy may serve as stocks upon which to graft weaker growing kinds of superior quality.

Spraying to secure perfect foliage will give apples of higher color.

Apples should be picked before October 10th, said the professor, but others contended that fruit picked later will show more color.

Mr. E. M. Ives, the well known grower of fancy apples, was present and showed a choice lot of nicely colored apples. When called upon he gave a short talk on the little details that enter into the growing of a good crop of fruit.

This closed the program, and after passing a vote of thanks to the Grange, one of the most successful institutes ever held by the Society was brought to a close.

INSTITUTE AT LITCHFIELD

March 19, 1901.

PROGRAMME

OPENING AT 10.30 A. M.

Address of Welcome .....F. L. Tharp, Master of Grange.
"The Spraying of Fruit Trees"
Dr. W. C. Sturgis, Conn. Experiment Station, New Haven.
"The Apple as a Money Crop" .....Edwin Hoyt, New Canaan.
Question Box.

Recess

Lunch at Grange Hall

AFTERNOON SESSION AT 1.30.

Music.
"Plum Culture in Connecticut" .....Geo. S. Butler, Cromwell.
"Some Opportunities Connecticut Farmers Should Realize"
Pres't N. S. Platt.
"The Home Fruit Garden" .....J. H. Hale, South Glastonbury.

Through the efforts of Mr. J. H. Putnam of "Fernwood Farm," an active member of the Society, a fruit growers' institute was held in the beautiful town of Litchfield on Tuesday, March 19th.

Owing to the unpleasant weather and very muddy condition of the roads, only a small number were in attendance at the town hall when the meeting was opened at 10.45.

Vice-President J. C. Eddy of Simsbury presided, in the absence of President Platt.

After Worthy Master Tharp of the Litchfield Grange had welcomed the visitors, Dr. W. C. Sturgis, of the Connecticut Experiment Station, gave a very instructive address on "The Spraying of Fruit Trees." The Doctor said in opening that the growing of fruit is the oldest branch of farming. Spraying is most essential; there is no money now-a-days in fruit growing without it. The grower sprays to fight the parasitic fungi that attack his crops.

The speaker then, by means of charts, explained how fungus troubles develop through spores which multiply and spread very rapidly, making these diseases exceedingly hard to conquer. The black knot of the plum and cherry was taken as an illustration of such diseases.

One way to keep our orchard trees healthy is to clean up and burn every bit of refuse and decayed fruit, for it is through these that the spores often spread. He explained how covering the foliage and fruit with copper solution, or other mixtures, will make them proof against the spores. This is where the value of the well known Bordeaux mixture comes in. We should spray only as an emergency. Rather we should try to carry out healthy methods of culture before it becomes necessary to spray. Vigorous trees will always be less susceptible to diseases, so we should aim to give attention to pruning, cleaning the trees, feeding them, and thinning the fruit.

The selection of the stock is an important point to remember. We have been striving for large fruits and lots of them. Hardiness has not been thought of enough. In future we must select those kinds that are less subject to disease.

The apple is the great standard fruit for New England, but the scab is a serious enemy of this fruit. It attacks the leaves, which are the lungs of the tree, and they fall; then the apple

is checked in its growth. This, and the apple rust, are not entirely to be controlled by spraying, but it will help. The leaf-spot of the pear and quince causes the fruit to crack but may be prevented by spraying.

The quince was the first fruit to be treated with Bordeaux in Connecticut.

The rot of plums and cherries is a hard trouble to control. With the exception of the Japan type of plums, spraying should be resorted to.

Will spraying pay? is the great question the fruit grower asks. The professor showed figures to prove his claim that spraying *does pay*, and when thoroughly done pays handsomely.

Replying to a question, Dr. Sturgis explained first how to make and mix successfully Bordeaux mixture.

For grapes the Doctor recommended winter spraying with copper sulphate; when buds open use Bordeaux, following it up every few weeks during the season until the fruit begins to ripen. This advice was seconded by Mr. Allen of Terryville, a large grape grower.

Next came a valuable paper by Edwin Hoyt, the veteran fruit grower and nurseryman, on the apple, and for its many practical points is reproduced here in full.

The Apple as a Money Crop, and How to Get the Most Out of It.

By Edwin Hoyt of New Canaan.

This question is one which should, and no doubt does, interest almost every farmer. We study to learn what crops can be raised on our farms, so we may realize larger returns for the fertilizer and labor necessary to produce them.

I have given much thought and study to the question, and I firmly believe there is no crop equal to the "apple" as a money crop for Connecticut farmers, or in fact for New England farmers.

From the yields and profits I have been able to gather from orchards that have been well cared for, I feel I am justified in saying that from $200 to $500 per acre may be readily realized from an apple orchard of well-selected varieties, given proper

care and cultivation. This may appear to you as an exaggerated statement, but first, let me give you a few facts, then you may judge whether I have given the amount of yield per acre too large or not.

Frank Olmsted of Chester, Orleans County, New York, sold from 1½ acres of apple orchard, 379 barrels of picked apples at $2.40 per barrel, amounting to $909.60, or $606.30 from an acre; and he had besides 300 to 400 bushels of apples for evaporating.

George T. Powell of Ghent, New York, wrote me two years ago, that the apples from two Baldwin trees near his place sold for $110.

Mr. Washburn of Chappaqua, Westchester County, New York, sold the apples on the trees from his four-acre orchard for $900, or $225 per acre.

John Miller of Guardstown, West Virginia, sold 6,000 barrels of apples for $14,520. They were raised on 34 acres, thus giving him $427 per acre.

Twenty years ago, R. D. Tilson, of the same place, planted 16 acres of orchard. The crop in one year has brought over $6,000, which is $375 per acre.

Mr. Morrill of Michigan stated before the Connecticut Pomological Society one year ago that a party in Western New York, that fall, sold from 4 acres of orchard $3,000 worth of apples.

Thirty years ago we picked from Baldwin and Rhode Island Greening trees, set 15 years, 12 barrels per tree. This would be from an acre containing 35 trees 420 barrels, which at $1 per barrel would be $420.

There are many more instances where like large yields and profits have been realized, but enough have been cited to justify the statement made, viz., that from $200 to $500 per acre may be realized from an orchard intelligently managed.

There should be no doubt then that the apple can be made a money crop, and more money gotten out of it than from any other farm crop we now raise.

Now, this brings me to the second or most important part of my subject, viz., "How to get the most out of the Apple Orchard." What many farmers, no doubt, would like most to learn is, how to manage their present orchards so as to make them more profitable? That is a question for another paper.

I will only say, however, in passing, that if you have a herd of cows which have been giving milk for six or eight years on half feed rations, and are poor in flesh, scrawny, and unthrifty, and you should ask me how to get the most money out of stock-raising or your dairy, I would say, don't try to do it out of these old, neglected, half-starved cows, but rather start anew, with some thrifty, vigorous, and healthy young cattle, and care for them as reason and good business methods would suggest, then there might be a chance for some profit.

Your old cows, however, might be improved for a while, and yield you more milk and profit, while the young stock was coming on, by carding, housing, and liberally feeding every day with well-balanced rations. This treatment would improve the old and neglected herd, but you cannot make these cows yield now what they would have done had they been liberally fed, and in every way cared for from the time they were calves.

So it is with uncultivated, half-starved, and neglected orchards. They, like the cows, may be improved by feeding, cultivating, pruning, and spraying, so as to be much more remunerative, but for the best and most profitable results it is better to start anew.

Therefore to show you how to get the most out of an apple orchard (and I believe orcharding is to be the future business of our New England farmers), I will start with a young orchard and show you how to grow and care for it successfully.

First. Select the best piece of orchard ground you have, which must be dry. If it is ridge land, as much of our Connecticut land is, with a retentive subsoil, so that water will drain into and fill, or partly fill, a hole dug 20 inches deep, when left over-night in the spring of year, drain it 3½ feet deep. Trees will grow and bear on such land, but for best results drain it. If the field is in turf, manure, plow, and crop it with corn to get the soil prepared for the trees. It is immaterial whether you set the trees in the fall or spring. If planted in the fall, do so early, say in October. The soil should be first plowed and well harrowed, and after the trees are set, sow to rye for a cover crop, to be plowed under the following spring. If not set with trees until spring, plow, then fertilize with 1200 pounds of fertilizer worth, at least, $30 per ton, or if you have it, 20 to 25 tons of stable manure to the acre, and harrow it in well, when the field will be ready for the trees.

Second. The distance apart to set the trees. This should be 18 or 20 feet, just as the field will lay out in rows; say 18 feet each way or 135 trees to the acre. This distance I know you will think too close to set them. I will give you my reasons for setting the trees this distance, which has very much to do with the early profits from the orchard. Trees set 18 feet apart each way will take 135 trees to the acre, while if set 35 feet apart, the distance more generally recommended, only 35 trees are set. Trees set on good ground, fed, cultivated, and cared for, as I will direct hereafter, should come into bearing the fourth year after planting and they should bear one-half bushel per tree; the fifth year one bushel per tree; the sixth year two bushels; the seventh year one barrel and the eighth year two barrels per tree. The increase of yield annually should continue until the trees are out 15 years, although, perhaps, not in quite the same ratio as the first five years named. Now we have had 100 trees more bearing and giving us this larger yield of fruit for 10 years than if planted 35 feet apart. Now let me show you what this means for profit. If the trees yield at eight years (the fifth year after coming into bearing) two barrels of apples per tree, it is safe to say the average yield for 10 years (until the trees are 15 years old) would be 3 barrels per tree. This gives for 135 trees per acre, 405 barrels of apples per year, and for 10 years 4050 barrels; while if the trees had been planted 35 only to the acre, and the yield 3 barrels per tree, would be 105 barrels, or 1,050 barrels for the ten years. These at $1.50 per barrel would give you for the acre of 135 trees for the 15 years' set and 10 years bearing, $6,075, while for the acre set 35 feet $1,575 or $4,500 more money from the acre by planting 18 feet apart. Now at 15 years, if these trees touch each other, suppose they were cut down and cleaned off, we have more money from the acre than the orchard set 35 feet apart would produce in 25 years, if not in 30 years; but we need not do this, for we can and must cut out every other tree, leaving the trees in the rows diamond shape, with 67 trees left to bear five years more before crowding again. Then take out every other row again, and we have 34 or 35 trees left to go on and bear, as would be the case if set 35 feet apart at first; or which I think would be better, the tops could be cut off of every other tree, the same as if to top-graft, and let the top come up new again. When they come

into bearing again, in three years, then serve the other half the same way.

I have tried to show the increased profit from this close planting method, and will briefly state some other advantages: if set 18 feet apart and we bring the trees into bearing the fourth year, we begin that year to receive some revenue from the crop. We must give up cropping the ground after three years, and give the trees the full benefit of the soil and cultivation. If the trees are 35 feet apart, the space is so wide between the trees, that it will be necessary to crop the ground in order to utilize the space and get something more than the few apples from the 35 trees, for the expense of fertilizing, cultivating, etc. The liability in such cases is to injure the trees by this plowing and cropping, or by seeding down to grass, which many would be tempted to do. Again, the cost of producing the apples will be much lessened by planting 18 feet apart than by the 35 feet plan; a factor to be always looked after to increase profits. One acre with 135 trees may be fertilized with one ton of fertilizer, which would make the trees bear and grow rapidly, while if the ton was spread over four acres to fertilize the 135, it would be too scanty a feeding. The cultivation, so important, could be done on one acre for 135 trees for one-fourth what it would cost to do it on four acres, and besides would be much more effective. The spraying, which is so indispensible now, for perfect fruit and healthy foliage, could be done more cheaply, as two rows could be sprayed at once, and no crop would interfere with the passing through of a team, as might be the case if set at 35 feet.

Would the trees bear any more for being set 35 feet apart for the first 15 years they were out? There is no reason to believe they would, but rather the probability is that they would not bear as much.

I trust I have made my reasons for planting the trees 18 feet apart each way plain and reasonable to you.

The third consideration, after selecting the soil and determining the distance to plant, is what varieties to set. Now be careful! Do not take advice from catalogues or fruit journals from all over the country. Varieties which may be good in Vermont, Michigan, Illinois, Missouri, or Kansas, may not be worth planting here. Use for your orchards only those varieties you know do well here. If I were to plant, I would select Baldwin, Rhode

Island Greening, Hubbardston's Nonesuch, Jonathan, Wine Sap, and some Roxbury Russets. There may be some other varieties like McIntosh Red, Sutton Beauty, Wagener, and Walbridge, that will do well here, but wait until further tested. Set only those varieties you *know* succeed here. I have often been asked if it would not pay to set the Lady Apple? They bring $10 per barrel; or the Esopus Spitzenburg, they are quoted $5 per barrel, when Baldwins are only $2. My answer would be "no." There is no money in growing these varieties. The Lady Apple would not be selling for $10 per barrel or the Spitzenburg for $5 per barrel, if they could be raised as easily as the Baldwin or Rhode Island Greening. The fact that they bring these prices shows that they are not easily grown. Ten dollars can be made growing Baldwins to one dollar raising Lady apples.

Fourth. Get your trees where you are a mind to, only be sure to get good healthy trees, and free from San José scale, with tops formed up four to five feet in height. For your trees dig the holes (in this previously prepared ground, as before noted) two feet wide and twenty inches deep; placing all the surface soil in a pile by itself, and the yellow or subsoil by itself. In setting the trees, be careful not to plant them but little, if any, deeper than they were growing in the nursery rows. Fill the hole with the black or surface soil, until high enough to receive the tree. Spread out the roots, and as the surface soil is thrown in upon the roots, work the dirt thoroughly in among them with your fingers, lifting up the upper roots until all is filled under, so that the roots may all lay a little slanting, and each encircled with the soil, which should be pressed firmly in among the roots, as the hole is being filled up. After the surface soil taken from the hole is all used, then take a shovelful here and there about the field until the hole is completely filled, and the trees firmly set. The yellow dirt from digging the hole can be spread about the field. The tree then has a fine bed in which to start and grow. The soil being plowed previously and well fertilized, that which is put into the hole in setting the trees contains all the plant food necessary for the tree the first year. I speak of this careful planting, because it is very important, so the first year's growth will be a good one. If a tree starts off well and makes a fine growth the first year, the foundation is well laid for the fourth year's crop of fruit.

The trees now being set, the field plowed and fertilized, say with 1,200 pounds of good fertilizer to the acre and harrowed in, it may be planted with potatoes, beets, carrots, strawberries, or any hoed crop. The cultivation necessary for the crop will do for the orchard the first two years or three, provided every time the crop is cultivated and hoed, the ground about the trees is hoed and kept free from weeds, soft and mellow. The bodies of the trees should be washed every May with potash water, one pound of potash to eight quarts of water. This is important, and should never be neglected, until the trees are ten to twelve years old at least. Spraying, pruning and thinning the fruit should be done each year, and the trees examined every May and October to destroy the borers, if any are present.

After the third year, crop the orchard no more, but fertilize every year, using 1,500 to 2,000 pounds of good fertilizer to the acre. Cultivate the ground annually, and cultivate every week or two, at least, until the last of August, when a cover crop may be sown. This may be crimson clover, rye or barley. In spring, this is to be plowed and worked into the soil, as well as it can be, with a cutaway harrow or cultivator; afterwards to be followed through the season with a spring-tooth harrow or other fine tilling implement.

The fourth year and after, apples are the only crop the soil should be required to grow. Now the orchard has been reared to bearing age, and should give a crop of apples every year following. The orchard, as I have said, should be fertilized every spring with three-fourths to one ton or more of fertilizer, and cultivation should begin early and be thoroughly done all through the season, whether weeds grow or not. Cultivation conduces to moisture, which is as essential to the trees and fruit for best results as the fertilizer. Trimming should be done annually; spraying all that is necessary, and thinning the fruit if the trees set too full to carry through the season properly. Never let any other crop on the farm interfere with spraying or cultivating the orchard *at the proper time*. Neglect other crops if you must, rather than the orchard.

You may say I have estimated for a crop of apples every year, while the facts are that trees bear only every other year. That is true with our present management or mismanagement of orchards, but orchards managed as I have directed will bear

every year, as readily as every other year. If the conditions are right for the trees to bear every year, they will bear every year, as well as they now bear every other year. These conditions it is our business to supply, and it is the tree's functions to give us the fruit every year, and the trees will do their part, if we do ours. Nature through the soil never fails to do her part, if man does his. This is true of all crops.

The conditions for annual apple crops are: a well drained soil, a liberal feeding of the soil, spraying the trees to keep up a healthy foliage, frequent stirring of the soil to maintain moisture throughout the season, and thinning the fruit that the trees shall not overbear. If these rules are strictly followed, as every thorough orchardist should do, an annual crop is assured, provided a spring frost or blasting eastern storm does not come when the trees are in blossom.

Now as we have an orchard grown into bearing age, we will next see what the cost per year is to be, to grow our crop of apples ready for picking. My estimate is as follows:

Fertilizer, one ton	$30.00
Harrowing and cultivating, 10 times	15.00
Spraying, 3 times	15.00
Pruning	5.00
Thinning fruit	10.00
	$75.00

The cost of picking, boxes, barrels, marketing, etc., would have to be added to this, which would, perhaps, add $100 more, or $175 for the acre. The lowest estimate of prices for such well grown apples would be $1.50 per barrel, for 405 barrels from the acre would leave $432 profit from the acre, or if at $3 per barrel, as they often bring, $1,040 profit per acre. The cost per acre would be lessened somewhat in proportion to the number of acres we had to care for. The cultivating, spraying, etc., would be less per acre for ten or twenty acres than for one acre.

Now that I have grown this orchard into bearing age, another very important matter for profit confronts us, viz., the putting up and marketing of the fruit. It is one thing to grow the fruit well, but to derive a handsome profit for the labor involved, it requires much taste and care in packing and marketing it. If

there is one thing in our business that needs revolutionizing, it is that of packing and marketing apples. In this section, apples are picked and put into flour barrels just as our grandfathers did fifty or seventy-five years ago. This will not do in this age. The eye is now educated to seeing nicer things more than when I was a boy. Cleanliness, neatness, attractiveness, and beauty are all vital factors in the sale of fruit of any kind. Half of the apples offered for sale in the markets to-day are really repulsive looking to a large portion of buyers, and not one-quarter of the apples are consumed that should be for good health, or would be consumed, if they were well grown and put up in a tasty and attractive manner. The day for flour barrels to send apples to market in has passed, if we are to derive the most profit from them. Apples should be evenly graded as to size and color, and no apples that are worm-eaten, or inferior in any way, should pass into a box of No. 1 apples. Selected fruit should be placed carefully in a box holding just one bushel. A clean box made expressly for apples should be used, lined with white tissue paper (or other colors, as best sets off the color of the apples to be packed), and when the transportation is to be far, like shipping to Europe, each apple should be wrapped in tissue paper, as is done with the best oranges. One bushel of apples thus put up will bring more money than a barrel put up in the ordinary way. This is not all: there will be a much larger amount of apples used than are now used. How many families in our cities will buy a full barrel of apples at one time. It is more than a family might use before many of the apples decay, but if put up attractively in bushel crates or boxes, many a family would have a box of apples sent to them from their grocers, where now they have none.

Go into any of the grocery or fruit stores and ask for apples, and see what will be shown you. Ask for oranges and you will see them displayed with all the attractiveness possible. That is business. Put up perfect apples in the same way, and display them in the same manner, by the side of oranges, and double the quantity of apples will be sold, to that of oranges. The second class apples can be put up in the same way and sold, of course, at less price.

Next we must have a proper place for keeping the apples after picking them until ready for market. House or barn cellars,

unless better than most cellars, are a thing also of the past for storing apples. A place for keeping apples from decaying after picking is what is needed, as much as anything else for largest profit. Many an apple crop has been wasted after picking, from being stored in an improper place. Two conditions are necessary for the perfect keeping of apples, viz., a cool atmosphere and one with sufficient moisture in it.

Can these conditions be reached and maintained by the grower? Certainly they can. One way is with ice, and another, when on a large scale, is in cold storage with chemicals, and such places for storing perishable fruits are coming more and more into general use.

Another important matter in large profit from the orchard is the saving of wind-falls and inferior fruit. Orchards fed, cultivated, fruit thinned, and cared for as I have directed, will not have so many wind-falls as we now have under our trees, but there will always be some not perfect enough to put in the boxes to sell for No. 1 fruit. There should be in every town where apple-growing is carried on to any extent, an evaporating plant, where all the apples for drying may be brought to and dried. This is now done in many places in Western New York, and many thousands of dollars are made from these drying houses. Apples are dried by hot air, and from 300 to 500 bushels per day can be pared, bleached, dried, and boxed. They are then put up in boxes of 15 or 20 pounds, and can be shipped anywhere. The market for these dried apples is the world. Apples for this purpose usually bring 25 cents per bushel. This is more than such apples are worth to feed cattle, or to make into vinegar. I have seen made from the cores and parings of apples at these drying houses what is called "apple butter," a jelly made from the juice and boiling it, until it comes out a thick paste or jelly; and it is really very fine. I have never seen this "apple butter" here in the East, but it has many uses, and is very wholesome.

Now I have hurriedly gone over this question of the apple as a money crop, and how to get the most out of it, yet there is one important matter for greater profit connected with it that I have not touched; that is, coöperation or combination. Applied to orcharding or farming, it is in advance of the farmers, but in manufacturing, or in the mercantile business world, it is uni-

versally adopted and successfully and very profitably managed. If one farmer in a town should plant ten acres of orchard and care for it, as I have directed, he would, no doubt, make more money from his orchard than from other crops he may raise on thirty acres; but if every farmer in the town would start in and set out from one to five acres a year until all suitable land for orchards was planted and cared for properly, then form a combination or coöperate together (as can be done), the apples could be raised cheaper, kept more perfectly, marketed more readily, and at much larger prices than we now sell them at, than the one farmer with his ten acres could possibly do. Buyers go where the goods are to be bought, and any buyer will go and will pay more for the fruit where he can get 5,000 to 10,000 barrels, than to chase over the State to pick up 100 barrels here, 50 barrels somewhere else and so on to get his wants supplied.

If all the suitable orchard lands of Connecticut were planted to orchards and well cared for, the apples would all find a ready market. There is not the least danger of over-production. The world's demands are larger then we can supply. When orcharding becomes the one business of Connecticut farmers, as it should be, then untold wealth will pour into our State. Our farms will be valuable and salable, and our farmers happy and successful.

Those who put careful study, thought, and brain power into apple orcharding, will be the ones who will realize the fact, that the "apple" is not only a money crop, but the largest money crop we can produce on our farms.

At one o'clock the meeting adjourned to the Grange Hall nearby, where the ladies had prepared a bountiful dinner.

With the opening of the afternoon session Mr. Hoyt's paper was discussed.

In answer to a question, Mr. Hoyt said the Wealthy apple is valuable as an early shipping variety. The best system of pruning is to cut back the top and aim to renew the bearing wood.

Mr. Whittlesey put the question, will fruit growing really pay in these hill towns of our State? Mr. Hoyt said, we can produce better apples than the West, and it *will pay* to grow them here. The market is ready for our fruit. We are near to the best markets and to the shipping ports. Our people should eat more fruit and less meat.

The speaker believed that the time is coming when capital will be invested in fruit jams rather than stocks and government bonds.

In the absence of Mr. Butler, the speaker on plums, Chas. I. Allen spoke on this topic, giving a short account of his experiences in growing the Japan plums.

E. M. Ives of Meriden explained his work in spraying apple trees for a series of years and, as an example of what can be accomplished, exhibited specimens of apples from his 1900 crop—very fine in every way.

The remainder of the session was occupied with a discussion of questions from the box in which all present participated; also the reading by the Secretary of a paper by President N. S. Platt, who was detained by a business engagement. The paper, which was well received, is given below.

Large or Small Agricultural Ventures in Connecticut. Which Shall It Be?

By N. S. Platt, New Haven.

The generations who have gone before us, and who tilled the soil for 200 years or more, no doubt did the best thing they could do when on each home place they planted fruit trees of all the known desirable kinds, and planted crops of grain and vegetables such as they expected to use themselves. They had their own families to feed, and they fed them largely with provisions of their own growing. Fruit, vegetables, grain and meat were produced near by.

If their fruit failed they went without fruit; if some of their vegetables failed they very likely went without them. They could not bring them from a distance, as we can. They depended on home production, and producers could have some chance to furnish the home market. In fact that was about the only one to be had, and so our people grew up, from father to son and son's son, with only the home market in view.

Those of us who have reached or passed middle life, will recall, I think, that in our boyhood days this home-market condition was more pronounced than it is to-day. In those days each farmer's family aimed to produce its own supply of about all that would grow in this climate. Now we have gotten away from

that, permitting other localities to furnish us with such things as they can lay down here cheaper or better than we can produce, turning our attention to fewer products and raising more of them, or looking up new productions that the market demands.

The producer has found that he can grow these special crops cheaply and well, with as great, and perhaps greater certainty than people in other localities can, and in his own home market he can compete with, and has an advantage over the rest of the world.

What is to hinder, then, his growing these special crops in quantities large enough to fully supply the home market and perhaps some for export as well? But how seldom do we find this to be the case. Let me mention some of the reasons which come to my mind, as showing why he has not done it. First, the average farmer never has worked that way, but has been accustomed to grow small quantities, thinking that was the safest for him. Second, he don't know how to do differently. Third, his lands are not adapted to it. Fourth, doubt as to the financial success of any other method than that which he has practiced. The first and second reasons are really no reasons at all; the third holds good in many cases, but is not by any means prohibitive. If your land is not good for what you want to grow, make it so, or find some that is. I am aware that in most cases you are already located and feel that whatever you do must be done on that farm and no other. To such, this paper would aim to have you enlarge on whatever crops you can grow that will be most profitable. In most cases this can readily be done.

The man who desires to grow a specialty, and is free to locate, can usually find the kind of land he wants. This is really the most business-like way, and in the case of peach and apple land has been followed lately to some extent, and is likely to be followed further. It has not reached its limit yet. In fact, it seems to me, it has only just begun.

Certain it is that there are plenty of good locations yet unoccupied, and very often they are just the ones that are in the market at a low price.

Elevated tillable lands in Southern and Central Connecticut, planted with peaches offer, I think, the best renumeration of any peach-growing country in America.

Peaches, though a perishable crop, can be planted and managed in large areas, and so can apples; the help needed in harvesting can be brought from the cities and lodged in cheap buildings; they doing their own cooking. I am aware that this would be an innovation to the common farmer, and not to be entered upon in a hurry. But such things are done in other parts of our country; they are already done here to some extent.

Will such large ventures pay?

Well, it is right in line with good business principles. You can manage the large business cheaper proportionately than the small one. You save in implements and in labor lost going from one employment to another: You save in marketing. There is a big saving in these last two items. The same labor and time will, or should produce a greater quantity and value. You can afford to inform yourself thoroughly on your specialty or specialties, in fact become an expert and make your product as good as the best, and place it on the market in the most attractive and desirable shape. Then, too, the dealer prefers to buy of one who has a large quantity of uniform quality to sell. The fact that we have trouble to find buyers for our apples is because we have such small quantities. Not enough in one place to pay buyers to come and look at them. One of our institute lecturers a year ago, made the fact very plain that the great drawback to successful farming was, that the production was too small for the capital. Many farms, and I presume most farms in New England, have acres on acres of land that has to be cared for, and fenced, and taxes paid on it, and yet it produces very little in the way of income. Large buildings, too, swallow up capital, and can only help on the income as they are used; and so it comes about that when you foot up the value of land and buildings in a farm, and figure to pay a fair interest on that amount and the running expenses and have a living profit besides, it is pretty hard figuring. What is the trouble? Just this, the production is not great enough to put the land and buildings to their largest use.

Many of the best lands for peaches and apples are being made the least of, under existing condition of things. Such lands as are suitable, could be made by means of these and perhaps other crops, to bring an income over and over again larger than whole farms yield now. It needs a little *persistent courage* or stamina, and good judgment or common sense.

My plan will remedy that defect, and at the same time make farming easier. It is certainly easier to plan for and care for a few specialities than it is to grow a whole line of productions. I have tried both ways and so do not speak without experience.

My twenty-seven years in the nursery business gave me a chance to work where there was more detail and more varieties than in any ordinary farming. Probably none of your branches of farming equals it for complications unless it is the market gardeners. Whoever follows these two callings must, I suppose, continue in turmoil and bear the wear and tear of the business.

Somebody must follow such callings of course, and I would not advise to abandon them, but my aim would be to simplify in variety and enlarge in quantity, believing that our New England people fritter away their time trying to care for too many things. Believing that the time has fully come when choosing our products we may grow them in larger quantities and depend on finding a market that will remunerate us well.

These thoughts may not impress the older heads as sound, and even if you do believe them to be correct you may not be able to follow them out, but there are young men growing up whose plans for life are yet to be laid. This paper may be food for thought to them. If so, and it proves of any value, I shall be satisfied to have presented it.

A vote of thanks was tendered the Grange for its hospitality, and the meeting adjourned.

It was gratifying to note the interest in fruit matters among those present, which promises well for more extended planting of fruits in Litchfield and neighboring towns. The presence of many summer visitors in these beautiful hill towns of the State insures a ready market for berries and tree fruits.

A number of growers took the opportunity afforded by this meeting to become members of the Society.

Invitations to the Society to hold Institutes came in thick and fast during the month of March. Some had to be declined, and, in order to accommodate others, two were held during the same week, that at Shelton following close upon the Litchfield meeting.

INSTITUTE AT SHELTON.

The Shelton Institute, on Thursday, March 21, 1901, encountered bad weather; a very severe rain storm keeping many visitors away, but a large enough company gathered to make the meeting both interesting and profitable. The following well arranged program was carried out:

PROGRAMME.

OPENING AT 10.30 A.M.

Introductory. .....S. B. Brownson, Master of Grange.
"The Home Fruit Garden,".....J. H. Putnam, Litchfield.
"The Market End of Fruit Growing,".....Nellis H. Sherwood, Southport.
"Essential Points in Apple Orcharding,"
Prof. A. G. Gulley, Conn. Agricultural College, Storrs.

Recess.

AFTERNOON SESSION AT 2.

QUESTION BOX

"Profitable Peach Growing," .....J. H. Hale, South Glastonbury.
"Strawberries—Best Methods of Growing and Marketing,"
J. C. Eddy, Simsbury.
Illustrated Talk—"The Dreaded San José Scale."
Prof. W. E. Britton, Conn. Experiment Station.

The morning session was opened at 10.45 with Vice-President Eddy in the chair. First on the programme was a talk on the home fruit garden by Mr. J. H. Putnam of Litchfield. This was an interesting and helpful address, full of practical suggestions as to the successful cultivation of fruits for home use. The speaker maintained that the secret of success consisted in close attention to details.

Referring to strawberry culture, Mr. Putnam advised the use of water for the growing crop. Hen manure is a valuable fertilizer for this fruit. A list of varieties for family use should include Bubach, Haverland, Parker Earle, Gandy and Marshall. Among the newer sorts worth a trial are Gladstone, Nick Ohmer, Glen Mary, McKinley and Sample. Mr. Putnam spoke from personal experience with each of these varieties. The famous Marshall berry outranks all the rest on his soil and under his system of culture.

In this work we should aim to grow varieties that have superior *quality* and leave the matter of quantity to the market grower. He explained his method of securing very late berries, by covering the plants with ice late in winter and mulching over this, removing the latter as the season advances. In this way berries are had all through July.

Among raspberries Mr. Putnam recommended the Columbian for a canning berry, and the Hansell, an old sort, but still a good one, for the home garden on account of its fine flavor. Plant the Golden Queen too, by all means.

The Older and Eureka are worthy of trial among the black caps.

Blackberries should be heavily fertilized and will respond with the finest of fruit. The Snyder is the most reliable kind.

A good word was spoken for the black currants, which Mr. Putnam said are not appreciated in this country. Their best use is in making jam. For currants plant the Red Cross, the Wilder and the Pomona.

Both currants and gooseberries need to be sprayed with Bordeaux to protect them from the leaf blight.

The speaker favored the practice of girdling grapes to produce early and fine fruit and explained his method. He plants his strawberries 2 by 3 feet, and renews his beds every two years. Allows each plant to set 5 runners, cutting off the rest. These unused runners make fine plants for next year's planting if set in a cold frame and allowed to grow.

The entire address was a strong plea for a more liberal planting of fruits for home use, in order that all may have an abundance on their table the year round.

Mr. Nellis H. Sherwood of Southport, a successful farmer and fruit grower, was then called upon to speak of that most important of topics: the market end of fruit growing. No one is better qualified to discuss this side of the business, and the points he brought out were well received. Among other things, Mr. Sherwood said, he practiced sorting and grading his berries before shipping, and thought it paid him to do so. He would advise the use of a slip or tag in each basket of fruit, containing the grower's name, etc., as a trade-mark. A loose tag is better than a pasted one on side of package, as then no fraud can be practiced after the package is sold. He is a firm believer in the commission man and advised sticking to one firm for the season.

The selling of peaches begins with thinning the fruit on the tree—none of us thin our fruits enough. A label will help to sell your fruit if the package is honestly packed. *Honest packing* is the great point in successfully selling our fruit.

A vigorous discussion followed in which the matter of picking received attention. Mr. Farnham complained of not being able to control his berry pickers through the season. Mr. Sherwood would aim to grow the largest berries and then the pickers will stay with you. The pickers who remain with him the entire season receive more per quart for their work. Mr. Innis told of his experience in grading strawberries and the increased price received for such uniform fruit. Many present, however, doubted if the extra labor involved would pay.

At 12.30 a recess was taken for lunch, which was spread in the Town Hall nearby, and served by the ladies of Farmill River Grange. All enjoyed this pleasant feature of the meeting.

The afternoon session began with a greatly increased attendance and much interest shown in the proceedings. Mr. A. C. Innis, Vice-President for Fairfield County, was called to the chair. The much regretted absence of Mr. Hale, who was on the program, was announced.

The first speaker of the afternoon was J. C. Eddy of Simsbury, who presented an excellent paper on strawberry growing, an abstract of which is here given.

Strawberries—Most Profitable Methods of Growing and Marketing.

By J. C. Eddy, Simsbury.

I don't feel capable of telling you how profitably to grow strawberries, but I see I am given no alternative but to go ahead and do the best I can. So I will give you a few points as noted in my own experience with this crop.

There have been seasons within the memory of us all when I should have felt compelled to treat the subject of the *profitable* growing of strawberries by saying briefly, "there is no profit," and this would be a true statement in many cases. However, to be profitable, strawberries must have good care from start to finish, not necessarily expensive care, but doing the right thing

at the right time. To commence with we must have good plants, with full vitality; to have these, care must be exercised in the digging of the plants, trimming and preparing them for setting out. Plants that are dug and exposed to drying winds ten minutes, or even less time, are often much injured by such exposure. In digging plants on my own farm, I usually trim them in the field where dug, keeping right up to the fresh dug plants, covering the roots of each bunch of 10, 15 or 25, with earth, as fast as trimmed, and then gathering them up into boxes or baskets, with scarcely any exposure to air. After they are properly packed they may be sent almost any distance, or kept in a cool place a long time without injury. For the strawberry crop there is no danger of fitting the soil too thoroughly. I mark out the field in any way that comes handy, in order to have rows the proper distance apart (say 3½ or 4½ feet), according to whether I want narrow matted rows or wide ones. I then take a Planet Jr. cultivator, and follow the marks, going twice if necessary, to fine the soil, then set in the center mark. By this method the ground is so mellow that no dibble is required in setting the plants. Care must be taken to have the crown of the plants as near the level of the surface of the ground as possible, if set too low, they are bound to make a poor growth, and if too high, are liable to be pulled out by cultivator. It may be rank heresy to say so, but I do not lay any particular stress on spreading out the roots when setting the plants, but I do insist that they shall be set with the roots fairly deep in the soil, and the earth well firmed around them. A good rule to follow and insist on, is that the plant must be so firmly set that it cannot be pulled up by one leaf, that is, that the leaf will break before the plant will start. Another important point is to set as early as possible in the spring; you can't set too early after the ground is fit to work. The ground is cool at that time and the plants will start without any check, when if set late and dry weather comes on a poor stand of plants is sure to result.

Within a very few days after setting, the weeder, or any good curved tooth implement, should be used, going lengthwise of the row right over the plants; it will seem at first that you would ruin the plants, but if plants are properly set, not one in a 100 will be injured. The first time over it is well to have some one follow the weeder and set in plants where any are pulled out, or

raise any that are found covered by being set too low; after the first cultivation very few are lost; if the weeder is kept going every few days, very little hand work will be necessary until the runners are well started.

Our greatest foes in the matter of weeds are those that live over winter, of which there are quite a number; unless we do thorough work with hoe and fingers, if necessary, late in the season, we have a lot of these to start up in the spring and surprise us by their rampant growth, just about when the plants are blooming.

The most profitable work I have ever done on strawberries has been in irrigating them in dry seasons. I have had cases when putting on water three or four times has made a difference of from $300 to $400 per acre. I don't think there is any crop that will pay more liberally for water than strawberries. On some soils I have no doubt water could be turned down the rows to advantage, but most of my soil is too porous to use that way of applying it. I have to spray the water on, to do any good; by spraying I don't mean as we spray our fruit trees, but applying a good lively shower of from twenty to forty gallons a minute. Forty gallons per minute will just about cover any acre a day if kept going; it takes 27,000 gallons to give one inch in depth over one acre and in a dry time this ought to be applied once in five days. I use 2 inch iron pipe and fire hose for conveying the water where I want it, then have a large sprinkler that can be attached to any length of hose, with a man to attend to it and change it from place to place as wanted. To get best results, irrigation should be commenced early, if needed at all; the berries will be a little later in ripening, but this will be offset by the greatly increased yield.

In regard to marketing, I think Mr. Sherwood has covered that ground pretty thoroughly. I will only say that we must have the berries carefully picked, put in clean, new baskets, and get them to some place where they are wanted. It is useless to try to force them onto a glutted market. Very often when one market is overloaded, some other place within reach would be glad to take them at a fair price. In short, *study* the markets if you would secure the profits.

Following Mr. Eddy's paper the contents of the Question Box came up for discussion. Questions on a great variety of

topics relating to fruit growing were considered. One asking for the best list of strawberries for a sandy soil was answered by Mr. Innis, who recommended Bubach and Sharpless; others mentioned the Clyde, Tennessee and Nick Ohmer as being adapted to light soils.

Mr. Sherwood thought no ironclad rule could be laid down about varieties and soils, as strawberries differ so much in different localities.

An interesting feature of the afternoon was a lecture by Prof. A. G. Gulley of the Connecticut Agricultural College, on "Essential Points in Apple Orcharding." Like all the Professor's talks, it was instructive and right to the point from beginning to end. He said we were after *profit* in apple culture. In driving over the State quite extensively he had seen but very few apple orchards in first-class condition. This was because the older orchards were not planted with the one idea of profit, and other crops had been grown among the trees much to their detriment.

Connecticut orchardists have keen competition to meet from the Western grown fruit, but we have the important advantage of being nearer good markets, and we know that our soil and climate will produce finer varieties of apples.

Often it will cost $35 per acre to prepare and clear our lands for orchards. Here we are at a disadvantage, still orcharding can be made to pay. The trees may be set 18 feet apart if we will attend to thinning out the trees when it becomes necessary. By this plan the entire area is made to produce apples and we are not tempted to grow some other side crop in the orchard. Head the trees *low* for they can be successfully cultivated with our modern orchard tools. You may purchase your apple trees when small and young and grow them several years on your own grounds before finally setting in the permanent orchard. By this frequent transplanting you secure better trees and ones that will fruit earlier.

Among varieties mentioned and recommended, in addition to the old standard apples, were Jonathan, Duchess of Oldenburg, Sutton and Wagener.

Mr. F. L. Perry of Bridgeport, in answer to questions, spoke of some of the new Japan plums, mentioning the October purple,

a fine late plum, and Chalco, which is an exceedingly good keeper.

The session was brought to a close with a lecture on the San José scale by Prof. W. E. Britton of New Haven. Many lantern slides were shown and helped to make the descriptions of this new pest very clear and interesting.

After expressing its appreciation of the hospitality of the Shelton people, the meeting adjourned.

It was a matter of congratulation that despite the inclement weather the attendance was large, the interest lively, and a substantial addition to the membership of the Society was received.

INSTITUTE WITH CHESHIRE GRANGE

March 27, 1901.

Responding to an urgent call, the Society held a fruit growers' meeting in Cheshire, March 27th. This old town, which has for years prided itself on the production of fine fruits, always extends a hearty welcome to the Pomological Society, and the present meeting was no exception. In few towns in the State has the culture of orchard and small fruits been carried to greater perfection, location and soil conditions combining to make the production of these crops profitable to a high degree.

The meeting was called to order at 11 o'clock by President N. S. Platt of the Society, who spoke briefly of the value of these fruit growers' gatherings and the general outlook for successful fruit culture.

Mr. J. H. Merriman of Southington was the first speaker on the program, his subject being, "Opportunities for the Connecticut Fruit Grower." His address, which is here given in condensed form, was an enthusiastic review of the peculiar advantages of Connecticut as a fruit-growing state.

"A knowledge of the requirements of any special line of business is always essential to success. The opportunities for fruit growing here are abundant, and open to those who have the energy to study the business. The environments are favorable in Connecticut. We have the right climate. The abundant sunlight paints our fruit, especially peaches, in artistic beauty, and gives them a flavor the world cannot equal. We have a

home market in our manufacturing centers, and are within a few hours of Boston or New York markets. We have the hills waiting to be planted with trees and vines. Certainly the land of Canaan is at our very doors; we have simply to enter and occupy.

I can seem to see, by the mind's prophetic eye, in the near future men of wealth buying land suited to the production of peaches, and the business much enlarged and extended; we are near the northern limit of peach culture, therefore the markets of Massachusetts and states north of us are ours to supply. I have no fear of overproduction. Hale may plant his thousand acres in Georgia, but they do not compete with us. Maryland and Delaware have no place in our markets, when our fruit is ripe. I will make this prediction, which some of you may remember in the years to come: Connecticut peach lands within the next ten years will double in value.

In Southern California orange culture has enhanced the value of the land $90,000,000 within the last twelve years; the possibilities lie before us to take land that can be bought for from $15 to $20 per acre and convert it into a value of more than $100 above expenses within a year's time; such opportunities will not lie unappropriated many years. We are only on the threshold of peach culture.

Unless some great calamity should befall the industry, like the spread of San José scale, unprecedented growth will mark the present decade.

I trust our legislature may listen to the words of warning and of wisdom, spoken by Prof. Britton, and take such steps to keep this pest under control or eradicate it, and so preserve the most valuable industry ever entered into by the farmers of our State. This Society stands as a beacon light, to warn of dangers, dispense knowledge; to inspire hope and confidence in our work; and to bring us into closer touch with each other, and with nature's God.

In the culture of apples the possibilities are not so easily shown, and possibly the returns are not so lucrative, but the opportunities are certainly not wanting.

The life of an apple tree in Connecticut is about 80 years, or a man's lifetime; in the western states 25 to 30 is the limit. I trust we shall in the near future establish a market in Europe

that will bring us satisfactory returns, when we can place them in cold storage steamers, and consign them to a cold storage house on the other side, so that they need not be sold at auction or forced sale. We have much to learn about packing our fruit so as to gain confidence and meet the demands of their trade, then success is assured. The world moves, and he who will not keep pace with it, is sure to be caught under the Juggernaut wheels of progress, and ground to atoms.

To meet the demands of progress we have to be vigilant, and meet foes at the threshold and give them a bold fight before their forces are too strong. Science and experience go hand in hand, and success depends upon our alertness, and ability to grasp and conquer the problems as they arise; conditions change with each year; shall we falter or be dismayed? I say no!

Our soil and climate are favorable and congenial for the apple, the buds are rarely injured by frosts. Our market is the world, since this fruit can be shipped long distances.

Orcharding may be much extended, and would at the same time increase our opportunities to sell at a profit. The larger the business, the more systematic it becomes, and a reputation becomes established and the buyers' confidence in our fruit becomes established. I fancy if we could raise ten times as many apples as we do now, the markets would be still better. It is the volume of business that enhances dividends; it is so in all lines of industry; business sagacity believes in combination of capital. It may not be practicable for the fruit growers of Connecticut to combine to market their fruit, but I do believe we can hold up a standard of excellence in the sorting and packing of our apples that will enhance their value. Of the small fruits our opportunities are perhaps better than in many other states; our manufacturing population provides us with the best market in the country. Strawberries, particularly, are our best fruit, and will continue to please the eye, and tickle the palate, for generations to come. I will not take your valuable time to go into detail. It is an old story, yet improvement must keep step with the march of time.

Brother horticulturists, I came here not to teach you, but to inspire you with renewed confidence in your business; to enthuse into your lives a love for the work, with heart and hand, mind and soul. Above all, let us carry home with us the thought

that we are co-workers with God. We may plant and cultivate, but He alone can give the increase."

Many questions followed the reading of this excellent paper, and then Prof. A. L. Winton, chemist at the State Experiment Station, was introduced and spoke on the important topic of "Fraud in manufactured food products and its effect on the sale of honest fruit." The professor handled this subject in a practical way, speaking from his experience in examining many samples of food products in connection with his Station work. He said that the use of preservatives in fruit foods is not necessary. It is not a good thing for the consumer and is a benefit to no one except the manufacturer. A good, pure jam or jelly ought to keep well without it.

Samples of foods were shown that contained adulterants, and the reasons for their use was explained; with strawberries, for instance, it is hard to retain a good color, so unhealthy dyes are used when the fruit is canned. Soda water syrups are badly adulterated. Most of the so-called extracts of berries are frauds, and contain no pure juice whatever. Coal tar dyes are used very largely. Manufacturers hide behind the excuse that farmers color their butter, therefore they have the right to use coloring matter in their goods. But the worst of it is, that there is a demand in the markets for these bright-colored, adulterated goods and their sale does interfere with the consumption of honest fruit products.

It used to be the rule to make the family supply of jellies, jams, catsups, etc., in the home; now the market is flooded with the poor, cheap factory-made goods, and, as they are mostly put up outside the State our fruit growers receive no benefit whatever from the industry; in fact, it is really taking money from the pockets of Connecticut growers.

This country excels in the making of imitation food products of every sort and it is no credit to us, yet the demand for such frauds increases and they continue to attract buyers by their attractive package and high colors, while they contain actually no honest fruit in their makeup. It would seem that the public likes to be humbugged!

Dr. Winton thought there might be an opening for enterprising growers to put up and market honest, pure fruit juices, jellies, etc., in this way making use of the surplus fruit that

now often goes to waste. These goods would not compete with the factory-made, as the cost would be necessarily greater and a different class of buyers would be interested.

The Connecticut Station is trying, said Mr. Winton, to show the public what fraud in food is, and what the foods we buy really contain.

At this point a recess was taken for lunch, discussion of Prof. Winton's interesting topic being deferred until later.

During the recess the ladies of the Cheshire Grange served a fine lunch to the visitors, in Grange hall below.

The afternoon session began at 1.45, with an increased attendance.

The subject of fraud in foods was again under discussion. Prof. Winton said further, that all American fruit products, such as jellies, jams and fruit, butters, etc., are more or less adulterated, and he explained the methods used by the manufacturers to deceive the consumer.

It would seem as if enough good fruit is grown in Connecticut to allow of the market being supplied with pure jellies, etc.

A lady present told of her experience in putting up good fruit for the market, and how she had found a ready demand for it.

Peach butter is a product much in favor in the city market.

The Satsuma plum was spoken of as being superb for preserving.

At this point a musical selection enlivened the proceedings.

The question box and its contents were next discussed. What apples to plant in Connecticut was answered by Mr. Merriman, who said, plant the Baldwin first, last and always. Mr. Platt and Mr. Sternberg supported this, as nothing can compare with the Baldwin for a first-class red apple.

Mr. Ives said the Rome Beauty is proving quite valuable in some sections of the State.

Mr. Moss thought some varieties succeed better in certain parts of Connecticut than in others. President Platt said Baldwins are not a success on the coast; Greening and Peck's Pleasant succeed better there.

A question on cold storage of fruit was answered by Mr. Terrell of Cheshire, who gave an account of an apple storage house in operation on his farm. The house was built at a

cost of $600, is run without ice, and has proved a success. Such storage houses offer many advantages to the smaller growers.

"The Growing and Handling of Orchard Fruits," was the subject of an address by Prof. A. G. Gulley of Storrs.

In opening, the speaker said, some of the present orchards in our State are worth more for firewood than for growing fruit. Starting with young orchards offers the best chances of success. Competition in fruit growing is changed from that of former years; our methods must change, too, if we would meet this condition of things. We must grow finer kinds of apples in the future, even better than the Baldwin; choice dessert varieties will pay well. We should plant fruit trees for succeeding generations to enjoy, even as we are indebted to our fathers for what we are eating to-day. And in any case fruit trees add very much to the value of our farms.

Spraying, so essential in all successful orcharding, is not fully understood yet; we don't always know just what we are spraying for. Study your conditions carefully and then do the work with thoroughness.

Prof. Gulley believed in planting the entire orchard with apples, but in the discussion following, several spoke in favor of planting peaches between the apple trees for quickest returns.

The professor said we cannot hope to beat Western New York growers in quality, but we are nearer best markets, and by growing varieties suited to our section we have an advantage.

Mr. Merriman was strongly of the opinion that no apples equal in flavor those grown here. Nova Scotia was mentioned as figuring largely in the apple market and we must meet that competition in the future.

A. C. Sternberg gave one of his always interesting talks on "Peach Culture," speaking especially to the young farmers present and urging them to embark in the business with no fears for over-production.

With a hearty vote of thanks to Cheshire Grange, the meeting closed at 4 P. M.

Summer Field Meetings in 1901.

Probably no single feature of the Pomological Society's work has contributed so much to its success as the series of field meetings held during the summer months on fruit farms throughout the State. These unique out-door gatherings were begun early in the history of the Society, and have been a source of great pleasure and profit to the members and their many friends who are always made welcome.

FIG. 16.

The 1901 Strawberry Field Meeting at Bristol.

To have the opportunity of visiting a successful fruit grower and noting his conditions, methods and results exactly as they exist, is worth all, and much more, than the little time and expense involved in attending these field days, to say nothing of the social pleasures and welcome recreation; while the benefits derived by the host himself in the way of suggestion and encouragement surely makes the meeting worth while.

STRAWBERRY FIELD DAY AT BRISTOL.

June 24, 1901.

Messrs. E. Manchester & Sons of Bristol were the first to extend a field meeting invitation for the season of 1901, and accordingly the annual strawberry meeting of the Society was held at their well known "Fernhill Farm" on Monday, June 24.

Despite the oppressive weather the attendance was large, the visitors finding restful coolness under the shade of a great oak, which was made the headquarters for the day.

The company as gathered under the old tree just after lunch is shown in fig. 16.

The forenoon was occupied with a tour of Mr. Manchester's farm. The farm is fertile and well tilled; much of it is devoted to grass and pasture, since the dairy is one of Mr. Manchester's specialties and his chief pride.

However, there are many fruit crops grown also; the apple orchard was of special interest to the visitors, for here was grown some of the fruit that received highest awards at the Paris Exposition. The trees are young and thrifty and give evidence of careful handling, including spraying. Plums, peaches, raspberries and blackberries were seen, and a good acreage of strawberries just ripening a bountiful crop of nice fruit. Mr. Manchester's sons give special attention to the berry crops. A fancy market is found for the fruit in nearby Bristol, in connection with the milk from the farm.

After all had partaken of the picnic lunch, for which the tables were pleasantly spread under the trees, the gathering was called to order for discussion and exchange of ideas. Mr. R. A. Moore, Treasurer of the Society, presided very acceptably in the absence of President Platt. Unfortunately the host, Mr. Elbert Manchester, was confined to the house by illness and was unable to welcome his guests, but his son Edward filled his place with much credit, telling of the work undertaken on the farm.

Among those who addressed the meeting were B. C. Patterson, Master of the State Grange; J. M. Hubbard of Middletown, one of the pioneers in Connecticut agriculture and fruit growing; Dr. Cressy of the *Connecticut Farmer;* F. L. Perry of Bridgeport, of the Committee on New Fruits, who spoke of

the behavior this season of some new varieties of berries and of his work in growing seedling strawberries; Mr. E. C. Powell of the *New England Homestead,* who complimented the good work of the Society and gave an encouraging account of the fruit crop outlook in New England and New York. He dropped the hint to Connecticut fruit growers to use more *water* in the cultivation of their fruit crops.

Vice-President A. C. Sternberg spoke of the Pan-American Exposition now open at Buffalo, and what our State is doing

FIG. 17.

to make a horticultural exhibit there. Rev. Magee Pratt of Hartford made a pleasant and witty address, dwelling on the wonderful evolution of the strawberry.

Prof. W. E. Britton of the State Experiment Station spoke of the new and improved selections in varieties of strawberries, also gave some good advice about spraying for the San José scale.

Mr. Elbert Gaylord of Bristol spoke briefly. Secretary Miles called attention to the meeting of the American Pomological Society at Buffalo in September, and a vote was passed giving the Executive Committee the power to select delegates to that meeting.

A very hearty vote of thanks was given to the Messrs. Manchester for their kind hospitality. The meeting adjourned early

to allow some of the visitors to make the trip to Whigville and inspect the strawberry fields there. About 175 were present during the day and all were loud in their praise of the excellence of Fern Hill Farm.

The above cut shows one corner of the berry exhibit, which was a notable feature of the strawberry meeting at Mr. Manchester's. The fruit shown was of a high grade, several new kinds attracting not a little attention.

Those who exhibited were: J. W. Lord, Warehouse Point, who showed the Marshall and also a new seedling called "Connecticut," a very promising variety, dark in color, extra good size and superb flavor.

H. P. Lowery, Whigville, 6 varieties, including Tennessee, Nick Ohmer, Haverland, Sample and Success, the latter a new berry that originated in Whigville and has succeeded well wherever tried. It is an early sort, large and productive.

A. J. Hannah, Whigville, also exhibited the Success and the Cardinal, another new variety.

Manchester Bros. showed Lovett, Brandywine, Success and Tennessee—all fine specimens.

Thos. Callahan, Newington, had Tennessee, and Orrin Gilbert showed a seedling berry not yet named.

FIELD MEETING AT WEST HAVEN.

July 30, 1901.

President N. S. Platt invited the members of the Society with their friends to visit his large peach orchard at "Shingle Hill," West Haven, and on July 30 this was made the occasion of the second summer meeting. Headquarters for the day were at Waverly Grove, a pleasant spot overlooking Long Island Sound, and barely a mile distant from the orchards. The morning being somewhat cloudy and threatening deterred a good many from attending, but about 150 interested fruit growers met at the grove, whence they were taken in busses to inspect the orchard. Most of the forenoon was thus very profitably spent in studying the conditions and the methods followed by Mr. Platt in his orcharding and especially in noting the behaviour of several new extra early varieties of peaches, now fruiting in this section

for the first time. Mr. Platt's successful orchard occupies a steeply sloping elevation a few miles to the westward of New Haven, and from the highest point a fine view of that city and also of the Sound is had.

As the location and soil presents varied conditions in peach culture, the visit was a most instructive one.

As the noon hour approached the company sought the tables in the grove, where the caterer had prepared a "genuine shore dinner." While falling somewhat short of the expected—as such menus are quite apt to do—still the hungry fruit men and their wives and daughters ate clams and fish with a zest, and for once showed their preference for the "fruits of the sea" rather than those of the tree and the vine.

The usual after-dinner exercises were included, President Platt, the host, presiding. Among the speakers were Treasurer R. A. Moore of Kensington; Prof. Gulley of the State Agricultural College, who gave an interesting report of the Pan-American exposition and told of the Connecticut exhibit of fruits of which he had charge—further contributions of fruit were asked for; Prof. Rorer, a new member of the staff of the New Haven Experiment Station; Prof. W. E. Britton, State Entomologist; Prof. W. G. Johnson, Associate Editor of the *American Agriculturist*, who was pleasantly welcomed by the meeting and responded with an interesting and timely report of the fruit crop situation of the country; G. F. Platt of Milford; F. L. Perry of Bridgeport; Rev. Mr. McNicol of West Haven, and Edwin Hoyt of New Canaan.

Plans were considered for further field meetings and the programme was brought to a close.

Many of the late comers made a tour of the orchards, while the remainder of the company were grouped under the trees and a snap-shot was taken by Prof. Britton, a reproduction of which adorns page 186.

THIRD FIELD MEETING, AT BERLIN.

Thursday, Aug. 22, 1901.

"By invitation of Manager Molumphy of the Connecticut Valley Orchard Company, the Society will visit their Berlin orchards on Thursday the 22d.

Perhaps never before has a better opportunity been offered our members to look over such extensive fruit farms. More than 100 acres are here devoted to peaches, plums, apples, pears, grapes, berries, etc. A great number of varieties—some of the newest—and many just ripening, will be seen. Japan plums will be at their best.

Let every member make an effort to attend. Bring the ladies and your friends too, who are interested in fruits.

Dinner will be strictly on the basket-lunch plan, so don't forget a well-filled lunch-basket. Good speakers after dinner! All come, and make it the biggest field meeting yet!"

The above invitation to a third summer meeting was sent out to over 400 members of the Society and others interested in fruit growing, and, as a result, the Connecticut Valley Orchard Co. entertained over 300 visitors on the day appointed, and there was held the largest field meeting of the year, if not in the history of the Society.

It was a "rousing" good meeting throughout—the tour of the big orchards and berry fields, the dinner, the speaking and the general sociality all being thoroughly enjoyed.

The Orchard Co., and especially the manager, Mr. Molumphy, received much praise for their enterprise and hard work in establishing so extensive an undertaking in fruit culture.

Probably nowhere else in the State could be found so large a variety of fruits growing successfully as on these farms. Originally rough and neglected lands, several farms have been thrown together and planted with apples, pears, cherries—both sweet and sour—peaches, plums, grapes and berries and, in some cases, vegetable crops also.

The visitors had the opportunity to see a large acreage of apples, and, even in this "off-year" with apples, an excellent crop of early summer varieties, also Ben Davis, Fallowater, etc. Of peaches the crop carried by the handsome trees was a promising one. Some early sorts were just ripening. But the interest of all centered in the splendid plum orchard, where the

Japan varieties were full to breaking, despite the severe thinning practiced. Mr. Molumphy has nearly 23 varieties of plums in bearing, including many new and rare ones for testing, and in plum culture at least, he has achieved success.

For several hours the visitors roamed about the orchards, or drove to the more distant portions of the big fruit farm. Just

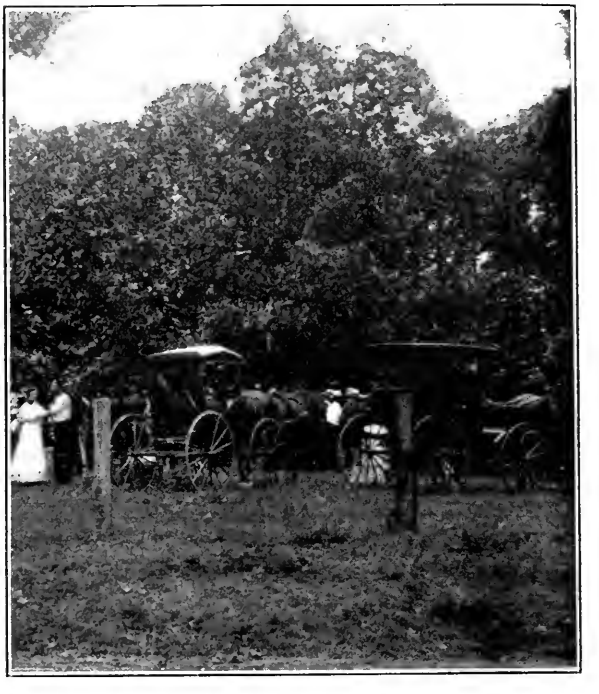

FIG. 18.

Lunch in the Grove, Berlin Field Meeting.

across from the manager's house a pretty grove afforded an ideal place for the lunch tables, and fig. 18 shows the company assembled about the tables, always one of the most enjoyable features of a field day.

After full justice had been done to the good things provided, President Platt called to order and introduced Mr. J. T. Molumphy to the meeting. Amid applause Mr. Molumphy came forward and in a pleasant way welcomed the Society and answered

many questions about the crops and methods on the farm. Ex-President Merriman spoke of the Pan-American Exposition and the importance of sending a creditable exhibit of fruits. Mr. J. H. Hale spoke on the peach crop outlook in the State. As chairman of the Society's Committee on Markets he explained the plans of the committee for aiding peach growers to properly distribute the large crop soon to ripen. Mr. Hale claimed there would be at least 200,000 baskets of peaches harvested within 12 miles of Hartford. Many of the growers have no market in view for their large crop. The railroads are not ready to handle the fruit and it is the fault of the growers that this condition of things exists.

With only moderate crops of peaches south of us, Connecticut growers ought to realize good prices this season. New York City offers the best markets at present, but, in his opinion, it would need judicious distribution of the fruit to avoid a glut.

John W. Clark of North Hadley, Mass., was present, with other large fruit growers from that state, and addressed the meeting briefly. Mr. W. W. Higgins of the *Rural New Yorker* was called on and responded brightly. Dr. Gurdon W. Russell of Hartford, a veteran fruit grower and one of the oldest members of the Society, spoke of what we should do to encourage the interests of horticulture. He thought the principles of horticulture should be taught in the public schools.

Secretary Miles announced regarding the fall meeting to be held in New Britain in October.

The condition of affairs at the State Agricultural College came up for discussion and, as a result, the Society placed itself on record as being in favor of the development of a strong and purely agricultural institution at Storrs.

A hearty vote of thanks to the hosts was not forgotten, and the visitors left for home on the afternoon trains, which by courtesy of the railroad stopped at the shipping station near the orchards.

THE FOURTH ANNUAL FRUIT EXHIBITION.

October 1st and 2d, 1901.

SCHEDULE OF PRIZES OFFERED.

FIRST DIVISION—COLLECTIONS.

		1st.	2d.	3d.
Class 1.	Best collection of fruits by grower, of which not more than two-thirds to be of apples	$10.00	$5.00	$3.00
Class 2.	Best collection, 15 varieties of apples.....	5.00	2.50	1.00
Class 3.	Best collection, 10 varieties of apples.....	3.00	1.50	.75
Class 4.	Best collection, 6 varieties of apples.....	2.00	1.00	.50
Class 5.	Best collection, 12 varieties of pears.....	5.00	2.50	1.00
Class 6.	Best collection, 6 varieties of pears.....	2.00	1.00	.50
Class 7.	Best collection, 12 varieties of grapes.....	5.00	2.50	1.00
Class 8.	Best collection, 6 varieties of grapes.....	2.00	1.00	.50

SECOND DIVISION—SINGLE PLATES.

Class 1. Best single plate of following varieties of apples, each..... $1.50 $ .75 $ .50 $ .25

Fameuse, Gravenstein, Hurlbut, Oldenburg, Twenty-ounce, Red Beitigheimer, Fall Pippin, Porter, Maiden Blush, Wealthy, Talman Sweet, Baldwin, Cogswell, Hubbardston, Jonathan, King, Northern Spy, Red Canada, Sutton, Wagener, Lady, Westfield, York Imperial, Jacob's Sweet, Belle et Bonne, Fallowater, Golden Russet, Roxbury Russet, Newtown Pippin, Peck's Pleasant, R. I. Greening, and of other worthy varieties, not to exceed fifteen.

Class 2. Best single plate of following varieties of pears, each..... $1.50 $ .75 $ .50 $ .25

Augouleme, Bartlett, Bose, Louise, Bonne, Diel, Onondaga, Anjou, Lucrative, Boussock, Buffum, Howell, Flemish Beauty, Mt. Vernon, Seckel, Clairgeau, Lawrence Sheldon, Easter Beurre, Keiffer. Of other worthy varieties, not to exceed ten.

Class 3. Best single plate of following varieties of grapes, each..... $1.50 $ .75 $ .50 $ .25

Brighton, Concord, Eaton, Hartford, Wilder, Worden, Isabella, Agawam, Delaware, Diana, Iona, Lindley, Salem, Empire State, Martha, Niagara, Pocklington. Of other worthy varieties, not to exceed ten.

Class 4.	Peaches and plums. Each valuable variety	$1.50	$ .75	$ .50	$ .25
Class 5.	Quince, each valuable variety.....	1.50	.75	.50	.25
Class 6.	Grapes grown under glass, one bunch each variety	1.00	.50	.25	

THIRD DIVISION—CANNED FRUITS AND JELLIES.

Class 1.	Best collection canned fruit, 15 or more varieties	$8.00	$4.00	$2.00
Class 2.	Best collection berries, 6 or more varieties	3.00	2.00	1.00
Class 3.	Best collection peaches, 6 or more varieties	3.00	2.00	1.00
Class 4.	Best collection plums, 6 or more varieties	3.00	2.00	1.00
Class 5.	Best collection pickles, 6 or more—one quart each	3.00	2.00	1.00
Class 6.	Best collection jellies, 6 or more	3.00	2.00	1.00
Class 7.	Best single can any of the above	1.00	.50	.25
Class 8.	Best sample unfermented fruit juice—each kind	1.00	.50	.25

FOURTH DIVISION—NUTS, ETC.

Class 1.	Best specimen any variety of cultivated nuts	$1.00	$ .50	$ .25
Class 2.	Best sample of native nuts, any kind	1.00	.50	.25
Class 3.	Best collection of native nuts, correctly named, by boy or girl	2.50	1.25	.50
Class 4.	Best arranged table piece of home-grown fruits	2.00	1.00	.50
Class 5.	Articles not classified for which discretionary premiums may be awarded.			

RULES OF THE EXHIBITION.

1. All articles entered, except in Fourth Division, must be grown or prepared by the exhibitor.

2. All fruits shall be correctly labelled (if possible) and except grapes and crab apples, five specimens, neither more nor less, shall make a plate, either single or in collections.

Of crab apples ten specimens, and of grapes three bunches, shall make a plate, except where noted. The collection also shall embrace just the required number of plates.

3. No exhibitor shall make more than one entry for the same premium, nor enter the same plate for more than one premium.

4. In the various collections the value of the varieties shown, as well as the conditions of the specimens, will be considered in making the award.

5. Premiums will be awarded to members of the Society only.

6. As the object of the Society is to encourage the growth of fruits of fine quality, wormy or diseased specimens will rank very low in making awards.

7. No exhibit shall be removed without the consent of the committee, until the close of the meeting.

The city of New Britain was the place selected for the fourth annual exhibition of the Society, and the event took place October 1st and 2d, in the Armory.

As an exhibition of a grand collection of seasonable Connecticut fruits it was a pronounced success and without doubt very creditable to the Society, especially considering the unfavorable season for fruit crops. The number of exhibits was larger and the quality of the fruit was, if anything, more nearly perfect than in any of the previous exhibitions. But, unfortunately, the

FIG. 19.

A glimpse of the tables at the Society's Annual Fruit Show, 1901.

meeting failed to attract the number of visitors that such an unusually fine show ought to call out, nor did the membership of the Society manifest, as a whole, sufficient interest, either by attending or contributing exhibits. The entries were mainly from growers in the central counties of the State. But, as pointed out by the Committee on Exhibitions, as an opportunity to exhibit the best in Connecticut's fruit products, to enter into friendly competition with other growers and to study and compare and receive helpful instruction, the exhibition was entirely worth while.

The whole of the first day was occupied with receiving, entering and staging the exhibits. The standing Committee on

Exhibitions, of which G. S. Butler of Cromwell was chairman, had general charge of the work. When the exhibits were finally in place the hall presented a most attractive display. The views at figures 19 and 20 give only a faint idea of the appearance of the tables.

The exhibition was open to the public during the evening, and this session was made of special interest to all who attended. President N. S. Platt presided and, after opening remarks, introduced his honor, Mayor Bassett of New Britain, who

FIG. 20.

The Canned Fruit Department at the Exhibition.

extended a hearty greeting to the Society, and congratulated the growers on the fine display of fruits.

He was followed by Hon. M. C. Webster of New Britain and Senator Sloper. The principal speaker of the evening was Prof. John Craig of Cornell University, Ithaca, N. Y., who gave an excellent address on the subject of agricultural education and progress. In a very interesting manner the speaker sketched the development of education along agricultural lines, the rapid changes in farm methods, and the wonderful progress in all rural affairs. He closed with an account of the University Extension work as carried on in New York State, where 27,000 farmers are at present taking the Extension course of lessons.

The professor said there are over 30,000 children enrolled in the Nature Study Clubs in that State, and yet the movement is only just begun.

The closing part of Prof. Craig's talk was devoted to a discussion of several orchard problems, which was of practical interest to those present. The orcharding methods practiced in New York State were touched upon and many valuable points brought out. In controlling the rot of the peach the speaker said that gathering and burning all the old decayed fruit and dead twigs had proved a good preventive measure, while spraying with the ammoniacal solution was successfully practiced on the early varieties, even when in full foliage.

Second Day of the Exhibition.

The second day opened with a goodly number of visitors and some members of the Society present.

During the forenoon the fruit was examined by the judges and the awards made. The following composed the Committee of Judges—On apples, collections and plates, Prof. John Craig of Ithaca, N. Y.; pears, R. A. Moore, Kensington; grapes, Prof. A. G. Gulley, Storrs; peaches, G. S. Butler, Cromwell; plums and quinces, N. S. Platt, New Haven; canned fruits, jellies and pickles, Charles E. Steele, New Britain; nuts, E. M. Ives, Meriden; wines, Adolph Werking, Plantsville; general collections of fruits, N. S. Platt; exhibits not classified, G. G. Tillinghast, Vernon.

After very careful and systematic work on the part of the judges, which was particularly necessary in the apple classes, premiums amounting to $397.25 were awarded, the awards being divided among 53 exhibitors.*

There was general satisfaction over the results of the judging.

Prof. Craig, who served as expert judge, expressed himself as much pleased with the quality and appearance of the fruit shown on the tables. The apples, especially, were remarkably fine and as a collection of perfect specimens of fruit would be hard to match anywhere this season.

*As the complete list of premium winners has already been published for distribution, it seemed unnecessary to include such list in this report.

The afternoon session was called to order at 3 P. M., by President Platt, and according to the programme, the announcement of the awards was made and topics relating to the exhibits were discussed. Before adjourning, a vote of thanks was extended to the New Britain friends who assisted in making the meeting a success, and especially the committee of the local grange.

Soon after, the exhibitors began the work of repacking the fruit, and by six o'clock the beautiful pomological display, which had cost so much time and effort to prepare, became a thing of the past.

It was to be regretted that the exhibition could not have been continued longer or some arrangements made whereby a still larger number might enjoy it. However, as much of the best fruit was turned over to Prof. Gulley for shipment to the Pan-American Exposition in Buffalo, where it added a very creditable display to the Connecticut exhibit—the Fourth Annual Fruit Show may be said to have served a useful purpose after all.

LIST OF MEMBERS

OF THE

CONNECTICUT POMOLOGICAL SOCIETY

... 1902 ...

Abbe, Linden S., Hazardville.
Abbey, Mrs. Chas. Pelton, Portland.
Abbott, Arthur J., Middlebury.
Adler, Leon W., New York City.
Albison, Joseph, So. Manchester.
Albiston, James H., So. Manchester.
Allen, Chas. D., Mt. Carmel Center.
Allen, Chas. I., Pequabuck.
Allen, W. F., Jr., Salisbury, Md.
Andrews, J. E., New Britain.
Andrews, Mrs. J. E., New Britain.
Ashton, Frank B., Middletown.
Ashton, Mrs. F. B., Middletown.
Atkins, S. J., Middletown.
Atwater, Edwin B., New Haven.
Atwater, E. A., Cheshire.
Atwater, E. B., Plantsville.
Ayer, Robert E., Unionville.
Babcock, G. P., Rockville.
Bailey, F. B., Durham.
Baldwin, Walter H., Cheshire.
Ballou, Prof. H. A., Storrs.
Barber, C. W., New Britain.
Barber, Henry A., Danbury.
Barber, Joseph, Windsorville.
Barker, N. C., Lebanon.
Barnes, A. G., New Milford.
Barnes, J. J., Southington.
Barnes, J. Norris, Yalesville.
Barnes, John R., West Cheshire.
Bassett, George E., Clintonville.
Beach, A. S., Plattsville.
Beach, Frank H., Stratford.
Beach, Prof. S. A., Geneva, N. Y.
Beach, Z. P., Wallingford.
Beard, O. G., Shelton.
Beard, Wm. T., Shelton.
Beckwith, G. C., Nepaug.
Beers, F. H., Brookfield Centre.
Beers, S. Perry, Greenfield Hill.
Benedict, F. C., West Hartford.
Benham, Leonard M., Highwood.
Benham, Wilbur H., Highwood.
Bernhard, Albert, Meriden.
Birdsey, E. T., Middletown.
Blakeman, J. H., Oronoque.
Blakeslee, G. N., Clintonville.
Bliss, Ethelbert, Wilbraham, Mass.
Boardman, F. E., Little River.
Bolles, C. P., Wilbraham, Mass.
Bradley, F. N., Derby.
Brainerd, M. N., Southington.
Brewer, C. S., Hartford.
Bridge, H. J., Hazardville.
Bristol, Geo. B., Middlebury.
Britton, Prof. W. E., New Haven.
Brockett, Hobart J., Montowese.
Bronson, N. S., New Haven.
Brown, G. F., Cannon.
Brownson, S. B., Shelton.
Buell, H. B., Eastford.
Burr, C. R., Hartford.
Burr, W. H., Westport.
Bushnell, Huber, Berlin.
Bushnell, Mrs. Huber, Berlin.
Butler, George E., Meriden.
Butler, George S., Cromwell.
Callahan, Thos., Newington.
Carnell, A. D., Bristol.
Case, G. J., Canton.
Chamberlain, L. P., Storrs.
Chambers, Frederick, Waterbury.
Chillingworth, Felix, New Haven.
Church, F. J., Pleasant Valley.
Clark, George M., Higganum.
Clinton, E. B., Clintonville.
Coe, C. W., Durham Center.
Coe, Ernest F., New Haven.
Coe, Harry S., Waterbury.
Coe, W. T., Durham Center.
Coleman, M. L., Seymour.
Coleman, M. P., South Coventry.
Colton, L. F., Hartford.
Comstock, G. C., Norwalk.
Conn. Agricultural College, Storrs.
Cook, S. G., Branford.
Copley, Wm. E., Hazardville.
Craw, Alanson, Waterville.
Crowell, L. L., Middletown.
Curtis, H. B., Cheshire.
Curtis, Mrs. H. B., Cheshire.
Curtis, Robert W., Stratford.
Davidson, C. M., Cincinnati, O.
Davis, Chas. T., Middletown.

Davis, E., Branford.
Davis, Richard, Middletown.
Dearden, Greenwood, Tolland.
De Bogart, F. Van, Bridgeport.
Deming, Chas. J., Litchfield.
Dempsey, John, Broad Brook.
Dimon, J. J., Hartford.
Dimon, Wm. B., Shelton.
Doolittle, Arthur H., Westville.
Doolittle, H. M., Meriden.
Doolittle, S. B., Wallingford.
Dow, H. L., Middletown.
Dowd, Frank C., Madison.
Downs, W. S., Derby.
Dunham, H. C., Middletown.
Eddy, J. C., Simsbury.
Eddy, John S., Unionville.
Eddy, S. W., Simsbury.
Elsworth, Frederick, Hartford.
Elwood, J. F., Green's Farms.
Eno, R. B., Weatogue.
Ensign, E. R., Silver Lane.
Ensign, F. H., Silver Lane.
Expansive Tree Protector Co., Rochester, N. Y.
Faber, W. A., Waterbury.
Fairchild, H. L., Nichols.
Fairclough, Mrs. Thos., Wolcott.
Fanton, I. C., Westport.
Farnham, A. N., New Haven.
Fawthrop, Walter, Cromwell.
Fenn, Dennis, Milford.
Fenn, Robert M., Middlebury.
Ferson, E. B., Chicago, Ill.
Flagg, Chas. H., West Hartford.
Forbes, J. S., Burnside.
Ford, Chas. C., Washington Depot.
Francis, D. G., West Hartford.
Francis, J. H., Meriden.
French, W. H., Wolcott.
French, Mrs. W. H., Wolcott.
Frisbie, Martin M., Southington.
Frisbie, M. W., Southington.
Frost, Frank M., West Cheshire.
Fugazzi, Chas. S., Cincinnati, O.
Gallagher, J. F., Waterbury.
Gardner, J. W., Cromwell.
Gardner, R. H., Cromwell.
Gates, W. F., Willimantic.
Gaylord, E. F., Bristol.
Gaylord, E. W., Bristol.
Gilbert, Henry, Middletown.
Gilbert, Orrin, Middletown.
Gilbert, Mrs. Orrin, Middletown.
Gilbert, Thomas, Middletown.
Gillette, E. Samuel, Bristol.
Gold, T. S., West Cornwall.
Goldsborough, H. H., Willimantic.
Goldsmith, H. G., Branford.
Goodwin, H. H., Cheshire.
Gordon, Mrs. Robert, Shelton.
Gould's Mfg. Co., Seneca Falls, N. Y.
Gridley, E. E., New Britain.
Griffith, Geo. H., Bristol.
Griswold, H. O., West Hartford.
Griswold, J. B., Newington.
Griswold, S. A., West Hartford.
Griswold, S. P., West Hartford.
Griswold, W. F., Rocky Hill.
Groesbeck, F. O., Hartford.
Gulley, Prof. A. G., Storrs.
Gulley, Roy C., Storrs.
Hale, G. H., South Glastonbury.
Hale, J. H., South Glastonbury.
Hale, Moseley, South Glastonbury.
Hale, Stancliff, South Glastonbury.
Hall, Chas. H., Cheshire.
Hall, G. D., Wallingford.
Hall, G. H., Manchester.
Hall, Linus H., Wallingford.
Hall, Wilbur H., Wallingford.
Hammond, G. S., West Goshen.
Hannah, A. J., Bristol.
Hannah, W. L., Bristol.
Hart, Mrs. S. A., Kensington.
Hart, Ernest W., Forestville.
Hart, G. W., Unionville.
Haskins, L. O., Scotland.
Hatch, Gilbert H., Whigville.
Hersey, G. M., Hartford.
Hill, S. B., Waterbury.
Hilliard, H. J., Black Hall.
Hopson, F. S., Bridgeport.
Hopson, G. A., Wallingford.
Hotchkiss, B. S., Waterbury.
Hotchkiss, Chas. M., Cheshire.
Hotchkiss, Chas. T., W. Cheshire.
Hotchkiss, D. B., Prospect.
Hough, E. J., Yalesville.
Hough, Eli S., Poquonock.
Hough, George E., Yalesville.
Hough, Joel R., Wallingford.
Hoyt, Edwin, New Canaan.
Hoyt, James, New Canaan.
Hubbard, Clement S., Higganum.
Hubbard, Elmer S., Higganum.
Hubbard, J. M., Middletown.
Hubbard, Robert, Middletown.
Hull, James, Durham.
Hunt, W. W., Hartford.
Huss, J. F., Hartford.
Innis, A. C., Stratford.
Ives, E. M., Meriden.
Ives, C. P., New Haven.
Jackson, George O., Colchester.
Jeffrey, H. L., Woodbury.
Jenkins, Dr. E. H., New Haven.

Jennings, E. G., Plattsville.
Jennings, Geo. P., Green's Farms.
Jennison, E. F., Hartford.
Jerome, F. M., New Britain.
Jewell, Harvey, Cromwell.
Jewell, Mrs. Harvey, Cromwell.
Johnson, Dr. F. E., Mansfield Depot.
Kelley, Edward, New Canaan.
Kelsey, Charles B., Hartford.
Kelsey, Frederick, Higganum.
Kenney, J. P., Hockanum.
Kilbourne, Harry N., Litchfield.
Killam, Edward, Thompsonville.
King, Horace, Thompsonville.
King, N. N., Thompsonville.
Kingsbury, Andrew, Coventry.
Kirkham, John S., Newington.
Knapp, M. C., Danbury.
Lane, A. N., Wolcott.
Lapsley, Arthur B., Pomfret Center.
Lathrop, E. B., Vernon Center.
Lee, W. S., Hanover.
Lewis, Frederick J., Highwood.
Liegey, Charles, Beckley.
Loomis, John, South Manchester.
Lord, J. W., Warehouse Point.
Loverin, D. P., Huntington.
Lowery, H. P., Whigville.
Lowery, L. L., Whigville.
Lucchini, Victor E., Meriden.
Lyman, C. E., Middlefield.
Manchester, E., Bristol.
Manchester, E. F., Bristol.
Manchester, George C., Bristol.
Manchester, Robert, Bristol.
Mansfield, Peter, West Hartford.
Mansfield, Wm. H., W. Hartford.
Martin, J. A., Wallingford.
Mason, W. S., Farmington.
Matthews, E. A., Bristol.
May, W. B., Hartford.
McCall, E. H., Lebanon.
McCormick, Samuel, Waterbury.
Meachen, George, Stratford.
Merriman, J. H., New Britain.
Merwin, Walter L., Milford.
Mexcur, George, Bloomfield.
Miles, H. C. C., Milford.
Miller, F. B., Bloomfield.
Miller, W. H., Bristol.
Miller, Mrs. Wallace H., Bristol.
Mills, D. E., Bristol.
Molumphy, J. T., Berlin.
Monson, W. B., Mt. Carmel.
Moore, Charles, Southington.
Moore, R. A., Kensington.
Morgan, E. P., Cheshire.
Morgan, Timothy J., Yalesville.
Morse, C. Z., Shelton.
Morse, H. C., Wallingford.
Morse, J. J., East Berlin.
Morton, E. G., East Windsor.
Moses, A. A., Unionville.
Moss, Julius W., Cheshire.
Munson, W. A., Huntington, Mass.
Nettleton, H. I., Durham.
Newell, E. R., Southington.
Noble, John B., East Windsor.
Norton, A. F., New Britain
Norton, John, Kensington.
Orcutt, P. C., Clintonville.
Parker, G. A., Hartford.
Parker, John B., Jr., Poquonock.
Parsons, Frank W., Hazardville.
Patterson, B. C., Torrington.
Patterson, S. A., Stratford.
Payne, Frank C., Portland.
Payne, George K., Portland.
Payne, Lyman, Portland.
Pease, B. F., Greenfield Hill.
Pease, Simeon, Greenfield Hill.
Peck, A. C., West Cheshire.
Peck, Clifton, Yantic.
Peck, F. J., Mt. Carmel.
Peck, W. N., Mt. Carmel Center.
Pero, Louis, South Glastonbury.
Perry, F. L., Bridgeport.
Petremont, Mrs. E., Shelton.
Phelps, E. J., Enfield.
Phelps, Mrs. E. J., Enfield.
Pierpont, A. B., Waterbury.
Pierpont, W. L., Waterbury.
Plant, A. B., Branford.
Plant, Albert E., Branford.
Platt, Frank N., Milford.
Platt, G. F., Milford.
Platt, N. D., Milford.
Platt, N. S., New Haven.
Platt, William F., Milford.
Plumb, James, Stratford.
Porter, D. G., Waterbury.
Post, Prichard E., Essex.
Potter, H. W., Glastonbury.
Powell, E. C., Springfield, Mass.
Prior, J. E., Moosup.
Putnam, J. H., Litchfield.
Reinhold, R. W., Mill Brook.
Rice, W. B., Meriden.
Rich, H. E., East Hampton.
Roberts, C. S., Riverton.
Roberts, E. J., Middletown.
Roberts, S. W., Middletown.
Robertson, L. J., Hartford.
Rogers, E., New Britain.
Rogers, F. D., Monson, Mass.
Root, L. C., Farmington.
Root, T. H., Farmington.
Rugg, J. H., Stratford.
Russell, Dr. Gurdon W., Hartford.

Ryder, G. B., Oronoque.
Russell, S., Jr., Middletown.
Sanford, F. D., Shelton.
Saunders, A. W., Forestville.
Savage, Clarence H., Storrs.
Savage, H. E., East Berlin.
Schwink, J. G., Meriden.
Scranton, Charles W., New Haven.
Seeley, Edward, Plattsville.
Sharp, A. G., Richmond, Mass.
Shedd, G. V., Preston.
Shelton, Mrs. Dora A., Shelton.
Shepardson, W. M., Middlebury.
Shepperd, W. S., Shaker Station.
Sherwood, J. H., Southport.
Sherwood, N. H., Southport.
Sisson, H. B., Hamburg.
Skinner, M. G., Higganum.
Sloper, A. J., New Britain.
Smith, A. A., Middlebury.
Smith, Andrew D., Litchfield.
Smith, F. M., Milford.
Smith, George R., Cromwell.
Smith, G. W., Hartford.
Smith, Harry C., Vernon Center.
Smith, H. P., North Haven.
Smith, J. B., Berlin.
Smith, J. Elliott, Wolfville, Nova Scotia.
Smith, Dr. L. A., Higganum.
Smith, L. P., Lebanon.
Smith, Nathan E., Woodmont.
Smith, S. A., Clintonville.
Spicer, G. W., Deep River.
Splettstoeszer, Herman, Kensington.
Squires, Chas. L., Branford.
Stadtmueller, F. H., Elmwood.
Staples, G. W., Hartford.
Sterling, S. P., Hamburg.
Sternberg, A. C., West Hartford.
Stevens, W. W., Clintonville.
Stone, D. E., Cheshire.
Strumpf, George, Burnside.
Sturges, W. S., Shelton.
Sturges, Mrs. W. S., Shelton.
Sturgis, Dr. W. C., New Haven.
Sumner, J. White, Bolton.
Taylor, Edward J., Southport.
Terrell, C. L., Cheshire.
Thomas, T. L., Forestville.
Thomas, W. T., Groton.
Thompson, Chas. J., Berlin.
Thompson, Wm. H., East Haddam.
Thomson, Paul, West Hartford.
Thrall, A. O., Rockville.
Tillinghast, G. G., Vernon.
Tillotson, H. D., West Hartford.
Todd, E. A., Waterbury.
Townsend, W. B., Middlebury.
Townsend, Wm. W., Middlebury.
Trask, Abner, Silver Lane.
Trask, W. W., Silver Lane.
Tucker, F. E., Vernon.
Turkington, Frank H., East Morris.
Turney, Oliver, Fairfield.
Tuttle, L. P., North Haven.
Tyler, W. M., Waterbury.
Valentine, H. E., Cheshire.
Van Alstyne, E., Kinderhook, N. Y.
Vibberts, L. A., New Britain.
Wadsworth, A. R., Farmington.
Wakelee, G. M., Shelton.
Wakeman, S. B., Saugatuck.
Waller, W. E., Trumbull.
Wander, Eugene A., Hartford.
Warner, E. C., Fair Haven.
Warren, W. A., Storrs.
Watrous, J. L., Meriden.
Watson, S. S., Tracy.
Weber, Alfred, Hartford.
Webster, George, Jr., Rockville.
Webster, M. C., New Britain.
Wells, Dudley, Wethersfield.
Wells, L. J., South Woodstock.
Wells, S. M., Wethersfield.
Werking, Adolph, Plantsville.
Wheeler, F. H., Middlebury.
Whitney, C. A., Upton, Mass.
Whittlesey, H. A., Newington.
Whittlesey, J. M., Morris.
Wilcox, R. C., & Sons, Guilford.
Wilcox, W. E., Meriden.
Wiley, C. H., Hartford.
Willard, S. F., Wethersfield.
Williams, A. W., New Britain.
Williams, R. W., Bristol.
Wolcott, E. R., Wethersfield.
Wood, O. S., Ellington.
Woodford, Miss Esther, Middlebury.
Wooding, M. N., Hamden.
Woodruff, R. H., Guilford.
Yale, A. C., Meriden.
Yale, Allan R., Meriden.
Yale, C. E., Yalesville.
Young, C. O., Yalesville.