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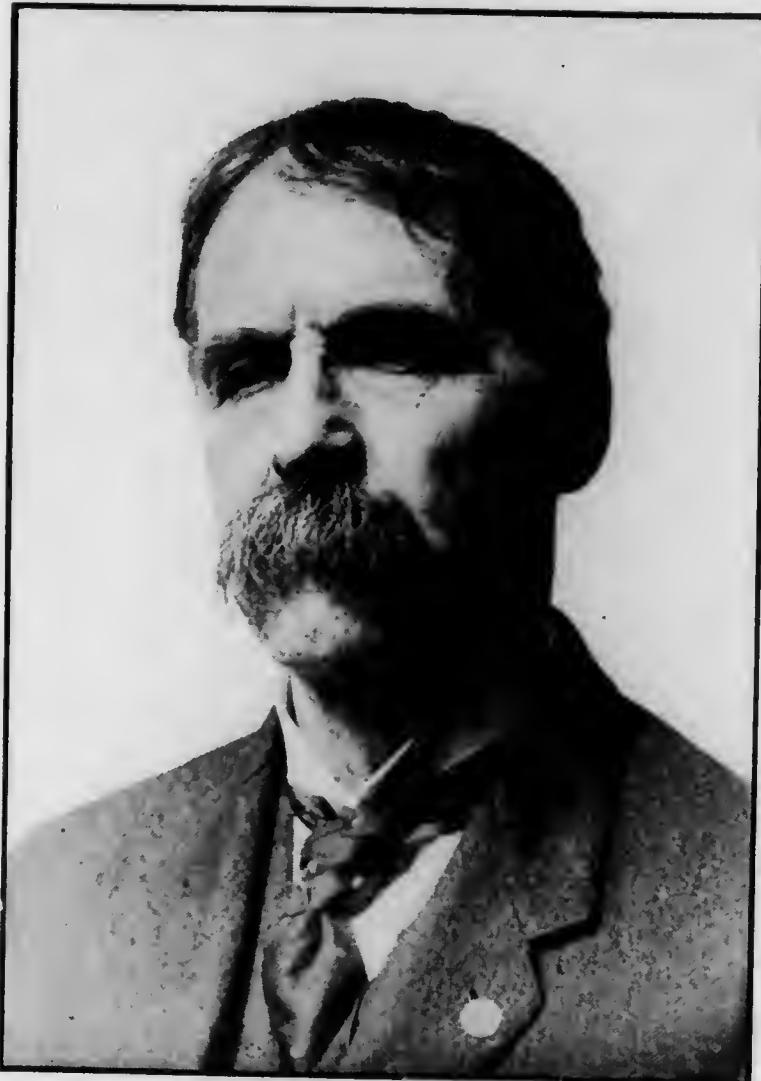
1909

PROCEEDINGS
OF THE
STATE HORTICULTURAL
ASSOCIATION
OF
PENNSYLVANIA
FOR 1909



HARRISBURG, PA.:
PUB. HOUSE OF THE UNITED EVANGELICAL CHURCH
1909

STATE HORTICULTURAL ASSOCIATION OF PENNSYLVANIA



ENOS B. ENGLE

Who has served this Association as Secretary for thirty-five years, has this year asked to be relieved from the duties and cares of the office. While no longer an officer, Mr. Engle's heart is in horticultural work, and the Association is promised his continued presence and encouragement. (See report of Committee on Resolutions.)

The incoming Secretary, under whose care this book is published, feels that the above is due Mr. Engle and is assured that his many friends will be glad of this opportunity to keep his likeness before them.

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PROCEEDINGS
 OF THE
FIFTIETH ANNUAL MEETING
 OF THE
State Horticultural Association
 of Pennsylvania,
 HELD AT
Harrisburg, Pa., January 19-20, 1909

The Fiftieth Annual Meeting of the State Horticultural Association convened in the Board of Trade Building at Harrisburg, at two o'clock Tuesday afternoon, January 19, 1909, with the President, Mr. Gabriel Hiester, in the Chair.

The President.—The meeting will please come to order. The first thing on the program is the reading of the minutes of the last meeting. Will the Secretary please read the minutes?

The Secretary read the minutes of the last meeting, and they were approved.

The President.—The next number on the program is roll-call and collection of dues. If there is no objection, I would say that the members shall call on the Treasurer just after the close of this session and pay their dues. He will be here when we adjourn.

Nominations for members of the committee who shall nominate the officers for the coming year are now in order. I will appoint the committee that you nominate.

The meeting nominates: Dr. I. H. Mayer, Mr. Chester J. Tyson, Mr. J. D. Herr, Mr. P. S. Fenstermaker, Mr. J. Hibberd Bartram, Mr. H. C. Snavely and Prof. H. A. Surface.

The President.—I will appoint these gentlemen as a committee to nominate officers for the election to-morrow morning. Reports of officers are next in order. Is the Treasurer ready to report?

(6)

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The Treasurer, M. Edwin W. Thomas, thereupon read the following report:

Treasurer's Report.

Edwin W. Thomas, Treasurer, to the State Horticultural Association of Pennsylvania, Dr.:

Receipts.

Cash balance January 15, 1908,	\$95 10
Annual dues for 1908, collected at Lancaster,	100 00
Annual dues for 1908, received since,	13 00
Annual dues for 1909, received in advance,	4 00
Donation,	150 00
Total receipts,	\$362 10

Credit by Amount Paid Out.

To Howard Paules, janitor service,	\$6 00
To John W. Backett, elevator,	1 00
To J. D. Herr, sundries,	1 78
To "The Wheatland," account hotel bills, ...	10 00
To Chester J. Tyson, Gen'l Fruit Comm., ..	44 50
To M. E. Rodrock, stenographic services, ...	50 00
To Enos B. Engel, Secretary's salary and sundries,	91 57
To Publishing House United Evangelical Church,	83 42
Total expenditures,	288 27
By balance, cash on hand,	73 83
	\$362 10

The President.—As an auditing committee, I will appoint Mr. W. C. Tyson, Mr. D. C. Rupp, and Mr. J. L. Rife.

The report of the General Fruit Committee is next in order. Is Mr. Tyson ready to report?

Mr. Tyson then read the following report:

Report of the General Fruit Committee for 1908.

CHESTER J. TYSON, Chairman.

In presenting this report for the season of 1908, the Chairman extends his thanks to the correspondents who have made prompt and satisfactory reply to the many inquiries. Blanks were mailed to several persons in each of the sixty-seven counties of the State. Responses have come from forty-seven of them, Butler, Clinton, Cumberland, Elk, Fayette, Forest, Fulton, Huntingdon, Indiana, Jefferson, Juniata, Lycoming, McKean, Montour, Philadelphia, Potter, Snyder, Susquehanna, Tioga and Venango, being silent this year. If any person from any of these counties, hearing or reading

this report, is willing to help with the work next year or knows of someone else who is competent, the Chairman will appreciate his sending in the names and addresses.

The season of 1908 has not been a very favorable one from a horticultural point of view. With the exception of a few favored spots, nearly all sections of the State report a cold, wet time of bloom, with the extreme condition of freezing and snow in some places. This was followed by drouth extending, with but slight rain, over two, three and even four months. This influenced the setting and subsequent growth of many fruits and with their proper and seasonable spraying, being offset in part, to be sure, by dry clear weather at picking time.

Apples.

The year 1908 seems to have been decidedly an off year for apples in Pennsylvania, only five persons out of a hundred reporting a good crop and these so scattered as to indicate local and not in any sense county or sectional conditions. A few reported a fair crop, especially in the northern counties. A slightly greater number reported good quality but even in this particular a majority of the reports showed poor quality and accounted for it by bad weather at spraying time and the subsequent dry season.

Pennsylvania has a long list of very good summer apples. Red Astrachan is the most favored by our correspondents, some persons, however, have found it a poor bearer. Yellow Transparent comes next with votes from all sections of the State, followed closely by Early Harvest. Others favored are Sweet Bough, Golden Sweet and Summer Strawberry. The chairman would add Early Ripe as an excellent and very useful cooking apple.

Next comes a list of the late summer and early fall varieties; Maiden Blush having the greatest number of votes, then Duchess for the north and Summer Rambo for the south, then Gravenstine, Wealthy and Porter.

Smokehouse is the great favorite of the later autumn kinds, followed by Fall Pippin and Twenty-Ounce. Baldwin is named as a fall apple in the southern counties.

Every home with sufficient ground should have at least one or two trees for each of these seasons and many persons have found the growing of summer and fall apples very profitable. If asked to make a list for a home orchard, of twelve trees to cover these seasons, we should probably name as follows: one Yellow Transparent, one Early Harvest, one Red Astrachan, one Porter, two Summer Rambo, one Maiden Blush, one Wealthy, one Fall Pippin and three Smokehouse.

A large majority of our correspondents prefer the barrel as an apple package but a surprisingly large number report that they have found it profitable to market their best fruit in bushel boxes. Seventeen persons report good home markets and recommend the use of baskets and bushel crates. Half bushel and bushel round stave baskets with covers are commonly used for shipping summer apples.

Under the present indifferent care in spraying, etc., which many of our orchards receive, the handling of second grade and cull apples is a very important matter. Their proper disposal often

settling the question of profit or loss. In the first place it is very important to provide boxes or crates to receive them from the sorting table to avoid unnecessary handling. Most of our correspondents use their culls for cider or sell them to the cannery, evaporator, or for bulk shipment. We are glad to report that only one man recommends barrelling second grade apples and we wish to make an urgent protest against the practice as most harmful to the trade in better fruit. Dispose of your seconds at home or ship them in bulk, or better still produce no culls and by thorough spraying, good culture and hand thinning produce only first-class fruit.

Pears.

There has been a good or better than average crop of pears throughout the State and in most places the quality is reported good. Where poor or only fair, neglect of tree and lack of proper spraying is the usual cause.

Blight is the one great enemy to pear growing and in some places has almost put an end to the industry. No remedy is known other than the timely application of knife and saw, but it is commonly believed that the germs of this disease enter most freely through the tissues of rapidly growing wood. Therefore, pear trees standing in sod and growing slowly are less liable to blight than when cultivated and making a rank growth. This has been the experience of many of our correspondents. Scale is also reported as a serious enemy.

Fifty-one reports tell of profitable growing of the Keifer pear, when well grown and properly handled, several saying "more so than formerly." Its comparative freedom from blight and scale injury and its early and regular bearing habit are strongly in its favor.

Peaches.

The peach crop has been a fairly good one, only seventeen reporting a failure. A few persons report having had very large crops but this was not at all common. The correspondents are about evenly divided in regard to weather conditions, some deplored the dry weather, others finding in it a blessing. Certain it is that brown rot was much less prevalent than usual this year and that thoroughly cultivated orchards suffered but little from the drouth. Yellows, borers and scale are named as the most serious enemies to peach growing. Only a few reports mention brown rot and curculio this year.

A large majority of the markets accept the four-eighths bushel round basket with favor, while the six basket carrier is found satisfactory for fruit of the best quality. A few persons recommend smaller baskets, especially for retail selling.

In answer to the question "Are peach trees being planted?" nine persons answer "no," nineteen answer "yes," and a great number say "to some extent." The counties in which considerable planting is reported are Bedford, Berks, Bucks, Chester, Dauphin, Franklin, Lancaster, Lebanon, Montgomery, Mercer and York.

The Carman peach is highly recommended as a hardy, frost-

resisting variety, having succeeded the past season under conditions which destroyed the buds of nearly all others.

Plums.

The plum crop was good in a few places but a large majority reported no crop this year, in many cases the conditions for setting of fruit having been quite unfavorable.

Circulio and brown rot seem to be the most serious enemies to successful plum growing. A few reports speak of black knot and San Jose Scale, the latter especially on Japanese varieties.

The vote for best varieties for home use gave a tie for German Prune and Lombard, next Burbank, Abundance and Damson, Bradshaw and Green Gage. Wickson, the Chairman's choice of all the Japans, received only three votes. If making a list from our own experience, we should say: Red June, Climax, Wickson, Satsuma, Green Gage and Shropshire Damson.

Thirty persons report profitable growing of plums and twenty-three say "not profitable."

Cherries.

Reports show the cherry crop to have been a fairly good one, although some varieties and some localities failed entirely.

Brown rot, which is easily controlled by spraying, and birds are given as the most serious enemies, also black knot, rose bugs, circulio and black aphid. Leaf blight, which is serious in many places is easily controlled by spraying.

Early Richmond is named oftenest as the best variety for home use. Montmorency comes next, then Governor Wood, Black Tartarian, Napoleon and English Morello. Windsor had only four votes and Ida three.

Grapes.

Grapes are reported as growing successfully in nearly all sections of the State, though commercial growing is practiced in only a few places.

Black rot is the great enemy to grape growing but can be very largely controlled by bordeaux spraying. In some places the rose chafer does serious injury but those who spray frequently with bordeaux and arsenate of lead will have very little trouble in this respect. Injury by grape circulio is very largely prevented in the same way.

Small Fruits.

In answer to the question, "What varieties of strawberries are best?" we were almost overwhelmed with names and are more than ever convinced that there is no best variety for all places and conditions. Bubach received most frequent mention, followed in order by William Belt, Haverland, Sample, Glen Mary, Brandywine, Gandy, Senator Dunlap, Sharpless and Aroma, and a host of others mentioned only once or twice.

Of the raspberries, Cuthbert, red, and Greeg, black, received the same number of votes, followed closely by Kansas and Cumberland, both good black varieties.

As usual Snyder leads the blackberries in popularity; next in order come Eldorado, Kittatinny, Erie and Ancient Briton.

Very few persons report success in growing dew-berries, the winters being most too severe for them. Where they grow well, the Lucretia dew-berry is an excellent fruit, and to our taste excels any of the black-berries.

Potatoes.

A large majority of the correspondents agree that there is no better crop for planting in the young orchard than potatoes, their fertilizer and culture requirements being well suited to the needs of the trees. A few persons prefer general gardening with peas, beans, tomatoes, sweet corn, cabbage and melons. Two suggest strawberries and one friend from Lancaster says tobacco.

Very few persons in the State have found the past season favorable for the potato crop, continued drouth through the most of the growing season being the cause. The most destructive enemies in unsprayed fields are blight and the Colorado beetle. When thoroughly and frequently sprayed there need be no loss from either.

Many persons have learned to control potato scab, the most favored way being to soak the seed for one hour and a half in a solution of two ounces of corrosive sublimate to sixteen gallons of water. Formalin, or formaldehyde, can be used in the same way, one pint to sixteen gallons of water.

A few of our reports recommend planting potatoes in checks, thirty by thirty inches up to forty by forty inches, but most persons prefer to plant in rows varying from twenty-four to forty-two inches apart. Thirty-six inches is most favored and is well adapted to cultivation and spraying with two horse tools. Some growers plant as close as ten inches in the row, others up to twenty inches, more correspondents preferring twelve inches than any other distance. A good number named fifteen inches, which we believe to be about right under most conditions.

Spraying.

We are glad to report that spraying for insects and fungi seems to be steadily increasing, but we are sorry indeed to report the deplorable fact that seventy per cent. of our correspondents tell us that spraying is not thoroughly done. Until this condition is overcome and the percentage at least reversed, our State cannot expect to make much progress in its war against these enemies. We will venture the assertion that fruit growers in the Hood River Valley of Oregon could report 100 per cent. of thoroughness and that in this very matter of thoroughness lies the secret to their great success.

Reports seem to indicate that only in districts where fruit growing is followed, at least to some extent commercially are growers awake to the possibility of controlling the codling moth. We

are much interested in the extent to which arsenate of lead has replaced Paris Green as a spray for this insect. Its adhesiveness is, of course, the feature which recommends it so strongly. Many persons use arsenate of lead combined with bordeaux deriving excellent results from both.

Scale seems to be held in check, at least to a considerable degree. We believe that the sections from which failure is reported are lacking in thoroughness of work. Many of our careful men write, "We no longer dread San Jose Scale."

In answer to the question "What is the most satisfactory and effective scale spray you have used?" the answers were as follows: Lime-sulphur wash 26, Commercial Soluble oils 23, divided as follows; Scalecide 17, Target Brand Scale Destroyer 3, unclassified 3. Two persons recommend the use of kerosene. It is not our purpose to make any recommendation but rather to emphasize again our belief that in careful and thorough spraying lies the key to success in controlling San Jose Scale. In a great many cases an effort to economize material has resulted in most dismal failure. We are frequently told that soluble oils should be sprayed with very fine nozzles and we believe it is a matter of vital importance in their use.

Orchard Management.

Our question as to heavy pruning of apple trees brought out a wide difference of opinion, our correspondents being almost equally divided. We can summarize these opinions in the statement that some varieties require much heavier pruning than others and that the pruning should be done annually to avoid removing too much wood from the tree at one time.

Some reports recommend very light pruning of peach but a much larger number prefer to cut back and remove about one-half of each year's growth.

In answer to the next question, we received a distinct surprise when nearly every correspondent expressed himself as believing that apples can be thinned profitably. This is certainly more than we expected from Pennsylvania apple growers.

Only seven out of the whole number of reporters expressed doubt as to the importance of keeping bees in connection with fruit growing. A few experienced growers report having proven the practice to be of great importance.

Orchard Values.

The question of the value of orchard trees over and above the value of the land, is often raised. Most of our correspondents say that an apple tree planted in a suitable place and growing at the end of one year, is worth one dollar; that its value increases at the rate of one dollar per year and that the increase continues up to twenty years or more, depending on the variety. This value is based on the ability of the tree to pay a good dividend on such an amount and we believe it to be very conservative. Not a few growers doubled these values in their reports.

Good Roads.

Feeling that the fruit grower and market gardener is probably more interested in the improvement of country roads than almost any other citizen, we have asked questions along this line.

The question of good roads seems to be a decidedly live issue in all parts of the State. A large majority of our correspondents favor the building of main roads entirely by the State. Many of them are opposed to putting the State's money into one main road or parkway from Philadelphia to Pittsburgh, feeling that it should be divided between the counties on the basis of present road mileage. This is also the view of your Chairman who is utterly opposed to putting all the available road money into one road for the use of a comparatively small class to the exclusion of road improvement in the balance of the State.

Throughout the reports runs a decided note of dissatisfaction with the administering of the present road law. The feeling is strong that the roads built by the State in the past few years have cost far more than they should have done, running as high as \$22,000.00 per mile for one piece of road in Lancaster county. The freedom with which "extras" are charged up raises a natural question in the minds of interested persons. Contract for a piece of road 8,300 feet long in the Chairman's own district was let at \$19,500.00, which was about \$3,000.00 above the estimate of the Department; alterations and changes were made from time to time, many of them apparently favoring the contractor and the price of the finished road was \$27,971.00, or \$17,688.00 per mile, \$8,400.00 more than the contract price and an advance of just about 70 per cent. over the estimated cost as prepared by the Highway Department and presented to the township supervisors to secure their sanction for building the road.

The President.—This report is now open for discussion. If you have any questions to ask the Chairman of the committee he will be pleased to answer them, and if you have any criticisms to make, or any suggestions to offer, he will be glad to receive them.

Mr. Jamison.—Would it not be proper for us to extend a vote of thanks for that full report? If you want that as a motion, I will make the suggestion as a motion.

This motion was duly seconded, and carried.

The President.—I am pleased to extend a vote of thanks from this Association to Mr. Tyson for the excellent report.

Prof. Surface.—While the subject has been touched upon by the Chairman of this committee, I would like to ask whether there are any of the members here who have ever used salt to cure pear blight. I have not had the time to try it myself, but would like to hear from the members here. I have had reports from several parts of the State saying they had used salt for pear blight. It was

applied to the roots of the tree. Did you hear anything of this from your correspondents, Mr. Tyson?

Mr. Tyson.—No one answering my inquiries has referred to it. I have not heard of it and I am inclined to doubt its value for this purpose.

Mr. Fenstermaker.—Is it applied after the blight has appeared on the tree?

Prof. Surface.—I, myself, have not used it, but I have letters from people saying they have used it for the blight, and have cured it. I would like to hear from some one in the audience who has used it. I would like to say that when we hear of a thing being a remedy, that is not in the books, I think it is well to discuss it at our meetings, because I am sure the purpose of our meetings is to acquire knowledge that will help us in our work. Therefore, while I have not used this remedy myself, I would like to hear from any one who has used it. I have letters from several people, particularly from Bradford county, saying that they cured pear blight by the use of salt, but whether the trees were blighted, or only the roots, or to what extent, I don't know.

The President.—I would like Prof. Watts to tell us whether this could be so.

Prof. Watts.—No; I have never seen salt used for pear blight; I have seen it applied to current bushes this year, and it killed every one of them. I can conceive of it being applied to a pear tree in such a manner as to materially affect the vitality of the tree. Heavy applications of it might probably affect the blight, but would also affect the vitality of the tree to that extent.

Mr. Bartram.—I would like to say that I tried salt on peach trees; I had some one-year-old trees to which I applied it in the proportion of one pint of salt to a pint of ashes and put it pretty close to the tree; the result was that they died.

Mr. Fox.—I have been handed a paper by the Chairman of the General Fruit Committee, which was sent to him in connection with the report from Berks County. I have been requested to read this report in reference to the San Jose Scale.

The President.—I would like to say that Mr. Fox was for many years chairman of the General Fruit Committee, but for the last four or five years he has been out of the State.

Mr. Fox.—I have been for the last six years in Virginia—the State of my friend Prof. Heiges. It is a very good state to come from. They had their meeting down there on the 6th and 7th, in Lynchburg, and it was a very large meeting. The meeting here is very large to-day—much larger than I have been in the habit of

seeing; still that meeting at Lynchburg was a larger one, and very well attended by members from the hundred counties of the state with the exception of those in the southwestern corner, where they have nothing but coal and ores, and grow very little fruit.

SAN JOSE SCALE.

By CYRUS T. FOX.

The discovery of the San Jose Scale's presence in Pennsylvania was first made known in December, 1894, and in a report to the State Board of Agriculture made by the undersigned in the following month, remedies were given whereby it could have been successfully resisted. Copies of this report were ordered to be printed, but there was the usual delay that is experienced in getting out State documents, and a fire in the State printery aggravated the matter. When the reports finally reached the writer's hands they were sent to every newspaper in Pennsylvania, with the request that the facts concerning the scale be published. Many editors courteously acceded to the request, and some called attention thereto in their editorial columns.

Had there been a general compliance with the instructions given in the information sent out at that time (14 years ago), the present very general warfare that is being waged in Pennsylvania against the pest would be unnecessary. It would seem, however, that it takes a long time to secure an awakening in such matters. Where only three cases of the presence of the "scale" were reported in the winter of 1894-95, and these were comparatively isolated, the progress of the insect was so rapid that in the course of a year it had made its appearance in 12 counties. This was largely due to the fact that scarcely anything was done to combat it. At the end of the next three years there was scarcely a county in the State that was exempt from its ravages.

Even now the San Jose Scale is not being fought by growers as it should, and it has been found necessary to start a special train through the state with spraying material and outfits and a corps of instructors to arouse farmers and fruit growers on the subject. Thousands of dollars are thus being spent for the giving of "expert" information. Notwithstanding all these efforts, it is doubtful if the farmers of the State will unite in maintaining the warfare of their own accord. For that reason we have answered question No. 2, on spraying, by saying that the work is being thoroughly performed "when done by the representatives of the State."

There is no question as to the efficacy of the work of that section of the Department of Agriculture known as "Economic Zoology," but it is to be feared that too much reliance will be placed by farmers upon the prospect that this movement will be continued by the State authorities, and that to secure the preservation of their orchards all that will be necessary will be to request the Economic

Zoologist to send along a spraying "expert," with his outfit, when the work will be done without any expense to the petitioners.

This would be well enough if a sufficiently large appropriation could be obtained from the Legislature for each season's operations, so that plenty of men could be employed to spray all the orchards—the State being divided into districts; but it would seem that after the farmers have been educated in regard to preparing the spraying mixture, and the mode of applying it, they ought to give the subject proper attention every season thereafter themselves. Although there are laws on the statute books for the prevention of the spread of diseases in fruit trees, and the extermination of insect enemies, some further legislation appears to be needed to compel greater attention to be given to these important matters.

Probably the chief trouble is that the orchard is depended upon largely for results without a thought that cultivation and care are necessary. The farmer is, perhaps, too much engrossed with other duties. The raising of grain or special crops may be more profitable. The dairy and hennery, with butter and eggs commanding prices that can be considered highly remunerative, may be regarded as all-important, and the orchard be consequently neglected. Indeed, fruit-growing is such a branch of agriculture (or horticulture, if you please) that it should be made a business of itself. It is only by close application to all requirements, and assiduous attention, that fruit growing will be successful. With a proper observance of the methods that have proven advantageous in the raising of fruit there can be no better-paying industry.

Pennsylvania, in addition to her supreme position in the galaxy of states on account of her mineral wealth, is great in agriculture and horticulture. As a producer of apples she is second on the list, and possessing, as she does, apple belts of superior soil and location, should stand at the very head, excelling even New York, whose climate, particularly in the western section, is so very favorable for the apple. But Pennsylvania must have a little care that her honors are not taken from her. Virginia, where the writer has spent much of the past six years, is forging to the front as a fruit-growing state. Commercial apple orchards have been established containing from 45,000 to 100,000 trees. Apples are being exported to England, where \$5.50 to \$6.50 per barrel is obtained for fancy fruit. One dealer in Richmond made two shipments during the season just closed of 25,000 barrels in each shipment, mostly of one variety of apples, the Albemarle Pippin. In fact, but two or three varieties are considered profitable, and in an orchard of 50,000 trees the only other variety than the Albemarle Pippin will likely be the Winesap or Mammoth Black Twig. The Ben Davis, once very popular, has been relegated to the rear. The York Imperial, a Pennsylvania favorite (a native of York county), is doing so well in Virginia, that it is being quite generally planted. It grows to greater perfection in the Old Dominion, and its fine appearance and desirable quality as a good keeper make it very popular. By some persons it is known as Johnson's Fine Winter.

Prof. Watts.—In connection with the excellent report of Mr. Tyson, I would like to hear at this time a discussion of the best win-

ter varieties of apples for Pennsylvania. It is not only the variety that will yield the most bushels that should be planted, but that variety which is most wanted by the markets and which will produce the best returns in dollars and cents. We not only want quantity, but we want what will yield the best returns on the market. I should like to hear this question discussed here to-day.

Mr. J. D. Herr.—In the article read by Mr. Fox, reference is made to the fact that fourteen years ago it was almost impossible to interest the farmers of the State in San Jose Scale, while to-day that subject is one of the utmost importance to them, and I hope to hear this subject fully discussed as we go along.

Prof. Surface.—There is one point in that excellent communication that I want to press a little farther; it is impossible to arouse the interest of the public in something that has not gone far enough for them to see the importance of it. Fourteen years ago the Scale was not serious enough to arouse the interest of the public to the importance of fighting it. But let us go to-day to the counties that have had the Scale, like Berks, York, Adams, and some of the others, and announce that there will be a public demonstration in regard to the San Jose Scale, and there will be a larger attendance than at any other agricultural meeting. They have had enough of it and they want to control it. And we find that the men who are most successful in its control, are the men who have come most to our meetings and have followed these denominations from day to day. These are the men who have the largest crops of fruit, because they have been obliged to see what it means.

Regarding the subject which Prof. Watts brings up, in reference to the varieties which should be planted as the commercial winter apples of the future, that most depends upon the education of the market. If the market of the future calls for a firm red apple, orchardists will continue to plant the Ben Davis or Gano; if it wants quality, then the yellow apple, like the Grimes Golden will be the best variety; if it wants a red apple, we can give them the red Grimes, the Jonathan, but I think the time will come when the market has been educated, that it will not ask what the color of the apple is, but what is the variety, the same as they do in the potato to-day. When the public becomes educated up to the fact that variety is the standard of excellence, we will be able to sell the Stayman Winesap in preference to the Ben Davis. The Ben Davis is 25 cents higher in the Philadelphia market than it is in any other place, while the Grimes Golden is way down the list, simply because the public has not been educated to variety as the standard of excellence, rather than color.

Mr. Youngs.—It strikes me that the question of apples is quite a question of locality as well. Now, what succeeds well with you here, would not succeed with us up in our part of the State, and in selecting a standard winter variety, you must also take into consideration the locality. I am a Pennsylvanian, have always lived here, and was born here, so that I am pretty close to home in Penn-

sylvania, and I certainly think if I were going into the apple growing business, I would do it right here on the hills of eastern Pennsylvania.

Prof. Stewart.—What variety would you grow?

Mr. Youngs.—As I have said, I don't think I would name any variety, because what succeeds with us up along the Niagara belt, on the shores of Lake Erie, would not succeed here. We are in the famous Chautauqua belt, and the grapes that succeed best with the growers in that district, succeed best with us also but if I were going into the apple growing business extensively, I think I would try to grow an apple that has succeeded in my particular locality for a good many years.

Prof. Stewart.—In reference to this apple question, I have been for a long time somewhat undecided in reference to apples of the Ben Davis type. As Prof. Surface has said, the Ben Davis has been receiving 25 cents per barrel more on the Philadelphia market than any other kind, but if you will look at the New York markets, you will find that the Ben Davis brings from \$3 to \$3.25 a barrel, while the last quotation for Baldwins is \$5. You see the New York market is becoming educated. Then, again, I see the Jonathan being quoted at \$5, while the Ben Davis is only \$3. Now, there are other things against the Ben Davis in this state, and one of these is its susceptibility to the San Jose Scale. I don't know of any other single variety that has seemed to be so susceptible as the Ben Davis. The Gano has seemed to be almost as susceptible, and so have one or two others, but on the whole, the Ben Davis seems to be the worst, and for this, if for no other reason, I think it should be replaced by a better variety.

Mr. Youngs.—In taking up this question of education, we must take into consideration several things. In appearance the Ben Davis is large and red, and a good bearer, but in quality it is a different thing. The Ben Davis is poor as regards quality. It is something like the Elberta peach; it is large, and, as the saying is, "hand-painted," and people take to it because of its pretty appearance. Just like the Ben Davis, they buy it by the eye. Now, you take Red Raspberries. There is the Marlboro', for instance; the Cuthbert is far superior in quality, but the market wants a berry that is large and red, and looks fine, and the Marlboro' goes to the market in better shape than the other, and so the market calls for it, so that there are really two sides to the question—the demand of the eye, which is for appearance, and the demand of the palate, which is for quality, and unfortunately the demand of the eye, in the average buyer, is still too prominent a factor for us to ignore.

Mr. Jamison.—Mr. Youngs is striking the key-note. Now, the market for our apples is made in Europe and they want a red apple. Of all our red apples, of course, the Baldwin is the favorite in this country, but there is no doubt that for shipment to England or across the sea, the Ben Davis carries well, it looks well, and

remains firm, and is therefore a good export apple. A friend of mine asked me recently what I thought of the Ben Davis apple, and I told him it beats *none* all to pieces. He wanted to know why, and I said because we can raise them when we can't raise anything else. Now, the market is usually not discriminating, because the buyer of the apples does not eat them, as a rule; he sells them. Once in a while, they get to know a little something about the quality, but as a rule, the dealer buys them only to sell them. A dealer who had been buying apples from the West the last few years came to my place last fall, and wanted to see our orchards and asked whether we had any apples; I was not home, but my son told him we had, and asked him what kind he wanted; he said "I want any kind but Ben Davis and the Bellflower." My son said: "We have not got the Ben Davis, we have the Gano. "Well," he said, "that is what I want."

Mr. Hale.—May I, as a stranger, say a word?

The President.—You are not a stranger, Mr. Hale, and we are always glad to hear from you.

Mr. Hale.—The San Jose Scale has been the cause of a great deal of expense in our orchards, and it is the public, in the end, who will have to pay the bill, just as is the case where my friend here on the left said that the people who buy the Ben Davis don't buy it to eat, but to sell; the consumer pays for it.

A few weeks ago I was up in New York State where they raise a great many apples and pears. Two strangers came in there to buy, one of them a buyer for a large firm, and the other a private gentleman of means; the buyer did not look at the Ben Davis, but he paid more per box than you were speaking of per barrel, for what he wanted. The other man, too, was in search of quality; he bought them a bushel at a time, and had them sent to his home, but he would not buy the Ben Davis; he called it a corkleg, only covered with skin. Traveling up and down the coast, as I do, from my New England farm to my Georgia farm, I have apples offered me at the station and on the train, and I have been tempted over and over again to buy the Ben Davis; when real hard up, and my flask was empty I have occasionally bought the Ben Davis, then vowed that if God would forgive me, never to do it again. The people who pay your bills, who pay for your improvements, and for your farms, and for your horses and tools, and your fertilizers, they are the consumers. The consumer is the fellow you have to get up against in the long run, and what you want to do is to make your apples so good that instead of buying a few Ben Davis now and then, he will eat a dozen apples a day and his wife will want them, and his children will want them, and there you have your market. Give them something good, and they will like it so well that they will pay you for it. If you want to get the consumer to buy your fruit, make it so good that he can't do without it. You want color, and beauty to attract the eye, and in addition to that you want quality to attract the taste. This is what you people of the Horticultural Association want to bear in mind,

Dr. Mayer.—I think the professor on my right is on the right track in investigating the profitable apples for Pennsylvania. Now quality, as the gentleman has said, is one of the first considerations. Quantity is not the prime consideration, important as that is. Right over here is an apple that sells at 35 cents a quart box, and I don't believe it beats some apples that are not attractive enough to command that price. The first demand for an apple now is that it must be attractive, and then must have all the quality we can get into it.

Mr. Geo. H. McKay.—I am not a raiser of apples, but I am an eater of apples, and I keep them in cold storage. When I first went into the market fifteen years ago, the Ben Davis was the highest priced apple on the market. Then the Baldwin and the Greening came in, and they, to some extent took its place. Finally an apple came on the market which attracted the attention of the stores, and sold for fancy prices. I tried to find a good market for it, and sent several barrels to Boston and Philadelphia, with instructions to have them taken home and used, and then report to me. The report came that they were a good eating apple, cooked well, baked well, and made good pies. That was the Stayman Winesap. Prof. Surface may have looked at the markets in September, and found the Ben Davis commanding a higher price, but if he were to go to market now, he would find that the Stayman Winesap could not be had at any price. The Stayman was sold out the 1st of January, and Jonathans will bring \$5 to-day, and I don't know but you could get \$6, while Ben Davis is down about where it was. This simply shows you what the Stayman Winesap is doing. The Ben Davis is like the western apple, good to look at, but not quite so nice to eat. The Ben Davis is a fairly good seller in the Philadelphia market, but New York and Pittsburg want a little higher grade. It does not do so well there.

A Member.—While all this is very interesting, I was at a meeting at the Carlisle Indian School, and I heard Prof. Surface there recommend the Ben Davis as one of the best apples to grow. I had a laugh all to myself, because I had four or five hundred bushels, and was going all over the country trying to sell them and could not.

Prof. Surface.—Is there anyone else here who was at that meeting? I would like to have somebody to make good on that.

Mr. Gossard.—I think I can help Prof. Surface. I am the superintendent for one of the Fruit Growers of Franklin County, and we stated that we got a higher price for the Ben Davis than for any of our other apples, and Prof. Surface said that was, of course, the apple for us to plant then.

Prof. Surface.—There is the point. I am glad there was some one to corroborate me. Col. Middleton said he was selling his Ben Davis apples at \$4 right in his orchard; that the Ben Davis was a money producer right here in this region, and I said, of course, under those circumstances that is the apple for you to plant.

A Member.—Can you sell the Ben Davis twice to the same dealer?

Prof. Surface.—Once; the second time you sell him the Gano.

Prof. Watts.—I rather like the suggestion made by Mr. Hale that we make our fruit so good that people can't do without it. About this apple—I will not name it—why say anything about it at this meeting? I heard another name for it up in New York State; you know it is usually put on the table along with a few other apples, and they call it there the "Stay" apple. I asked how it got that name, and they told me it always stayed on the table.

The gentleman in the rear who spoke of the condition of the Philadelphia market is all right. The unnameable apple is now selling at \$3, while the Stayman could not be had for less than \$6.

Mr. Youngs.—Last year the apples that ripened slowly, like the Northern Spy, were up to the normal in quality, while those that ripened earlier were very dry and defective in quality. The later apples received the benefit of the rains that came on after the long dry spell we had, while the earlier apples suffered as the result of that drouth.

Mr. McKay.—In reference to Mr. Wertz's apples, I want to say that I visited his orchard, and he had some of the most splendid apples I ever saw. He sold some of his first Jonathans, I think, for \$4, and not long before Christmas the dealer retailed them for \$12, while the Ben Davis was bringing only \$2 to the producer.

Mr. Good.—The gentleman says the dealer sold them for \$12; what did the producer get?

Mr. McKay.—He received the \$4, and that was the highest I have ever known the market to go.

Mr. Newcomer.—We get a better quality of Ben Davis on a good sandy, or sandstone soil than on any other it is grown on.

The President.—We have gotten a little away from our subject and while it is very interesting, I think we had better go back to our subject, and take up the next number on the program, which is closely allied to it—an address by Prof. Stewart on the result of Orchard Experiments. While Prof. Stewart is getting his map ready, I want to announce the following committees:

Committee on Nomenclature and Exhibits: Mr. J. Hibberd Bartram, Mr. H. C. Snavely, Mr. J. D. Herr, Dr. I. H. Mayer, Mr. D. Z. Detweiler and Mr. F. H. Fassett. I would like them to report on these apples by to-morrow morning. I have made this committee large so that they may be fully able to advise themselves;

we have some of our older fruit growers here, and they may be able to supply the names of some of the unfamiliar varieties.

Committee to represent us in the Allied Agricultural Organization: Mr. E. C. Tyson, Mr. R. M. Eldon, and Mr. E. B. Engle.

Committee on Resolutions: Mr. R. M. Eldon, Mr. A. W. Stephens, and Mr. E. E. Persing.

Prof. Stewart will now make his report on the result of Orchard Experiments.

ORCHARD FERTILIZATION.

PROF. JNO. P. STEWART, *Asst. Professor of Experimental Horticulture, Pennsylvania State College.*

In fruit production, there are at least four factors that are essential in securing maximum profits. Assuming that location and varieties are proper, they are soil management, fertilization, pruning and spraying. Each must be right. No one of them can be singled out and made to carry the load of others left undone. Any one or part of one neglected may become the crop-limiter of that orchard and the extra care devoted to the others is lost. The truth of this principle is emphatically shown in figures which we have recently collected in a study of costs and profits in fruit growing. These figures show that in the case of the apple net profits have actually increased with expenditures up to more than \$300 per acre for producing and marketing the crop. Thus in fruit growing as elsewhere one gets returns exactly in proportion to what he intelligently puts into it. To increase this intelligence, we look into one of the most complex of these production-factors, orchard fertilization.

In the country as a whole, orchard fertilization is not being neglected. The last census shows that the size of the orchard-fertilization bill is about \$2,000,000 per year. Fruit farms expended 30 cents per acre for fertilizers as compared with 4 cent on hay and grain farms, and 2 cents per acre on stock farms. Whether this expenditure is being wisely made or whether it is sufficient is the question. At the present time, we have no exact system of orchard fertilization and little accurate data upon which one may be based.

The systems of fertilization now in operation or recommended are based on four things: (1) analyses of trees and their crops; (2) general experience and observation; (3) orchard surveys; and (4) experimental studies. Each has its strong and its weak points. For example, analyses show that an acre of bearing apple trees takes up about 55 lbs. of potash (K_2O) per year. But the fact that they have this potash does not prove either that they must have it or that its addition to the soil would secure any material response. Indeed, the same analyses show the annual possession by the trees of 57 lbs. of lime per acre, and yet lime is not generally considered important in orchard fertilization.

There are similar weaknesses, with the other sources of evidence. General experience and observation fail because of their lack of checks and their local application. Orchard surveys furnish the wide application and are very valuable on this account, but they can not completely isolate any one factor, and they are confined to current practice. Experimental studies are confined to comparatively few trees and soils, hence, must be more or less local. They also require long periods of time. But in spite of defects, each of these sources of evidence furnishes something and the final solution of the problem will depend upon them all.

In this discussion, we are concerned with the experimental evidence. The apple is not an easy crop to deal with experimentally. The difficulty of getting uniformity in soil and varieties over the large areas required, the perennial nature of the plant with its resulting food-storage for early spring growth, the continuous cropping without chance for rotation, and the sensitive and fickle bearing habit are a few of the difficulties that face the investigator. They make it necessary to forget some of the methods found applicable to other crops, and they require that the whole problem be studied from its foundation.

In view of these difficulties, there is a very fair amount of experimental evidence already at hand. Three valuable, long-time experiments have been made. The first of these has been in operation at the Woburn Experimental Fruit Farm in England, since 1894. Up to the close of the 14th season, there had been almost total absence of effect of manure of any kind. In a more recent test on poorer, sandy soil, they report that manures and especially stable manure, are having a very beneficial action.* The absence of effect in the longer experiment was explained by "the fact that trees draw their nourishment from a very large area, and from a very considerable depth, * * * * * and, hence, are very little affected by surface dressings."** This experiment is of value in showing that some orchards are limited by something other than manures and fertilizers. It is also interesting in the fact that while the experiment as a whole shows no results from manures, yet it is reported that certain July applications of nitrate of soda produced distinct effects. The applications of nitrogen in the regular experiment were made in February. While this experiment undoubtedly has the values indicated, yet its full application to our conditions is somewhat inadvisable because of the marked difference in English conditions, and the fact that the experiment is being conducted on dwarf trees.

The second, long-time experiment is the one made at the Geneva Station, New York, and reported in 1907 by Professor Hedrick. This gives the results of twelve years of annual applications of potash and phosphate, at the rates of 169 lbs. K_2O , and 129 lbs. P_2O_5 per acre. The trees were 43 to 55 years old and the soil is a medium heavy clay. The results as a whole were considered negative, since the annual increase in yield of all varieties on the treated plots barely paid the cost of the fertilizers and their application.

* Letter of Spencer U. Pickering, September, 1907.

The results in detail are shown in Table No. 1. The first three lines of the table are taken from Professor Hedrick's report, page 225. The last three lines we have calculated from them, since the trees were set 48 to the acre.

Table 1.

New York Results. Potash and Phosphate Applications. 12 yrs.

	Baldwin	Fall Pippin	Roxbury	R. I. Greening	Northern Spy			
Annual Averages (Bu.)	Treated	Not Treated	Treated	Not Treated	Treated	Not Treated	Treated	Not Treated
Yield per tree, . . .	8.78	8.50	7.23	6.18	11.16	8.51	8.38	8.72
Yield per acre, . . .	421.4	408.	347.	296.6	535.7	408.5	402.2	418.6
Benefit, . . .	13.4	50.4	127.2	-16.32	122.4			
Per Cent. Benefit, . . .	3.1 per cent.	17 per cent.	31.5 per cent.	-3.9 per cent.	42 per cent.			

In our judgment, one of the most striking things shown in this table is the difference in response to fertilizer made by the different varieties. The Baldwin and R. I. Greening were practically unresponsive, while the Spy and Roxbury show an annual average benefit of nearly 125 bushels per acre. It did not pay to add fertilizer to the Baldwin and Greening trees, while even at the low price of \$1 a barrel the Spy and Roxbury returned a net profit of nearly 180 per cent. on the cost of the fertilizer. This apparently indicates that the value of a fertilizer may sometimes depend upon the variety fertilized. But it should also be remembered that only phosphates and potash were applied in this experiment, and it is stated elsewhere in the report* that "leguminous cover crops plowed under in the orchard have usually produced beneficial effects the same on the next season," and that "it needs nitrogen, or humus, or the physical condition to be obtained by plowing under organic matter." In other words, nitrogen or humus is apparently the crop-limiter in this orchard and until this need is met, little or no advantage can be gained by applications of other forms of plant food. Hence, we conclude that instead of being negative, the least that can be said of this experiment is that it shows partial results from the application of certain fertilizers.

The third experiment is in Massachusetts, a preliminary report of which has been kindly furnished us by Director Brooks.[†] This experiment has been running at the Massachusetts Station during the last 30 years. The trees were planted one year after the experiment was started and the plots contain three trees each of Baldwin, R. I. Greening, Roxbury and Gravenstein. The soil is a "moderately heavy, gravelly loam, with a moderately compact (clay) subsoil," and is reported to have been "highly exhausted, chiefly by the production of hay, before the experiment started." The treatments and results we have arranged as shown in Table 2.

* Page 231, Bulletin No. 289, N. Y., Geneva Station.
† Letter from Director Brooks, November 30, 1903.

Table 2.
Massachusetts Experiment on Apples, 1889-1909.
(Treatments and Yields per A., to date.)

Plot	1	2	3	4	5
Annual Treatment, . . .	Manure, 10 Tons-Acre	Wood Ashes, 1 Ton	Check	Bone and KCl 600 and 200 lbs.	Bone and Low Grade K ₂ SO ₄ 600 and 400 lbs.
Present Average Girth, . . .	37.75 "	31.94 "	37 "	30.554 "	35.42 "
Ratios of Girth, . . .	140-	118.4	100	113	131.5
Total yields lbs., . . .	17288.5	10150	3354	10058.5	15371.75
Ratios of yields, . . .	515	301	100	327	476
Quality,	5	1	4	3	2

Here we have some very positive results from the application of fertilizers. In growth, the trees of the treated plots show an increase of 13 to 40 per cent. over the checks, and in yields, they show benefits of 201 to 415 per cent. The quality of the fruit is also improved in all plots except that receiving the stable manure, in which it is poorest. Manure, although most efficient in securing growth and yield, fails so completely on quality that it takes relatively low rank in final value. The most valuable returns clearly have come from plot five, where ground bone and low-grade sulphate were used. This plot also shows a surprising gain over plot four, which differs only in the use of the muriate instead of low-grade sulphate of potash. Whether this superiority is due to the magnesia in the sulphate or to a harmful effect of the chlorine accumulating from the muriate, or to a soil difference can not now be stated. It is being further studied by the Massachusetts Station.

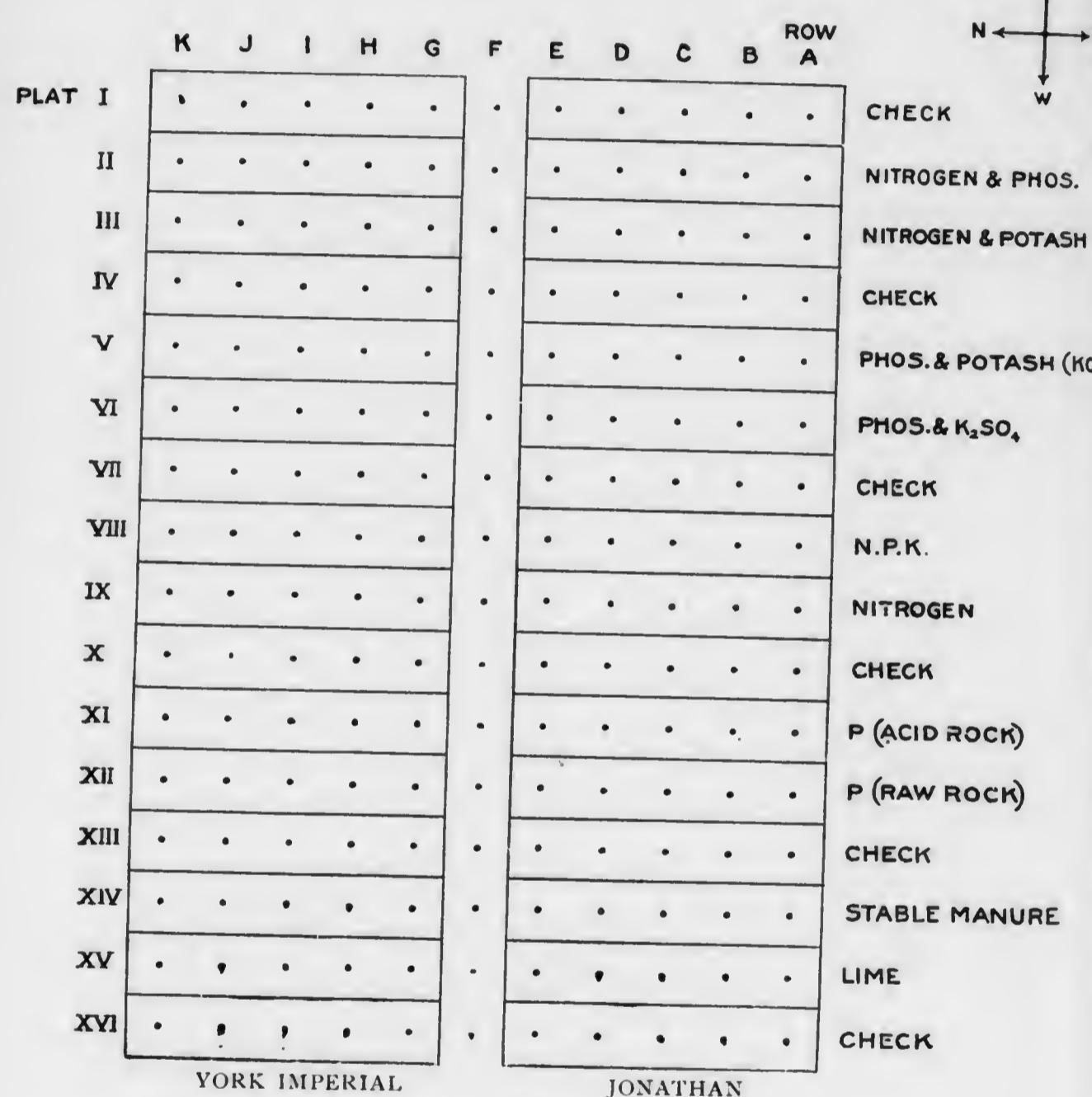
Thus we have before us the results from three experiments in orchard fertilization, running for 14, 12, and 20 years respectively. One shows no results, another partial results, and the third shows very beneficial results. Altogether, they show for a certainty that plant food is a crop limiter, but not in all orchards.

To obtain additional evidence, the series of experiments now in operation in this state were started, as you know, by the Pennsylvania Experiment Station in April, 1907. The series is without the merit of age as yet, but we trust that it has some extent and plan. An idea of the extent can be obtained from the fact that the records of the past season required the handling of 82 tons of fruit from 2,268 trees. These trees covered nearly 50 acres, and involved ten soil types and twelve varieties. Young orchards to the amount of 42 acres in addition were set during the season.

Before examining the records in detail, we shall outline briefly the work as a whole. The problem placed before us was to determine and study the causes that affect yield and quality in apples. We based our work upon the general proposition that the growth and development of any plant vary with the limiting factor. The possible environmental limiting factors for all plants are moisture, food, heat, light, carbon dioxide and oxygen. Some of these factors are beyond the control of man and, hence, it was decided to study first the influence of those that are more or less within his control.

We, therefore, are now studying (1) the influence of plant food as affected by fertilizers; (2) the influence of moisture as affected by soil management; (3) the influence of cover crops; and (4) the influence of heredity as shown by propagation from best individuals, and by variety.

Figure 1.



Influence of Fertilizers.

This experiment is located with D. M. Wertz, Franklin Co. Others with Tyson Bros., Adams Co., S. M. Brown, Bedford Co., and at State College.

The plan of our fertilizer experiment is shown in Figure 1. The fertilizers are applied annually at the rates per acre of 50 lbs. nitrogen (N), 100 lbs. phosphoric acid (P_2O_5), 150 lbs. potash (K_2O), 1,000 lbs. of lime, and 12 tons of stable manure. The results from three orchards ranging from 9 to 19 years of age are shown in Table No. 3.

Table 3.

Fertilizer Results, Three Experiments Combined, 1908.

INFLUENCE ON YIELDS. TOTAL YIELDS, LBS.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
X	N	P	N	K	PK	PK	SO ₄	X	N	P	N	X	Acid	Raw	X	Manure	Lime	X
3337	5117	4244	1416	2135	1109	931	2286	2034	1467	707	475	882	1370	643	80			
Per cent.	90	58	70	1.5		98.7	55.5		-45.2	-55.8		59.7	-22.9					

INFLUENCE ON COLOR. PER CENT. COLORED.

69.2	50.8	56.2	58.5	66.4	55.2	47.9	35	37.6	60	58.9	69.3	53.7	49.2	64.6	75.9	
Per cent.	-14.8	-5.9	11.4	3.8		-16.9	-18.4		1	13.5		-11.7	-4.6			

INFLUENCE ON SIZE. AV. WT. IN OZS.

4.42	5.03	5.29	5.01	5.22	5.45	5.22	4.97	5.51	5.05	5.65	4.87	5.18	5.18	5.18	5.49
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Too variable to determine benefit on size.

Influence of Fertilizer Elements. Per Cent. Benefit. 2d Year.

By comparison of the results from the different combinations shown in Table No. 3, it is possible to obtain figures showing the influence during the past season of the individual fertilizer elements. Their effect upon yield and color is shown in Table No. 4.

Table 4.

Element.	Yield.	Color.
Nitrogen,	47.25 per cent.	-17.87 per cent.
Phosphate (P_2O_5),	5.8 per cent.	1.56 per cent.
Potash (K_2O),	19.00 per cent.	10.15 per cent.
Manure,	59.7 per cent.	-11.7 per cent.
Lime,	-22.9 per cent.	-4.6 per cent.

This table shows that both nitrogen and stable manure have materially increased the yield and decreased the color of the fruit. It also shows phosphates to have had but little influence on either yield or color. This seems to be largely because this element failed so completely on the plot where it was applied alone. Where it was used in combination, phosphoric acid showed some distinctly beneficial results. Potash has shown moderately beneficial results on both yield and color, and lime has apparently decreased both. It is hardly believable that lime actually has the harmful effect indicated here, and it will be interesting to see whether or not the indication is maintained in later developments. It is probably one of the transient conditions, which make necessary the long periods required in orchard experiments.

The strong influence of nitrogen both on fruit and foliage is one of the striking features in these experiments to date. This is particularly true in the Bedford County experiment, on a thin, exhausted, stony clay. Its effect in relation to the time of applica-

tion here we believe also to be significant. The first application was made in the form of nitrate of soda as a top-dressing on July 8, 1907. Not only was the effect of the nitrogen plainly evident before the close of August and during the remainder of the season, but the trees of these nitrogen plots came out again into leaf much greener the following spring and showed as marked differences in late May of 1908, before the second application as they had shown in the preceding autumn. This undoubtedly has a bearing on the time for applying *soluble, transient fertilizers* to such perennial plants as apple trees.

Coupled with the Woburn experience, it indicates (though it has not proved) the advisability of delaying such applications until the season's growth is well advanced, but not completed; in other words, until the plant's supply of stored food is about exhausted and available food becomes a limiting factor.

Figure 2.

Influence of Soil Management and Manures.

The experiment figured here is located in Bedford County, with J. R. Sleek. Others with J. H. Ledy, and with John A. Nicodemus, Franklin County, and with F. H. Fassett, Wyoming County.

Figure No. 2 shows the plan of our soil management experiment. Soil management is so closely related to the use of fertilizers that it has seemed inadvisable to completely separate them. This experiment, in addition to comparing the different systems of management, tests the value of commercial and stable manures in connection with each. The stable manure is applied annually at the rate of 12 T. per acre and the commercial fertilizers at the rate of 30 lbs. of nitrogen (N), 60 lbs. of phosphoric acid (P_2O_5), and 100 lbs. of potash (K_2O). On the sod-mulch plot, all grass is left in the orchard and an additional mulch of straw at the rate of three tons per acre is applied annually.

Table 5.

Influence of Soil Management on Yield, 1907, 1908.

Young Orchards	Clean Tillage	Tillage and Cover Crop	Sod Mulch	Sod
Yields 1907,	4037 lbs.	3359 lbs.	4425 lbs.	4481 lbs.
Yields 1908,	13651	16112	18692	15473
Totals 2 years,	17688	19471	23117	19954
Ratios,	100	110	130	113
Ratios,		100	118.5	

Mature Orchard				
Yields 2 years,	-	353:8	25266	
Ratios,		140-	100	

Table No. 5 shows the yields obtained from the different systems of soil management during the last two years. Results for both years are given here because the current year's crop can be more directly influenced by cultural methods than by fertilizers. The results given here, and those in the later tables on young orchards, have been obtained by combining the yields from three orchards of six to fifteen years of age. The mature orchard is thirty-five years old.

As shown in the table, the young orchards have yielded better under the sod-mulch and sod treatments, while the mature orchard is best with tillage and cover crop. Sod-mulch in young orchards shows 30 per cent. better yields than clean tillage and 18½ better than the cover crop method, while in the mature orchard the cover-crop is 40 per cent. better than the sod-mulch. If these differences are maintained by later results, they would indicate that the mulch treatment is of value in developing and establishing the bearing habit in orchards which have reached bearing size and age. Also after this habit is established, the present results clearly indicate that tillage is to be preferred.

Table 6.*Influence of Manures on Yields, 1908.*

Young Orchards	Unfertilized	Manure	Com. Fertilizers
Yields, lbs.	23669 100	41532 176 111	34316 145 100
Ratios,			
Mature Orchard			
Yields, 2 years,	34635 151	26540 116	22881 100
Ratios,			

Table No. 6 shows the yields obtained under different methods of manuring in their second year. The orchards are the same as described under table No. 5. The young orchards have responded to the treatments while the old orchard apparently has not. Both commercial and stable manures show distinct benefit in yields in the young orchards, with the latter somewhat in the lead in orchards of both ages.

Table 7.*Influence of Manures on Color, 1908.*

Young Orchard	Unfertilized	Manure	Com. Fertilizer
Average per cent of color,	59.89 100	48.34 81.5	44.5 78.5
Ratios,			
Mature Orchard			
Average per cent of color,	88.3 100	84.7 96-	86.45 98-
Ratios,			

Table No. 7 shows the results obtained during the past year on the influence of complete fertilizers and stable manures upon color. Both manures have decreased it. The decrease averaged about 3 per cent. in the old orchard and 20 per cent. in the young.

This decrease in color is probably simply due to delayed maturity, the effect being greatest in the young orchards because their general response to fertilizer has been greater. Had picking been delayed a few days on the manured plots, it is quite likely that the differences in color would have vanished.

Table 8.*Influence of Soil Systems on Size, 1908.*

Young Orchards	Tillage	Tillage and Cover Crop	Sod Mulch	Sod
Average Wt. in ozs.	5.9- 102-	6.03- 104	6.02 104-	5.79 100
Ratios of systems				
Mature Orchard				
Average Wt. in ozs.		5.47- 1.09	5.02- 100	
Ratios of systems				

Table 9.*Influence of Manures on Size, 1908.*

Young Orchards	Unfertilized	Manure	Com. Fertilizer
Average Wt. in ozs.	7.30- 100	7.79 105.3	8.26- 115.8
Ratios,			
Mature Orchard			
Average Wt. in ozs.		5.65 122.5	5.47 118.5
Ratios,			

Tables No. 8 and No. 9 shows results of the past season in regard to the effect of soil systems and manures on the average size of apples.

Both manures and tillage-with-a-cover-crop have increased the size of the fruit. This is desirable in old orchards, but rarely so in young as the fruit in the latter is already likely to be overgrown.

In the prosecution of the work as a whole, some interesting data have been gathered upon things a little aside from the main lines which we may briefly mention here. The most important of these are on the extent and depth of root-growth, the influence of soil systems on moisture, and their influence on the sticking qualities of certain varieties. As to results, suffice it to say that apple roots extend much farther laterally than is generally supposed, reaching sometimes more than three times as far as the spread of the branches. Soil systems during the past season varied greatly in ability to conserve moisture. On a moderately porous soil in Wyoming County, tillage held the moisture much better than a three-ton-per-acre, sod-mulch system and was vastly superior to sod even when closely cropped and the grass left on the ground. On the tillage plots, under these conditions, the sticking qualities of Baldwin apples were greater by 52 per cent. than on the sod-mulch plots. Northern Spies, however, under identical conditions, showed no material differences in sticking qualities.

To summarize the present status of orchard fertilization we would say that:

(1) Plant food is a crop-limiter in some orchards and in others it is not. Hence, it is a question whether the orchardist should apply manures in quantity until he has evidence that they are needed in his soil.

(2) There is generally little use of applying fertilizers without at the same time giving proper attention to the other factors of fruit production, viz: soil management, spraying, pruning, and general orchard care.

(3) After the other factors are right, if the trees are deficient in growth, foliage, or fruit, it is probable that an application of fertilizers will produce beneficial results.

(4) The indications are that nitrogen has more value as an orchard fertilizer than is generally accorded it, though it should be used judiciously on account of its effect on color. It can be used most freely on the earlier soils or in localities with rather long

growing seasons. It is probable that failure to secure results on apples from the application of potash and phosphates may be often due to a deficient nitrogen supply, which thus becomes the limiting factor for that orchard. If applied in the nitrate form, the time of application must be right.

(5) The greatest actual improvement in value of fruit has been secured on plots receiving phosphoric acid and potash in the form of low-grade sulphate. The exact cause of this is not yet known.

(6) Where plant-food is needed, we can not now improve upon the general recommendation of stable manure or leguminous cover-crops alternated with a fertilizer carrying about 30 lbs. of nitrogen, 60 lbs. of phosphoric acid, and 100 lbs. of potash per acre.

(7) To accompany this system of fertilization, the indications are that the proper soil management for most situations is tillage with a leguminous cover crop while the orchard is young, followed by a mixed lemmunious sod or sod-mulch when bearing age and size is reached. After the bearing habit is established, a return to tillage every second or third year should be made, increasing the frequency of tillage with the age of the orchard and the demands of the fruit.

The President.—If you have any questions you wish to ask the Professor, we will be glad to receive them.

Mr. Fenstermaker.—Will that result from tillage hold good on a steep side hill?

Prof. Stewart.—That brings in an entirely different matter. Our work is to find out what is the effect of the various systems of soil management on yield. We find that tillage and cover crop is distinctly best in orchards in which the bearing habit is established. In the side-hill orchard, it would not always be practicable to apply this system, because they would wash, but if you can prevent the washing, I don't see why the effect there would be any different from that in any other orchard.

Prof. Surface.—The question has been asked here, to what depth were the orchards cultivated and with what implements,—that is, on old orchards—and for what purpose?

Prof. Stewart.—Three or four inches. The main purpose of tillage, as I see it, is to conserve moisture. A four-inch cultivation will do that as well as a deeper one, and will avoid unnecessary injury to the roots. The implements used were plows, or double-action discs or spading harrows, followed by spring-tooth and smoothing harrows. I don't see that there is any objection to any implement that will thoroughly stir up the soil and keep the weeds down.

Prof. Surface.—If it should be a rocky soil, would it be broken up?

Prof. Stewart.—Yes, unless there was too much rock,

Prof. Surface.—How late do you till?

Prof. Stewart.—Up to the 1st of August, this year, although there was very little tillage done in July, there was no need of it either to preserve a mulch or to kill weeds. The reason for this tillage up to August was that we wanted to sow our cover-crop at that time. This was because we thought the chances were better then for enough moisture to get the seed started. And there is plenty of time after that in most Pennsylvania orchards for proper fall growth.

Prof. Surface.—What do you sow for the cover crop?

Prof. Stewart.—A combination of alsike and medium red clover this past year. We have added hairy vetch in some cases, and have used it and rye in others.

Mr. Good.—I would like to ask the gentleman if cultivation, especially where it is a little bit rocky, so as to bring the roots near the surface, does not injure the roots a few years afterwards? Then, another thing; don't the cover crop in the orchard absorb a great deal of the moisture that the tree should have just at that time—the latter part of the summer?

Prof. Stewart.—I don't know of any injury from cultivation, and as for the demand for moisture, I may again call attention to our results in the Wyoming County orchard this year, where tillage and cover crop increased the sticking qualities of Baldwins 52 per cent. over the mulch system.

Mr. Good.—And yet you say that tillage causes the fruit to drop.

Prof. Stewart.—No, the effect seems to be quite the reverse, the figures show this and it is not necessary to argue one way or the other. Now, as to the question as to whether tillage injures the roots of the tree. I suppose that we have some soils that are so shallow that a three-inch tillage would take up all the soil that there is for the apple roots, but orchard soils should be deeper than that if you expect the trees to grow properly. If you have soil of a proper depth, a three-inch tillage will not injure the tree. We have records from over 15,000 acres of bearing orchard in Orleans County, N. Y., and they show an increase of over 40 per cent. in favor of tillage as compared with sod systems under approximately similar care otherwise. This shows that whatever injury the roots may have sustained has not interfered with the yield, which is what we are after.

A Member.—Do your results apply to the peach as well as to the apple?

Prof. Stewart.—Of course, they cannot apply as well to the peach as to the apple, as these figures were all derived from ex-

periments with apples, but other records show that any stone fruit requires even more cultivation than the apple.

A Member.—How about commercial fertilizer for peaches; is that any benefit?

Prof. Stewart.—There is a good deal of difference of opinion about that, and little experimental evidence. However, in an orchard survey of Niagara County, N. Y., in which I had the pleasure of participating, it is found that out of about 8,000 acres of peach orchard, 80 per cent. of the orchards are receiving fertilizers of some kind, either stable manure or commercial fertilizers, or both, and these orchards are making much larger financial returns than the others. I can't give you the exact figures. I have them in my office, but they are distinctly greater where fertilizer is being used, about \$20 to \$45 per acre I believe, and these are five-year results, not the results of only one year.

A Member.—What fertilizer would you use—potash, or nitrogen or phosphorus, or all combined?

Prof. Stewart.—That is a question that can only be settled by actual tests in the orchard. You will notice the summary that I closed with; that summary will guide you in the use of fertilizer as well as anything I am able to tell you at this time. But there are several things you must do in connection with putting on fertilizer. You can't expect it to do the work of tillage, nor of any of the other essentials in the care of the orchard. These things must be done or your fertilizer may be thrown away. After they are done, if there is a deficiency in either wood, fruit or foliage, the chances are that an application of fertilizer will produce beneficial results. Now what fertilizers shall you use? People have always been talking phosphorus and potash for fruits and yet our greatest effects thus far are coming from nitrogen. This doesn't mean that the other elements are not needed and it may very well happen that where nitrogen is lacking, this lack must be met before any benefits can be realized from the potash and phosphates. For the present, I would recommend the use for general conditions of a fertilizer containing 30-60-100 pounds per acre of actual nitrogen, phosphoric acid and potash, respectively. To bring up the nitrogen this can be alternated with an eight to ten ton application of stable manure, and supplemented with a leguminous cover crop or a permanent cover.

The Secretary.—I should like to ask if one has an old apple orchard that has not been cultivated, if it is advisable to plow it up three inches, or less?

Prof. Stewart.—I should say that I would plow it up if it is not now producing satisfactory results.

Prof. Surface.—What depth?

Prof. Stewart.—About three or four inches; if you do cut off a great many of the old roots the effects will show increased

yield, and that is all the argument that is necessary, I should say. If the orchard is doing well, however, it would not be advisable to make any radical changes. We can over-till orchards as well as under-till them, in my opinion.

Mr. Hale.—What is the risk?

Prof. Stewart.—It aids fire-blight, for instance. And in trees just coming into bearing, our present records seem to show that it delays fruiting. In such orchards, in our experiments, the sod-mulch system shows an advantage of 30 per cent. over clean tillage.

Mr. Gossard.—Do you think that apple trees that are treated with stable manure are more subject to twig blight than those that are treated with commercial fertilizers?

Prof. Stewart.—That simply resolves itself into this, it seems to me: twig blight is caused by bacteria, which are largely transferred by insects during the blooming period and during other periods of succulent growth. The insects become inoculated by visiting the gummy masses that exude from active blight cankers on the limbs or trunks of trees, in which the bacteria pass the winter. Many twigs become inoculated in this way every year, but it is only those of succulent growth that are badly injured. Therefore, the fertilizer that does most to produce the succulent growth is the one that does most to spread the blight. Barn-yard manure as shown by the Massachusetts records, already presented, will produce a somewhat greater growth than commercial fertilizer, hence, it is likely to be a little more conducive to blight.

A Member.—I would like to know whether there is any material difference between cultivating three inches deep in an old orchard with a spring tooth harrow, or a three-inch cultivation with a plow.

Prof. Stewart.—I doubt whether you could get a three-inch cultivation with a spring-tooth harrow.

I'm afraid some of us are inclined to be too tender on these old roots, and we often fail to do things we should. I sometimes think that fear of injuring the apple roots is simply an excuse for not getting out and doing the work. I have recently made a study of costs and profits in fruit-growing. I have noticed a most interesting relation between the cost of production and net returns. Of course, you know the man who does nothing for his orchard and gets nothing back from it. In that case, the cost of production is zero, the return is zero. Up in Orleans county, N. Y., the records from the 15,000 acres of which I spoke a while ago show that the average annual cost for five years in producing and marketing the fruit is about \$50 per acre, about \$35 of which went into barrels, packing and so on. The average net return is \$61.40 per acre. I have the figures from an orchard here in Pennsylvania, the exact figures, where \$116 per acre has been put out for cost of

production and marketing, and the net returns are \$274 per acre. In an Oregon orchard, where the cost of production and marketing was \$380 for an acre, the net returns were \$900. Notice that the higher the cost of production the higher the net returns were. We must remember that there are several essentials in fruit growing, and in order to succeed we must look after them all. The neglect of any one may reduce returns from the whole orchard.

Mr. Hale.—The orchard is simply a factory in which a man invests his capital, and the finished product must be so regulated that it will restore it to him again. Of course, we must waste money to begin with, and the returns are slow; we must plant and prune, and cultivate and fertilize. Some time ago the Atlanta Constitution sent out inquiries to the large peach growers as to what it costs to handle the growing peach in order to get the best returns—the best prices on the market, and the answers showed without a doubt that those whose cost of production was low, also got low prices; those who had the greater expense also got the greatest returns. We can't get something for nothing anywhere in this country, and the returns shown by our Experiment Stations everywhere all point one way.

The gentleman on my right asked the professor something about the feeding of his orchard. You must ask the tree some questions. The most successful orchards have been built up by men who consulted their trees and gave them what they required. Regard each tree as an individual thing, and study the local conditions attached to it, and then give it what it needs, and you will get the best results.

Prof. Surface.—It has been recently said that in tilling an old orchard for the first time it is necessary to cut back the branches so as to make them balance with the root branches. I want to ask Prof. Stewart if that is the right hypothesis.

Prof. Stewart.—I don't know that it is absolutely necessary to cut back the tree in renewing tillage in an orchard. The tillage system is going to conserve more moisture. The roots that you cut off will be quickly restored by fibrous roots, which perhaps will enable the tree to get as much moisture as necessary, so I don't believe there is any real necessity for the maintenance of that so-called balance that we have been assuming, between the top and the roots. Of course, there is probably more or less of a balance there, but I believe that the greater amount of moisture that should remain in the soil under tillage will supply the tree, even with the shortened roots, so I doubt the necessity of maintaining that balance. Of course, in an orchard that has been neglected in the matter of tillage and pruning, we will be compelled to do more or less pruning, but as to whether it is absolutely necessary to maintain this balance, I do not think it is.

Now, then, one other word: Mr. Hale takes exactly the position that I wanted to see. You can not get something for nothing, except possibly in the case of plant breeding: our plant-breeding friends would have us believe that they can increase returns without increased expense. But in regard to his factory analogy, there is a

little danger there. Because with the idea that our orchard is exactly like a factory, we have sometimes thought we could increase our returns by cutting down the cost of production. Here is where the analogy ceases. You can increase profits in factories by cutting down the cost of production, but usually this is not the case in fruit production; here, you will find it necessary to increase the cost of production rather than decrease it because we are dealing with a perishable product, but with that amendment, I am heartily in favor of Mr. Hale's experience as to cost.

The President.—Is the Auditing Committee ready to report?

Mr. W. C. Tyson, Chairman of the Auditing Committee, then read the following report, which was accepted:

"We, the undersigned, have examined the Treasurer's statement of accounts, and find the same to be correct."

(Signed)

W. C. TYSON,
J. L. RIFE,
D. C. RUPP.

Mr. C. J. Tyson.—The Fruit Growers' Association of Adams County received a communication from State College recently, requesting that our exhibits here might be sent to them for use in their class work. We should be glad to accede to this if the Association is willing.

The President.—That rests with the exhibitors. The fruit is simply on exhibition here, and remains the property of the exhibitors. If you wish to send it to State College, we will try to see that the Adams County exhibit is not disturbed in any way.

Before making the announcement that we will take a recess, I want to say that the Treasurer is sitting at his table, ready to receive your dues, and that it is necessary to have your dues paid before you can receive the publications of the Society. I hope every one will take advantage of this, and pay the same.

Mr. Chester J. Tyson.—Right here is a point that has occurred to me, and that is that we do not get enough new members in these meetings; there are people who come here to our meetings, but who are backward about making themselves known. If a committee were appointed to see these people, we might be able to increase our membership considerably.

The President.—Do you make that as a motion?

Mr. Tyson.—Why, yes; I move that the Chair appoint a committee of ten to canvass and see what can be done towards increasing our membership.

This motion was properly seconded, and carried.

The President.—In addition, I would like to say that any one who is interested in Horticulture is welcome to join us; we have no

initiation; all that is necessary is to pay your dollar, and you become a member and receive the report of the Society.

If there is no further business, we will now take a recess until quarter of eight this evening.

TUESDAY, JANUARY 19, 1909, 7:45 P. M.

The session came to order with President Hiester in the Chair.

The President.—I will name the following committee of ten to secure new members: Mr. E. C. Tyson, Mr. Calvin P. Scholl, Mr. D. C. Rupp, Mr. W. C. Tyson, Mr. F. H. Fassett, Mr. W. S. Adams, Mr. J. H. Coursen, Mr. John G. Engle, Mr. A. W. Stephens, Mr. H. H. Snavely.

The Secretary took the Chair, while the President delivered his annual address.

President's Address.

Fifty years have passed with all their successes and failures since this Society was established.

For a half century a comparatively small company of men, drawn together by their common love of fruit, flowers and trees, have met annually, to exchange views, to renew acquaintances, and add somewhat from their experience to the general fund of Horticultural knowledge.

For nearly forty years I have met with them. In viewing the present audience I look in vain for many faces that were familiar in the early days, faces of men who were respected not only on account of their horticultural knowledge, but who were loved for all those qualities of mind and heart that make good comrades. Some are in distant states, some are prevented by ill health, and many are resting from their labors, and reaping the reward of a well spent life. But while I miss the faces of those strong, good, lovable men of the early days, I see occupying their seats to-day young men, full of enthusiasm, courage and state pride, ready and able to take up the work which they have laid down, and push it with equal diligence and success.

We meet to-day to celebrate our bi-centennial anniversary. It seems to me that this is a good time to ask ourselves the question: Is it worth while? Do these meetings pay? Are we getting out of them as much as they cost?

At one of the first meetings which I ever attended, President Josiah Hoopes made use of these words in his annual address:

"We are designed to be social beings, and he who would conceal an important discovery and refuse to assist his less fortunate friend with the benefit of his experience, is an enemy to the cause and should be shunned as such. Let our lasting endeavor be to render some real lasting service to Horticulture, and by the simple act of

each individual member relating the many little items of experience that he may have gained in his daily work, receive in return the accumulated wisdom of those who have made the subject their life long study."

If during the first fifty years of its existence, this Society had done nothing more than encourage and keep alive this spirit of mutual helpfulness, this willingness to do something for the common good without special pay, it would have been worth while, it would have paid well. But it has done much more. The early members were not commercial orchardists as we accept that term to-day. Most of them kept a small orchard as a side line to general farming, and sold the product in the local market. Cold storage was unknown. Railroads had not penetrated to every nook and corner of the country, carrying tropical fruits North, Northern grown fruits South, Western fruits East, and Eastern fruits West, as they do to-day. Their object was to build up the home orchard in such a way as to furnish the owner and his local town with a good apple for every day in the year, and to prolong the season of the other fruits. So we find that these men living in many different counties planted a great many varieties in each orchard: they met together annually to discuss their merits, and exchange scions of desirable kinds. The result is that these old orchards not only contain trees of many kinds, but often single trees bearing several different varieties.

When Dr. Hunt accepted the position of Director of the Experiment Station and Dean of the School of Agriculture at State College two years ago, he came to us with the question, What can the Experiment Station do for Horticulture? After a lengthy discussion which was participated in by a goodly number of our members, it was decided that we ought to know more about the adaptability of the different varieties of fruit to the conditions existing in the various fruit sections of the State, that the time had come when we should plant in commercial orchard only such kinds as would reach their highest degree of perfection in that particular locality, and so Dr. Hunt was asked to start a fruit survey of the State under the direction of the Experiment Station for that purpose, and at the same time start a series of experiments in orchard management, including cultivation and fertilization. This work was placed in the hands of Prof. J. P. Stewart.

In making this fruit survey Prof. Stewart is greatly aided by the work of these early members. In almost every old orchard visited he finds most of the standard market sorts, and a great many others, with usually three or four kinds doing their best, so without any theorizing he is able to say "I find this variety growing in a certain locality, and succeeding admirably. You are perfectly safe in planting it." So you see these annual meetings with their exchange of views, and exchange of scions, have kept alive the interest in fruit, have furnished the preliminary tests of varieties, in all parts of the State, and under all conditions, have paved the way for the profitable planting of commercial orchards to-day, and have furnished the source from which our Experiment Station can draw much useful information in the pursuit of its investigations.

We are fortunate indeed in starting the second half of the cen-

tury to have the information that has been accumulating during the first half, and to have the interest and enthusiasm that has been encouraged and kept alive in our members by these annual meetings.

We have now reached the commercial age. The markets of the world are open to us, and here we are confronted with new conditions. In order to succeed and hold our own in the general market we must not only study varieties and methods of cultivation, but business methods generally.

Dr. Hunt in his first address before this Association said: "I do not wish to underestimate the importance of barter, but the most important element of success is the economic production of a high class article, whether it be an apple, iron or broadcloth."

I am glad to have the endorsement of so high an authority to the idea that I have been advocating for a number of years. That in our future planting, quality should be the first consideration, that in the selection of varieties, location and system of orchard management, we should always keep in view the production of fruit of highest quality. We are now just beginning to appear in the general market. If this Society by precept and example can induce the fruit growers of the State to plant and grow quality, and pack honestly, we can meet any competition that may arise, and easily place Pennsylvania at the head of fruit growing states.

It is regretable that we must have page after page of laws on our statute books relating to pure food, and an army of inspectors and detectives to enforce them, and now we have another proposed law known as the Porter Bill, which will be introduced at Washington this winter to regulate the packing, grading and marking of fruit, which in its present shape will require another large army of inspectors to enforce. In my opinion the only additional law we need is one that will define the exact size of the several packages used in the general market, and require the name of the packer to be placed thereon, and let each fruit section, and each individual, profit or lose by the manner in which the fruit is packed. Let me illustrate my point by a short article which appeared in one of our trade papers under date of October 30th, as follows:

"New York, October 30.

"At this writing Steinhardt & Kelly have received some 10 or 12 cars of Hood River apples packed under the terms of their contract with the Hood River Apple Growers' Union. The apples that have been coming along are fruit that might very aptly have been grown and plucked in the Garden of Eden itself. It would be impossible for the artist to paint prettier apples than these Hood Rivers, and the best of it all is that in the top, bottom, sides and middle of the boxes they are all the same—so much alike in color, conformation and unblemished beauty that one can not tell 'tother from which. No higher standard of packing is humanly possible and the contents of the cars already received fully bear out the statement of H. M. Huxley.

"By this magnificent kind of pack the Union is not only helping Steinhardt & Kelly to work out on a big deal in a successful manner, but it is also helping itself and the Hood River Valley beyond all words. For car after car to turn out with every apple in every

box a perfect specimen of its tribe is the biggest and best advertisement that the Hood River section could ever get."

It seems to me we do not need laws and inspectors so much to enforce business honesty among fruit growers, as we need leadership. Let each individual member of this Society make up his mind that he will be a leader in his community, and will try to induce others to follow his lead. In this way and in this only can we establish a reputation that will be proof against all competition.

You will notice in the short sentence which I quoted from Dr. Hunt's address, he referred to the *economic* production of a high class article. By economic production is not meant growing a crop with the least possible expense. It has been found that when money and labor are judiciously expended on any farm crop, the net profit will steadily increase up to a certain point. After that point has been passed, while there may be a slight additional gain from the added care and expense, it is not equal to the cost. How many of us have ever reached the limit of profitable expenditure in the care of our orchards?

We have not nearly reached the limit of economy in the production of our crops, there are a number of important questions that must be answered before we can hope to reap the maximum profit from our orchards, to answer which requires a knowledge of the great principles which underlie all plant growth, animal growth, and the chemical and physical changes that are constantly occurring in the earth itself.

Our large mining, manufacturing and railroad companies long ago began to realize the importance of having technically trained men for their work, and at last the farmer is getting his eyes opened to the importance of the subject.

The 500 farmers who met at State College during Farmers' Week about the 1st of January, and listened to the lectures, asking questions and taking notes, and discussing the last topic among themselves between times, show very clearly that they appreciate the importance of this technical knowledge.

I am glad to be able to say that at last State College is prepared to train men for this work. Dr. Hunt has gathered about him a corps of able assistants and proposes to give Pennsylvania an agricultural school unsurpassed by any in the United States.

We of course are most interested in the Horticultural side of this school. He has shown his interest in us by placing at the head of that department Prof. R. L. Watts, one of our own members, a selection that gives universal satisfaction. The amount of good this department can do us is only limited by the means furnished by the State for its support. Equipment is badly needed as the department is new. Prof. Watts must have green houses and laboratories before he can do effective work. I would suggest that our Legislative Committee take up this matter and bring all possible influence to bear upon the Legislature this winter to secure the needed equipment.

It is gratifying to see the interest which the railroad companies are taking in our welfare. As you all know the Cumberland Valley road recently placed a special train at the disposal of our Economic Zoologist for several weeks, which enabled him to visit

all the leading fruit districts in the great Cumberland Valley, and demonstrate the use of the various sprays and sprayers in a much more thorough manner than has ever been done before. I am sure the farmers appreciate the courtesy of the railroad company, and the officers of the company believe that the results will justify the expenditure.

Owing to the changed conditions under which we work, I think the time has come to change somewhat the character of our future conventions. In my opinion we should have three days sessions instead of two, and should have a hall as near the convention hall as possible for our fruit display, and for the display of all kinds of orchard supplies and equipment.

Some of our sister states have been doing this for several years, and find that it adds much to the interest and usefulness of the meetings. I mention this now so that the members can talk it over informally, and give their views to the members of the Executive Committee.

We should devote one session to market garden subjects. Notwithstanding the fact that we have exceptional advantages of soil and climate for market gardening, our neighboring states of New Jersey, Delaware and Maryland furnish nearly three-fourths of the produce sold in our local markets. As many of these crops can be grown to advantage in young orchards before the trees come to a bearing age, it is highly proper that they should be considered in connection with the cultivation of our orchards, and that we should urge our market gardeners to join our Association, and work with us for the upbuilding of Pennsylvania Horticulture.

I would suggest that our Legislative Committee examine very carefully the proposed amendments to our game laws, which have been prepared by the State Sportsmen's Association, and will be presented to the Legislature for adoption this winter. It is highly important that the property rights of the farmer should be protected. We should see that no law is passed which takes from the farmer the right to protect his crops at all times from their enemies, whether in the form of beast, bird or man, and no one is so competent to determine who are his friends and who his enemies as the farmer himself.

I will now close by extending to you a very cordial invitation to our Centennial Celebration, which will be held on January 19, 1939.

The President.—I am glad to say that we have with us one of our oldest ex-members—one who needs no introduction, but whom I am glad to present to you—Prof. S. B. Heiges.

Address of Prof. Heiges.

Mr. Chairman and fellow members of the State Horticultural Association:

I little expected when I left the mild climate of Virginia that I should be honored by being presented to you as the oldest member of the Association. I feel as if I were the youngest man standing among you.

It certainly affords me great pleasure to be with you once more. I have come for two purposes—for the purpose of seeing again the older members of the Association, with whom I have met in earlier years, and also for the purpose of looking into the faces of the younger members who have taken up the fight. It is with a feeling of great pleasure, and also of great sorrow that I appear before you to-night. My heart would be a heart of ice or adamant if it did not respond promptly to the old, warm hand-shakes, and the warm greetings that I received here this afternoon. Many of the older members have gone over to the other side. The Bard of Avon puts into the mouth of Mark Anthony at the bier of Julius Caesar the words: "The evil that men do lives after them; the good is oft interred with their bones;" but of these older members who have departed, I have known nothing but good. There is no class of men more honest, more honorable, more truthful than fruit growers. The very nature of their occupation makes them so.

I have not come here with any set speech; I have merely come to take you by the hand, those of you who are my old friends, and to meet the new ones but I want to recall to your memory some of the older friends and members who have passed away. If I have omitted any, it is simply because my time has been too brief to do more than glance over the history of the Association since its organization.

The first meeting of this Association was held in the city of Lancaster half a century ago; I was not present, but I had the pleasure afterwards of meeting the first president, Dr. Eshleman. A truer, more genuine, better man never lived. He was followed by Mr. A. W. Harrison, of Philadelphia, a man whom I knew well. The third president of the Association was Mr. R. A. Grider, of Bethlehem. I have taxed my memory over and over, but cannot recall that I ever met him. The president for 1862 not only served faithfully, but he lectured on potato culture in various parts of the State.

The fifth president of the Association, whom I had the pleasure of meeting, was Dr. James Calder, of Harrisburg, at one time president of the Agricultural College of Pennsylvania. A more genial, honorable and upright man, and a better husband and friend never lived. The three or four years I was a member of the State Board of Agriculture, I lectured with him at Farmers' Institutes. Earnest, honest, truthful, his influence made itself felt in whatever he undertook.

The next president of the Association was D. W. Gross of Harrisburg, a druggist, and horticulturist, who had personal control of a small vineyard a few miles from home. I have nothing but good to say of him.

Dr. James Calder was again elected president in 1868, and after him followed Josiah Hoopes of West Chester, who wrote one of our most valuable horticultural books, "Evergreens of America." For reasons known only to himself, he declined to serve after being elected, and his position was filled by the vice-president, Mr. H. M. Engle. Of the years 1874 and 1875 I shall not speak. The president was from the county of York.

In 1876 Mr. Edwin Satterthwaite was elected president. He

was an extensive pear grower, and long before the experts at Washington discovered how the pear blight was carried from one tree to another, he gave us his experience, showing the influence of the distribution of pollen. Dr. Waite, of the Department of Agriculture, made some of the most valuable discoveries in horticulture, but Mr. Satterthwaite had, unknown to Waite, anticipated these discoveries several years before they were announced by the Department of Agriculture.

After the years 1877 and 1878, during which Mr. Josiah Hoopes was again elected president, Mr. Henry M. Engle, the first vice-president, served during 1879. He was from Lancaster county, and an upright, honorable, genial man; a cultivator of the Paragon chestnut, which he introduced to the horticultural world.

As Pomologist of the Department of Agriculture, during the second administration of Cleveland, I was able to introduce this chestnut into Virginia. There were no native chestnut trees in certain sections on which to graft them, but Charles Baltet, of Troyes, France, one of the most eminent horticulturists of the last century, suggested grafting them on the oak, and particularly the red oak: we issued a small bulletin, and sent scions throughout Virginia, and I am pleased to say, we were unusually successful.

To-day I received from the family of Charles Baltet the announcement of his death, in which are the names of his wife and his sons and daughters, his grandchildren, his brothers and brothers-in-law, his nephews and nieces and his cousins and cousins-in-law, together with the societies of which he was a member: he was recognized in this country, and in Europe, where he was known by his writings, as one of the most honorable and honest men, as well as one of the most eminent horticulturalists.

From 1880 to 1884 this society honored by the presidency the Hon. George D. Stitzel, of Reading, an honest, earnest man. From 1885 to 1888 he was succeeded by Calvin Cooper, to whom I am largely indebted for being called to the position of Pomologist of the Department of Agriculture. At the meeting of the State Board at Bethlehem, he was the member from Lancaster county, and Governor Pattison the presiding officer. Mr. Cooper rose and offered a resolution recommending my appointment to the position of Pomologist of the Department of Agriculture. It was the happiest moment of my life, when, after the reading of this resolution it was unanimously adopted. Governor Pattison requested Secretary Edge that this resolution be sent to the Hon. J. Sterling Morton, Secretary of the Department of Agriculture, with his strong personal endorsement. My appointment hung fire for five months. My assistant, Mr. Taylor, afterwards told me that Mr. Morton had told him he had so many applicants for the position that he was in a quandry whom to appoint. He sent for Mr. Taylor to come over to his office one day, and directed him to write to Thomas Meehan, regarding my qualifications. He was just about to write, when he again received a message from Mr. Morton, saying he need not write, that he had received a letter from Mr. Meehan, and I was appointed. I wish I could tell you, ladies and gentlemen, of the little good I was able to accomplish during the four years that I held the position. As I have already said, I was instrumental in

introducing the Paragon chestnut into Virginia, and with the assistance of the Minister to China, Mr. Denby, I introduced the cultivation of the Chinese persimmon in this country. After bringing great pressure to bear on the Chinese, Mr. Denby was finally able to secure some scions. I instructed that the ends should be covered with paraffine, and covered with finely powdered charcoal, and sent to us. Upon opening the tin cases, I found that the charcoal, instead of being finely powdered was about the size of a hazlenut, or even an English walnut. The following year we got Mr. Denby to send us another lot. This time they came in the same style. Mr. Denby, however, sent a lot of seeds from choice specimens that he had bought. These seeds were propagated and we sent the trees to several different states, chiefly California and Florida, and from these seeds we have cultivated this persimmon in this country. Again, my predecessor, Prof. Van Deman, had wisely tried to secure from Sicily scions of citron trees. They are very jealous of their fruits over there, and guard them carefully. Instead of sending citron scions they sent the three varieties of their most worthless lemons. Of course this fraud was detected when fruit was produced in California and, perhaps, in Florida.

Application having been made to me for scions of the true citron, Secretary Morton directed me to obtain them through Prof. Fairchild, who was in Europe studying the diseases of the coffee tree in order to take charge of the coffee industry for the Dutch Government in Java.

We also conducted a series of experiments in different methods of root grafting, at the suggestion of Secretary Morton, who was a strong advocate of "whole-root" grafting. Selecting a dozen or more of the varieties in general cultivation in the apple-growing states, several hundred scions of these varieties were grafted on whole roots, an equal number on the upper half, and an equal number on the lower half of the seedling roots. These were all cultivated precisely alike and at the end of the first growing season an equal number of each method was taken up, caliperized, measured as to height, and root development compared. No perceptible difference in the different methods could be discovered.

The second season all the trees were cultivated alike and at its end the trees were subjected to the same test as the former years, with no perceptible difference of growth in either method. A complete set of these varieties, grafted by the three different methods was sent to the Experiment Stations of all the apple-growing states with the request that they be planted, cultivated in similar manner and to carefully note; difference of growth, vitality, time of fruitage and productiveness.

Of course years will be required to answer all of these questions in such a manner as to benefit the nurseryman and orchardist.

Mr. H. C. Snavely, whom I had the pleasure of meeting here this afternoon, succeeded Mr. Cooper, and served during 1889 and 1890. He is one of the most successful growers of small fruits and peaches in this section of the State.

Next came Mr. Moon, and there is no slander in saying that in appearance and in fact, he was a full moon.

I again was honored by election to the presidency from 1897 to

1899, and from 1900 to 1904, H. A. Chase, of Philadelphia, served as president—one of the most successful orchardists in the State of Pennsylvania. From 1904 to 1908 your most worthy chairman has filled this position. I have not only known him as president of this society, but it has been my pleasure to have been with him at Farmers' Institutes, and he has been an honorable and faithful laborer in that capacity.

This is the brief list of the gentlemen who have served as president. We have, however, with us this evening, a gentleman who for many years acted as treasurer—Mr. J. Hibbard Bartram, whom I have not seen for many years.

Of the members who have died, there is one who was to me as a brother—Hiram Engle of Marietta. Now, of these soldiers who have died, I wish I had the time to make up a list. Standing at the head of the list was that honorable, upright, genial man, Brother Sisson, whose heart was so pure and whose hands so clean that he could stand up and tell a story for which I would have been hissed from off the platform, and whom the State honored by having his portrait in one of its reports. I was with him at Somerset when he met with his accident. I was at another hotel, but I went to see him, and he said to me, "Brother Heiges, I have fought a good fight, and my time has come." I have come here for the purpose of telling his story and that of the other leaders, to these younger members of this society, on whom will soon fall the burden of leadership, so that they may know what the old soldiers have done.

One of the first members from my own county was Jacob Cocklin, a noble, honorable gentleman; his son is here to-day. Then there was the Hon. Gerard C. Brown; and another known to the older members of this Society—Peter Lint, who surprised us by always having a basket of fine Maiden Blush apples on exhibition in January—fine and firm, and free from specks. He called upon me a few months before his death. He said, "I will never meet the Pennsylvania Fruit Growers' Society again, so I'll tell you the secret of the Maiden Blush apples; I always selected the largest, and finest specimens, and put them in a basket, which I hung by a strong twine in the well, just about two feet above the water"—a process of cold storage, ante-dating the cold storage as we use it to-day. Then, I must not forget that clean Quaker, Edward Jessup, a son of Jonathan Jessup, who came up from North Carolina; he was fruit-grower, carpenter, blacksmith, engineer and everything else, and proved successful in everything he undertook. He disseminated the York Imperial. During my residence in Washington, two other states claimed to be the originator of this valuable apple, and one man wrote me from New York that its very name proved it to have originated in New York—"York Imperial." Another man wrote me from the South, saying it had been discovered there and known as "Johnston's Fine Keeper"—spelling Johnston with the "T." But that it was due to Jonathan Jessup that this fruit was disseminated, I know, because I have seen the letter written to him, now yellow with age, by Andrew Jackson Downing, brother of Charles Downing, one of the greatest horticulturists this country ever produced. He laid out the grounds of the Smithsonian Institute, and lost his

life in a steamship accident during the time of President Tyler; this letter read as follows: "Friend Jessup.—I have received thy basket of very fine apples; it is the Imperial of late keepers, and very fine, and as thee says it originated near York, Pennsylvania, I would suggest the name of York Imperial."

"Thy friend,
Andrew Jackson Downing."

It received its name in the first place from Mr. Jessup as "Johnson's Fine Winter," owing to the fact that it was found first on the grounds of Mr. Johnson near the banks of the Codorus. The tree grew along the highway and it was noticed that market-men as they passed by, and school children got most of the fruit; there did not seem to be much appreciation of it by the owner. Mr. Jessup undertook to cultivate it, and introduced it as "Johnson's Fine Winter." The trees could not be sold, and to get rid of them Mr. Jessup took them out to a gully along the highway leading from York to Baltimore and strewed them there. Then the shrewd, economical Pennsylvania Dutchmen picked them up and planted them. Mr. Jessup said: "They will not plant anything else; I'm glad they will plant these." That is why the county of York is the home, and the great producer of the York Imperial.

Then, I must not forget that fine tenor singer, Mr. Mercereau. He was an Englishman, who came to this country as a member of Madame Seguin's English Opera Troupe; that was before the days when Grand Opera was popular, and the company soon disbanded, and Mr. Mercereau began the cultivation of fruit at Catawissa, where he was very successful, and introduced a very fine strawberry, called after the English statesman, Gladstone.

If I had time, I could talk to you for a long time of the older members of this society. Younger members, you have before you the example of some of the finest and most noble men, and I want to say to you that I have never known fruit growers to be anything but honorable, honest, upright men, from Maine to California, and from Washington to the Mississippi Valley. I have never known one of them to do a mean, contemptible, dishonorable thing. (Applause). Keep on; be courageous, be honest, be energetic, be industrious, be honorable, be just, and don't be afraid of work. Work is a blessing that God has conferred upon us. Work is not a curse. There was no curse imposed on us for the sins of our first parents. Man was not cursed. The Bible says "cursed is the earth"—not man—but "cursed is the earth, for thy sake."

I leave you with the promise that I hope to see you ten years hence, when some of you younger men shall have gray hair, with the thought, and with the prayer:

*When comes the evening tide,
When Life's Saturday is gone,
We'll cast our working dress aside
And put our Sabbath garments on.*

Mr. Good.—I am acquainted with the gentleman who has just spoken for a number of years, and was very much interested in his

talk—particularly in his personal talk, and his reference to the per-simmon. I wonder whether he is responsible for the "simmons beer" that was used as a 'possum chaser for the 'possum and "sweet 'taters" that they have been feasting Mr. Taft on down there in the South?

The President.—We have with us one of our older members and former presidents, Mr. Howard A. Chase, from whom we shall be glad to hear at this point.

Mr. Chase.—I appreciate this invitation to speak to you to-night. Mr. Heiges has referred to many of our older members. I should like to refer briefly to a few more who were leaders with us, but now meet with us no more,—such men as Thomas Meehan, William Parry and one or two others. These men met with us at Williamsport; it was a meeting long to be remembered. These men, men rich in experience, rich in thought, made our meetings both pleasant and profitable. Year after year it was my privilege to meet with them and with others whose names I cannot now recall, at the various meetings throughout the State. Much have I learned, much have I yet to learn in horticultural matters, but when I look here to-night at this fine display of fruit, I think you will agree with me that it is not a matter of great surprise that at the Paris Exhibition the fruit grown in Pennsylvania won the first prize for excellence, for some forty-six varieties exhibited and what was done there, is done here. While in point of size, perhaps, or beauty of finish, our apples cannot reach the standard of those raised on the Pacific coast, when it comes to quality, our Pennsylvania apples are far superior to them. But, gentlemen, this is the material side of our work. No man on this floor here realizes more than I do the importance of Pennsylvania's being and becoming one of the great fruit growing states of the Union.

But, gentlemen, let us consider for a moment the ornamental side of our work. I realize that, working as we do, and keeping at it daily, we have an excuse for not paying more attention to the ornamental side, but let us pay a little more attention to our yards, and our lawns. We need not purchase expensive shrubs. Right here in Pennsylvania, out in our woods, and on our hillsides, we can find as fine shrubs and plants as any one could wish, with which to ornament our lawns. So let us consider this feature. Two years ago I went up to the mountains for a few days rest, and during the few days I was there I was busy taking up shrubs in the woods, and carrying them down to the little yard and planting them. To-day people stop and look at that little garden, and ask where these beautiful shrubs came from, and are surprised to learn that they came from the hills around them.

Ladies and gentlemen, when I came here to-night, I did not expect to say a word, but I am glad of this opportunity to say a word about those brother members who have gone; if it were left to me to write the epitaph of every brother who has gone over the "Great Divide," I might truthfully say that he was faithful to his God, to his country, and to his fellow-men.

The President.—Now, Mr. Hale is going to tell us some of the things we are up against. Mr. Hale has learned how to push away most of the things that bother us, and we want to learn how to do it, too.

THINGS WE ARE UP AGAINST.

By J. H. HALE.

Mr. President I did not intend telling stories this evening, but when the good brother complimented Brother Heiges about the per-simmon, and talked about the 'simmons beer, it was rather a dangerous subject for one who has just come up from Georgia. It reminded me of the colored brother addicted to gambling; he was playing his favorite game with some of the other colored gentlemen, and when he found he was losing pretty steadily, he said, "Let's us give up what we has been a doin' and name what is good eatin', and the fellow what names the best gets the pile." The others agreed, and then they started, each one taking a turn, until it came about the fourth man; he said, "Well, dar's 'possum, and dar's sweet 'taters, and dar's watermelon, and dar's 'simmons beer," and then they set up a howl "for sure, dat niggah done named all de good things dar is to eat." So it is with these gentlemen; they have done said all the good things, until there is but little left for me to say.

Yesterday I met a horticultural friend of mine, and I told him they had asked me to come over here and talk about the things we are up against, and I hardly knew what to say; I asked him what was the chief thing the horticulturist was up against, and he said: "He is up against himself more than anything else," and I said, "Amen." I think we are up against ourselves as the most serious proposition to be worked out, and that reminds me of another story. A young bride who had recently been married was congratulated by all her friends on having a model husband. She felt very good over this until she went home and looked in the dictionary for the definition of "model," and found it meant "a small imitation of the real thing," and that is the real proposition. We are up against model orchards.

One of the things that the average orchardist is up against is too many varieties. The old stager who has been through the mill, and then out of it, and the business man who starts out to go through the mill all make this mistake. One of the most successful agricultural teachers I ever knew turned his attention to orcharding the past few years, and against his own knowledge, and the advice of his friends, planted three times as many varieties as he should. In commercial orcharding keep the number of varieties down to a very few of the best for your location.

Another thing we are up against is the advice of our friends. Then the nurseries give us mixed varieties; and there are so many

old favorites that we would like to have that the nursery gets in some very good work, and nine times out of ten, between the advice of your friends, and the wiles of the nurseryman, you plant twice as many varieties as you should.

Then there is another consideration. Nearly always our trees come to us in poor condition, due to cheap packing and bad handling by the railroad company, and then we sit down and write the nurseryman that his trees are bad. Yet no doubt they were first class trees when he shipped them, and yet often reach you all dried up, and with apparently no life. Instead of sitting down and writing to the nurseryman—it will do no good anyway; the next lot will be just as bad—bury the trees in a moist, cool, shady place for a few days, give them the moisture they need, then in a week dig up and plant and tend carefully, and 95 per cent. will probably grow. One of my best pear trees lay root up in the sun for eight or ten days; I buried it for a week, and then took it up and planted it, and there it is standing, as fine a tree as you want to see. So don't worry every time you get a dried-out nursery tree. Don't cuss out the nurseryman too much. Nine times out of ten it will not accomplish your purpose, while intelligent handling will bring results.

Then, we are up against small fields, and unsuitable locations. It pleases me to hear you people laud the high quality of Pennsylvania apples; it is the same thing with Vermont and Michigan, and everywhere else. Each man believes he has the best fruit right there in his native state. That is a good indication; in order to succeed you have got to believe in yourself. In order to succeed best you will probably have to work right near where you were born. There are some good things farther on, sometimes, and when you get there, they are just a little farther on, and a little farther on again, and so you could go on until you land in the Pacific Ocean, but nine times out of ten you will find the best place right within ten miles from where you were born. Of course, you are having a pretty hard time, especially if you take hold of the old farm and try to make something out of it, but you *must* win out if you work hard with your brains and try to fit yourself into your surroundings. I saw an advertisement the other day for a man to undertake the sale of a wonderful patent medicine, warranted to be profitable to the undertaker, and I want to assure you, young men, and old men, widows and old maids, and the whole of you, that if you undertake to follow the ways of this society, it will work along the same lines. It is not all honey, and it is not all vinegar. There is a wonderful lot of pleasure in fruit culture—in finding and overcoming the obstacle in the way. I find successful horticulturists all over America, and they are not the ones who started on Easy Street; they are the men who started out determined to succeed and even under adverse conditions they did succeed; they know there is something in the soil that can be brought out, and they undertake to bring it out, and they succeed, with whatever branch of horticulture they undertake.

There comes the question of "how far apart shall I plant my trees?" I always say that is a local question; one man will tell you so far, and another, another distance, and so on, but to me it resolves itself into a local question. All my life I have been growing

peaches, but lately for the last 10 or 12 years I have been planting apple trees to keep me when I get old and lazy. I am afraid the trouble with most of us is that we get lazy before we get old. I started to plant one peach orchard on light thin land, twelve feet apart, but by some carelessness, we got an eleven foot pole, and before we found it out the trees had been growing two months. It has been discussed by horticulturists, and cussed by drivers who had to drive the teams with plows and harrows through it. A correspondent in Canada who had heard of this close planting, finally decided he would make a visit to the States, don't you know, for the purpose of seeing this orchard; he told me he had followed my example, only had gone farther and planted his apples 32 ft. apart, and then between them he had planted the peaches 16 ft. apart, and between the peaches, plums 8 ft. by 8 ft., and then he said, "What do you think about it?" I said, "I think you are a damn fool." "W-what?" he said, horrified; "why, I made a trip to the States, don't you know, for the purpose of seeing you and Prof. Bailey, don't you know"—Bailey of Cornell; in view of what he said to the Englishman, I think he is a pretty good fellow. From my place the Englishman went up to see Prof. Bailey, and he told him the same thing about close planting that he had told me, and that I had said he was a damn fool; "Now, what do you think of that?" he asked Prof. Bailey. Bailey said, "Why, Hale is generally right." Now, of course, you can understand why I love Bailey. It took that blessed Englishman a year to get that through his head, and then he saw the point and laughed, and wrote me a jolly good letter and I suppose he is laughing yet. These interplanting problems cannot be worked out in any scientific manner, by theory; it means just plain every day hard work, observation, and adapting yourselves largely to local conditions, varieties, etc., which reminds me of the story of the two scientific gentlemen who went hunting one summer in the Rocky Mountains, camping out; finally one night they came upon the shack of a hunter, who agreed to take them in for the night, and give them something to eat. In the corner of the one room there stood a large stove, standing about 8 ft. from the bottom on stakes. The hunter was out, and the two scientific gentlemen began to discuss the reason for putting the stove up in that manner; one of them finally came to the scientific conclusion that it was put up so high, because heat always rose first and the quicker he could get it up there at the ceiling, the quicker it would naturally fall again, and distribute itself through the room and so get most heat at least cost. The other had another scientific explanation, equally plausible, and each thinking he was right, they made a wager on the subject. They decided to ask the hunter, so when he came in, they said to him, "you have a nice warm room here, but now tell us, why do you set your stove up that way?" "Oh," he said, "I put it up that way because I lost a piece of pipe when I crossed the river, and had to put it up that way or not at all." That is just the way with the orchard; theory and practice do not always agree. I was glad to hear the report of that Professor—by the way you have so many professors here that I am beginning to wonder whether you have any real, everyday practical men—I mean orchardists—that he had from different sections of the state, showing a tendency

to thin out the apples, when half grown, just as we do peaches and plums to secure better fruit. That shows decided progress over five or ten years ago. But we must be making progress all the time. We are spreading out more in all orchard matters, and we must keep up with our progress by improved methods in every branch of our work.

Here comes the question, how shall we get the heads of the old trees down where we can properly spray and thin the fruit? That is the question, how to cut the old high headed trees down so we can get at them and how to spray so as to get the best results. Matters of this kind were not discussed ten years ago, but we will have to do it from now on, and we will do it. Most of the old trees stand twenty, thirty, forty feet in the air, and at least one-half the top must come off. A few of the nurserymen are beginning to adopt the method of lower headed nursery trees, following the hints from the growers who will have them. If you cannot get the lower headed trees from your nurserymen, get yearling whips, and make your head where you want it. We cannot any longer afford to climb ladders to get our fruit. For the outside of the tree a short ladder may be used, but the best way is to try and grow our orchards so low headed that we can do away with ladders altogether. I have in Georgia considerable of a peach orchard; it covers a thousand acres, and we sometimes gather more than two hundred carloads in five weeks, and nary a step-ladder, or any other kind of a ladder have we used in that orchard, and I don't propose to use any in my orchard in Connecticut.

Then comes pruning. The gentleman this afternoon spoke of turning up the roots of the trees, by plowing, but made a discrimination between the peach and the apple. That is just the point: there must be some discrimination between pruning and the old promiscuous slashing, once in four or five years will not do for the modern orchard. A little bit at a time, is the way to prune. There is no hard and fast rule but the way that will let the sunlight and air in is the best way. I use a good many Italians on my place in Connecticut. They are natural tree pruners, and once I give them an idea of what is wanted I get good results.

The question of culture comes next. Now, the question is a very important one, whether culture of the mind of the orchardist, or the land in which his orchard is planted. We want thorough preparation before planting. We must not only have good top plowing, but we must have a sub-soiling if it is anything except gravelly or light sand. We want as thorough preparation of land for the new orchard as we want for the garden, and when the trees are once growing, we want thorough cultivation early in the spring of each and every year. That is where we often fall down. Most farmers have so much else to do in the spring that the orchard must often wait until the last. We lose a great deal of the very best wood growth by neglecting early culture. We in Connecticut are about the same latitude as you in Pennsylvania—probably a little farther North, but if I can have only one good cultivation in a season, I want that from the middle of April to the middle of May. I used to talk a great deal about keeping orchards clean in fruiting time, but I would rather see the orchard clean during the first

growing month of spring than during the last two or three months of the season. If possible, by all means cultivate frequently the first three spring months with a cover crop on the land through late summer and fall. The question of what manner of culture must depend largely upon the soil, the trees, and your own opportunity; the implements do not so much matter; anything that will keep the land well broken up will do, particularly during the early part of the season, though of course the best modern implements are to be preferred. So many of us grow cover crops of crimson clover—one of your advantages with it here in Pennsylvania is that it often winter kills. If it continues to grow, and comes up nice in the spring, you are tempted to leave it for another week, and then it looks good again, and you decide to leave it for another week, and then it begins to bloom and it looks so pretty that you want to get your wife or your sweetheart out to see it, and she admires it so that she has two or three friends to whom she wants to show it, and so you have it pumping the moisture out of the land. Never mind what happens in the spring; you want to get cultivation early, and a cover crop put on in August if possible, and anything that tends to interfere with your early cultivation in the spring is a temptation of the devil. Early cultivation is necessary for a good, vigorous growth of the orchard.

Now, about the feeding of your orchards. It has been discussed here this afternoon, and the papers have discussed it, but it seems to me that the tree itself will tell the observing orchardist what it needs better than any one else can. The successful orchardist will prune well, and feed well, and cultivate well, in order to bring about the highest degree of fruit development; 30 of nitrogen, 60 of phosphorous, and 100 of potash per acre, is the proportion usually used, but I would say this was just a little bit stingy to your trees. I believe I would pretty near double that if I could borrow the money, and some of you are so good-looking that I would not hesitate to borrow money of you. I have in years gone by borrowed money to buy fertilizers—hundreds and thousands of dollars, because I could not afford not to do so. If you have more trees than you think you can afford to feed liberally, cut down half of them and feed them that are left full rations. Commercial fertilizers produce the best results. We have been talking for some years—especially the scientific fellows—that peach trees did not need nitrogen, but it is well to keep some nitrates on hand, and feed it to your orchards when foliage growth tells you its needed. I would not apply nitrates after July, but during May or June I would watch each individual tree, and any that were not quite as green as I should like I would give a little nitrate. I never buy a mixed fertilizer; the dealer figures that \$10 worth of nitrates, \$10 worth of phosphorous, and \$10 worth of potash, and says three times ten is forty. I do not believe in feeding his pocketbook quite so liberally as that, at the same time I feed my trees all they will take up: 1,200 to 1,500 pounds ground bone, 400 to 500 pounds of muriate of potash, and 200 pounds of nitrate of soda per acre annually, it pays me to use. You want that tree to make a good return to you, so feed it well; don't be stingy with it; and, after all, it is "the other fellow" who pays the bills in the long run. You simply advance it;

and the more you intelligently spend on it, the more you will get back later on.

Another thing we are up against is the San Jose Scale. I got nearly mobbed in Western New York a few years ago for saying that I believed it was a blessing. But I think it has caused many of us to wake up. We were too much in the habit of letting our orchards alone, and it came along, and made us look after our orchards, or lose them. Thousands of orchards got no attention whatever until the time of fruiting came, when they went in to pick the fruit, but the scale made it necessary to give them at least some attention. The little boy upon being asked whether he knew the difference between the quick and the dead, said "Yes; those who got out of the way of the automobiles were the quick; those who didn't were the dead." So it is with the San Jose Scale; if we are not quick to look after it, our trees will be dead; while fighting the scale, which we must or lose our orchards, we have also learned to feed and prune and cultivate our orchards a little better, and they are showing their gratitude for the attention. Thousands of trees died during the earlier years of the scale, but we have become better acquainted with it, and have learned how to control it, so that instead of a curse, it has proven to be a blessing in disguise. It has made us acquainted with our trees, and when you become acquainted with a good thing, you usually learn to love it. When you become better acquainted with people, you love them better. The meanest "critter" you have in your neighborhood—I hope you haven't many of these, but you will find some in almost every other community—has some good traits, if you come to study them, and you must love them for these traits while forgetting all others as much as you can. I had occasion, not so long ago, to drive up the mountain, to see an orchard, so I hitched up old Blossom and started out. Half way up the mountain, we came across the biggest and the meanest looking dog I ever saw; Blossom hesitated, and I didn't like his looks, but there was nothing to do, but to face him; so I urged Blossom on, and said to the dog, "Why, good morning, doggy; this is a pleasant morning for you and me to be taking a trip up the mountain," and that dog looked brighter and better for the kind word. I don't know how much better he really was, but he looked better just for those few kind words. I like good and sweet things—most men do—men, women, dogs, flowers, anything that is good and true, and its all about if we but open our eyes. So in this matter of the San Jose Scale; it forces us to inspect every individual tree, and become acquainted with it, and as we become acquainted with it, we become attached to it and want to care for and improve it in every way possible. Any spray that we use to kill scale, either lime and sulphur, or anything else, but especially with the lime and sulphur, we also get rid of the fungous growths, and get better and more healthful trees, so the scale is a benefit to us after all, and if we don't profit by it, I hope we will get something—shall I say worse?—no, better than the San Jose Scale to stimulate us to do our full duty by our trees. Of course, we have the codling moth and the other moths and growths, but in fighting the scale, you fight them, too and to see their effects, you have to go to market and see the fruit offered there. We go to market, and see some re-

markable fruit offered there and then we go home, and look over our own fruit to see whether it is as good as it ought to be. The unnameable apple that we spoke of this afternoon sells because it looks well, and shows up beautifully. The people of this country are becoming more and more inclined to buy beautiful things. They are beginning to go to market with a few dollars to buy their supplies and to set aside ten cents or a quarter of that for something wherewith to decorate their tables, and feed their sense of beauty, and they are finding that they get the same benefit from \$1.75 worth of food, and 25 cents worth of beautiful fruits and flowers as they would get from \$2 worth of "grub." Now, beautiful fruits on the table are just as attractive as beautiful flowers, and if our fruit growers will just realize that if they grow beautiful as well as good fruits they will not only send actual food into the homes of the consumers, but something that will appeal to their sense of the beautiful as well.

Then we have the trouble of winter and spring freezings following warm weather; you can overcome that in a measure by selecting your hillsides and hill tops for your orchards, where the temperature is from five to eight degrees higher than it is in the lowlands in times of greatest drop in temperature. This question of extreme frost is one of the most serious things we are up against. These frosts come upon us from year to year, often at the time the buds are pretty well swollen, and often do serious damage. Those of you who have a hillside orchard are more fortunately situated with regard to frost than those whose orchards are down in the valley. For the man in the valley, the best thing he can do is to see that his tree is in a good, healthy condition, protected by a good, healthy cover crop; it will stand more freezing than where ground is not covered. The cover crop will help to keep back the buds, and in this way be some slight protection against freezing. The question of spring frosts at blooming time is to my mind one of the most serious general propositions we are up against in the central states in latitude of Pennsylvania and a little South, and the worst of it is, we have it regularly. Like the widower who was about to be married the fourth time to a widow and sent word to his friends to come to the wedding, it was not going to be an amateur performance, this spring frost matter is not an amateur performance but a regular thing; it comes with distressing regularity, and the only thing we can do to guard against it is to select our location very carefully, propagate good, healthy wood, spray, cultivate and use cover crops. A singular thing about it is, that it may freeze all the trees in your orchard, while half a mile up or down the road your neighbors' orchard remains unscathed. I have known this to happen in my own immediate neighborhood, 50 feet extra elevation often saving the crop.

Then, we have the question of proper thinning. We can add greatly to the production of finer fruit by thinning at the right time. This can be done by a certain amount of pruning at the proper time. I have a friend who grows only one quarter acre of plum trees, but he thins them, and he gets more from his quarter acre than the average man gets from his whole acre; he gets at least fifty per cent. more fruit from his trees than his neighbors do, and it is of much

greater size and beauty. I know a man who has half an acre of strawberries, which are regularly thinned, and makes money by the thinning. We will all get up to these things by and by, and make money by so doing. The orchardist who grows apples and plums and pears and peaches and does not thin them is making just as much of a mistake as the man who does not till his land every year. Thinning has as much to do with fine fruit as spraying has. That is why I rejoiced when I heard your chairman of the General Fruit Committee report eight or ten of his correspondents advocate thinning their apples. I have heard men say, "It costs too much;" it does cost something, but you are simply advancing the money, and will get it all back in the higher prices you can get for your improved fruit. Beginning early in the summer, the same as with your spraying, thin out your apples and peaches, and the result will surprise you. In time, this will be the general practice, but we must educate the orchardist up to it. It is like the man who saw in the paper an advertisement to send a dollar and learn how to cure his horse from slobbering. He sent the dollar, and got back the advice, "Teach him to spit." That is education of a kind at least. The fruit grower must be educated up to his fruit; he is slobbering all over the market with fruit that is not up to the standard of what it should be because he does not do the things he must do, and one of these is to thin his fruit. He thins for good peaches now, and in 10 years from now he will be thinning his other fruit, or be beaten in the market by those who do. Those of you who thin your apples, raise your hands (two hands raised). Perhaps next year there will be at least three. Now then, how many of you thin your peaches? Raise your hands. Ah! that's better; I see quite a number of hands up. You have been more used to thinning peaches, but this idea of thinning apples is a comparatively new one. Now, another question. We pick our tomatoes as they get ripe; how many of you pick your apples the same way? Our peaches are picked as they ripen, but how about our apples? How many of you pick your apples at two or more picks when they get ripe, and how many of you pick your apples when they are matured? Raise your hands. I see five hands up. How many times do you pick them? Three—four—five—sometimes half a dozen times. That's good. I have seen in Western New York the wonderful apple orchards you have all heard about, but they don't pick the Baldwin's until one-fourth or more of them are on the ground. And then they pick the matured ones and the immature ones all at once.

Now, as to apple packing. In New York yesterday I heard a consumer ask the dealer whether the apples in a certain barrel were the same all the way through; on the top they looked fine. The dealer declared he would guarantee nothing except what was on the top; he said, "I don't know whether they are good apples, bad apples, or any kind of apples; all I can guarantee is what I see on the top." We will have to change our way of packing apples, as well as of picking apples; we will have to pick them as they mature, and then grade them and pack them uniformly and when we have secured the confidence of the dealer in our method of doing this, there will be no trouble about the price. We have got to get over this idea of picking up our mature and immature apples all at once.

and shipping them in the market without uniformity. They should be properly graded, and packed in such a way as to attract attention, with not a single specked or unattractive apple among them. Of course, I am speaking now of gilt edge fruit. Make the consumer want your product, and he will pay for it. You are, if it costs extra to do all these things, just remember, you are simply advancing the money it takes to do it. The consumer will gladly pay the whole bill and a good big profit on top.

We used to take the best fruit and put it on the top, but the business proposition has changed, and we have got to have the same kind of fruit all the way through each and every package. You don't suppose that this beautiful fruit that comes from the West looks the same here as it does when it comes from the tree? Not a bit of it. They were careful to select it, shipping only the perfect specimens, and to wrap every single specimen by hand very carefully. Most of this work is done by women—that is, the wrapping. And by the way, if you want honest and careful grading, take women and girls to do this work. Let the men do the heavy work—picking, rolling the barrels, handling boxes and baskets, and taking them to market, but when it comes to grading let the women do it. They are more honest than the men, and they have a quicker eye, and a quicker perception. I don't know that they deserve any credit for that; they were simply made so, and cannot help it; they can't be otherwise, and I'm glad of it. If you live near enough to the market to do so, and can haul the fruit to market; your fruit will fare better. If you cannot do this, and must depend on the express companies, you will find that even your best fruit is likely to suffer at their hands. In shipping by express we are up against a serious proposition. They are in position to do as they please in regard to handling and promptness, and the fruit growers are simply at their mercy. Whether this organization, and the other organizations combined can bring any pressure to bear on them, I don't know, but it is a serious, serious proposition. We have found it not only cheaper, but safer to ship by freight whenever possible. If you can get enough fruit together to take a car you will have a better chance to get your fruit into market in better time and condition than any other way, and the cost will be considerably less.

I used to think that we had a pretty serious proposition in the commission man; that he was simply trying to take advantage of the fruit grower but a better acquaintance with the men in this line of business has convinced me that the average commission man is a little squarer man than the average fruit grower. That is, of course, in my own state, and some others. Here in Pennsylvania it may be different. You are all honest and square, and it is the commission men and the express companies that do the juggling. But the commission man has to work just as hard for his living as you and I have to. Look up your commission man, get acquainted with him, and get him to come up to your orchard, show him your way of handling fruit, show him that you are doing honest and careful grading, that you are reliable, and he will go back, and begin to advertise your fruit. When you begin to pick your fruit, ask him to send down a man to see how you pick it, and how you pack it for him, and he will go back and get a little more money out of that

fruit for himself and for you too. If you are doing business on a large enough scale, get a good newspaper reporter out to your orchard, if you have to pay his railroad fare or carriage hire, or anything else. Get him to believe in you, get him to believe in your trees, and it will pay: there is always a good story to be had out of a good crop of fruit. You may convert your commission man and retail fruit dealer from a good many of his unsatisfactory ways of fruit handling and selling, if you show him you are trying to do better. We must use the commission man in a good many ways, and more and more through him, reach the consumer. It must be done by honest packing, a high quality of fruit, making it just a little bit better in the middle, if possible, than it is on the top; then put on your own labels, telling just what it is, and who grew it, and get the consumers out to your orchard; give them a taste of your fruit, and sell them a lot more for double what it is worth, and it will pay you. I could tell you of some large orchardists to-day, who are selling direct to the consumer, sometimes two and even three hundred miles away, once they get their acquaintance, and get their faith. It is very profitable, indeed, once you get their faith, and get into this business of direct family trade through high quality and honest pack of your fruit.

The next thing the peach grower is up against is the Yellows. That is something we are likely always to have with us. The first indication of it to most observers is when they begin to see a little pennyroyal like sprouts on trunk or main branches, and a little hectic blush or red spots on the fruit, with red thread like lines running through the flesh. We are up against not knowing what the Yellows is two or three years before it first shows itself in this way, and by that time it has reached serious proportions. At the first sign of it, take that tree out of the orchard; if it is on a Sunday morning, don't begin to leave it over Sunday. Pull it out then and there; if it is on a Sunday morning, get out and burn it before you go to church, even if you don't get to church that day. No matter whether you discover it in July or in September, take it out, and take it out at once. I speak thus feelingly, because I grow peaches more than any other fruit, and I have struggled against this dread Yellows and in some small degree overcome it. I told you that the nigger is a born gambler. We have three or four hundred of them on my place down in Georgia, and we have to have watchmen night and day. So when we catch one in any offense not altogether in the nature of a crime, we hold a court of our own on the place. I am usually the judge, and the superintendent is the prosecuting attorney, or he is the judge, and I am the prosecutor. We do this to save these poor fellows from being taken to court and delivered to the rigors of the law; down there they are pretty hard on the nigger, on principle. Well, on one such an occasion, I was acting as judge in the case of a colored brother who had been caught gambling; the superintendent was the prosecutor, and he made out his case. After he got through, I began to question the darky, but could not get much satisfaction out of him, then one of the older niggers came to me and said "Cap'n, I'se a good deal older nigger than you is, and I don't think you are going the right way to get the truth; you'se questioning the nigger what's got the money; if you'se

wants the truth, ask the follow what loses." And my experience has always been that you get nothing out of the nigger what wins; to get at the bottom of a thing you must ask the nigger what loses: so it is with the Yellows: I'm the nigger what loses, and I know there is no salvation unless you discover it and root it out two or three years earlier than you generally do.

In eradicating the Brown Rot, the self-boiled lime and sulphur wash, two or three sprayings of it in summer will pretty nearly control it. Certain varieties seem to invite it more than others. Take the Carmen peach, for instance; it is hardy in bud, delicious, of high quality, and a prolific bearer, but we find it seems more liable to this rot than most of the other varieties. Where an orchard has become infected with this Brown Rot, you must be prepared to fight it by burning all rotten peaches. Leave no mummies on the tree. Spray with lime and sulphur when dormant and with self-boiled later.

You think you are up against it in your peach planting here because of the competition of southern peaches, and so you are, but do not be discouraged; this competition is no more to be feared than the Rocky Mountain apples in competition with your apples. The southern peaches are beautiful in appearance, but they do not have the high quality and delicious flavor that your eastern Pennsylvania peaches have—or your eastern apples. You have the advantage of that high quality here in Pennsylvania, and in addition to that, you have the advantage of close proximity to some of the leading markets. These western people have to ship three thousand miles in order to reach our markets. Land out there sells at a thousand dollars an acre because of this craze for fruit growing. Here in Pennsylvania just as good fruit growing land is held at a much more reasonable figure. If you grow the right kind of apples and peaches and put them on the market in the right way, you will need to fear nothing from this western and southern competition.

I had some notes here about shipping packages, precooling, etc., but my time is about up. I thank you for your attention. If you have any questions to ask, I shall be glad to answer them, but I doubt whether you want any more to-night.

The President.—Are there any questions? If so, Mr. Hale will be glad to answer them.

Prof. Surface.—How high do you head your apple trees?

Mr. Hale.—I have about 15,000 trees that are headed from 15 to 18 inches high.

A Member.—How far North are you?

Mr. Hale.—Latitude 40 to 41.

A Member.—How do you detect the Yellows three years before it is generally discovered?

Mr. Hale.—I should have to take you to the orchard, but the first indications I have found are generally in the thick setting of the leaves up in the tops. I have seen the leaves eight inches long and two inches wide, set not more than half an inch apart on a rapidly growing central branch.

A Member.—How deep would you have the cultivation?

Mr. Hale.—Three, four or five inches; rather five inches than anything else.

Prof. Surface.—What implement do you cultivate with?

Mr. Hale.—Every implement of soil torture that I have ever heard of—plows, spring tooth harrows, disc harrows—everything I have ever heard of. I have some rocky land where the stones are very thick and we use everything we have ever heard of—anything that will loosen up the soil.

A Member.—What next?

Mr. Hale.—Oh, well, we get a slow-going pair of horses, and go over it with a sharp plow, lengthwise, and crosswise, and contrariwise—any way we can get around those stones; if you were to come there you would probably want to know where the land was; you would not see anything but stones.

A Member.—What varieties of winter apples is it possible to raise in your section?

Mr. Hale.—Oh, well, there is the Baldwin, the Rhode Island Greening, the Rome Beauty, the Jonathan—they are all winter apples.

Prof. Watts.—Are you including the Rome Beauty in your list of high quality apples?

Mr. Hale.—It is very much better with us than here in Pennsylvania.

Mr. Eldon.—How do you get your Italians, and how do you like them?

Mr. Hale.—They are mostly from the North of Italy, and love the land and love to work in it. Once get one good man, and you will soon have a lot of others. I always have more than I can use. Most of our men spend the winter in New York as waiters at hotels. I believe if you went to New York to-day you would find some of our men waiting on you at the Waldorf-Castoria, or some other joint.

Mr. Eldon.—What do you have to pay for that class of labor?

Mr. Hale.—A dollar and forty cents a day, and a house to live in. Men with families have a house, while the rest live in a barracks. There is a good big garden on the place, and the men seem to take delight in working it; it looks like a veritable flower garden.

Prof. Surface.—Do you have a cover crop for the peach trees, and cultivate the same as for apples?

Mr. Hale.—Yes.

Mr. Engle.—Do you cultivate for young apples the same as for old?

Mr. Hale.—No.

Mr. Good.—You spoke about having weeds for a cover crop; do you allow them to go to seed?

Mr. Hale.—Yes; I love weeds. There are a great many people in my country so lazy that they would not cultivate their crops if it were not for the weeds. I would rather have weeds than no cover crop at all.

Prof. Surface.—What about peaches as a filler for apples?

Mr. Hale.—As a theory it is all right, and I have one orchard where for twelve years I have had peach as a filler, and they have paid for themselves and a fine house and barn on the land, so I have a fine apple orchard that will not cost me a cent. When the peaches are out of the way, I shall probably change the method of cultivation somewhat.

A Member.—How far are your trees apart?

Mr. Hale.—The apple 36 ft., and 18 ft. for the peach trees.

Prof. Surface.—How long do you carry the peach trees?

Mr. Hale.—Fifteen or sixteen years—just as long as they bear well.

Prof. Surface.—Do the apple trees suffer?

Mr. Hale.—Yes; but the peaches furnish the money to pay for that suffering.

A Member.—Don't you break your plows in going over those stones?

Mr. Hale.—Oh, yes; but we have some factories in Connecticut which make sharp knives and plows, and we must patronize them and keep them busy.

Prof. Surface.—How long do you keep your peach trees profitable?

Mr. Hale.—Just as long as they live. I have never known a tree that was so old as not to be profitable. Some of the best bearers I have ever had are trees eighteen and twenty years old. I don't believe that any tree, peach or apple, should be cut down as long as it lives and bears well.

Prof. Surface.—I asked that question because at a public meeting some time ago I made the remark that I expected to keep my peach trees alive and profitable until they were twenty-five years old, and I was accused of being visionary and laughed at. I simply wanted to see whether I was not right.

A Member.—When and how do you apply fertilizer?

Mr. Hale.—Usually with broadcast machine and plow it in.

A Member.—On this particularly low-headed tree, how do you get the borer?

Mr. Hale.—I do it by proxy, the Italians get them.

Prof. Surface.—How do you keep those low trees from lying on the ground?

Mr. Hale.—A tree that wants to lie on the ground, we keep shearing and working at it constantly.

Prof. Surface.—What kind of a cover crop do you prefer?

Mr. Hale.—Crimson clover and Cowhorn Turnips.

A Member.—What time do you plant it?

Mr. Hale.—The 5th of August, as nearly as we can.

Prof. Surface.—In Georgia or Connecticut?

Mr. Hale.—Connecticut.

A Member.—What do you do with the turnips?

Mr. Hale.—Oh, just leave them in the ground. Sometimes we use Russian Vetch with them.

Prof. Watts.—What is the idea of using Cowhorn Turnips with the Crimson Clover?

Mr. Hale.—Along the early part of August we often have a damp spell, followed by a very dry spell, and the little clover plants

begin to suffer. Then the turnip makes a shade for the little clover, and in the winter they make a sort of mat for it.

A Member.—How long do you leave it go in the spring before you turn it down?

Mr. Hale.—That depends on the locality, and on the amount of work on hand. About four or five inches I like it best. Some people allow it to come to full bloom, and then plow it, but I do not like too many heads.

A Member.—How do you get in to the low trees to plow?

Mr. Hale.—Well we plow to one side of the tree, and use a chain a little longer than the whiffletree, and then we try the other side, and plow it just any way we can.

A Member.—Do you plow close to the tree?

Mr. Hale.—Oh, yes, but I don't know that it is absolutely necessary; I have known very successful orchardists who merely plowed in the middle of the rows, and then fed the trees well.

Prof. Surface.—How do you plow the soil—in the direction of the tree?

Mr. Hale.—Sometimes towards the tree, sometimes away from it—anyway we can.

A Member.—Don't you think the cover crop causes some rot?

Mr. Hale.—We know that a succession of cow peas causes too much nitrogen, and that causes rot, but in a peach orchard we can grow something else.

A Member.—Don't you have to plow cow peas a number of times?

Mr. Hale.—Oh, yes; and they bob up serenely every time.

A Member.—Do you sow them after corn?

Mr. Hale.—No; it would be too late to grow them, but if you grow clover, and let it grow until May or June, and then turn it over and plant cow peas, and when next fall comes turn them in, that will be all right.

A Member.—Would that be sufficient to give enough nitrogen?

Mr. Hale.—I don't know; you will have to ask the tree about that. You can't tell down here what is going to happen in Glastonbury.

Mr. Good.—What is the idea of the cover crop? It does not prevent the evaporation of the fertilizer.

Mr. Hale.—It is to protect the roots.

Mr. Good.—And cover the land?

Mr. Hale.—I don't want any free land.

A Member.—How do you prevent the land washing on the hillside?

Mr. Hale.—Well, we have a little trouble in that respect. On one sharp hillside, we set in alternate rows, so as to catch any soil that may wash.

A Member.—Is that a peach or an apple orchard?

Mr. Hale.—An apple orchard.

Prof. Watts.—What kind of a spraying machine do you use on the hillside?

Mr. Hale.—A good barrel pump and you will be surprised to learn that in some of my orchards we spray altogether with the knapsack sprayer. This is due to the fact that I employ a great many Italians, and they like best to work as they have been accustomed to do in Italy and I have found that when you let a man work in the way he is used to, he will do a whole lot better work, and do it more cheerfully, than he would otherwise. One of my best men, the foreman of the place, has a little vineyard out on the hill back of his garden, to make his native wine to take the place of the poisonous tea and coffee we use here. He used the knapsack sprayer there, and he figured out that it would be more economical to use it in the orchards, and so I sent over last year and got half a dozen more. Now we spray this hundred and fifty acre orchard of three or four year old trees entirely by knapsack. These Italians are happy in their work, and so do good work: give me a man or woman that is happy in their work.

Prof. Surface.—What do you do for borers?

Mr. Hale.—Dig them out and sit on them.

A Member.—What do you do about the twig borer?

Mr. Hale.—I have no trouble with them at all.

Prof. Surface.—That is because your trees are healthy.

Mr. Hale.—Yes; my trees are all healthy.

A Member.—Do you spray your peach trees in the summer with lime and sulphur?

Mr. Hale.—No; I have never done it myself, but they have been doing it in Georgia and one or two other states the past two years.

Prof. Watts.—The same strength as is usually applied to apple trees?

Mr. Hale.—No; I believe not.

Prof. Surface.—It is a good thing for winter, while the bordeaux is an excellent thing for summer.

Mr. Hale.—Yes, but not so good as the lime and sulphur.

The President.—Gentlemen, you will have time to work the pump on Mr. Hale to-morrow, and in order that some of us may have time to catch our cars for home, it will be necessary to adjourn pretty soon.

I would like to have the Committee on Nominations report as early in the morning as it is convenient to Dr. Mayer.

Dr. Mayer.—I would like to have that committee meet right here in this room immediately after adjournment.

Adjourned until Wednesday morning.

WEDNESDAY MORNING, JANUARY 20, 1909.

Nine o'clock A. M.

President Hiester in the Chair.

The President.—I have here a communication from the Cambria County Horticultural Society, stating that Mr. Abram Hostetler was elected a delegate from that society to the State Horticultural Association; I have also a letter from Mr. Settemeyer stating that the Cambria County Horticultural Society was organized last Saturday with 108 members, 14 of them ladies. Another county heard from; we shall be glad to hear from every county in the State in the same way.

Mr. C. J. Tyson.—I would like to add that at their meeting on Saturday Mr. Hostetler was elected president.

The President.—So much the better; I suppose he is a member of our Association; if he is not, he should become one at this meeting.

Mr. Hostetler.—I just want to say at this time that I became a member of this Association last year.

The President.—The next thing will be unfinished and new business. The Committee on Fruit is not ready to report at this time; we will hear from them this afternoon. We have quite a lot of business, and but little time to get through with it. Is the Committee on Nominations ready to report?

Dr. Mayer.—The Committee on Nominations begs to make the following report:

For President—Gabriel Hiester.

For Vice-Presidents—Hon. W. T. Creasy, F. H. Fassett, R. M. Eldon.

For Recording Secretary—Chester J. Tyson.

For Corresponding Secretary—William P. Brinton.

For Treasurer—Edwin W. Thomas.

The President.—What shall be done with this report?

Mr. McSparran.—Our committee has made excellent nominations; I move that their report be received, the committee dismissed, and the Secretary be instructed to cast the ballot for the officers as nominated.

The motion being seconded, was carried by unanimous vote and the Secretary was instructed to cast the ballot of the Association for the gentlemen as named.

The Secretary.—In accordance with the instructions of the Association, I take pleasure in casting the ballot for the following officers for the coming year: President, Gabriel Hiester; Vice-Presidents, Hon. W. T. Creasy, F. H. Fassett, R. M. Eldon; Recording Secretary, Chester J. Tyson; Corresponding Secretary, William P. Brinton, and Treasurer, Edwin W. Thomas.

Mr. Fox.—In the adoption of this report of the Committee on Nominations, I have noticed that the old officers of 1908 were re-elected, with the exception of one. I know you had a good set of officers during 1908. I know of Mr. Hiester's devotion to the cause of Horticulture, and I think you can all be proud of having a man like Mr. Hiester at the head of the Horticultural Association of Pennsylvania for the coming year. I know all the other officers. Mr. Brinton goes back to the early days of this Association, and Mr. Thomas is one of its old stand-bys.

I regret to notice that one name has been dropped, and I know that name has been dropped at the request of Mr. Engle himself, because he no longer feels able to do this work in connection with the other work he is doing. He has been a faithful worker for many years, and I think he deserves a vote of thanks from this Association. He has been Secretary for many years, with the exception of two years, while he was absent, and your humble servant filled the place. He gave his time and service cheerfully, and I wish to move that a rising vote of thanks be given to Mr. Engle, the retiring Secretary.

This vote was seconded and unanimously carried, and a rising vote of thanks for his faithful services was tendered Mr. Engle.

The President.—I want to assure you, gentlemen, that I appreciate the honor you have done me in re-electing me President, and the confidence you have shown in me. I don't know whether it was wise. I have always tried to merit your confidence, but I don't know whether it was wise to keep a man at the head of the Association until he begins to feel that he owns it—but when I begin to show signs of that, just warn me at once.

I join with my friend, Mr. Fox, in regretting that Mr. Engle has declined re-election. The name of Engle has been associated with this organization for so many years, that it does not look like the old association without the name of Engle to represent it, somewhere. But since he has declined, I am glad to see in his place a young man, who is so well able to do the work, and I am sure that we will go on, and in no wise lose by the change. I am sure that Mr. Tyson will have the support of this association in the future, as Mr. Engle has had it in the past.

Mr. McSparran.—At the meeting last year, at Lancaster, we had a fine exhibit of fruit, and I requested the Association to turn the fruits that were not taken back to the Women's Christian Temperance Union. I want to express to the Association the thanks of these ladies for the fruit turned over to them. I have been told that the habit of eating apples is a counter-irritant to the habit of drinking whiskey, and I am sure we could devote our fruit to no better cause.

The President.—Do you mean that the ladies are to eat the apples? Or are you a member of the Association?

Mr. McSparran.—No; I am not a lady. My wife is a member, and I pay her dues, and in that way, perhaps, become an honorary member. But I am authorized to thank the Association in behalf of these ladies.

Mr. Youngs.—If in order at this time, I would like to say a few words. It occurs to me that it would be a good idea for the society to have a "Field Day," that is, a summer session, when we could get together and review the actual work of the Association. I have attended quite a number of these meetings in New York State, and it strikes me that their pattern is quite worthy of emulation. I would merely throw this out as a suggestion, if the Society cares to adopt it.

The President.—Do you make that as a motion?

Mr. Youngs.—I would prefer the motion to come from some one a little nearer the work of the society than I am, but in order to get the thing started I will make a motion to that effect.

The President.—It seems to me that the principal objection to a summer meeting would be the fact that it would come at a time

when the men actually engaged in growing fruit could not well be away from home for two or three days. If a time could be set for September, or a little later in the season, it would be all right.

Mr. McSparran.—I move that this matter be referred to the Executive Committee.

Mr. Youngs.—I second that motion.

This motion was carried, and the matter referred to the Executive Committee.

Mr. Youngs.—I did not intend this meeting to take the place of the regular meeting. It would be merely a supplementary meeting.

The President.—Our regular annual meeting is fixed by the Constitution.

Is there any further business? If not, the next thing will be to fix the place for our next annual meeting.

Mr. Fassett.—In selecting a place for the next meeting, I extend a cordial invitation to the society to wend their way up to Wyoming County, amongst those hills where we grow the Northern Spy. It has been the practice of the society to revolve just around a little circle here, and to meet with the fruit growers of York, Adams and Lancaster County, or here in Harrisburg. They no doubt offer splendid inducements to the society, but we think we are entitled to a little encouragement from the society. We have the climate and soil to grow good fruit, and we want you to come and meet with us and see what we are doing. Consider this well before you decide to hold the next meeting right down in this mellow pocket. We want you up there at Tunkhannock, Wyoming County.

Mr. Youngs.—While you are getting out of your regular beats, why not go a little farther and come to Erie County? We are not so much growers of the apple, although it is an apple growing country, but every other fruit known to horticulture in this State is grown up there. We have pretty nearly boxed the horticultural compass—grapes, and cherries and plums—and they grow to perfection up there. It occurs to me that you might come up there for your summer meeting. If you would get up say in September, it would not interfere with your business as fruit growers. Our latch string will be out. The 25th of September is the time we usually begin to harvest the Concord grapes, but any time prior to that would be acceptable. The early varieties of grapes will be well ripened, and we could take you through our vineyards, and over pretty nearly the whole Chautauqua field by trolley. In fact, you can go all the way from Buffalo to Chicago by trolley. We would be very glad to have you come over there to see us. Now, we always get more or less one-sided in our views if we do not get away, and I think we are entitled to some of your consideration.

Mr. Snavely.—It has been quite a long series of years since this society has visited our little city of Lebanon. We have a little

city of about twenty thousand inhabitants, and it is fifteen or twenty years since the Association last met with us, and I think the time has come when Lebanon wants another visit from the State Horticultural Association. We can give you a hall about twice as large as this, and if you bring three times as many exhibits we can take care of them. We have good hotels, and our people will be glad to welcome you. I bring this invitation by advice of the Lebanon County Horticultural and Agricultural Society.

Mr. Chase.—I would be delighted to have this Association meet a year hence in old Stroudsburg, that is historic ground, and a rapidly increasing fruit growing district, but I appreciate the fact that it is away off to one side of the State, and inconvenient of access, and expensive to get there. In view of that, I rise to second the motion for Lebanon.

A Member.—I want to emphasize Lebanon as a railroad centre. Then we have a hall four times as large as this, and the last few years our people are just beginning to waken up. There are only a few who really know how to grow fruit, and I think the object of the society should be to help those who really want to be helped, and so, when it comes down to voting, I would ask you to consider helping those who really want to grow fruit, and don't know how.

Mr. McSparran.—The greatest good to the greatest number, should be our aim. As the gentleman from Wyoming has said, the Horticultural Association has revolved around a comparatively small centre ever since its existence: Harrisburg, West Chester, Lebanon, Gettysburg, and Lancaster. The result has been that the membership has been drawn from around this centre. If we go to Wyoming or Erie, we will be going into new districts. Pennsylvania is unfortunate in only one thing—its geography and topography. It is divided by the mountains, and it is almost impossible to get the Western man East, and the Eastern man West. I belong to the Stock Breeders, and when we meet at Harrisburg, we have very few Western men, and when we meet at Pittsburg, we have only a few Eastern men. We should be very glad indeed, to have you come to Lancaster again next year, but I realize that this would not be fair, and I think we should take advantage of these invitations to go into a new centre, and, if possible, increase our membership, and arouse more interest in the Association.

Mr. Knuppenberg.—We have just begun our work in Wyoming County, and also in Bradford. The people up there are just beginning to be instructed in the matter of growing fruit, and fighting the San Jose Scale, and they are asking for more land to grow fruit, and it would seem to me that you gentlemen could do nothing better than to give us a little lift up there. We would extend our most hearty and cordial welcome to you, and invite you to meet with us at Tunkhannock in Wyoming County next year. I, therefore, want to make a motion that the Association hold its next meeting in Tunkhannock.

Mr. Fox.—I do not want to knock Tunkhannock, but I am afraid they have no daily newspapers there, and it is very important that there should be a daily newspaper where we meet. The last time we met at Reading, we had 108 members. I don't know how many you have here. I am not authorized to invite you to come to Reading; I have been away a little while, and I don't know what my standing is in my home society, but I know you would be very welcome. Now, Lebanon has three daily newspapers, and one of the Senatorial districts is made up of Lebanon and part of Lancaster, and I know from what my friend, Mr. H. C. Snavely, has said, that you will be very welcome to come to Lebanon, where they have daily papers, people interested in horticulture, and a room four times as large as this one. You have crowded quarters here, and it is well to take into consideration a desirable room in which to hold the sessions of the Association. I think you would, therefore, be wise in selecting Lebanon as the next meeting place.

Mr. Hostetler.—I represent the newly-born Horticultural Society of Cambria County, and I was instructed to ask you to come over there to us for your next meeting. I need not tell you that we are interested in horticulture, when we had our first meeting on Saturday, and started our Society with 108 members, 14 of whom are ladies. Johnstown is situated in the southwestern part of Pennsylvania, and has a distributing population of about 200,000. Carload after carload from New York and other centres is unloaded there, and from there distributed to this upwards of 200,000 people, which includes all of Cambria and Somerset, and a good portion of Westmoreland and Indiana. Therefore, I would heartily invite you to come to the city of Johnstown. We have three daily papers there, and will promise you all the newspaper advertising you want; and even more—a picture of the president and some of the representative men in the papers.

Prof. Watts.—I only want to say that this invitation has come as a surprise to me, and yet it is not a surprise because I know the interest of those people in horticulture, and their warm welcome to friends. Now, it seems to me that the State Horticultural Association should go to any place with a definite object, and one of its objects should be to increase its membership. I am not in favor of meeting in Harrisburg every other year. I think we should meet at Johnstown next year, and the following year in the new Horticultural Building at State College. I'll tell you why we should go to Johnstown; they are just beginning to take an interest in the work of the Horticultural Association; they grow fine fruit over there, and the people are anxious for encouragement. A young man from there came to me recently, and asked me if I did not think it would be a good thing to organize a Western Pennsylvania Horticultural Association. I told him "no." That instead of organizing such a society, they should become members of the State Horticultural Association, which covers the entire State. That is the reason why I think we should go over to Cambria or up to Wyoming, and to every other part of the State, so as to increase our membership, and our interest in every section, instead of only one little centre.

At Johnstown we have lots of good halls, good hotels, three papers, and best kind of people to welcome us. By all means come to Johnstown; you will do more good there than at any other place, I think.

The President.—It seems to me that the only way to settle this question is to accept all of these invitations, and have a monthly instead of an annual meeting.

I am glad to see this interest, and to receive all these invitations. We have never had so many before, and it pleases me to see the interest. I don't know whether it would be well to settle this now among yourselves, or to turn it over to the Executive Committee to settle, and avoid any dispute that might arise.

Mr. Hale.—Yesterday, when I heard the report of your worthy Treasurer, which showed 113 paid members last year of the great State of Pennsylvania Horticultural Society, I was surprised. It should have been, had you scattered your meetings. In the little State of Connecticut, hardly larger than some of your counties, we organized our State Pomological Society fifteen or twenty years ago; at the first meeting we had between 175 and 200 members, and we decided to visit the fruit growers in every section of the State and hold two or more summer meetings. It got to be three or four live summer meetings right out among the trees and plants, where considerable time was devoted to discussion, and some to little group talks around the tree. We started these meetings, and at every meeting we got an increased membership—more than enough to pay the cost of meeting. So far as the society is concerned, the result is that in our little state we have a membership of 700. I don't make this as a criticism, but you become a local society when you stay right in one locality. Go anywhere you will, and have different meetings. I am inclined to think that in Pennsylvania, with her railroad facilities, it might be well to hold your annual meeting at some central point, and take your summer meetings all over the state.

Emphasis was laid on the newspapers; how many newspapers are represented here to-day?

A Member.—The Secretary gives them a report.

Mr. Hale.—He has other business to attend to besides running after the papers.

The President.—They have the legislators to watch just now.

Mr. Hale.—They probably need it too.

A Member.—I would like to second the motion to meet at Tunkhannock.

Mr. Youngs.—I was over in New York at several of their meetings, and they shamed me when I compared their attendance with ours. Now, as has been said here, it seems to me that we are

going in a rather prescribed area. So far as the 113 members are concerned, if I cannot double that on the Lake Shore, I will make up the difference out of my pocket. We have a larger membership in our local society. Your worthy president knows that we raise fruit over there. I have sixty acres in grapes, and am only small fry when it comes to grapes; I have more orchards in other fruit than in grapes. I have more plums. Two years ago I came over here to talk on brown rot, and curculio, and I am surprised that people have not controlled that yet. We started on that fifteen years ago.

Now, I know it is a long ways over there, but you will find our latch string out over there in Erie County. We have good accommodations there, and it is easy of access. If you cannot come to my own town of North East, I am willing to go to Erie, fifteen miles away. I know it will do you good. We raise gooseberries and currants, besides the grapes and other fruits, and all during the season, Heinz of Pittsburg, has his man on the ground, watching for the best fruit, and selecting it with care. Come to Erie County, and let us show you what we are doing there.

Mr. Creasy.—I have listened to this discussion, and have gotten some new ideas. This idea of a summer meeting out under the trees is a good thing. If we have a summer meeting, I would like to have it at Lebanon, right out under Brother Snavely's trees.

I think it would be a wise thing to turn the whole matter over to the Executive Committee, and let them find out what each place has to offer in the way of railroad facilities, hotels, and other accommodations. Now, I think the railroads might give you some inducement if they find out what you are trying to do.

Mr. Hull.—I think this would be a good plan, and I move that the matter be referred to the Executive Committee.

Mr. Fenstermaker.—I would like to rise and second the motion to go to Lebanon. Mr. Snavely is a host in himself. The place is easy of access, and our membership is right here in this locality.

The President.—Is the motion to refer the matter to the Executive Committee seconded?

This motion being duly seconded, a vote was taken which resulted in a division. A rising vote was then called for, which resulted in the carrying of the motion, and the matter of the place for the next meeting was referred to the Executive Committee.

Mr. Fox.—Who is the Executive Committee?

The President.—The elective officers constitute the Executive Committee. We will now take up Mr. Youngs' talk on Grape Culture.

Mr. Youngs.—Mr. President and Members of the Pennsylvania Horticultural Association. It certainly affords me great pleasure to come here and see you, and to watch the warm interest in

horticulture that is shown in the State of Pennsylvania. It was my privilege to come over here about six years ago, and again two years ago, and now to-day, and each time I find a warmer interest than before and I am glad to see it.

Now, I know I come from a section where my own interests are at present somewhat different from those of most of you gentlemen in the horticultural line. I come from a town which grows the most grapes in the world and that town is in Pennsylvania. I should be glad to have the summer meeting come up there.

THE GRAPE IN PENNSYLVANIA AND MODERN METHODS OF CULTURE.

By L. G. YOUNGS.

Pennsylvania makes no pretensions as a grape growing state, and a few of its people are aware it stands fourth in importance as a producer of the grape. That her acreage can be increased greatly goes without saying, provided care is taken to control black rot, and the fungous diseases grapes are heir to. Our neighboring State of New York has several well defined sections where grapes are grown in a commercial way. The most important of her districts are the Chautauqua and Keuka Lake districts. The Erie district of Pennsylvania is really a part of the Chautauqua district, and my home town of North East is the parent town of the Chautauqua belt, and ships more cars of grapes than any other town in the belt, and more ears than any other in the world.

I have a little leaflet with me. It was issued by our local Business Men's Exchange. It has some information about yields of grapes and other fruits and may interest you.

I will take up now the question of vineyards, suitable soils, air-drainage, etc. These questions I shall discuss from the standpoint of the commercial grower. If I can answer any questions later for the amateur or home grower, I shall be glad to do so.

In planting the grape we prefer a loam or sandy soil, well under drained if any of it is inclined to be wet. Remember the grape, like most fruits, while a modified Baptist, does not believe in total immersion. Vineyards on extreme low lands are more subject to fungous diseases than on uplands, because of poor air drainage, and most of the lands are either clay or peat, which is not an ideal soil for the grape.

In planting the vineyards, land that has been used for some cultivated crop the previous year is to be preferred, and is plowed all the way from 6 to 12 inches in depth according to the whims of the planter, some being advocates of shallow, some of deep plowing; however, fit your ground thoroughly and mark in checks. Now you will find Concord grapes set 8x8 ft., 8x9 ft., 9x9 ft. Of these checks 8x9 ft. is the one now most generally used for the Concord grape. This gives 605 plants to the acre. Delawares and light wooded varieties are usually set closer, using 800 to 1,000 vines to

the acre, but many have the rows the same distance apart, i. e., 9 ft. The distance of 9 ft. is not an arbitrary one, but most of our grape wagons, gang plows and cultivators can be used to better advantage in that width of row.

The checks are now furrowed one way with a double furrow, using a large plow and a man on the beam on the return trip of the team. We are now ready for planting, and for this a root known as a 1 year 1 root is used, and is prepared in this way. You see we have a root left with 7 to 8 inches of root on each side and should remove the loose dirt from our furrow according before we commence planting. A few planters use the whole root, but I do not think as good results are obtained. The tendency when the whole root is used being to bunch the whole root system along under the wire, something to be avoided. A cultivated crop is often grown between the rows the first year, but it is a questionable practice, and I think it is better to cut out the nurse crop and give good cultivation.

The spring after setting, the vine is trimmed back to two buds, and is given thorough cultivation the same as it should have the first summer until last of August.

We now come to the second spring after planting, when if the vines have made a satisfactory growth, they should be again cut back as they were the previous season, and not allowed to fruit, but granting the growth to be good, we are ready for the "staking and wiring" of the vineyard. For this, chestnut posts and stakes are preferred, but any of the lasting woods can be used. Lengths of 8 to 9 feet for posts and stakes are the rule. At the end of each wire a post is used with a brace 10 feet long, and stakes are set to every three or four vines of Concord grapes throughout the row. On these two wires of No. 9 soft wire are strung, the first 30 to 36 inches from the ground, the second usually 24 inches above the first. A few vineyardists have used a third wire, but the practice is now an obsolete one, and I will not further consider it. In stapling, the wires are stapled to the stakes, seldom to the posts, which would be a bother when wires have to be restretched. One or two canes can be brought up from the ground, tied to the bottom wire with twine, and to the top wire of the trellis with No. 20 soft wire.

Some tie to the bottom wire only the first year, but the practice does not commend itself to me, because it is apt to give a lot of dirty grapes. The second year of fruiting more canes are brought up from the neighborhood of the first wire. In thrifty vineyards four and even five canes are sometimes used the second year, but I think three or at most four would be better. The natural tendency of fruit raisers is to overcrop—particularly is this the case with grapes, and too much caution cannot be exercised in the matter. These canes are tied in a fan shape, if the fan system of tying is used. Now while this and the arm system is generally used in our vineyards, quite a few are believers in the Kniffen system, in which as usually practiced with us two canes are carried to the top wire, over and then tied down. Another modification is to carry two canes to the bottom wire and two to the top wire, and tie at right angles to the main vine.

The single post or stake system, while it has much to recommend itself to those who grow for home use, is almost unknown in the Lake Erie belt. Along the Rhine the vineyards are all laid out on this single post system.

In the arm system, the arms are carried along the first wire at right angles to the main vine, and laterals are tied that come from these arms to the top wire for the bearing wood for the next season. This system does away to a great extent with the tying with twine to the lower wire, for after a few years, the arms become quite a permanent fixture, and are only removed when injured, or it becomes necessary to renew them. Now while there are other systems of training the grape, and zealous exponents of them for the commercial grower, those mentioned pretty well cover the subject.

Summer pruning is no longer practiced in our vineyards, but we do some tying of laterals that get in the way of the cultivator. Cultivation should be thorough, at least five, and better, eight times. The first tool used after the brush is removed and the vineyard tilled is the horse shoe. Of these there are several makes. The Morgan now made by the Syracuse Plow Co.; the Buckeye, made by P. P. Mast, Springfield, O., and there are some other candidates for public favor.

In laying by the vineyard the previous year, we prefer to leave it slightly ridged under the wires. The horse hoe is used to remove this ridge, and any fugitive weeds or grass that has strayed in. The horse hoe does not count as a cultivation. Its use is immediately followed by plowing the vineyard with the gang plow, using three or four plows, and plowing to the depth of about three inches. Some plow twice during the season, but most of the growers only once, doing the balance of the work with the lever harrow and a horse cultivator which has disc wheels to guide the tools in the vineyard.

Before the vines are laid by, we turn a light furrow upon them. This covers all exposed roots and leaves us the ridge I spoke of for the horse hoe to remove the next season. The furrow is turned with a light one horse plow, or with the horse hoe blade reversed. Lay by the vineyard July 15 to 25 with a crop of crimson clover, cow horn turnips or something to furnish humus or nitrogen or both.

If I had advocated fertilizing vineyards 15 years ago, some of my neighbors would have thought I was a fit subject for a lunacy commission, so grounded were they in the faith that vineyards did not exhaust fertility, and while vineyards are doubtless less exhaustive than many crops to the land, yet grapes come every year, they are always demanding some element of fertility, and we must husband our resources or eventually have poor vineyards. Starvation rather than neglect is the history of the poor vineyards of our belt, and it is contemporaneous to the Christianity of the Methodist brother who said he had been a member of the Methodist church for fifteen years and it had not cost him a cent. May the Lord have mercy upon this kind of a Christian and this kind of a fruit raiser. We really have no use for them here.

We have found it necessary of late years to supplement the other labor in our vineyards with spraying with bordeaux to control rot, and with arsenate of lead to control the grape berry moth and

the grape root worm (*Fidia Viticidi*). If rot has been in evidence the season before in the vineyard, take no chances. Spray, and if a livid brown spot about one-quarter inch in diameter appears on the young leaf very early in the spring, spray, for this is the danger signal to the grape grower and antedates the appearance of the rot on the fruit. If there is no rot, spraying is often delayed until after blossoming, and arsenate of lead is added to the bordeaux at the rate of six pounds to the 100 gallons to control the berry moth and the root worm.

The root worm, whose habits and life cycle was not very well understood a few years ago, is the fly in our ointment at the present time, but we are not on the ragged edge of anxiety as much as we were. We can successfully fight them, and the matter is up to us.

Our member of Congress, Mr. Bates, succeeded in securing a special appropriation of \$7,000.00 for carrying on this work, and we have had three government specialists studying the habits and life cycle of the pest for a couple of seasons, and with their aid, we are getting pretty well acquainted. The bug is not what the Irishman called one of the "damned foreigners," but is of American origin.

I will next take up the harvesting and marketing of grapes. The harvesting of Concord grapes in our section usually commences about the 25th of September. The picking is mostly done by women; the price varies from one cent to one and one-half cents for an eight-pound basket; for the 40-pound crate three and four cents are paid. One hundred and twenty-five to 175 baskets of eight pounds is a day's work, but some extra swift pickers pick as high as 200 baskets per day. The cost of the eight-pound baskets with cover is about 2 cents each. The cost of the 40 pound crate is 6 cents. Most of the packing is now done in the field. A light stand is used, holding three baskets. When a basket is full, the picker, who is known by a number, places her number on the handle of the basket; also the number of baskets she has picked during the day, and places the basket under the vines out of the way of the gathering wagon. The driver, whose duty it is to keep the pickers supplied with empty baskets, keeps the tally of the baskets he hauls to the field, and also sees that the pickers' count of picked grapes agrees with his when he hauls to the storage house. Both the pickers' and his own count are given each day to the owner or manager of the vineyard, and by him credited.

The grapes remain in the storage house from 24 to 48 hours, when they are covered and hauled to the station, are loaded into refrigerator cars, after being inspected and pronounced satisfactory, and if the weather is warm, are iced with about four tons of ice. A car is loaded with baskets, 10 to 12 high and contains 3,000 to 3,300 baskets. In inspecting a load of grapes, the inspector endeavors to examine some baskets of each picker's packing and if her work is slighted or improperly done, her number leads to detection, and she has to correct the fault in the future or she is discharged.

The bulk of the grapes is sold by the growers themselves, who are organized into an association, with a manager, secretary and board of directors, who retain one-half cent on a basket and \$1.00 per ton on bulk grapes as an expense fund for loading and marketing. If this is more than sufficient for the purpose, the balance is

returned to the grower. The sales of grapes are pooled in periods of three days, each grower receiving the same price that have shipped in that time. All the large associations keep a representative or agent in the principal distributing centers, like Chicago, Pittsburg and New York. If from any cause, the market becomes bad, the agent notifies the home office and shipments cease for a time to that point. If the markets generally become disorganized, word is passed to the growers and picking and loading is suspended until the markets rally.

The manufacture of grapes into jellies, unfermented juice, etc., is becoming quite a factor. We are building such a factory at my home town of North East. The plant has a capital of half a million dollars, and is expected to be one of the largest in the United States. This will materially affect the shipment of grapes from our station, and give us a home market for much of the products of our vineyards.

The trimming of vineyards is mostly done in winter. The brush is removed from the wires and hauled out then or in early spring with a horse hitched by a chain six feet long to a pole 15 feet in length. This does the work very well and better than would seem possible. The brush is burnt, broken stakes replaced, wires tightened in the spring, and the tying is done by women, who are paid from 12½ to 15 cents per hour for their labor.

Women help board themselves in the boarding houses which the growers have built for that purpose and furnished with stoves, tables, chairs, bedsteads and mattresses. The pickers provide their own sheets, quilts and provisions. Butchers, bakers and grocery wagons visit those away from the towns and keep them supplied throughout the season.

We have found it necessary to insist upon certain rules among our help. A fixed rule for retiring is among the most important. There are always some among the girls who will keep late hours, if we allow it, and by disturbing the slumber of the tired ones put your whole force on the "drydock for repairs" the next day. The work is not play, but it is healthy and will perhaps often save a trip to the Hot Springs or Mount Clemens and leave more money in their pockets. We call this the grape cure and are particular to extol its virtues when we are short of help; so you see we are not entirely disinterested in recommending it.

Now in an article of this kind I cannot, for want of time, go into all of the details. Some things I have doubtless left obscure to you. I have only mentioned the two packages that are most used, but, as a matter of fact, nearly all varieties are put up in smaller packages; Delawares and Catawbas in two, three and four pound baskets. Many Niagaras in 20 pound baskets with raised cover. Well, you may determine from the tenor of this article that I am somewhat of an optimist. The fact of the matter is we do not have any pessimists in our section of the country. We think we have almost as much cause for self congratulation as the convivial individual who had been out with some boon companions and had to be carried home at an early hour in the morning. His friends conceived the idea of leaving him in a cemetery they were passing, to sober up and then concealed themselves to await developments.

He finally came back to semi-consciousness with the dawning light and staggering to his feet looked at the memorial tablets and said: "Well, if this isn't the resurrection morn, and I am the first man on the ground."

If a bit of this spirit has crept into this article and if I have said anything I will be sorry for, I am willing to be forgiven. At any rate I am going to extend the olive branch of peace. I am going to invite you to be our guests, the guests of the Horticultural Society to Erie County, which is located at North East, at your next annual meeting. Our invitation is in the hands of your secretary and we hope you will avail yourselves of the opportunity to come and visit us. We will make your stay pleasant and profitable. We will hang our latch strings out. We have abundant hotel room for such of you as we may not be able to induce to come to our homes, and my friend Watts of State College, will be your guide and see that you get back home reasonably sober.

Now we have met as "ships that pass in the night." You have been kind to a stranger from Jericho. I sometimes lose my temper, but never my memory, and in thanking you for your patience and indulgence, I hope I may be allowed to say that I have enjoyed meeting you again very much. I will carry away most pleasant recollections of this meeting. If any of you should become birds of passage through our country, come and see us. We will be blood brothers. This invitation has all seasons for its own. I thank you.

The President.—Are there any questions that you would like to ask Mr. Youngs? If so, he will be glad to answer them.

A Member.—I wish he would explain to us how to prune the currants. I have quite a patch.

Mr. Youngs.—Well, now, that is not so much my business, but we grow a great many currants. We prune back about one-half of the growth, perhaps two-thirds of it. We control the worm with arsenate of lead or Paris Green. Now, with that plant we have practically boxed the compass, and our leader to-day is the President Wilder; for a pure white, we use the White Imperial.

A Member.—I use the Red Cross, and find it very satisfactory.

Mr. Youngs.—The trouble we have with the Red Cross is that the market is not always ready to take our berries, and the President Wilder is in better condition to stay on the bushes awhile than any other, up in our section. They will hang on the bushes for weeks when the others will wither. We send a good many to Pittsburg on the afternoon trains, for sale the next morning. The returns are 'phoned to us about ten o'clock in the morning, so we know the condition of the market from day to day.

A Member.—Do you advise spraying before the crop is in bloom?

Mr. Youngs.—If you are troubled with the rot. I don't believe that in all the grapes we raised, we had any rot last year, and we had 1,070 full cars of grapes go out from North East, besides local shipments. Of course, with our vines in this healthy condition, it is not necessary to spray so much, but in order to control the anthracnose and mildew, which comes on the stems of the fruit we have to use bordeaux sometimes during the season. In order to control rose bugs, we add to our bordeaux six pounds of arsenate of lead to the hundred gallons.

A Member.—How often do you spray?

Mr. Youngs.—That depends on weather conditions. Last year we had an abnormally dry season, and we only sprayed the greater part of our best vines twice. Most of it was done in one spraying. The spraying remained on the vine, and that was all that was necessary to control the worm.

A Member.—Is it safe to spray when the berry is nearly grown?

Mr. Youngs.—I would not do so with arsenate of lead; that is poisonous. We treat with lead right after the blooming time, when the berry is small, and we have never had any injurious effects. It is estimated that in order to get any ill results from spraying, it would be necessary to eat about two tons of fruit at a time. That is the amount of arsenate of lead we would get from these small grapes.

A Member.—At what time does the rot usually affect your crops?

Mr. Youngs.—Well, when we were in the kindergarten class we did not understand rot very well, and we waited until it appeared in the full-grown berry. Now we know that when we see a speck about the size of a pinhead turn black, it is rot, and it is a danger signal. When you first see the small red-brown spots on the leaves, about quarter of an inch in diameter, then it is time to hitch up and spray your grapes.

A Member.—I never had the rot until two years ago, and then it attacked the full grown berry.

Mr. Youngs.—You did not know how to look for it. When you first see the little round reddish spots on the leaves is the time to spray. After a little while you will get so that you can easily detect it.

A Member.—Do you use commercial fertilizer?

Mr. Youngs.—Why, yes: we use quite a lot of it. We like to buy our nitrogen from nature, and so we get crimson clover; if we are not always able to produce enough, owing to natural con-

ditions, we have been using nitrate of soda, about 400 pounds to the acre, putting it on in three applications. You get quicker results this way than any other way. If you need potash, you can get it from the potash sellers.

A Member.—In pruning, how many buds do you leave?

Mr. Youngs.—Well, in a young vine, I would not exceed 25 or 30—probably not over 25 the first year, and in an older vine about 40 or 50 buds is all you want. The tendency is to over-crop.

The President.—This discussion is very interesting, but in order to cover our ground, we will be obliged to pass on to the next subject. Prof. Watts will now speak to us on "Modern Truck Farming."

MODERN TRUCK FARMING.

By R. L. WATTS.

Mr. Chairman, Ladies and Gentlemen:

I consider it a special privilege to address this Association on Vegetable Gardening because I believe the subject has been neglected in the discussions of horticultural societies in the East. The growing of fruits has received the most attention from organized eastern horticulturalists and it is exceedingly gratifying to note the growing interest in market gardening. I feel that the programs for the annual meetings of the great eastern horticultural societies are not complete without several topics devoted to the growing of vegetables in the open ground or under glass.

Some of the eastern states as Maryland, Delaware, New Jersey and Pennsylvania possess unusual advantages for the growing of garden crops. The great fertility of soil and favorable climatic conditions in these states make it possible to grow a full line of vegetables and the easily accessible markets pay the best prices for vegetables of high quality.

Agricultural Experiment Stations are giving more attention than formerly to investigations with vegetables. Unusual interest is being shown by several stations at this time, experiments are being conducted along important lines as companion cropping, the proper use of fertilizers, and the breeding of plants of superior merit. It is believed that our Experiment Stations will in the near future furnish data of great value to growers of all kinds of vegetables.

There are two general classes of vegetable growers. First, those who are growing a great variety of crops on either a large or small scale; and, second, those who are producing special crops on a large or small scale. Growing a variety of crops possesses certain advantages: first, the possibility of following a desirable rotation and, second, it furnishes a variety of vegetables for market at different seasons of the year with less probability of flooding the market with a supply greater than can be disposed of to ad-

vantage. With a variety of crops there is little danger of serious losses from fungous diseases and insects and it is also less difficult to maintain soil fertility than when a special line of cropping is followed. On the other hand, growers who produce special crops are likely to become masters in the business, securing the largest yields and the finest quality. As a rule, the specialist has less difficulty in selling his produce at good prices because he is better known than the general grower. The question whether a man should produce a variety of crops or confine himself to a few vegetables depends largely upon local conditions and facilities for marketing.

The growing of a great variety of crops on a large scale is usually confined to farms within easy reach of large cities. The business is generally satisfactory because the producer deals directly with retailer, jobber or commission merchant and he does not take as great risks as growers who must ship by rail.

One of the best examples of a market gardener and fruit grower producing a variety of crops on a very large scale is Mr. Horace Roberts, of Moorestown, N. J. Mr. Roberts has about 1,000 acres of land, nearly all of which is devoted to the growing of fruits and vegetables. The most unique thing about Mr. Roberts' farming is that his usual practice is to buy run-down farms, plant them in orchards, and by growing vegetables between the fruit trees, pay for the farms from the sale of vegetables during the first two or three years. This businesslike method of farming has for its primary purpose the growing of orchards which are very profitable after reaching a bearing age, and yet, the vegetables grown between the trees are very remunerative regardless of the fruit trees which receive the best kind of care with this system of tillage. Companion cropping is practiced to the fullest extent on these New Jersey farms. A typical plan is to set apple trees with peach trees for fillers. Dwarf peas are generally sown for the first early crop with rows about five feet apart. Later in the spring, after danger of frost, a row of tomato or other vegetable plants is set between the peas. After the last picking of peas, the vines are cultivated into the soil and the land between trees devoted entirely to tomatoes and other crops until late in the summer when a cover crop is started. Crimson clover is the most valuable crop used on Mr. Roberts' farms as well as on most other truck farms in New Jersey. It is ideal, because being a legume, it gathers free nitrogen from the atmosphere and when plowed under furnishes rich organic material to feed crops that may be planted in the future. If tomatoes and other vegetables are harvested too late to give a good start of crimson clover, rye is sown. No land is allowed to lie bare on these farms if it can be avoided.

Another plan commonly practiced on the Roberts' farms is to plant peas followed with beans drilled between the rows of peas and the beans followed with crimson clover. Peas are used most extensively for early spring planting. Two hundred and fifty acres were planted last year, using as inter-tillage crops, tomatoes, cabbage, cucumbers, watermelons, muskmelons, sweet corn and a few other vegetables. The method is satisfactory in every particular and it should be practiced more largely. Another unique plan used is to set strawberries early in the spring in rows five feet apart, the

plants placed two and one-half feet apart in the rows. About the first of June, tomato plants are set in every other space in the middle of the strawberry rows. The plan has been found very satisfactory, giving a heavy crop of tomatoes and the vines of this vegetable do not seem to interfere seriously with the growth of the strawberries, so that a full yield is obtained the following spring. With this plan, peas are also drilled between the strawberries. Most of the produce from the Roberts' farms is hauled on wagons eleven miles to the Philadelphia market.

I wish to mention in this group of truckers, Mr. C. C. Hulsart, Matawan, N. J. Mr. Hulsart is one of the prominent Grange farmers of New Jersey and the most striking thing in his farming is that he is an enthusiast on growing practically all the seed used on his farm. He exercises the greatest care in selecting seed of asparagus, tomatoes, peppers, sweet corn and other vegetables which are being grown for the New York market. He believes that a gardener cannot afford to take chances buying from seedsmen who find it impossible to exercise a close supervision over much of the seed offered to the trade. Growing your own vegetable seeds is a commendable practice, provided it is done with care and intelligence. During the past year, I have met quite a large number of growers who have secured by careful selection some fine strains of vegetables. Many of the vegetables placed on the market as novelties have had their origin on farms of progressive market gardeners. Examples are Earliana tomatoes, Jenny Lind muskmelons and Roberts' watermelons. These two melons originated on the farm of Horace Roberts. Many truckers and market gardeners in Maryland find it desirable to save their own seeds. This work has been conducted to such an extent in some sections that special strains have been developed that are used almost entirely in such localities. It is not possible for the gardener producing a great variety of crops to grow all of his own seeds especially if he is giving attention to vegetables which require certain soil and climatic conditions for the production of the best seed. For example, it seems to be difficult to grow good celery seed in the eastern part of the United States. The most of the seed of the self-blanching varieties comes from France, while seed of late varieties such as Golden Queen and Giant Pascal are mostly grown in California.

One of the most successful and progressive market gardeners in Pennsylvania is M. Garrahan, Luzerne County. He has two sons, R. H. and Ernest, who are just as enthusiastic in their work as their father. A careful study of their business shows that their success is due largely to two factors. First, the use of the best seed that can be procured, and second, the most liberal use of commercial fertilizers and stable manure. Mr. M. Garrahan has been a very careful breeder of vegetable seeds for many years and he has developed a type of Wakefield cabbage which some consider superior to better known strains of this variety. All kinds of seeds which may be grown successfully with existing conditions are produced on the Garrahan farms. There is no stinting on this farm in the use of manure and commercial fertilizer. Manure of the highest quality, containing practically no litter is secured from the stables in the hard coal mines and this fine manure is especially good for green-

house crops and vegetables grown in the open ground which require manure that is free from coarse litter. It is not an unusual thing for these gardeners to apply twenty-five to forty loads of manure per acre. Commercial fertilizer, home mixed, of the highest grade is used most freely. From one to two tons per acre is considered about the right amount on this farm for most crops. An important factor in maintaining soil fertility on the Garrahan farms is the use of crimson clover. An effort is made to have all ground covered with this legume during the winter season. A few years ago when visiting this farm, I found a field so densely covered with crimson clover that a bare spot as large as your hand could not be found in the entire field. The following spring this clover, covered with manure, was plowed down and fertilizer used at the rate of a ton per acre. With such liberal feeding, is it any wonder that yields of potatoes run from three hundred to four hundred bushels on this Luzerne County farm? Numerous examples might be given of other men in various parts of the East who have been highly successful in the growing of a variety of crops on a large scale. The rotation of crops with such farming is a factor which should not be overlooked.

The gardening operations of Hon. R. F. Swartz, Monroe County, are of more than usual interest. Mr. Swartz conceived the idea some years ago of growing vegetables on a large scale and selling at retail to consumers in the summer resort regions in the county. He grows a long list of vegetables which are in demand with summer boarders. With such a line of farming it is important to secure highest quality. This is accomplished by the selection of proper varieties and by growing the crops as rapidly as possible. There is no question about the fact that succulence counts for more than anything else and it cannot be secured unless the growth is rapid. Nitrogenous fertilizers are used extensively. Yields are large and the business as a whole is most satisfactory. Companion cropping is practiced to a considerable extent.

Thousands of farmers throughout the East are growing a variety of crops on a small scale. A large percentage of them live near enough to cities to market by wagon, hauling an assortment of vegetables with other produce as butter, eggs, potatoes and fruits. The vegetables most commonly grown on such farms are cabbage, tomatoes, sweet corn, peas, beans and other vegetables that may be grown successfully with existing conditions. The produce is often sold at retail and profits are necessarily large. It is a desirable form of market gardening for farmers who find it convenient to attend market regularly.

There is another class of vegetable growers generally spoken of as market gardeners who usually operate in close proximity to large cities. We often find such men cultivating vacant lots and an effort is made to perform all work in the most thorough manner. This kind of farming may be found on Long Island and near every large city. The land where such gardening is followed is usually high priced and labor also expensive, but close proximity to the market makes it possible to put his vegetables on the market in the best condition. In nearly all cases the manure can be secured at a minimum cost. With liberal manuring, the land is kept at a high

state of fertility and this makes it possible to intercrop and have one crop follow another in quick succession.

May I call attention to one little farm on Long Island which I visited several years ago. It contains eight acres and gives steady employment to thirteen men during the entire season. One team is kept busy the year round hauling manure from the city. This is applied several inches deep every year, making the soil a great storehouse of plant food and a reservoir of water ready for the crop at all times. The owner of this farm told me that his crops never suffered for want of water. No commercial fertilizer is used on this farm.

Market gardeners following this extensive system intercrop to a great extent. For example, the first sowing in the spring of the year may be lettuce with rows from ten to fourteen inches apart. After the lettuce is cultivated for the last time a row of beets is drilled between the rows of lettuce. The lettuce is soon harvested and then the ground is given over to the beets and after this crop has received its last cultivation, some other crop as carrots or turnips is drilled between the rows. By this system of cropping it is possible to remove from four to six crops during the season and, with proper management, such cropping is very profitable.

Another line of gardening which is popular in many sections is the growing of special crops on a large scale. Examples of this line of gardening is the production of early cabbage in the Norfolk and South Carolina districts and other sections of the South; lettuce and celery growing in Florida; Danish Ballhead cabbage in New York; tomatoes for shipment or canneries in Maryland, Delaware and many other states; onions in Ohio, Michigan, Massachusetts and other states where the crop is grown extensively; celery in the Kalamazoo district; peas in New York; cauliflower on Long Island; and asparagus in New Jersey. There is less worry, perhaps, with this kind of vegetable farming than any other line. The grower attempts to thoroughly master every detail connected with the crop and a few years of experience enables him to select the market which pays the best price. A common practice is for the product to be sold at the railroad siding when there is often the keenest competition of city buyers. Examples of this may be found in Caroline County, Md. A great many general farmers would find this method of cropping profitable. Some men are using land for potatoes when, perhaps, early or late cabbage or tomatoes would be more profitable and the cost of production, perhaps, little greater. With a special line of cropping, rotation should be followed, planting when possible on clover sods. Without rotation, the planting of these crops on a large scale is likely to prove disastrous because of increasing trouble with diseases and insects.

Many growers in all sections of the East find that special cropping on a small scale pays the largest profits. For example, dairy-men whose soils have been built up to a high state of fertility often find that some gardening is very profitable. It may be a few acres of cabbage, cauliflower, onions or other crops which thrive and do their best because of the very rich soil in which they have been planted. I have seen a number of farms where a few acres of special crops have made unusually large profits. Some of these

men possess more than usual skill and by confining their efforts to one or two crops they become thoroughly informed concerning every detail.

A rural mail carrier in Pennsylvania makes large profits from a very small acreage of Danish Ballhead cabbage. He fertilizes liberally, cultivates thoroughly, uses the best seed and sets strong plants. His annual yields are large and the highest prices are secured.

Another example of a grower who secures the largest returns is M. L. Ruetenik, of Cleveland, Ohio. Mr. Ruetenik is a grower of lettuce under glass but cultivates several acres of celery from which gross receipts are usually about \$1,200 per acre. His methods are radically different from those used by most growers. Golden Self-Blanching is sown in the greenhouse about the first of March. Sprayings with bordeaux mixture are made at intervals of ten days until the plants are set in the open ground. The plants are set at intervals of six inches in rows two feet apart. No manure is applied before transplanting. Thorough and frequent tillage is given until the plants are six or seven inches high when manure is used as a top dressing at the rate of forty tons per acre. No further tillage is given the plantation. All water is applied by sprinkling. The method has proved entirely successful.

Hull Brothers, Waymart, Pa., are celery specialists. They plant annually only three acres of land, but returns from this small acreage are larger than from many farms of one hundred acres or more. Two things are especially striking about the farming of Hull Brothers. First, the use of an unusually large amount of commercial fertilizer; second, close planting. Over eight tons of fertilizer were applied this last year on three acres. The fertilizer cost over \$100 per acre. The soil is a black muck, naturally acid, and as commercial fertilizers are used extensively this firm finds it necessary to apply lime to prevent the soil from becoming very sour. Early celery is grown more extensively on this farm than late celery. The rows are three feet apart and plants four to five inches in the row. With such high feeding, Hull Brothers are of the opinion that close planting has little influence on the size of plants. The crop is blanched by means of boards. Blanching begins early in August and is continued until the crop is sold. Twelve inch boards are placed on each side of the rows and held in place by means of strong wire hooks. The boards when not in use are stored carefully to protect from the weather and to prevent warping. When boards are used, about ten days are required to blanch the celery ready for market.

There is no better example of specialized gardening than on the Patapsco Neck, near Baltimore, Md. I attended a Farmers' Institute in this section a few years ago, and had the pleasure of meeting many aggressive growers. They understood all the details connected with the special crops receiving their attention.

I have described various methods employed in market gardening but the fundamental principles are essentially the same in every case. Growers everywhere find it necessary to use modern methods of tillage. Large crops are seldom grown without the use of liberal quantities of fertilizers. The soil must not become depleted in

vegetable matter and, therefore, stable manure and green crops are used extensively in all sections. Good seed must be employed to secure the best results and more attention is being given every year to this important factor.

Methods of marketing are being studied more than ever before. Growers have discovered that the appearance of their produce has more to do in securing good prices than anything else. Every possible effort is being made to place the vegetables on the market in a neat, attractive condition. Greater care is exercised in the selection of packages. Many growers claim that small packages are the best for various reasons. Special means of attracting attention are being employed, such as the use of narrow blue or red tape for bunching asparagus, rhubarb and celery. We have learned that careful handling in the harvesting of vegetables counts for a great deal and that too much care cannot be exercised in grading and sorting. All of these items are important in securing good prices and I believe that the most important lesson to be learned by the average market gardener is the skillful marketing of his vegetables.

If there are any questions I can answer, I shall be glad to do so.

A Member.—What would you do for the maggot which causes so much injury to our cabbages?

Prof. Watts.—It has been suggested that we use small cardboard disks, and slip them over the plants very early. Carbolic acid emulsion has also been used with good effect.

Mr. Youngs.—In the early days of my fruit growing I had to do something for a living, so I raised cabbages. We had the maggot, and we used saltpeter water. It will kill the worm and hasten the growth of the plant. Up in Waterford they grow cabbage very largely, and near Ashtabula, I have seen thirty-five and forty acres of growing lettuce. Ashtabula, of course, is in Ohio, but near enough for us to annex it.

Mr. Hale.—I was deeply interested in the gingery talk of Prof. Watts. That is what the horticultural society of which I have talked, tries to impress upon its members—that the selling end is the profitable end of the crop. The trouble with our fruit growers has been that they never go near the cities, to watch the markets. They stay at home and look after the growing end of the work. What you want to do is to go to the market and meet the men who buy our fruits, and see what they want and what they really are buying, and when you do so you will notice that it is always the attractive looking product that brings the highest prices. A product of high quality loses a good deal of its selling power if it is presented in an unattractive manner, while a product of high quality, presented so as to catch the eye, will catch the purse of the buyer as well. I don't doubt that red ribbon that the professor was talking about was cotton tape, which the grower bought for about half a cent a mile. Right down in the asparagus district of Chicago, near South Water Street, the Michigan shippers send in their product, and I have seen the boxes come in old and dirty, kicked around there for awhile,

and finally find their way back to the owner—regular "old subscriber" boxes, I call them—tied with coarse twine, and showing all over the same sandy soil. Then near them I have seen another lot, in clean, white boxes, with the owner's name stencilled on them, and the asparagus nicely grouped and tied up with a pink ribbon. What was the difference? Why, the "old subscriber" brand sold at 6 cents, while the "best girl" brand sold at 10 cents. There was that asparagus jumping from 6 cents to 10 cents just because the grower had known enough to put it on the market in an attractive manner. I knew neither of these growers, and could only judge them from their boxes, but there was no doubt as to the business sense and judgment of them. It made some trouble to group and tie up this arparagus, but it paid 4 cents more to put the "best girl" brand on the market than it did for the "old subscriber" brand. The marketing end of our produce is the one that needs to be emphasized very strongly to growers.

Mr. Youngs.—Why not use a rubber band in putting up asparagus and rhubarb and celery,—anything of that kind. It looks better than twine, and is quicker.

Prof. Surface.—Some of you may wish to know the details of the carbolic acid emulsion; they are published in the bulletin of the Division of Zoology, I think for April, 1907. We give the results of our experiments, and they are in accordance with what Prof. Watts has said.

Mr. Hostetler.—May I say that I have used that emulsion with considerable success and it has the advantage of being cheap.

The President.—I am sorry that I am obliged to curtail this subject; it is very interesting, but it is necessary to pass on to the next subject—the report of Prof. Surface on Orchard Inspection and Demonstration Work in Pennsylvania.

REPORT ON ORCHARD INSPECTION AND DEMONSTRATION WORK IN PENNSYLVANIA.

PROF. H. A. SURFACE.

Mr. President, Ladies and Gentlemen:

The subject upon which I have been requested to speak is that of the Inspection and Demonstration Work done in Pennsylvania. We have, as you know, instituted an important work in Demonstration Orchards in regard to controlling pests, especially the San Jose Scale. We have seen the need of this, and the matter is an important one to us all. We must all work together to rid our orchards from this pest. We have seen the day when the so-called Professor Amateur and Professor Would-be could tell us what to do, without soiling their hands but that day has passed; we must

all get out and work and soil our hands to fight these pests, and help the other fellow. On the other hand, we have never seen the day when the people demanded scientific information in such a practical manner as they do to-day. They want to be shown how; not left to work it out by themselves according to some other person's theory. I think it would be a good thing to have a demonstration market garden in every county in the State, with Prof. Watts or some of his assistants there, demonstrating it to the people. That was the only way to teach how to control the San Jose Scale—to demonstrate it to the people, and as the result of these demonstrations, I have had the pleasure of seeing thousands and thousands of trees that would have been cut down for firewood saved and produce first class fruit for the owner which sold for thousands of dollars as well.

It is this, then, that the knowledge which the State has been giving out for some time from our State Experiment Station up at State College and by our own Department here, has brought about. Instance after instance, we have, of orchards that have been saved through this work; hence the necessity of demonstration. But before I say anything about demonstration, I wish to say a word about inspection.

The first thing necessary to know, is for a man to know when he has these pests on his premises. Once in a while I receive a letter from a man who says his trees are affected; what shall he do? He might just as well write to a veterinary surgeon and tell him that his stock is sick, what shall he do; without telling him what kind of stock it is, or describing the disease. The first thing you have to do is to learn to recognize the symptoms of the different pests, and then treat each thing in a definite manner. Then, again, some men read the results of experiments, and have trouble in mixing the different ingredients properly, and they do not get the results; or they may not know how to spray thoroughly. So it was decided to organize a course of inspection in this State to be made by a reliable corps of demonstrators under the supervision of the Division of Zoology of the Department of Agriculture. Since inaugurating this inspection we have inspected 4,500,000 apple trees, over 2,500,000 peach trees, and over one-third of a million pear trees, and nearly a million of plum and other trees, making a grand total of over 8,000,000 trees. And some counties we have not entered because we did not have the funds to extend the work. As to value, would you let a man cut down one of your fruit trees for five dollars? No man with even the slightest knowledge of the value of a tree would do that, but taking that low figure as a basis, I will state as my opinion that there are over \$100,000,000 worth of fruit trees in the State of Pennsylvania, to-day, and there is considerable more planting being done. Nurserymen will tell you that five, six, or even ten years ago their sales fell off considerably, but to-day they will tell you, also, that for the past two or three years their sales have been larger than for the six or eight years previous. What does this mean? The people are taking courage. A way has been found to control the scale, and with the scale under control we will soon have as fine orchards as there are to be found anywhere, producing a first class quality of fruit.

In speaking of this work, I should like to show you these pictures. I will leave them here, so that those of you who wish to do so, can look at them at noon. They are pictures of the Demonstration train on the Cumberland Valley Railroad. The Cumberland Valley Railroad placed at our disposal for over three weeks, this train, consisting of a baggage car and passenger car, and from this train we talked to large numbers of farmers showing how the trees were to be treated. You will see how interested the people were, and how they even stood out in the rain for hours to hear us talk, and followed us from place to place in many instances. It simply shows that our fruit growers are in earnest, and that is a hopeful sign. I think, Mr. President, this will be a very good place for me to stop.

WEDNESDAY, JANUARY 20, 1909.

1.30 P. M.

The afternoon session came to order with the President, Mr. Hiester, in the Chair.

The President.—I will now call on Mr. Hale to tell us about "The Clearing, Planting and Culture of Rough Land Orchards."

THE CLEARING, PLANTING AND CULTURE OF ROUGH LAND ORCHARDS.

BY J. H. HALE.

I saw an advertisement in the paper the other day, which read something like this: "Wanted: a man to drive a pair of mules, of a good Christian disposition," and in tackling this rough land problem, you want both men and mules of a good Christian disposition, in order to win out.

I was born and brought up on a Connecticut Valley farm. The land rolled back in the hillsides, and into the rocks and stones, but I never attempted to handle rough land myself until I got into the orchard business some years ago. After I had been in it for some years, I received a letter from a young man, saying he was working in a factory, but wanted to get out into the country; that he loved the land, and loved to watch things grow, and he was positive that if he could get out and get some rough land, and cultivate it, he would win out. I wrote him that if he loved the land, and loved the flowers, and loved the plants and trees, he would win out, but the better the location, the better. Sometime later I heard from him again; he said he had secured the land, and would like to get several thousand young trees, to be paid for by the 1st of July. I did not know the young man,—knew nothing of him except what he wrote—but I liked the way he was going about things, and I decided to let him have the trees. Now, here is the point: On the

24th of June I received a letter from him, asking what on earth he was to do; that he had promised to pay by the 1st of July, and found now he would not be able to do so before the 8th or the 10th of the month. Most men, if they pay any time during the month, think it is all right, but here was this young man, asking what he must do to be saved because he could not meet his obligation on the very day he had said. I wanted to see a man of this kind; he was 65 miles away, but I went, just to see the man. And I was glad I went; he had planted his trees on the roughest land I ever saw, and the rockiest land. No farmer here in Pennsylvania would begin to think of undertaking to plant an orchard in anything like that kind of land. But this young man was hard at work; he was trying to work it in every possible way—sometimes plowing, sometimes grubbing,—cultivating it in every way, and any way he could. It was an eye-opener to me. Here was my opening. I wanted to increase my acreage, and it was practically impossible to get any kind of an orchard down in the valley. And I had before thought my hill lands too rough and rocky. We want the clearest-skinned, and the finest colored peaches and apples, and up there on those hills is the place to produce them. I thought that what this inexperienced man could do, I could, and I really got my first eye-opener to the possibility of planting orchards upon the rocky hills of the northeastern section of the United States, Pennsylvania, New York and New England, after planting largely on rough lands about home and wanting more acreage.

A little later I came upon another question, and that was the selling of our product. I looked up a section of our state where there were some 400,000 people in 5 cities and towns within a 15 mile driving distance of a centre where there was no orchard that could deliver direct. To be able to sell direct to retail dealer or consumer means the greatest profit to the orchardist. But there was no land of easy tillage that I could find that was good orchard land, but there was a hill farm of 100 acres divided into sixteen fields by stone fences; stones in the land by the hundreds of tons to the acre, from a stone as large as a wash tub, down to the size of a water bucket. But the opportunity was there to sell the orchard product if we could produce it. Adjoining these sixteen fields was a brush pasture, 60 acres practically covered with all kinds of trash from six feet high up to 30 or 40 feet. Adjoining this was a larger piece of rocky land, covered mostly with a growth of chestnut timber. This land was put in the tax list at \$5 per acre, and the owner swore it was not worth that. When I wanted to buy it, he asked me \$20. Where he got this difference I don't know—yes, I do; it was because it was not the right sort of land for him but was all right for me. He had no faith in the land, and did not expect to make anything out of it, so he thought he would make something out of me while he had the chance. Well, I bought it, and my orcharding friends thought I had gone crazy. They said, "Why, you can't till that land," but I made up my mind that I would take another lesson from my young mechanic. I went to see him, and I made a deal with him, whereby he was to sell his tract, and come over and take charge of that orchard of mine as a sort of partner and foreman.

The first thing we did was to get rid of the stones from those

walled in 16 fields. Where the land was level, we dug ditches and filled in with stones. Then after we turned the sixteen fields into one, we had to dig out a lot more stones and bring them to the surface; we had so many that there was no surface; it was all stones. Then we broke up the land; in breaking it we broke a good many plows, and a good many wagons, and some of the commandments,—not all of them, but some of them, I will admit.

Well, we got it ready, in a very crude way, and planted our apple trees, thirty-six feet apart each way, and peaches in between, and then we began to grub round the trees and cultivate the trees wherever possible, thinking that possibly we might have to use mulch about the trees on the roughest part of the tract; it looked like a big proposition, as we had no cheap mulching material at hand and if we did mulch it looked as though it might be a breeding place for rabbits and mice, and also borers, which we could not get at. So we finally moved those stones little by little, year by year, as we had time, expecting to break a good many tools as we did it, but the land was rich virgin soil that had never been used. The first year's plowing or rather rude attempt at plowing, did not make any show at all, but year by year we have gone over it. Where we could not reach any soil by plowing straight, in rows, we cultivated diagonally, and cater-cornered and every other way. Where we could not get to the stumps we had to dig, use dynamite and do every other thing that could be done. That, of course, left a lot of rubbish on the land that had to be hauled away. That, of course, was expensive, but we saved the expense of the dynamite and stone and stump cartage out of the fertilizer money. The fertility was there in the land, and we did not have to apply it. Where the dynamite broke up the land, it was well broken up, and we started in to plow it; we used very short and stubby plows, and bought them by the dozen, and the parts by the hundred, all costing a lot of money, but I know it has paid us and paid big in annual fruitage of high class fruit.

Later on in another orchard, I had an Italian partner I will tell you about later. I was estimating the first month the cost of the plow bills. They footed up for that month \$300, and I went out to give him some sort of a "cussing out." I expected him to get down on his knees, but there he stood, with his pleased Italian smile, and when I had finished he said to me, "You no breaka de plow, de man maka de plow he no have de money to buy your apple and peach." And there is your whole proposition. We are all tied up close together. And all must be doing some business if the other fellow is to succeed. No one can go it alone very long.

Now, to return to this rough land; after plowing it in every possible direction, we harrowed it with an oak beam, a harrow to which was attached teeth of Bessemer steel, and we turned the land a little at a time, turning, rolling and tumbling the stones, and no doubt freeing a little of the potash that we are told is contained in the granite. These things we did for 2 years, and then it got into my head to use spring tooth harrows—the roughest sort of an operation; just like going over your heads, here in this crowded hall, except that the stones are harder than your heads. We kept this up, and at every odd time kept on hauling out stones, until we

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feel we have them whipped, and still there are more stones than land show on the surface. We have never attempted to move a stone as small as a man's head. We only pay attention to stones as large as a washing tub or a water bucket, and not much attention to those below the size of a water bucket, because we can get around or over them. Of course, each year we get down into the soil a little farther, and the trees keep right on growing, and at 8 years old the apples are beginning to bear, and I have never seen anything more beautiful than the fruit, which we have received from there for the last 2 years, while the peaches have fruited for 10 years. That orchard has been the laughing stock of my horticultural friends, but the results are coming little by little. If a tree don't grow to suit us, we just grub round it a little more. We keep boosting it, and it comes round. A man said to Pat, "Pat, how about that dog I gave you last year?" Oh, said Pat, "he swallowed the tape measure, and it killed him." "Oh," said the man, "I see; he died by inches." "No," Pat said, "he went back of the house, and he died by the yard." Well, so it is with us finally; we get it first by the yard, then by the tree, and then by the acre. It has been an expensive operation, but on the whole it was a successful one, because I was right there where the people were who wanted the fruit. We got them to come out and see the orchard, and gave them a taste of our nice fruit, and after we got them started we sold it to them; after they were sufficiently attracted, and had admired the beautiful fruit enough and had appreciated its fine flavor enough to ask the price, we told them that we could probably spare a dozen or so one-half bushel baskets for two dollars or two and a half, and they were glad to get them and tote them away without further expense to us. These people paid the bills of the work we had done, and when you don't have to ship away to market, you can make it up so much sooner and easier.

I never lived on "Easy Street," and I never want to, if I can keep my neighbors interested in the game. The peaches in this orchard are now thinning out. We planted this orchard twelve years ago; peaches have recently been stricken with the Yellows and will have to go, and the apple orchard now coming in will have more room and will produce as beautiful fruit as can be produced anywhere in America. Right there where the people have the money to buy, they are ready to pay the bills, and that is a part of my proposition. The rocks and stones on the side hills of this rough land orchard are a protection; there are so many stones there that there is less danger of washing; they simply can't run down hill. I have found it better to till these steep side hills every other row of trees one year, so that every other row gets tilled only every two years. We have used clover and turnip cover crops, although it has given us a great deal of bother; but it has paid us. We have added another farm, making in all about 400 acres that is a beautiful and profitable farm in a section that was a semi-abandoned farm district. It is becoming a stimulus to the entire neighborhood. We set out to do something, and the other fellow has followed. I am satisfied that our rocky lands are those that will give us the highest flavored and most beautiful fruit and the most net profit in the long run.

Then, I wanted to increase my home orchard, and there was no farm to be had except a rocky timbered lot with a road running through it, and another field with an old abandoned apple orchard. By removing the fences and walls we made it into one tract and when we had it cleared we found many chestnut stumps to be blasted out by dynamite. We used the best grade of dynamite that we could buy, and it took large charges to get them out. After going on in this way for a while, I found it would cost me about \$200 an acre to get rid of these stumps, I thought it would be better to plant trees in among the stumps. Adjoining this there was another field in which there was a chestnut grove of perhaps 20 years growth. In the summer time when the trees were in full leaf we went in there and felled the trees in full mass, big and small and otherwise. It was cut down in June and July. Then, one absolutely still day in October we started a fire clear round the 75 acres, and in a few minutes we had the whole in a whirling, burning mass, and in one hour and fifty-five minutes it was practically cleared, except some heavy timbers, and then we found we had stumps, with stones between them. We then surveyed it for apples, 36x36 feet, and while we were planting, digging many of the holes with dynamite on account of stones or stumps where trees ought to go, my Italian foreman came to me and said, "Why you no planta de peach between?" I said, "Oh, I don't know about that, I fear land too rough for tillage." Then Pero said, "I worka for you nine years; you giva me one interest in the orchard, and I planta de peach, and make de peach tree grow like hell." I did so, but Pero's hell is always heaven. When he gets anything into the ground he loves it, and he nurses it and he pets it, and just makes it grow; it can't help it with his attention. I made a contract with him whereby he would plant the peaches in with the apples, every fourth tree to be an apple.

It cost a great deal to take out the stumps in the other field by dynamite, but here we had stumps and stones, and I assure you that the stumps are a great deal more serious proposition than the stones. The stones will give up to the spring tooth harrow, but the stumps will not. The first year we tried to start the growth of trees by grubbing round them, and the second year by plowing round them a very little as we could, and then with the spring tooth harrow, a little in one direction, and then in another way, and every way that we could get in between the stumps and the stones, and then we smoothed down the ground, and plowed it again. It takes about two years to do any plowing equal to one plowing on ordinary farm land, but as long as the trees keep growing, it is all right; and every year that they do not grow so well, we find that a little nitrate of potash or nitrate of soda adds ginger to them, and I doubt now if you will find a better 4-year-old orchard of a hundred and fifty acres anywhere. Some work has been going on each year from April until October, and all the time that has not been taken up with culture—that is, October, November and December, we have been taking out the stones. We have occasionally sacrificed a tree for a dump pile where the cost of hauling away was too great. We work it for the stones, but naturally it makes the trees grow more and more, at the same time. Last year we had a little crop of peaches, selling for about \$4,000, not quite enough to pay for the

year's culture, but nearly so, and in another year we expect it to do so, and then we have the apples coming on, to last much longer than my natural life time.

Now, in these rough land orchards, it is impossible to drive a wagon among many of the trees, so we have to use floats, or as they are generally called, stone-boats, to haul our stones, fertilizers, spray tanks, etc. As I told you yesterday, we have been spraying all except our largest trees, and expect to continue to spray with the Vermorelle Knapsack Sprayer. Our Italians like it best, and after all, it is results we want. We spray more trees at least cost with this powerful little pump than any other, and have recently imported a fresh lot direct from Vermorelle in France.

Mr. Good.—How do you get the fruit from that farm if you can't get under the trees with a wagon?

Mr. Hale.—Make a few special roads for the wagons and "tote" the fruit by hand to these roads.

A Member.—How much nitrogen for each peach tree?

Mr. Hale.—I don't know exactly; I generally tell the boys to take a good handful, and as Pero has a pretty big hand, and a pretty big heart, and is a pretty good all around fellow, there is no danger that the tree will get too little. About half a pound per tree, I should say.

A Member.—Have you the Yellows in that orchard?

Mr. Hale.—This is a new orchard; only 4 years old; we have not had it there; in the earlier orchard that I speak of, we have it. It broke out two years ago, and we lost about one per cent. of our trees; then about 25 to 30 per cent. were damaged, and last year about 40 per cent. developed, and then we began to weed out the entire orchard, which had, however, been planted twelve years ago, and paid very well. Generally we can keep a peach orchard profitably for from 15 to 18 years.

A Member.—What do you spray for? And what do you spray with?

Mr. Hale.—What for? For the San Jose Scale we spray with lime and sulphur, mostly. Two or three years ago we commenced experimenting with making our own soluble oils; we also tried the commercial oils, but the only one we were in any way satisfied with was the Scalecide. Last year we made all our own oils, according to the instructions given by Prof. Jarvis, of our State College Experiment Station, and they gave excellent satisfaction. This year we shall continue to do this in our apple orchard and use lime and sulphur on the peaches. I like the beneficial results to the tree from the use of lime and sulphur, but I think the oil will kill the scale a little easier. You can spray a little more carelessly with the oils, and still get good results because the oil spreads itself to a

certain extent. The lime and sulphur is the best all around spray for scale and fungus troubles combined, but the oils for the scale alone, are just as effective and much easier to apply.

A Member.—What oils do you use?

Mr. Hale.—One of my own make about the same thing that is recommended by our Storrs Experiment Station. The average farmer in a small way is not always successful in mixing these oils himself, and does not get the results he should. And when to be used in moderate way it will be safer and probably as cheap to buy Scalecide.

A Member.—Still you think it is very easy to prepare?

Mr. Hale.—Yes; I find it so.

A Member.—Have you tried the lime and sulphur put up by the Niagara people?

Mr. Hale.—No; I know nothing about that from actual experience; wherever a man is going to use any quantity, it is, however, surely cheaper to make it than to buy it. They can't make it any cheaper than I can, and by making it myself I save their profit and the transportation on a lot of water. I buy my lime by the carload, and my sulphur by the carload, and so get lowest rates. You of this society should combine and buy all your supplies in large lots.

A Member.—We have used several barrels, and the results have been pretty good.

A Member.—At what season do you spray for the San Jose Scale?

Mr. Hale.—If I could spray when I want to, I would spray about two days before blossoming, but with much to do you can't do that. In the South we spray in the fall—finished this season about the 10th to the 12th of December; in Connecticut we generally commence the latter part of February or early in March, or as soon as it gets warm enough so the men can work comfortably.

A Member.—Do you find any bud damage in fall work?

Mr. Hale.—Never have; no, sir.

Mr. Banks.—Can you make it any stronger than it is generally used?

Mr. Hale.—What do you want it any stronger for? We have experimented with that, and find we get just as good results in killing scale from 12 pounds of sulphur, and 13 or 14 of lime to 50 gallons of water, as from anything stronger, so what's the use

of any extra expense it will do no good, neither will it do harm except to your pocket book.

Prof. Surface.—In view of the fact that it can be applied of different strengths, it may be just as well to say that it does not injure the tree in any form.

Did I understand you to say, sir, that the oil can be handled more carelessly?

Mr. Hale.—Yes; the lime and sulphur will stick right where it is put, but the oil will spread round a little more. It is sort of a mechanical operation. You usually will kill more scale with the oil, because you can cover more of the tree, without being quite so particular in the work of spraying. General lack in thoroughness in spray work, is the leading cause of most failure to kill the scale, no matter what the material used.

Prof. Surface.—That is what I wanted to bring out. I wanted it made clear that it is not a difference in strength, but in the method of applying it.

A Member.—Then you are not acquainted with Scalecide?

Mr. Hale.—Yes; I have used it in large quantities in both Georgia and Connecticut. My only objection to it is that it is not cheap enough to be used on a large scale. I have spoken to my friend Pratt about it, but he says he cannot make it any cheaper, and yet that is the one thing to do to bring it into more general use.

Mr. Banks.—We get the best results from 10 of lime and 10 of sulphur.

Mr. Good.—Does the spray give the same results in Connecticut as in Georgia?

Mr. Hale.—Practically, except that my superintendent has felt that it is rather an injury to the peach trees in the South to use lime and sulphur. We applied Scalecide and lime and sulphur, and got the poorest foliage from the lime and sulphur. I did not want to believe it, and tried to shut my eyes for a year or two, but was finally convinced.

Prof. Surface.—Did it have a fungous effect?

Mr. Hale.—Both Scalecide and lime and sulphur were beneficial except the yellow foliage when lime and sulphur was used.

Prof. Stewart.—What is there about the knapsack sprayer that makes you import it?

Mr. Hale.—Do you know any one in America that makes as good a knapsack sprayer as does Vermorelle in France? It is made of the highest quality of rubber, and material in every way, lasts

longer and works easier than any American made pump I know of. I wish I knew where to get one-half as good a one in America; I would get it here.

Prof. Stewart.—Do you recommend the knapsack sprayer in the hands of any one but an Italian?

Mr. Hale.—Oh, there are heaps of things that I do myself that I would not recommend any one else to do; you see, most of us like to do things our own way, and my Italians are no exception to the rule, and after all, it is only results that I care for.

Mr. Good.—How do you keep these knapsacks supplied?

Mr. Hale.—By hauling a barrow after them, and letting them fill them as needed.

A Member.—What proportion of Scalecide did you use?

Mr. Hale.—I can't remember now—about one part to 18 parts of water I think; I like to mix these commercial preparations a little stronger than the amount that the manufacturers claim.

Mr. Good.—It costs a little more that way, and the trouble is that we always want to keep our expense down and use as little as we can.

Mr. Hale.—I think, Mr. President, that they have pumped me dry.

The President.—I think they have gotten off the question; the question before us is rough lands; if there are any questions on rough lands, we shall be glad to hear them.

Mr. McSparran.—In connection with these rough lands, it seems to me that Mr. Hale could have left those rough hills of Connecticut, and come here to Pennsylvania, where the land is not nearly so rough, and where the conditions are good to make a success of orcharding with less labor.

The President.—What is to prevent him from coming here now? If there are no further questions, we will go on with the report of Prof. Surface.

REPORT ON ORCHARD INSPECTION AND DEMONSTRATION WORK IN PENNSYLVANIA.

PROF. H. A. SURFACE.

(Continued from the morning session.)

Mr. President, Ladies and Gentlemen:

My chief justification in saying anything about this subject whatever, is that these Demonstration Orchards have been estab-

lished in different counties of this State, which show what has been already done, and what still remains to be done in the future, and what results may be expected. Many persons have already seen them, and have seen what has been done; and what has already been done can be done again.

I am surprised at the enthusiasm manifested; I have seen crowds stand for hours in snow and rain, and many of them have followed us from place to place, to try to learn what they can of this work, and these men are all practical men. When we give a demonstration of this kind in a real fruit-producing community, and the attention of the public becomes drawn to this fact, the gratifying result is that almost every time we have larger audiences than previously in the same community. That has been the record ever since we made our first demonstration with a barrel pump and a one horse wagon.

The purpose of these demonstrations is to make clear that pruning is a necessary part of getting rid of the San Jose Scale when the spraying application of the insecticide is made, and that the exact composition of the material (lime-sulphur wash) is not so essential. You may put on boiled lime and sulphur in any way, and you will have satisfactory results, but the best and most economical methods will not come into general use until there are a few demonstrations with the spray pump. For example, there is the one-eighth turn to the nozzle, making it possible to spray three sides of the tree from one position; and one man, who has thousands of trees to spray, has told me that just to learn about this eighth-turn has repaid him for all the time and expense of attending the demonstrations.

Then there are several other topics, such as demonstrations in pruning; it may seem foreign to the subject of scale, but when the matter is thoroughly investigated, you will find that only by pruning properly can the scale be controlled and trees invigorated even by perfect spraying. The scale spreads its injury by injecting its poisonous sap into the growing part of the tree. The results are not so conspicuous at once, but the poison may still have entered the tree to such an extent that nothing but "dehorning" will save it. Pruning will also make it possible to get the nozzle into the tree top in such a manner as to thoroughly spray it. If you will examine Downing or any other authority on pruning, you will find that he says that "pruning is manuring." A man here this morning said he had helped his cabbage plants by the use of nitrate of soda. The same thing applies to trees. The tree plant must be invigorated all that is possible. Now, pruning is not only to remove the dead and superfluous branches but also to remove the serious and harmful effects of the insect that has attacked it and invigorate the tree. After pruning means should be taken to give that tree a good form of growth, such as fertilization and cultivation. Besides spraying, the four essentials to successful fruit-growing are pruning, thinning, cultivation and fertilization, and they are all necessary to a successful control of the scale.

Cultivate that tree from the standpoint of scale control. To show people how to do this it becomes practically necessary for us to go into the orcharding business. This was not our original

intention, but I have seen trees so badly infested with the scale that they were practically dead, yet saved by proper methods. I can show you good trees that would have died if left alone, and yet saved by proper treatment. We found when we took up the subject of pruning that we were engaging in a practical work to which little expert attention had been given in this State. We can't expect a tree to produce good fruit which is in such bad shape that its branches die or leaves become diseased. We obtain the best results from trees that are pruned. Mr. Hale spoke of thinning fruit by means of pruning. We find that necessary. In spraying for the scale, most men have overlooked the necessity of pruning, or have not understood that the one accompanies the other to get good results. *If the tree be infested, destroy the scale, and then keep the tree invigorated until it recovers from the effects.*

We must keep the leaves healthy, and to do this, we must spray with bordeaux mixture. Consequently in our method of demonstrating how to keep the orchard free from the San Jose Scale, it became necessary for us to show how to spray, how to prune, and how to keep the tree invigorated, and the leaves healthy by spraying with the bordeaux mixture. And as one result of our demonstrations, we have found that by spraying with bordeaux mixture so as to keep the leaves healthy, we keep the fruit on the tree longer. Of course, we went a little farther, and demonstrated spraying for the leaf spot and other diseases. It was so easy, just after blossoming, to add a little arsenate of lead for the codling moth,—one or two pounds to fifty gallons of the bordeaux mixture. When we sprayed with the arsenates, such as Paris Green, or arsenate of lead, we found that we not only prevented injury by the codling moth, but that the mixture acted as a fungicide as well.

For spraying for the San Jose Scale, we use home boiled lime and sulphur. It can be used in almost any proportion, but the general formula that we use is 17 lbs. of sulphur, and 22 lbs. of lime, boiled together an hour and then strained and sprayed thoroughly.

We have had some remarkable instances of the efficacy of this demonstration work that cannot be denied. For example, there is Mr. C. C. Gelwicks, a banker of St. Thomas. I heard that he was destroying his fine young apple orchard because it was so badly infested, and I asked him whether he would not hold up until I could give a spraying demonstration there. He had sense enough to see that I could not do any harm, if I could do no good, so he agreed to let me make a demonstration there. I had Dr. Funk go there with a little bucket sprayer, and he gave a public demonstration in methods of making and applying the lime sulphur wash. We sprayed twice that winter. Mr. Kieffer, a buyer, of Chambersburg, said, "I was in his orchard the summer before the demonstrations, and I would not have taken his fruit at any price. Then, I was there the next summer after the two sprayings that winter, and Mr. Gelwicks said he would give me \$5 for any scale-marked apple that I could find in his orchard. I went through his orchard, but could not find a single apple that showed any traces of the pest. I went across the way, into a neighboring orchard, and picked up a marked apple, and brought it to Mr. Gelwicks; he looked at the

apple, and said, "That never came out of my orchard." I had to confess, and told him that I could not win his five dollars."

Mr. Minnich, another fruit buyer, a neighbor of Mr. Kieffer, went to see Mr. Gelwicks' orchard, and Mr. Gelwicks offered him a dollar for one scale-marked apple from his orchard, if he could find it. (I don't know whether Mr. Gelwicks has any fixed sum, or not; it doesn't look like it.) Mr. Minnich also looked for a scale-marked apple, but could not find it.

Now, if we had not given these demonstrations, what would have been the result? As it is, he is in thousands of dollars, both in the returns from his fruit—especially the Grimes Golden, which is known, I understand, in Chambersburg at the "Evening Party" apple, because it is demanded and served at evening parties—and in his trees.

Now, ladies and gentlemen, we are establishing the county demonstration orchards chiefly in the public institutions of the State because the public has an interest in these institutions, and should have the benefit of any good that can be done them, and again to guard against the charge of favoritism in selecting such orchards, however unjust. I wish to call attention to these demonstration orchards, in order that you may refer to them at any time.

LIST OF DEMONSTRATION ORCHARDS IN PENNSYLVANIA FOR 1908.

Allegheny Co.,	Beechmont Farm and Fruit Co.,	Oakdale, Pa.
Bedford Co.,	County Home,	Bedford, Pa.
Berks Co.,	County Home,	Shillington, Pa.
Bucks Co.,	National Farm School,	Farm School, Pa.
Butler Co.,	County Home,	Butler, Pa.
Cambria Co.,	County Home,	Ebensburg, Pa.
Chester Co.,	County Home,	Embreeville, Pa.
Clearfield Co.,	County Home,	Clearfield, Pa.
Columbia Co.,	Bloomsburg Poor District,	Bloomsburg, Pa.
Cumberland Co.,	Indian Industrial School,	Carlisle, Pa.
Dauphin Co.,	County Home,	Harrisburg, Pa.
Delaware Co.,	County Home,	Lima, Pa.
Huntingdon Co.,	Industrial Reform School,	Huntingdon, Pa.
Indiana Co.,	Frank Daugherty,	Indiana, Pa.
Lackawana Co.,	Randolph Crippen Estate,	Dalton, Pa.
Lancaster Co.,	Home for Friendless Children,	Lancaster, Pa.
	County Home,	Lancaster, Pa.
Lebanon Co.,	County Poorhouse,	Lebanon, Pa.
Lycoming Co.,	City Home,	Williamsport, Pa.
Mifflin Co.,	County Home,	Lewistown, Pa.
Montgomery Co.,	State Insane Hospital,	Norristown, Pa.
Montour Co.,	State Insane Hospital,	Danville, Pa.
Northampton Co.,	Carter Junior Republic,	Redington, Pa.
Northumberland Co.,	Odd Fellows' Orphanage,	Sumbury, Pa.
Perry Co.,	House of Employment,	Loysville, Pa.
Potter Co.,	County Home,	Coudersport, Pa.
Tioga Co.,	George Hatherill,	Wellsboro, Pa.
Union Co.,	J. Newton Glover,	Vicksburg, Pa.
Venango Co.,	Home for Feeble Minded,	Polk, Pa.
Westmoreland Co.,	County Home,	Greensburg, Pa.

Now, my friends, it is my earnest desire personally to attend to the demonstrations in these orchards this year. I am trying to arrange my work so as to spend a great deal of my time in the field this year, and when it is announced in the papers that I will be at a certain demonstration, I will be there, rain or shine. I trust we

will be able to show you something that will be of benefit to every county in the State, and we want every man growing trees to come to these demonstrations. I am sure that if a man came into this State who could teach me something more than I knew myself in regard to anything in my profession, I would make it my business to go to hear him.

Finally, I hope conditions (legislation and appropriations) will come round to where I would like to have them so that we will have in each three counties, one of my men, one man from State College, and one from Washington,—three orchardists competent to help the fruit growers of the State save their orchards,—co-operation of the United States Department, the State Department, and the State College,—who will meet with local organizations all over the State once a month, in order to compare notes. How can we help people unless we know what to do? We are placed here to do service to the public, and are very much pleased with some of the results of our service, as shown here to-day in the interest manifested by the public, and in our Demonstration Orchard Exhibit, by the Inspectors.

Mr. Youngs.—I wrote you a year ago in reference to the material that was put on the market by the Niagara Sprayer Co. At that time you, of course, had not experimented with it, but we wish to know now, what has been the result of your experiments in that line?

Prof. Surface.—Our further experiment with the prepared lime and sulphur wash shows that it is as good a prepared wash as can be gotten. In regard to strength, we have used it 1-8. I have used it recently 1-11, but am not yet ready to report on it. But there is just one word I want to say. In mixing 1-8 you can use cold water for all sprayers but gas, but in using carbonic acid gas pressure always use hot water, as the hot liquid does not dissolve the gas and break up the solution as when cold.

Mr. Youngs.—We have used several carloads of it in my home town.

Prof. Surface.—You used it as a fungicide. In my report I used it for scale, and not as a fungicide.

Mr. Youngs.—We used it also as an insecticide, for the leaf, and we have been able to get good results, but have had some burnings of the leaf. So far as I am concerned, we were careful in using it, and I am rather inclined to speak favorably of it.

Prof. Surface.—I used it for potato blight, and it did not burn the foliage until I came down to San Jose Scale or winter strength.

Our department entered into co-operation with the U. S. Department in regard to the grape-root worm. We sprayed with arsenate of lead at the time the beetles started, and two weeks later; the number of grubs taken from ten vines in starting was 200, after spraying 25, showing that it is an easy matter to control

it. The United States Department saw the necessity of invigorating the plant by every means possible, so we used nitrate of soda, about 400 pounds to the acre, in three applications, with the best results in fruit.

Mr. Eldon.—Professor, what was the proportion of the prepared lime and sulphur wash?

Prof. Surface.—One to eight, of the commercial. I do not think it can be made strong enough to hurt the plant, unless you spray when in leaf.

Mr. Eldon.—Is one to eight strong enough to kill the scale?

Prof. Surface.—Yes, sir.

Mr. Eldon.—Well, I used it on peach trees, and found it was not strong enough.

Prof. Surface.—What power did you use?

Mr. Eldon.—A hand pump.

Prof. Surface.—There is no objection to that if the spraying was properly done.

Mr. Eldon.—I was there myself and I know it was. I made a thorough spraying with the lime and sulphur, and I know it will not kill the scale at that strength.

Prof. Surface.—I used it only once; that was in January of last year, and I have seen that 1-10 of the prepared wash is not as strong as the home boiled 17-22.

Mr. Fox.—About a week or two ago Prof. Surface sent out a warning in regard to the Brown-tail Moth; how did you find it?

Prof. Surface.—I am glad you called my attention to that; it is one of the most important subjects to come before the meeting. The San Jose Scale, as compared with the Brown-tail Moth, is but a shadow as compared with the substance. It will eat the leaves off practically every deciduous tree, and the hairs of that moth will drop down, and as they are poisonous; you will see pedestrians going along, scratch, scratch, scratch. It will give every man, woman, child, dog and horse the "itch." Beside it, the San Jose Scale is but a shadow. It lives in winter in little tents on the branches of the trees as young larvae. There has been an unusual importation of it this year on the stalks of French seedlings and roses, particularly the stalks on which the finest roses are grafted. In Massachusetts they appropriated \$300,000 last year to fight the Gypsy Moth, and they also appropriated \$30,000 extra to bring in parasites to stamp it out. That simply shows to what extent these ravages can go. If you see any little bunches or tents, like the tents of the

caterpillar, destroy them immediately by burning. It is the best and simplest solution of the case. They will also be killed by any of the arsenical sprays.

Mr. Good.—There is a small worm that bores in the grape, just as it is ripe. What is that, and what is to be done for it?

Prof. Surface.—That is the Grape Berry Moth. Write to the Ohio Experiment Station at Wooster, Ohio, for their bulletin on it. They cover the subject fully. Or, spray with arsenate of lead, 3 pounds to the hundred gallons.

Mr. Good.—Then there is another insect that attacks the horse-chestnut in Massachusetts.

Prof. Surface.—That may be Gypsy Moth. When it appears in Pennsylvania I will issue a bulletin on it.

Mr. Youngs.—Have you ever had the Brown-tail Moth before?

Prof. Surface.—Not that I know in this State. New York inspectors are finding many of the winter nests now on newly-imported French stock. If it once appears in this State, you shall be told promptly.

Mr. Scholl.—Will fumigation kill this moth on the tree?

Prof. Surface.—I could not say anything in regard to that from my own experiment, but I had a letter from Mr. Atwood, of New York, saying that fumigation will not kill them at the same strength that it will kill the scale.

A Member.—I am very much interested in this discussion; I am from Luzerne County, and we have never had a demonstration up there. We want a Demonstration Orchard started there.

Prof. Surface.—I am glad to see this interest, and to hear requests for demonstration orchards. The only reason we did not visit every county in the State and establish one, is because our funds gave out before we got around. I trust this Legislature will appropriate enough money to enable us to carry on our work in such a manner that we shall have at least one demonstration orchard in every county in the State.

The President.—Are there any other questions to ask Prof. Surface?

A Member.—Is there any fungous that can be introduced into the orchard that will kill the scale?

Prof. Surface.—Attempts have been made in California and Florida to do this, but they have not been successful this far north.

A Member.—I will tell you what happened in my orchard. In looking over my orchard, I noticed that one limb of apples was covered with dark spots. I took an apple off and cut it in two, and found it had dark spots running in to the core. Have you any idea what it is?

Prof. Surface.—That looks like the work of a fungous disease, possibly Bitter Rot, but I could not say positively until I have seen the apples themselves, or the trees. My work, you know, lies in the insects that infect the trees, and I guess I am something like the doctor who, when he was called in to see a typhoid case, and was not sure of the disease, decided to give the patient some medicine that would produce fits, "For," he said, "I'm death on fits." That subject should go to the Plant Pathologist, but if referred to me, I will do the best I can.

A Member.—The spot appeared on the outside of the apple, and went clean in to the core.

Prof. Surface.—What do you think it is? We are always on the watch for new diseases and new insects.

A Member.—I should like to ask what time of the year this disease appeared?

A Member.—In September.

Mr. Youngs.—What was the appearance of the spot?

A Member.—It was dark, like the San Jose Scale.

Prof. Surface.—Probably the Bitter Rot. It occurred in a ring, and that does not look like the Bitter Rot.

Mr. Youngs.—We have the counterpart of that in the grape; that is the brown rot, not the black rot.

Prof. Surface.—Birds-eye rot, is it not?

Mr. Youngs.—Yes.

The President.—If there are no more questions on this subject, we will proceed with the program. Reports of the committees are now in order. Is the Committee on Nomenclature ready to report?

Dr. Mayer.—The Committee on Nomenclature is pleased to present the following report:

Report of Committee on Nomenclature and Exhibits.

Owing to such high average excellence as we find exists here, the committee had some difficulty in making decisions. Perhaps errors have crept in for which we crave the indulgence of exhibitors.

We would recommend the exhibit of the Fruit Growers Association of Adams County as deserving a Diploma for largest and best general or "association" exhibit, with Perry County as second in merit; and the display by the Demonstrators of the Division of Zoology, Department of Agriculture of Pennsylvania, while not so large, was also very fine. Of newer varieties for name we did not find any of more merit than those now in general cultivation.

To R. M. Eldon, Aspers, Pa., is awarded a certificate of merit for best individual exhibit.

Stark Bros. Nursery and Orchard Co., Louisiana, Mo., deserve special mention for best box of apples grown outside the State. Variety, "Delicious," especially fine.

The exhibit of nuts of various kinds was of such character as to show that Pennsylvania can grow fine nuts successfully. The English walnuts exhibited by L. C. Hall, Avonia, Pa., were the largest and finest ever exhibited in the State.

For best plates of apples by individuals the following are awarded certificates of merit:

S. B. Sheibley, Alinda, best plate Bellflower.
Joshua Kitner, New Bloomfield, best plate Fallawater.
Gabriel Hiester, Harrisburg, best plate Baldwin.
F. H. Fassett, Meshoppen, best plate Northern Spy.
E. E. Rice, Aspers, best plate York Stripe.
C. J. Tyson, Flora Dale, best plate Stayman Winesap.
W. S. Adams, Aspers, best plate Wolf River.
W. W. Boyer, Arendtsville, best plate King.
R. M. Eldon, Aspers, best plate Summer Rambo, York Imperial, Grimes Golden, Smith's Cider.
D. M. Wertz, Waynesboro, best plate Ben Davis.

The following exhibitors made creditable displays of fruits and are deserving of mention. All the specimens were clean, well grown and highly colored:

C. P. Scholl, R. F. D., Halifax, Pa.
Cyrus T. Fox, Reading, Pa.
Fruit Growers Association of Bedford Co., Bedford.
S. B. Heiges, Dorset, Va.
A. W. Griest, Flora Dale, Pa.
H. M. Keller, Gettysburg, Pa.
C. E. Rice, Guernsey, Pa.
H. E. Wolf, Aspers, Pa.
Rufus Lawver, Biglerville, Pa.
J. W. Prickett, Biglerville, Pa.
Abram Hostetler, Johnstown, Pa.
Geo. W. Settemeyer, Johnstown, Pa.
H. H. Laub, Lewistown, Pa.
J. Hibberd Bartram, West Chester, R. F. D., Pa.
M. R. Good, Narvon, Pa.
R. J. Walton, Hummelstown, Pa.
L. M. Simon, Linglestown, Pa.
D. Z. Detweiler, Belleville, Pa.
Ira J. Light, Lebanon, Pa.
Benj. P. Hooke, Landisburg, Pa.
Dan'l. Anderson, Alinda, Pa.

D. C. Hayes, Alinda, Pa.
 Jacob Stambaugh, Alinda, Pa.
 Sam'l. S. Kane, Landisburg, Pa.
 H. B. Cumbler, Logania, Pa.
 Tressler Orphanage, Loysville, Pa.
 C. E. Zeigler, Duncannon, Pa.
 W. J. Koch, McClure, Pa.
 W. A. Lightner, Landisburg, Pa.
 S. M. Lightner, Landisburg, Pa.
 Wm. Fosselman, Millerstown, Pa.
 Dr. J. Fosselman, Millerstown, Pa.
 Wm. Stewart, Landisburg, Pa.
 P. F. Duncan, Duncannon, Pa.
 T. C. Foster, Winfield, Pa.
 Oliver D. Shock (English walnuts), Hamburg, Pa.
 J. G. Rush (English walnuts), West Willow, Pa.

Prof. Watts.—I would like to say just a few words concerning the Delicious apple. It might add to the interest here to know that it has been found at the Geneva Experiment Station, N. Y., that the Delicious apple grown at Geneva is a better product than the Hood River Delicious; now, it is possible that we can grow the Delicious in Pennsylvania as well, and make it better than the Hood River Delicious.

Mr. Youngs.—Not to take up too much time—I had occasion several years ago to invest in the "Golden" Plum. It is a Japanese plum that has done good in some sections, but not with us. So there are many other fruits that are local, and will not do so well in Pennsylvania. Let us find out what will do best in our localities, and stick to that. I would suggest that we go lightly in recommending any fruits as standard fruits that are not thoroughly acclimated.

Mr. Good.—There is a season for the Delicious apple; perhaps this is not the proper season.

Mr. Youngs.—I think the proper season is the propogating time.

The President.—I want to announce the following committees which I omitted this morning:

Legislative Committee.
 Hon. W. T. Creasy, W. F. McSparran and James Bergey.

Allied Agricultural Societies of Pennsylvania.
 E. C. Tyson, R. M. Eldon and E. B. Engle.

Chairman of General Fruit Committee.
 J. D. Herr, Lancaster.

The President.—Is the Committee on Resolutions ready to report?

Mr. R. M. Eldon.—As chairman of the Committee on Resolutions, I beg to submit the following report:

Report of the Committee on Resolutions.

WHEREAS, Mr. Enos B. Engle has served this Association most faithfully and conscientiously for the long term of thirty-five years, and

WHEREAS, He feels it imperative that he lay down the work at this time;

Be it resolved, That the warmest thanks of this Association be extended to Mr. Engle for his long and faithful service, and that we express herein our sincere appreciation of his unselfish and conscientious work.

Resolved, That the committee representing the Horticultural Association in the Allied Agricultural Organizations, be instructed to promote the development of horticulture at State College, including a soil survey in its relation to fruit and vegetables.

WHEREAS, The horticultural interests of Pennsylvania are rapidly becoming a prominent factor in the wealth of the State, and believing that the State Horticultural Association can be a great power for good in advancing and guiding this work, and

WHEREAS, Its usefulness in the past has been very much limited by lack of funds,

Be it resolved, That this Association do respectfully petition the Legislature of the Commonwealth of Pennsylvania to appropriate through the Department of Agriculture the sum of \$2,000 for the furtherance of the work of this Association for the ensuing two years.

WHEREAS, There are in the United States numerous conflicting laws specifying the legal capacity of a bushel, a box and a barrel of apples which are a hindrance to interstate and foreign commerce, and

WHEREAS, There has been much just complaint from consumers regarding the grading and packing of American fruit that has seriously affected the market at home and abroad, both by decreasing consumption and increasing competition from sections which, because of stringent laws, enjoy the confidence of the buyer, and,

WHEREAS, There is now before Congress a measure known as the Porter bill which has for its aim the correction of these adverse conditions; therefore,

Be it resolved, That this Association, while not agreeing with all the details of the bill in its present form, is thoroughly in sympathy with its general aim, and

Be it further resolved, That the chairman appoint a committee of two to confer with similar committees, which are being appointed by other horticultural associations throughout the United States at a meeting to be held at the Raleigh Hotel, Washington, D. C., January 27, 1909, and

Be it further resolved, That this committee be instructed to secure, if possible:

1st. The establishment of a legal capacity for a bushel, a box and a barrel of apples, when packed for interstate and foreign shipment, same to be stated in terms of cubic inches, the growers to have the privilege of using a package of different capacity provided the actual content is plainly marked on the package.

2d. The adoption of a standard grading of the fruit, and marking of the package in accordance therewith.

3d. Requiring that the name and address of the packer or the person in whose interest the packing is done, be plainly stamped upon every package before it leaves his possession.

4th. Providing suitable penalties for the violation of the law and designating proper channels and appropriating sufficient funds for its enforcement, and

Be it further resolved, That should this bill in its final form be referred to this Association for approval before next meeting, the Executive Committee be empowered to take action and, if its verdict be favorable, the Corresponding Secretary shall inform our Senators and Representatives of our action and demand their support of the bill.

WHEREAS, There has been in the past and still is a vast amount of Paris Green, arsenate of lead and other forms of arsenical poison which is being sold to fruit growers in an adulterated form which makes it either ineffective or positively dangerous and

WHEREAS, There is now before Congress a bill known as H. R. 21318, entitled "A bill for preventing the manufacture, sale or transportation of adulterated or misbranded fungicides, Paris greens, lead arsenates and other insecticides, and for regulating traffic therein and for other purposes," a copy of which is hereunto attached; therefore,

Be it resolved, That this Association approves this bill and demands its passage and that the Corresponding Secretary be authorized to forward copies of this resolution to our two Senators, to each member of the House from Pennsylvania, and to Mr. H. F. Baker, care Thomsen Chemical Company, Baltimore, Md., Secretary of the Executive Committee of Entomologists and Manufacturing Chemists having this bill in charge.

Resolved, That the thanks of this Association are due to the Stark Nursery Company, of Louisiana, Mo., for their donation to the Association for distribution at its meeting of two boxes of fine apples, named Delicious.

WHEREAS, Through the death of Mr. B. K. Johnson, the horticultural interests of the State have lost a valued worker.

Resolved, That this Association express to the family of the deceased and by placing this resolution upon the minutes of this meeting, its sympathy and its sense of loss.

WHEREAS, Henry Ort, of Mifflin County, an early member of this Association, and for many years an active worker along horticultural lines, has been called to a higher reward.

Resolved, That we hereby express our appreciation of his work and our realization of the loss we have sustained.

All of which was duly considered and the resolutions approved by vote of the Association.

In Memoriam.

Mr. Fox offered the following which received the approval of the Association:

This Association mourns the loss of two of its Berks County members, James N. Ermentrout and John C. Hepler, both of the city of Reading, where they were born. The former was a life member and at the time of his death was President Judge of the courts of Berks County. He was "A man among men," honored and respected by everybody and beloved by the members of the bar who practiced before him. In the twenty-two years that he served on the bench he was noted for his urbanity of manner and promptness in the despatch of business. He took a deep interest in the promotion of agriculture and horticulture and his death was a distinct loss to this Association. John C. Hepler, was, when he died, superintendent of the Charles Evans Cemetery, one of the most beautiful resting places of the departed in this country. The deceased was brought up amid fruits and flowers, his father having been a pioneer gardener and orchardist. For a number of years John C. Hepler took an active part in the proceedings of the Horticultural Association and attended the meetings. As a public-spirited citizen, active church worker and man of affairs, he occupied a conspicuous position among his associates.

The President.—We should now like to have a few words from our retiring Secretary, who is about to close his labors among us.

Mr. Engle.—I don't know, gentlemen, that I have much to say, I am sure. I want to thank you very cordially for all the kindness I have received at your hands all these years during which I have acted as your Secretary. Nothing has touched me more than your kind expressions of good will.

Mr. Fox.—Mr. President, I have spoken at different times during this meeting. I don't want to take up too much time, but in listening last night to the reminiscences of Prof. Heiges, I noticed some names that might have been mentioned. There was Jacob Stauffer, Botanist, S. S. Rathbun, Entomologist, Jacob Lauder, a fruit grower, all of whom, with Dr. Eshleman, took an active part, and a true interest in the work of the Association. They were among the good friends who came to our first meetings, and I certainly felt, in listening to Prof. Heiges, I could not but feel—how many, many, have passed away. Of course, I am still a young man, but I can still look back to 1871, when I first joined the Association, and in 1882 I was writing up the meeting of the Association for the Reading Times and Dispatch, of which I was then the city editor, and I am glad to be here to-day as the representative of the Reading Eagle. I am sorry that we do not have a bet-

ter representation of the press here to-day. There is a great deal that is sent out by the Department of Agriculture at a meeting like this that should be sent out through the papers, and brought before the people. Full reports of our meetings should be published in the papers of Harrisburg, Reading, Hamburg and Lancaster, and other places where there are fruit growers. Let us not hide our light under a bushel.

Prof. Stewart.—In our work on scion selection, we shall be very glad to get hold of scions from trees of known individuality, and if any of the fruit growers here have scions of any of the following varieties from such trees I shall be glad to hear from them. I don't want to go out of the State for them, but it is possible that I may have to. I made this announcement at Lancaster last year, but have had very few responses:

Grimes,	Summer Rambo,
Jonathan,	Maiden Blush,
Baldwin,	Early Ripe,
Stayman Winesap,	Williams Red,
Northern Spy,	Salome,
Smokehouse,	Esopus (Spitzenberg),
Rome (Beauty),	Tompkins' King.
Paragon,	

There are fifteen varieties, and we want to know about individual trees of these varieties. This is important now because we have got to get these scions this year. I can go away into other states and find these individuals under certain conditions, but that is not what I want. I want to get them here in Pennsylvania, if possible.

Mr. Youngs.—There are a number of trees grown over on the shore of Lake Erie, and among them one particular tree—the Tree of Hospitality. This tree is always in bearing, and we extend to you a hearty invitation to come over and partake of its fruits. Come at any time, in season or out of season; it has all seasons for its own.

The President.—Now, I would like to hear the report of the delegate from the Adams County Society.

REPORT OF MR. C. A. GRIEST.

Delegate from Fruit Growers Association of Adams County.

The Adams County Fruit Growers Association met on December 15, 16, and 17. We had with us able men from New York, New Jersey, Ohio, and Pennsylvania, who talked to us very interestingly and instructively. The meeting opened on Wednesday afternoon, with the customary devotional exercises, after which Mr. W. H. Black, one of our own members, read a very important paper giving an account of our work throughout the year. Prof.

Baker, of State College, talked to us on the subject of Forestry; he made a very strong plea for the preservation of our forests, and urged that every person who had a piece of land without any natural growth, plant some trees there, and thus get some forest growth all over the country. We have a great deal of land in Pennsylvania, which, as Mr. Hale would say, we are too tired to work; that land could be successfully used for tree planting. Mr. Jos. Barton, of New Jersey, presented the subject of peach growing, but what he said has been pretty well covered in the different talks during this session. There are certain things in peach growing with which every person has to contend—such as "Yellows" and "Little Peach." We have heard a great deal about the "Yellows" and borers, and mice and scale, pruning orchards and other things that are necessary to successful peach growing. Pruning is as necessary for the peach as it is for the apple, and right here it is, it seems to me, that peach growers make their mistake. Every one knows that it is the new wood in peach trees that produces the fruit, and Mr. Barton made the statement that you should have a new peach tree every second year. That is, cut away about half the wood every year. It is a simple matter of going over the tree, and taking away practically one-half of the wood that is on it at the time. In New Jersey they prune in the winter time with the pruning shears. Mr. Horace Roberts, of New Jersey, then presented the subject of "Chestnuts." Don't understand me to say that his talk was a "chestnut;" it was not by any means. He gave us a very interesting and instructive talk. He said the chestnut could be grown well in rough land. Mr. Catchpole of New York, spoke of the utilization of the cull apples. I know that in our county of Adams, the cull crop is five or six times what it should be. Mr. Catchpole said that the only right way to settle the cull question was not to have any culls. Why can't every one of us have our ideal set so high that we will cultivate and prune, and look after our crops until we get only good apples? Get them so uniform in size and color that you have no cull crop. But of course, we do have cull apples, and I am afraid we will continue to have them for some years to come. The best way of disposing of these culls is probably by evaporation, or vinegar, or sending them to an apple-butter factory. The next period was occupied by Mr. Cox of the Ohio State Horticultural Association, on the general subject of apples. That was a very large subject, and went all the way from starting the orchard to getting the fruit to market. He emphasized getting plenty of humus into the soil, to retain the moisture there. The hills of southern Ohio are very steep, and they have considerable difficulty in keeping soil on them, so he mulches. One subject that should be thoroughly emphasized at our meetings is that of the necessity of spraying. Inquiry was made of Prof. Surface here to-day what to spray with. You want to know what to spray for, as well as what to spray with, and then when you spray, spray thoroughly. It is a waste of time to go over an orchard and spray it in a poor way. You don't kill the Scale, and you don't kill the Codling Moth. Of course, the tree will last a little longer, with poor spraying, but you will eventually have to cut it down unless the spraying is thoroughly done. Another thing Mr. Cox said they were doing in Ohio

was a later spraying with lime and sulphur after the leaves were out on the trees. They claim it is better than the bordeaux mixture, and can be applied with perfect safety. Prof. Stewart then gave us a very interesting talk. I believe I won't say anything about it, because he pretty well covered the same ground here.

Prof. Wilson, of Cornell, then showed some charts illustrating the results obtained from cultivation, from pasture orchards, and also the results of sod treatment. The charts of sod v. tillage, of course show that tillage had greatly the advantage, and where hogs, sheep and cattle had been pastured in the orchard, it showed that the hogs were preferable to anything else. I believe that lots of labor can be saved by turning hogs into an orchard; they will keep the soil pretty well turned up. Mr. Roberts told us how crops can be grown profitably in a young orchard. It was just as Prof. Watts told us about it this morning. He says no grain should be used in the orchard, except possibly corn the first two years after it had been planted; no kind of grain at any other time, peas and beans, cabbage and asparagus and plants of that kind are right. The last period of the last afternoon was occupied by Mr. Richard D. Barclay on the relation of bee-keeping to orchard culture. He showed that it was necessary to keep bees in close proximity to the orchard. In very many instances the bees have been a great help.

We had three evening sessions, which were principally entertainment, planned to interest the greatest number, not necessarily fruit growers. The last evening was a lecture by Prof. F. H. Green, of West Chester, which was in a measure entertaining, but was full of good lessons. We had good music each evening.

The President.—I am glad to hear such a good report of the meeting of the Adams County Society. You see they are able to hold a three days' institute there, they must have more money than we have in the State.

Now, as announced this morning, the Cambria County Society has been organized with 108 members, 14 of them ladies; if Mr. Hostetler is in the room, we should like to hear from him in regard to this society. It appears that he has gone. We will then be glad to listen to Mr. Fassett while he tells us what they are doing up in Wyoming County.

Prof. Watts.—I want to say for the Cambria County Society, that although it is newly organized, they mean business over there, and you will hear from them later.

Mr. Fassett.—It gives me great pleasure to come down here to the meeting of the State Horticultural Association. I have enjoyed this meeting very much, and have also gained some very good points.

I want to report to you what we are doing for horticulture. We have land in plenty, and when it is all planted in apples, it will take first rank in wealth with Lancaster. So, I think, worthy fellow-members, that you could do us a good turn by bringing some of the enthusiasm of this society up to us by meeting with us the next time. We have a local society, which has had a number of meetings, and we are going right on. We mean business, the same as

they do in Cambria County. We have done some things and expect to do more.

Dr. Mayer.—I wish the gentleman would take time to tell us about the man who has sold his farm in one of the far-famed western orcharding sections, and bought one up in Wyoming County.

Mr. Fassett.—I don't know anything about it.

Mr. E. C. Tyson.—In a recent edition of the *Rural New Yorker*, some one asked the name of the gentleman who had sold his farm in Oregon, and moved to Pennsylvania, so there must be some foundation of fact in the story.

A Member.—The gentleman's brother is right here.

Prof. Surface.—And is one of my demonstrators, and I am not ashamed of him, either.

The President.—I wish he would tell us about it.

Mr. Knuppenberg.—I don't know that there is very much to tell, but I will do the best I can. My brother lived out on the Hood River, between Oregon and Washington, and was raising apples on land that was worth all the way up to \$500 an acre. He was doing well, but he made up his mind to come back to Wyoming County, where land was not anything like so high, and where he could make a little more money. I have traveled through that fruit country myself, and, in fact, all over the West, and I believe I have seen as fine fruit here to-day as I have ever seen anywhere in the West.

My brother sent me the money to buy him a farm. I thought that was rather an undertaking, but he had sent me the money, so I went ahead and bought as I would buy for myself. I bought for him 260 acres, and he came along with a few horses, and a carload of stuff that he wanted to keep, and set his orchard with one year old trees about two ft. high, and you would be surprised to see how they have grown this year.

The President.—A few years ago it was decided that each member should try to bring another, and a gentleman said that without any inducement to offer, that was a pretty hard thing to do. I see he is here to-day with his wife, but he has left his seven daughters at home; now, I want him to tell us why a man should bring his wife, and leave his daughters at home.

Mr. Scholl.—Mr. Hiester told us several years ago, when we left, to come back the next time and bring new members with us. I asked him what inducement we had to offer a man to come here and pay his dollar. He said, "We'll send him the report of the society, and that is valuable." I told him they would have to have a better inducement than that to induce our Dauphin County farm-

ers to come here and pay their dollars, and then wait two years on the report. I have not heard anything of it since, but if I have never done anything else, I have induced the society to get out a report every year. We don't have to wait two years now.

The president wants to know why I brought my wife, and left my daughters at home. Last year I took my daughter to Lancaster, to the meeting of the society, but she, and her friend, were the only two women present at that meeting. I think that is wrong. My children are all interested in horticulture, and I think that every one of us should bring our wives along, and our children, too, when we can. If the women take hold of our meetings and work them up, perhaps we can get better meetings. Then, we will let Mr. McSparran bring his wife along, too.

Mr. McSparran.—I want to say to Mr. Scholl, that if we want to help get up an interesting meeting, he shall let "the old woman" stay at home, and bring his girls. Where the girls are, the boys will be, too, and then we will have an interesting meeting; we want all the young blood we can get.

But I think Mr. Scholl is mistaken about his daughter and her friend being the only women present at the meeting at Lancaster last year. There were several other ladies present.

I think the least this society can do is to make the wives of the members present, and all ladies attending our meetings, honorary members.

Mr. Engle.—Just a word in regard to Brother Scholl's statement about having to wait two years for the report of the society. Our reports were printed for us by the State, with the State reports, for it is only with the assistance of the Department of Agriculture that we can get them out. The last few years we have been able to do better. Last year we got the report out in June, and this year I expect to get them out in March or April. We will not have to wait on the State Printer.

Mr. Eldon.—Concerning the new local societies that have been organized, bring them in to us, and go on organizing others. We want a little noise; don't let it die out. Try to get new members; I tried to follow out the suggestion regarding new members; I did not succeed in bringing the member, but I brought his dollar, which is almost as good. Now, let us try to unite all these county organizations, and get six hundred members. I like one thing about these county organizations. Each one does the best he can, and if the other fellow beats him, it is all right; he simply goes at it and tries again the next year, and unless we adopt some of this enthusiasm we will go along in the same old way. Now, I am in closer touch with the Adams County Association than I am with the State Association, and I am not ashamed to come here and tell of their enthusiasm; I think it would be a good thing if we could get more of it in here.

Mr. Scholl.—I think the Secretary will vouch for the fact that I have talked the Association up in the upper end of the county;

I have tried for fifteen or eighteen years to get new members, but have never been able to induce them to come in. I tell them to come and listen for themselves, and I think I am right. I know, and you know, that the talk we get here is worth more than all the bulletins.

The President.—I had an object in stirring Mr. Scholl up, because when I stirred him up a few years ago, he stirred the rest of us up. As I suggested yesterday, we should have a three days' session. We can't do what we want in two days. I think the members should come and bring their wives along, and then we can have at least one session devoted to their interests. I trust that in another year we can get the ladies here, and secure a great deal of good to the home and to the school and to the farm, as the result of their meeting with us.

Mr. Creasy.—I would like to make a suggestion. In the first place, publish the time and place of the meeting in all the Agricultural papers of the State, and then in the daily and county papers all over the State. I missed the meeting last year because I was not informed as to the date. Then, as to the reporters, if we can get them interested and satisfy them that it is to their interests to get an account of our meetings in their papers, they will come. Now, take such papers as the "Farm Journal" and the "Grange News"—they should publish a full program of the meeting before it is held, and a full account of the proceedings afterward. And the same thing applies to the daily papers.

Mr. Engle.—Mr. Chairman: I just want to say in reply to the gentleman, that when I got up this program, I sent 150 copies to the daily papers throughout the State, everywhere, and even took the time to write to them requesting them to print it. Only one of them sent me a marked copy; that was one of the Chambersburg papers; one or two of the others made a small paragraph. I sent them to the papers here and gave them due notice of the meeting. I don't recall that the Philadelphia papers gave us a single notice. I also sent this program to the American Agriculturist, the Rural New Yorker, and the Country Gentleman. I didn't even presume to mail it with a 1 cent stamp attached; I wrote a little notice and placed a 2 cent stamp on the envelope. I have done all that I could to advertise the meeting.

Mr. Creasy.—I did not mean to reflect on the Secretary in any way. I simply want to tell you how to get around that. I know how hard it is to get the papers interested. Get your members in different sections of the State to take it up with the papers in their communities; send a committee to interview the editor, and make him understand that it is to his interest to publish these proceedings. It can't be done from a central point by mail. But let every member constitute himself a committee to interest the papers of his community in it, and the thing is done.

The President.—It is only fair to the American Agriculturist and the Country Gentleman to say that they have their reporters

here. The thing we want to talk up is how to get the daily papers interested.

Mr. Creasy.—I think we should extend a vote of thanks to the Reading Eagle, and any other paper that has a representative here to report our meeting. I make a motion that the Reading Eagle, the American Agriculturist, and the Country Gentleman be tendered a vote of thanks.

This was amended to cover all periodicals represented here and was duly carried.

Mr. Fox.—I don't want to stand up in defence of the Reading Eagle, but it prints more of our proceedings than any other paper. But a mere printed program is not the thing that will interest our papers in our meetings. Send a personal letter to the editor, asking him to publish in full the account of the meeting, or at least some notes. Get the members in different parts of the State to see the editors and have them publish it. Now, I am a newspaper man of forty years' standing, and know what I am talking about. The Farm Journal, the Practical Farmer, the Southern Planter, of Richmond, and the National Stockman and Farmer will all publish the reports of this meeting. I will attend to that.

Mr. Jamison.—We have one paper in Juniata County that published the program in full.

Mr. Sheibley.—I am from Perry County, and I want to say that the Perry County papers have published the program in full; I attended to that myself. I want to say that the first time I came to these meetings, I brought a plate of five apples; the next time, at Lancaster, I brought five plates; this time I brought that table full there at the end, with the assistance of a few friends. It came in at the eleventh hour, but it is here all right. I could not bring my wife, because I have none but I am getting some of the neighbors interested.

The President.—I am glad to hear from you, and glad to know that Perry County is falling into line so nicely.

Mr. Eby.—I, too, represent Perry County, and I also went to our newspaper publishers and requested them to publish the program, which they did.

Mr. Engle.—Just one word in regard to Perry County. One of our demonstrators, Mr. Foster, has been at work throughout Perry County, and has used his influence towards having the papers publish in full the program of this meeting. The papers of Perry County have been very faithful in that respect, due largely to the efforts of Mr. Foster and these gentlemen.

The President.—The Secretary has a letter from Prof. Craig, which I will have him read at this time.

The Secretary thereupon read a letter from Prof. John Craig, of Cornell, Secretary of the American Pomological Society, asking that we appoint delegates to a meeting of that organization to be held at St. Catharines, Canada, in September, 1909.

The President.—Do you care to take any action on this letter?

Mr. Creasy.—I believe it would be advisable to appoint delegates in case some one should wish to go, and I make that motion.

The President.—It would be at their own expense, you know.

Mr. Creasy.—At their own expense, of course.

The President.—It has been moved that the President appoint delegates to the meeting of the American Pomological Society at St. Catharine's, Canada. The great trouble is that the meetings are always held at our very busiest time. I have been a member for twenty years, and have never been able to attend a meeting. Is this motion seconded?

The motion was properly seconded and carried.

The President.—I will try to get some delegates to go there; I would like to go myself.

Before we adjourn, I want to make an announcement in regard to the fruit; the fruit on the table of the Adams County section has been donated to State College for use in the classes there. The members will please remember that, and not remove any of it.

Prof. Watts.—We had a very enthusiastic session in horticulture during Farmers' Week up at State College, and before the next Farmers' Week, we hope to be able to have the lectures in our new horticultural building, and in connection with them to have a display similar to the display here, only with each variety grouped separately; for instance, the Ben Davis group by itself, and the Winesap, and so on. It will be a strictly horticultural exhibit, and we would be glad if as many of the members here as possible will send us of their fruits to be exhibited. If they will send them to me at State College when they harvest the apples, I will put them in our storage house up there at the college, and see that they are properly placed when the time comes.

Prof. Surface.—I would like to say that there are some of the exhibits from our Demonstration Orchards to the right of the door as you go out.

The President.—Is Secretary Critchfield here?

Mr. Engle.—Inasmuch as you have called on Secretary Critchfield, and he is not in the room, I want to say that he has expressed the deepest interest in our work, and it is only by his assistance that we have been able to publish our report every year; he is not

always with us at our meetings, but he shows his interest in a substantial way, although it must be done indirectly. He takes the deepest interest in the continuation of our work.

The President.—I see Dr. Hunt in the room; we should like to hear from him.

Dr. Hunt.—I certainly could not expect to take up your time at this time of night. I will merely say that I am glad to be here, and glad to be able to stand on the floor of the Horticultural Association, representing the second highest state in horticulture. I am very glad to note, as I passed in and out the last two days, and the last two years, that the agriculture and horticulture of Pennsylvania is coming into its own. I have abounding faith in the agriculture, the horticulture, and the market gardening in this State. I have the utmost faith, because I see the possibilities; and while it is all right to have the possibilities, you must have some one to take hold, and the signs of life and growth in the State Horticultural Society give me warrant to believe that we are going to make Pennsylvania the leading horticultural State of the Union.

The President.—Any other business?

Mr. Fox.—I move we adjourn.

This motion was properly seconded, and carried and the Fiftieth Annual Meeting adjourned.

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