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# Pennsylvania State Horticultural Association News

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## Proceedings of the State Horticultural Association of Pennsylvania for 1925



SIXTY-SIXTH ANNUAL MEETING  
HELD IN HARRISBURG  
JANUARY 19-24, 1925

# **Pennsylvania State Horticultural Association News**

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# State Horticultural Association of Pennsylvania

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MEETING OF WEDNESDAY MORNING, JAN. 21  
THE LIFE-HISTORY OF THE APPLE SCAB FUNGUS

C. R. Orton, State College.

Scab has been for years, and still continues to be, the most destructive and wide-spread disease of the apple. No other disease of this crop has been experimented with more fully, particularly from the standpoint of control. The life-cycle of the parasite has been known for years; the relation of weather to the incidence of the disease is rather well understood; and very satisfactory methods of control were worked out years ago but still this disease takes a huge annual toll of the apple crop.

The reasons for the present situation regarding apple scab must be due largely to the failure of the grower to fully understand the nature and the life history of the fungus which causes this disease. This fungus has two distinct stages in its development, a "perfect" stage which develops during the early spring on the infected leaves of the previous season which have over-wintered on the ground, and an "imperfect" or repeating stage which develops on the green leaves and fruit as a result of infection from "spores" which are produced by the perfect stage on the fallen leaves, these spores being carried by wind from the dead leaves to the green leaves.

Since the spores produced by the perfect stage on the old dead leaves are the only known source of infection the attack on scab is after all relatively simple. Two methods are open to the orchardist; either he must rake and burn all the fallen leaves, or he can protect the newly developing foliage and fruit from infection by the use of fungicides. Since the former method is usually held impractical because of the difficulty in destroying all the leaves the latter has been most generally practiced. Upon the timely and efficient application of the fungicide the degree of control is dependent.

**Period of Infection.** Rather extensive experiments have been conducted to determine the period of infection in order that the time of application of the fungicide may be so arranged that the maximum protection is secured. It was formerly considered unnecessary to begin spraying for scab control before the pink stage of the blooming period and this was followed by a petal fall, a 10 day, a two week and a midsummer application. We know now that the pink application is too late to catch the early infections and that at least a pre-pink and in some years a delayed dormant is necessary to secure satisfactory protection against scab. If the pre-pink, the pink, the petal fall and 10 day applications are thoroughly made later applications specifically for scab are usually unnecessary.

The failures to control scab are invariably traced to carelessness or untimely applications of the fungicide. These omissions allow even a few summer repeating spores to develop, spread, reinfect the host, and thus perpetuate the disease in spite of consistent attempts to control the disease after it is seen to be established. Truly an ounce of prevention is superior to a pound of cure in this case.

**When to Spray.** While it is important to apply the fungicide prior to rainfalls during the critical period of spore discharge from the old dead leaves, the real object which every orchardist should attempt to attain is to **keep** the newly developing leaves and fruit as fully covered as possible from the time of their emergence to that time which is marked by a date approximately two weeks after the petals have fallen. By this date practically all the viable spores have been shed from the dead leaves.

Slides will be shown illustrating the life-cycle of the scab fungus, *Venturia Pomi*; the method by which the spores escape and are carried by wind to the leaves where they germinate and infect to produce later the summer repeating spores which in turn germinate and reinfect. This process is repeated until growth processes of the leaves and fruit are concluded when the leaves fall to the ground and by the next spring the perfect stage is matured.

**Question:** Isn't cultivation one means by which scab may be controlled?

**C. R. Orton:** Yes; the whole infection comes from the leaves on the ground. If you destroy the old leaves you do not need to spray. But experience has shown that this is impossible. You can reduce a great deal of the infection by cultivation and covering up the old leaves, but you cannot do it completely. There will always be leaves left uncovered, especially around the trunks of the trees, so that you are sure to get ample infectoin.

**Question:** When is the period of the first spray?

**C. R. Orton:** That varies with the conditions. You have to watch the season and have your experts advise you. Some years it will come at the delayed dormant period. The past year it came a week or ten days later so that our pre-pink application was the most important one.

**Question:** How far can the spores be carried?

**C. R. Orton:** They do not have to be carried very far because everybody has a few apple trees. Undoubtedly these spores can be carried a considerable distance under favorable conditions. I do not think the maximum distance has ever been determined but we know that the spores of other similar parasites they may be carried miles and still cause infection.

**Question:** Why is it that some trees are more susceptible than others?

**C. R. Orton:** That is inherent in the tree itself. You may be immune from a certain disease while your neighbor along side of you may be susceptible. With trees you have a similar condition. The York Imperial is quite a resistant variety but you will always get enough infection so that it will injure a certain proportion of your crop.

**Question:** How long is your foliage protected ordinarily by applications?

**C. R. Orton:** It depends on the rate of growth of the leaves, but you cannot expect absolute protection of the foliage during this stage of rapid development much more than four or five days. We find, however, that we get excellent control by placing the sprays at ten day intervals.

**Question:** Does the application protect the leaves already developed and the new infection take place on the new growth of the leaves? If you put the application on today and cover the leaves thoroughly are they immune?

**C. R. Orton:** They are protected for just so long as that film of spray covers your leaves. But you must remember that the individual leaves are growing all the time and the growth is always from the base and not from the tip of the leaf. The place unprotected, therefore, is always at the base of the leaves. At the end of five or six days you have quite a little area there that is not adequately protected.

#### LESSONS FROM EXPERIMENTS IN THE CONTROL OF APPLE SCAB WITH SPRAYS AND DUSTS\*

Summary of talk by H. W. Thurston, State College.

1. In light scab years, such as 1920, almost any of the common sprays or dusts will keep the disease in check, but in years of heavy infection and unfavorable weather, many spray materials fail.

2. The severity of scab infection is determined by the rainfall during the months of April and May, and the character of the rainy days is of more importance than the total amount of rainfall. A small amount of rain, together with cloudy, drizzly or foggy weather, is a much more dangerous condition than several heavy showers.

3. The early applications are the important ones, so far as scab is concerned. The tests have shown the necessity of at least one application prior to the pink. Certainly this is true in most years, and it is recommended that where scab is

\*The results of these experiments are presented in greater detail in a bulletin of the Pennsylvania Agricultural Experiment Station, State College, Pa., sent free on application.

a problem spraying should start with a delayed dormant spray. Growers should get away from the idea of spraying only at fixed intervals. Their aim should be to start with a delayed dormant and keep the young foliage covered as fast as it unfolds. Don't give the scab spores any unprotected leaf surface on which to get a start. If this is done up until the time of petal fall scab control will be assured.

4. **Spraying:** During the six years of these tests it has been found that lime sulphur, either home made or commercial, both liquid and dry, when properly diluted and applied has given the most uniformly satisfactory results and probably should still be considered the standard fungicide for scab control.

5. **Dusting:** Sulphur dusts have given some very good results at State College. During these tests dust has been increasingly promising and during the past season one of the dusted plots was actually the best in the test. Improvements in dust and dusting machinery have been largely responsible for the better results obtained in more recent years.

**Question:** In the use of dry lime sulphur did you follow the directions of the maker in diluting it?

**H. W. Thurston:** We followed the directions to this extent: we never made it any stronger than the directions said. I have tried several strengths.

One of the members present stated that he seemed to get as good results from a weaker strength.

**Question:** Did you make the same number of applications of spray as with dust?

**H. W. Thurston:** In the experiments of the past summer the same number of spray applications were used as with dust. They were put on in every case during the same day.

**Question:** What is the right amount of dust pressure?

**H. W. Thurston:** I do not know what the dust pressure should be but I feel that we still do not have enough pressure, even though the dust is ground much finer. We need more pressure and something in the way of a nozzle. Now we have nothing but a piece of pipe. It seems to me that the best way to apply dust is to apply it in the same manner as we apply the spray.

**Question:** At what time of day do you put on the dust?

**H. W. Thurston:** Early in the morning,—not necessarily at daylight by any means. It is not always necessary to get out before daylight in order to dust. The main point to avoid is wind interference and if you have to get up early to get this, do so. Some dust at night.

**Question:** How much wind can you have without inefficiency?

**H. W. Thurston:** That depends on the size of the trees and the power of the blower. You cannot blow dust against much wind, that is certain. Furthermore, the farther you have to blow it to the top of large trees the more difficult it becomes.

**Mr. Wolfe:** I would like to know whether you have had any discoloration of the foliage through the use of dust?

**Answer:** We get no discoloration.

**Member:** In our county we noticed a bronzing of the foliage and in places where the dust seemed to settle it checked the growth of the trees.

**Question:** When is the grower to know just when to start spraying and what to use?

**H. W. Thurston:** The grower perhaps is not able to know just when these scab spores start shooting. We will come to the time when in each important fruit region there will be a specialist who will watch these dead leaves for the first appearance of the spores. Then when he finds that condition word will go around the region to start spraying for apple scab. A beginning has already been made in Pennsylvania to supply this spray service. There is no set schedule that can be safely used. It is up to you growers to get behind a movement of this kind if you wish to secure this assistance.

**Question:** What is the weakest strength we can use lime sulphur and secure results.

**E. L. Nixon:** 1.008 is the weakest you can use and control apple scab.

**Question:** In your experiments with different kinds of sprays did you experiment with sulphocide?

**H. W. Thurston:** Not in 1924. We gave that up several years ago as a scab spray.

**Question:** How strong can that be put on without injuring the fruit?

**H. W. Thurston:** The weakest solution we used burned. If we had used a weaker solution it probably would have had no value.

**Question:** Have you had any experience in spraying in the rain? I know of that being done.

**H. W. Thurston:** We do not make a practice of spraying in a rain, but, if we are spraying and there is a drizzle we do not stop.

**Question:** In case of rainy weather between your pre-pink and petal drop period, would you advise spraying?

**H. W. Thurston:** In case of a long drawn out period of rainy weather I would get in there if I could.

**Question:** Do you think there would be any damage done the blossoms?

**H. W. Thurston:** I am pretty well convinced that you can spray the blossoms in full bloom without hurting them, but if you use arsenic in the spray it will kill the bees, which are beneficial in pollination.

**The Chairman:** At this point I will appoint the following committees: **Nominating:** F. H. Fasset, New Hope; P. S. Fenstermacher, Allentown and H. F. Hershey, Hamburg;

**Resolutions:** D. M. Wertz, Waynesboro, Luther P. Creasy, Catawissa, Samuel Dickey, Oxford.

**Auditing:** A. E. Reist, Palmyra, R. J. Gillan, St. Thomas, G. B. Pollock, Wyoming.

### SOME RESULTS OF APPLE PRUNING IN NEW JERSEY

A. F. Mason, New Brunswick, N. J.

In an endeavor to cut down the cost of production, or perhaps due to actual labor shortage, many apple growers have overlooked the value of thorough pruning in the production of high quality fruit. Trees have been allowed to become very brushy, and the tops on older trees have reached a height that even the most modern type of orchard sprayer cannot reach.

**A Very Profitable Orchard.** Senator Emmor Roberts, of Moorestown, N. J. has a 10-acre block of Rome Beauty trees that is known all over the state of New Jersey because of some tremendous crops which it produced about the time of the war. For two or three successive seasons the gross returns from the 10 acres are reported to have exceeded \$20,000 per year. However, in 1922, the crop, though bountiful, ran to small sized fruit, while considerable scab in the orchard caused much loss when the fruit was picked. Perhaps a quarter of the crop was thus lost. The trees had grown tremendously and were quite thick and brushy. Lack of pruning was suggested as the probable cause of the small size and as a contributing factor to the poor control of scab secured by spraying. A pruning comparison was arranged for the 1923 season.

A three row block was pruned very thoroughly, special attention being given to bringing the tops back within bounds, and to thinning out the clumps of small wood with which the periphery of the Rome Beauty tree gets so full.

**Moderate Dehorning.** The first move was to bring the tops down to a height of from 20 to 25 feet. This involved the removal of sometimes three or four limbs as much as three or four inches in diameter, cutting always at a point where a strong side branch carried the growth out laterally, thus forming a natural top at that point. Many growers will object to the removal of much of the top in that manner, stating

that the top is the portion of the tree from which the finest fruit is secured. Their statement is correct, but their reasoning is faulty. Light is the controlling factor, and it makes no difference whether the "top" of the tree is fifteen feet in the air, or fifty feet. It is the section that gets the most light, and therefore is the portion of the tree that has the most vigor, that will produce the best fruit. In bringing down the tops of each tree from five to ten feet we did not destroy the portion of the tree that bears the best fruit, we merely moved it five to ten feet closer to the ground, so that it could be more easily handled. No large bare holes were left in the center of the tree. Cuts were made at points where a natural top existed.

**Renewal of the Tree Top.** Most growers have observed that the bearing apple tree, if neglected, has several "stories" in it. The strong shoots that formed the top were bent over by weight of fruit, and new vigorous sprouts developed to carry the growth a few feet higher. When they, in turn, are bent over and outward with the weight of crops, still another crop of vigorous new shoots develop to elevate the top of the tree. It is possible for the experienced pruner to bring back the tree to one of these natural stopping places, without damaging the tree, or opening the center up too much to the danger of sun scald, and the operation seems to lower the cost of operation greatly. It has been shown by Childs, of the Oregon Experiment Station, that when spraying with the best type of equipment, and 300 pounds pressure, that 51% of the wormy apples on a 26-foot tree were in the top eleven feet, that only produced 25% of the crop, while 31% of the wormy apples in a 28-foot tree were in the top six feet that only produced 6% of the crop. When the cost of spraying and picking the fruit from high trees is considered, and the evidence on the amount of wormy or diseased fruit in the top of the average well sprayed tree is weighted, a strong case against the high tree is developed.

After bringing down the tops, the side branches were then carefully thinned out, removing much wood about the size of a finger or a thumb, leaving the twigs and branches so that they hung evenly and without interference. In thinning of this kind, the twigs that rose from the top of a limb and those that hung directly down from beneath it were first candidates for removal. When we finished we thought we had the trees in excellent shape, but the growers who watched the progress of the work were scandalized. They claimed that it would be impossible for the tree to produce a crop on such a small amount of wood.

**Size of Fruit Increased.** In the fall the crop from five typical trees in the well-pruned block was compared with the crop from five typical trees of the thick, brushy block. The

thick brushy trees averaged 25.4 bushels per tree, while the well-pruned trees averaged 20.6 bushels per tree. But notice the effect of the pruning on the size of the apples; 54% of the apples from the well-pruned trees were over three inches in size, while only 18% were less than two and one-half inches. On the brushy trees, only 30% were over three inches in size, while 34% were less than two and one-half inches. The following table gives the results:

**EFFECT OF PRUNING ON SIZE OF FRUIT. RESULTS BASED ON CROP FROM 5 TREES IN EACH BLOCK**

Treatment	% of crop over 3 inches	% of crop 2½ to 3 inches	% of crop less than 2½ inches
Well pruned	54%	28%	18%
Thick and brushy	30%	36%	34%

Two per cent increase in apples having half or more of the surface red accompanied the increase in size due to pruning.

A large group of Burlington, Camden and Gloucester County growers, representing our biggest fruit districts, followed these results closely. To clinch the matter we repeated the work in this past (1924) season, using the same trees. However, we pruned five of the trees in the thick brushy block, so as to have three comparisons, as follows:

1. Trees well pruned for two years—1923-24.
2. Trees well pruned only one year—1924.
3. Thick brushy trees.

The results were very gratifying. Both blocks of well pruned trees far outyielded the thick brushy trees, this condition being true over the entire orchard, all but the check trees of which had been well pruned. The block that had been well pruned only one year had 33.1% more apples than the thick brushy trees, while the trees which had been well pruned for two years had 40.9% more apples than the thick brushy trees. The following table gives the results:

**EFFECT OF THOROUGH PRUNING ON AMOUNT OF CROP—1924**

Figures obtained from hand-picked and windfall stock from 5 trees in each block.

Treatment	Total crop from 5 trees in each block	% increase over check
Unpruned check	: 76¼ bushels	: 0.0
Well pruned 1924 only	: 101½ bushels	: 33.1%
Well pruned 1923 and 1924	: 107¼ bushels	: 40.9%

Again, the size of the fruit from the well pruned trees ran far ahead of the fruit on the thick brushy trees; 66.6% and 54.1% of the crops on the two well pruned blocks were above three inches, while only 43.8% of the crop from the thick brushy trees ran above three inches.

As to small apples, the two well pruned blocks had 5.6% and 8.2% of their crops under 2½ inches, with none under two inches. On the thick brushy trees 18.8% went from two to two and one-half inches, while 3.4% even fell below two inches. The following table gives the results:

#### EFFECT OF THOROUGH PRUNING ON SIZE OF APPLES—1924

Figures obtained from hand-picked stock from five trees in each block.

Treatment	% crop over 3"	% crop 2½"-3"	% crop 2"-2½"	% crop below 2"
Unpruned check, 1923	: 30	: 36	: 34	: 0
Unpruned check, 1924	: 43.8	: 34	: 18.8	: 3.4
Well-pruned, 1924	: 66.6	: 27.6	: 5.6	: 0
Well-pruned, 1923-24 (1923 crop)	: 54	: 28	: 18	: 0
Well-pruned 1923-24 (1924 crop)	: 54.1	: 37.7	: 8.2	: 0

Color was again benefitted by careful pruning, there being 6% more red apples on the well pruned than on the thick brushy trees. The following table gives the results:

#### EFFECT OF PRUNING ON COLOR OF FRUIT—1924

Figures obtained from hand-picked stock from five trees in each block

Treatment	% of crop running over 50% red color	% of crop running less than 50% red color
Thoroughly pruned	: 35.3	: 64.7
Unpruned check	: 29.3	: 70.7

We feel that we have built up a strong case against the thick tree, the unpruned tree and the high tree. In these days only fruit of high quality has been bringing adequate returns. It costs only eighty-three cents per tree to do this thorough job of pruning the first year, and on an estimate, not over fifteen cents to prune the same tree the next year. It required 1.7 gallons per tree per application more to spray the high thick tree than it took to spray the well pruned tree, not to speak of the difference in labor required.

#### QUESTION BOX

"Did dusting control scab in 1924?"

One member stated that dusting did control scab for him and that he averaged 97% control.

Mr. Thurston was asked if he dusted both sides of the tree and he stated that he did.

"Is the York Imperial losing ground in competition with other varieties?"

**G. W. Mitchell.** The York Imperial is losing ground and it is largely the fault of the grower himself. It is an ideal apple for baking and has wonderful keeping qualities. It is necessary to educate the housewife as to how best to use this variety, especially with reference to baking and cooking.

**A. C. Martin.** When it comes to stewing there is nothing to equal the York. The York Imperial has been losing ground for one reason: If you attempt to sell the York they will tell you it won't cook. I make it a practice to ask what they cook with. Very often they say gas and then I tell them that they try to cook too quickly. I could sell 100 bushels of Staymans where I could sell five of York. It used to be that everybody used coal or wood. Now they are using gas and that, I believe, is the reason why the York is losing ground.

**Sheldon Funk:** It is simply impossible for me to sell the York Imperial.

**President Greist:** It seems to be largely a question of locality and market. There are certain markets that know the York Imperial and will pay as much for it as for the Stayman, sometimes it will bring a little more. I should think that Mr. Funk would have no trouble in selling the York Imperial, especially this year.

**Sheldon Funk:** I have had more trouble this year than ever before. I cannot move them.

**A Member:** The Stayman bears five years earlier than the York and bears every year, while the York bears every other year. The Stayman is far ahead of the York.

**A Member:** I have five bushels of York Imperials to one of Winesap. I cannot get \$1.00 a bushel for them.

"Who has had satisfactory experience with hail insurance?"

**Sheldon Funk:** I had hail insurance last year and my experience in adjusting a loss with the Company (the Hartford) was entirely satisfactory.

"Is there over-planting of apples and peaches in Pennsylvania?"

**Member:** A short time ago the New Jersey Horticultural Association passed a resolution favoring a census of the plant-

ing of apples and peaches in New Jersey. I think it would be a good thing for us to take up the matter.

**The Chairman:** I think this will be taken care of by the census being taken by the Department of Agriculture at Washington, which has an appropriation for that purpose and has regularly appointed census takers.

#### AFTERNOON SESSION

January 21st

#### EXPERIENCES OF A PENNSYLVANIA PEACH GROWER

Sheldon W. Funk, Boyertown.

The success or failure of the peach business in Pennsylvania is very largely dependent upon location. Extremely cold weather during the winter and late spring frosts are usually the limiting factors as far as profit is concerned.

The first essential, therefore, is a high, well drained location on a light, friable soil. A high, well drained location is not only essential as far as frost is concerned but it is also conducive to higher quality fruit. Peaches grown on a light, well elevated soil are practically always superior in flavor, appearance and carrying qualities to the fruit grown on low and richer soils. The spraying costs will also be far heavier on the low elevation.

My practice has been to use the peach only as a filler. This is contrary to the practice of a great many growers. We, however, have never experienced any of the difficulties usually claimed for peaches as fillers and I would not consider using them in any other way.

The apples are planted forty feet apart and the peaches twenty, giving us twenty-seven apples and about seventy-five peaches to the acre. We put in a driveway every thirteen rows, which accounts for the smaller number of peach trees.

The peaches come into bearing at three to four years of age and are taken out when ten to eleven years old. This allows for from six to eight crops ranging from one to ten bushels per tree.

The number of varieties to be planted will depend upon a number of conditions which should be considered very carefully before the actual planting is done.

The most profitable variety is, of course, the Elberta and it should be planted as extensively as possible. Always bear in mind, however, that the harvesting period on this variety is never more than ten and frequently as low as three to four days.

**Cultural Suggestions.** I have not the time to go into cultural details but will merely offer a few suggestions. It is highly important to grow a large tree in the shortest possible time. To do this it is necessary to practice a thorough system of cultivation with liberal applications of fertilizer. Young trees may be cultivated until the end of June and bearing trees several weeks longer. The fertilizer should be applied earlier in the season.

The consumer wants large, well colored fruit which means that culls should be eliminated as far as possible. To accomplish this, it is necessary to prune the trees well each winter and then thin the fruit very hard during the summer.

After the fruit is grown, grade it carefully and pack well in new containers suited to your market.

The trials and tribulations of the fruit business seem to be increasing quite rapidly at present. Our old enemy "Peach Yellows" is, of course, still with us; but with careful inspection two or three times each season, we are able to hold it in check. Recently a new pest, the Oriental Peach Moth, has made its appearance and this insect has all the earmarks of a "bad actor." At present, we have no practical remedy for its control. The Japanese Beetle is also about due in our section so it would seem that peach growing in our part of Pennsylvania is due to become highly interesting, if not profitable.

**Peach Varieties.** The discussion developed that that part of Berks County where Mr. Funk is located has had about one peach failure in forty years—that of 1921. He extends his peach season several days by using nitrate heavily on certain trees. He gets about seventeen half bushel baskets per tree; a good picker can pick 100 baskets a day, but the average is nearer 50. It takes seven packers to pack a car a day. His market is chiefly Boston, and his season normally comes in between south Jersey and New York, northern New Jersey being out of peach growing now. Mr. Funk has mostly Elberta, but would plant more Hiley than any other white peach, not Belle of Georgia, which comes on the market with other sorts. The Early Elberta will not bring a good price; their color is against them. Matthews Beauty, which is usually three days ahead of Elberta, is preferable. The later the Elbertas ripen, as a rule, the more money they bring.

#### HOW CAN WE GET NURSERY STOCK THAT IS TRUE TO NAME

J. K. Shaw

Massachusetts Agricultural College, Amherst, Mass

I don't know whether or not the fruit growers in Pennsylvania have had as much trouble from getting fruit trees not true to name as we have in southern New England. I judge

from what Professor Fletcher has told me that you are not without your troubles in this respect. I have sometimes thought in southern New England we have more than our share of this trouble. Possibly this is partly because of the experiences of Professor Sears and Waugh when they started their orchard in South Amherst some fifteen years ago. They were unfortunate enough to get more than a thousand trees not true to name and most of these were undesirable varieties that proved pretty nearly worthless to them. Their experiences were pretty thoroughly advertised around that part of the country and perhaps this has helped to bring to our notice a great many cases of fruit growers who have had trouble of this sort.

While it is true that the absolute numbers of misnamed trees is apparently large it is also true that the proportion of misnamed trees is rather small. I have no means of knowing just what the proportion has been in recent years but I think it is somewhere in the vicinity of five per cent, but even this rather small proportion is of great importance to the fruit grower for it results in material losses if one grows these trees several years before he finds that they are not true to name and must then top-work them or pull them out and replant with other varieties. At any rate our fruit growers have become considerably interested in this problem of misnamed trees and this has resulted in developing a plan of certifying varieties which has been carried out for the past four years through the agency of the Massachusetts Fruit Growers' Association. In the time that is allotted to me this afternoon I propose to tell you about this plan and how it has worked and the success that it has attained.

**How Misnamed Trees Occur.** In the first place it may be profitable to consider for a few minutes how misnamed trees occur. I find that a great many fruit growers think it is all due to dishonesty of nurserymen. As a matter of fact, I believe, that the number of misnamed trees that occur through the dishonesty on the part of the nurserymen is extremely small. I have found that nurserymen are as honest as any other class of people, but they are up against serious difficulties in this matter and despite considerable effort on their part, misnamed trees do get out and get into the hands of the fruit grower. The worst thing I have said about nurserymen is that I do not believe they have felt the responsibility in this matter that they should have felt.

In the early years of the nursery business, any single nursery enterprise was comparatively small. The proprietor quite possibly made the personal acquaintance of every tree in the nursery. He probably cut all his propagating wood himself, oversaw the process of budding, kept watch of the trees as they grew and personally looked after the digging and packing

of the trees when they were sent out to his customers. The business has grown so that now no large nurseryman can give this personal attention to his trees but must turn a great deal over to hired helpers. Now you all know it is a fact that a hired helper is not as dependable as the man who has a personal interest in the success of the business. Moreover, many nursery laborers are not competent to keep a close oversight of the trees in the nursery and occasional mix-ups occur.

**Mixtures in the Nursery Row.** All nurserymen cut their propagating wood from the older trees in their nurseries. Of course, there are some who propagate part, or perhaps in a few cases practically all their trees, but the proportion of nursery trees so grown is extremely small. Now it is the easiest thing in the world for a man cutting bud wood or scion wood to make a mistake and get on to the row of Stayman Winesap when he thinks he is cutting Baldwins. In this way Stayman Winesap gets mixed into the Baldwin row in the nursery and in succeeding years when one goes to cut bud wood in these rows he gets a mixture. So from year to year this mixture is perpetuated and will continue until it is discovered and the misnamed trees eliminated from the row. It is also very easy to get scions mixed in the grafting room when the operation of root grafting is under way. In fact there are all sorts of ways in which a stray variety may get mixed in the rows. So you see from the nurserymen's method of propagation that once a mixture occurs it is bound to persist until it is discovered, or until the nurseryman goes to some other source for his propagation wood.

Furthermore practically all large nurserymen dig their trees in the fall and bring them into the storage cellar where they are kept during the winter and perhaps graded during slack times in the winter season and finally in the spring shipping season are packed up to fill customers' orders. It is true that only the greatest care will prevent occasional mistakes while these processes are going on.

Occasionally the stocks are grown from seed from our orchards of cultivated varieties. It has seemed to me entirely possible that while in most cases these seedling stocks are easily distinguished from the variety to which they are budded and most seedling stocks which come up are eliminated, that possibly once in a great while a seedling stock might be mistaken for the budded variety and allowed to remain in the nursery row. Then if propagating wood is cut from these trees the mixture continues and as I have shown before it is bound to continue until discovered and eliminated.

It has seemed to me that there is more likely to be misnamed trees among those that have been wholesaled than among trees bought directly from the nurserymen who grows the trees. I have sometimes said to groups of nurserymen that

I thought the wholesaler was less careful in selling to other nurserymen than was the retail grower in selling to orchardists and I have never had this statement challenged. How much of this comes about through mistakes and how much through gross carelessness or worse I am unable to say, but I believe it is true and, therefore, it is always desirable to buy trees whenever possible from the nurseryman who actually grows them.

**Some Mistakes Inevitable.** I think we may say, therefore, that it is practically impossible to grow trees on a large scale without occasional mistakes being made no matter how careful the nurseryman may be and the only way to avoid misnamed trees is by inspection of the nursery row and identification of the varieties therein, and the elimination of trees not true to name. As a by-product of some of our investigation work at the Massachusetts Experiment Station some years ago it appeared to us that this was an entirely practical scheme and I have frequently said that it is just as easy to know varieties by the nursery trees as it is from the fruit. Practically every fruit grower knows the common varieties by the fruit, but he does not know varieties by the nursery trees. The reason for this is that the fruit grower sees the apples more often and becomes more familiar with them. Expert nurserymen familiar with trees through long experience in growing them, on the other hand, know varieties by the nursery trees better than they do by the fruit.

It is our experience with this problem of identifying varieties that has led to the plan of the Massachusetts Fruit Growers' Association for the certification of nursery varieties. I will now show you a collection of slides, the first of which illustrates some of the operations of the nursery; some of them illustrating the difference between varieties of trees as they grow in the orchard and finally some slides showing the leaves of different varieties by means of which I hope to show you that differences do exist between different varieties.

**Plan of Variety Certification.** The certification plan of the Massachusetts Fruit Growers' Association was started in 1921 in the nursery of J. W. Adams & Company of Springfield, Massachusetts. The way the plan worked is briefly as follows:

Any nurserymen desiring to have his trees certified makes application to the secretary of the association. Thereupon the association sends its agent to examine the trees in the nursery, this work being carried on during August and early September. Each tree is very carefully scrutinized to see if it is true to name and all trees found true to name are drilled through the scaffold, or in the case of one year whips through the main trunk of the tree, and an ordinary lead seal is inserted and the name of the variety stamped on the seal by means of

an ordinary hand sealing press. It has been our intention that this seal should stay on the tree until the tree comes in bearing but we have not been able yet to find a satisfactory wire that will last that long. At first we used a copper wire, but discarded that on account of the expense and more especially through fear that in occasional cases it might injure the tree. Next we used a soft steel wire, that apparently will not last for more than two or three years. Last year we used a tinned wire, which I hope will last a little longer, and next year we expect to use a galvanized steel wire which we hope will prove more satisfactory than anything we have used heretofore. The actual work of attaching the seals is performed by laborers in the employ of the nurseryman.

During the year 1921 to 1922 work was confined to Massachusetts nurseries. Now as a matter of fact there are very few apple trees grown in nurseries in Massachusetts. I do not suppose the total number exceeds ten thousand. It, therefore, became apparent that in order to try out the scheme in any adequate fashion it would be necessary to go outside the state. Accordingly in 1923 we made arrangements to certify trees for the Kelly Nurseries in Dansville, New York. Inasmuch as it appeared unfair to say that we would certify the trees for one nursery and refuse to certify trees for another we decided in 1924 that we would offer certification to any nurseryman desiring to have his trees certified and as a result of this policy took on three additional nurseries the past summer. The total number of trees certified has grown from about 3,500 in 1921 to more than 125,000 the past year. It is significant that all nurseries adopting the plan of certification have continued it in succeeding years. Moreover, they seem well pleased with the idea and tell us that they think the plan has come to stay.

**Regulation of Nurserymen Not Advisable.** The Massachusetts Fruit Growers' Association does this work at no profit to itself. The actual expense of the work is paid by the nurserymen for whom it is done. The total cost including the cost of labor in attaching these seals has amounted in most cases to less than 2 cents per tree. The nurserymen having certified trees sell them ordinarily at a small advance over the cost of uncertified trees though this increase in some cases has been greater than fruit growers think warranted. We have considered very carefully the idea of attempting to regulate nurserymen in this matter and require an agreement that they would not ask more than a stated increase in price for the certified trees. It has seemed to us, however, that this was unwise as it is very difficult for a variety of reasons to determine what a fair advance in price should be. We have decided to leave it to the regulation of the law of supply and demand and at the present time it looks as though this solution would work

itself out in time. I do not think the nurserymen think so much of an advanced selling price for certified trees as they do for the advertising value of the plan and the assurance it gives them that they are selling trees true to name.

**Percentage of Misnamed Trees.** It is significant that in every nursery in which we have done certification work for the first time we have found misnamed trees, the proportion varying from less than one per cent to more than ten per cent with different nurseries. Sometimes these misnamed trees are merely a few scattered trees through a given variety, and sometimes we find substituted for a certain variety something entirely different. Of course, we find all intermediate degrees of mixtures. Of course, after two or three years of this inspection and certification the misnamed trees are eliminated and we find very few or no misnamed trees in the nursery row. There is, however, always a chance of new mixtures creeping in and we found them the past summer in varieties that had been pure the year before.

**Certifying Other Fruits.** Up to the present time the organization has confined its work entirely to apples. The reason for this is that apples are the most important fruit in this section of the country and that we felt familiar with varieties of apples and did not feel sufficient familiarity with varieties of other fruits. Next year, however, we hope to take on plums and pears in case any nurseryman desires to have them certified. There is, however, comparatively few mixtures in these fruits in the nursery. Within a year or two we hope to be able to take on sweet cherries which are rather badly mixed in western New York nurseries. The problem with peaches is a more difficult one and I doubt very much if the present scheme can be carried out satisfactorily with this fruit. Many varieties can be distinguished with comparative ease, but some groups of varieties present great difficulty, notably the Early Crawford group. We have given very little consideration to the problem of small fruits which are undoubtedly badly mixed in the nurseries and it seems certain that our plan of attaching permanent seals to such plants would not work.

Variety certification has been started in other sections of the country, although not on exactly the same plan as we have used in the Massachusetts Fruit Growers' Association. There is an association of nurserymen in California that maintains an orchard for furnishing propagating wood for nurserymen and which maintains a variety inspection of the nurseries which is continued until the trees are in the orchard of the purchaser. In this way they are able to practically insure trees true to name. They have not thus far tried the plan of attaching permanent seals to each individual tree.

Considerable attention is being given to this problem by Canadian fruit growers and nurserymen and they have started

the past season a plan of inspection of nurseries, but without any official certification and without attaching the seals to individual trees.

Thus far our operations have been carried on entirely with retail nurserymen that is by men who grow trees themselves and sell them directly to the fruit grower. I hope sometime we may be able to reach into the wholesale trade where we will be able to correct or prevent more mistakes than we find among the retailers. Whether this work will be continued through the agency of the Massachusetts Fruit Growers' Association or through some other agency remains to be seen. It may not seem logical that a state organization should be operating in other states, but so long as no other organization appears it seems best that this organization should carry on the work. I feel sure that the effect of this certification work will be felt far beyond the trees actually certified for it will prove a spur to other nurserymen to take more pains in examining their trees and making sure that the trees are true to name. We think in Massachusetts that it offers the most practical solution for the problem of the misnamed trees and that in time they may be eliminated from the nursery and orchard.

In the discussion which followed the presentation of this paper it was brought out that the additional expense of certification of varieties—about five cents a tree at present—is small compared with the advantages secured. Two New York nurseries now offer trees that have been certified by the Massachusetts Fruit Growers' Association and had exhibits at the Farm Products Show. Dr. Shaw stated that the State Horticultural Association of Pennsylvania, in cooperation with the State Department of Agriculture and State College, is the logical agency to undertake this work, and that his services would be available for the certification of trees in Pennsylvania nurseries that desire it, until one of our own men can be trained to distinguish the varieties. He believes that many nurseries eventually will secure certification, as a matter of self interest, without regulation or pressure from governmental agencies, and that the law of supply and demand will determine the extra price that it will be necessary to pay for certified trees. The Association authorized the appointment of a Committee to prepare a plan for variety certification in Pennsylvania nurseries.

## WHAT DETERMINES THE KIND OF SOIL MANAGEMENT, FERTILIZATION AND PRUNING THAT APPLE TREES SHOULD RECEIVE?

E. C. Auchter,

Head Department of Horticulture, University of Maryland,  
College Park, Md.

The commercial fruit industry of the United States has been increasing so rapidly in the last few years and the demand for quality has become so emphasized, that orchards managed carelessly or in a haphazard manner are not likely to be very profitable.

In order to properly manage apple orchards, which are growing under a wide range of soil and climatic conditions, it is necessary to understand some of the fundamental principles which underly the various orchard practices. If some of these principles are understood it can readily be seen why certain orchard operations, such as pruning, fertilization, etc. might properly be varied under different conditions. A knowledge of some of the fundamentals of tree growth will also give us a better understanding of how different pruning, soil management and fertilizer practices affect growth and production.

### Desirable Orchard Conditions and the Interrelation of Orchard Practices

In productive and profitable orchards the following essentials are generally found: (a) A good supply of large, dark green and healthy foliage. (b) Terminal growth over the tree, which is of good length and thickness. (Desirable lengths vary with age of trees). (c) Fruit spurs of good lengths (one-half inch) and thickness, with numerous and healthy large leaves. (d) Well balanced tree growth and development.

Orchardists realize that to get their trees into the above conditions and to keep them in such condition, requires certain definite orchard practices.

Assuming that the orchard has been planted on suitable ground and that proper arrangements have been made for pollination purposes, the following orchard operations, **properly done**, are then essential if productive and profitable orchards are to result.

1. Proper spraying.
2. Proper pruning.
3. Proper soil management.
4. Proper fertilization.
5. Proper thinning of fruit.

The first four of these operations are so interrelated in their effects upon tree growth and fruit production that they should be considered together and not as separate practices.

Numbers 2, 3, and 4 especially should be considered collectively before deciding upon the method to use under any one of the headings. For instance, it is impossible, in many cases, to apply fertilizers intelligently without knowing what types of soil management and pruning are to be used. Likewise, in many instances, the pruning should be varied depending upon the type of soil management and fertilization to be used. It is quite possible to use proper soil management and fertilization practices and then counteract many of their advantages by improper pruning. An attempt will be made to explain these statements and evidence will be presented later, which can be used as a basis for deciding how these practices are interrelated and which practices should be decided upon under different conditions.

### Tree Physiology and Nutrition.

Apple trees as well as other plants grow, thrive and are productive provided sufficient amounts of water, mineral or soil foods and air foods are available. The plants absorb from the soil, through the fine root hairs on the roots, the various mineral elements. These, of course, must first be dissolved in the soil water before they can be absorbed. Thus the various elements such as phosphorus, potassium, calcium, sulphur, iron, magnesium, nitrogen, silicon, sodium, chlorine, manganese, aluminum, etc., are taken into the plants through the roots. The first seven of these generally seem to be the most important in most plants.

In the leaves, various elaborated or digested foods are formed. This production occurs in the presence of sunlight in the green parts or chloroplasts of the leaves. Carbon-dioxide of the air enters through small breathing pores or stomata and is combined with water to make up certain elaborated foods called carbohydrates (starches, sugars, etc.).

The soil foods can be considered as raw foods and as such are of little value to the plant until they have been changed and combined with the carbohydrates or other elaborated materials formed from them, helping to make up certain of the elaborated foods such as proteins, fats, etc. The elaborated foods are the ones which are used by the plants in making new growth and in producing seeds and fruit.

It can thus be seen that the leaves might be called the stomachs of the plant. With these facts in mind, the great value of the plant of having a large, green and healthy leaf surface can readily be seen.

### The Relative Importance of Certain Mineral or Soil Elements and the Importance of Carbohydrates in Apple Orchards

Although apple trees do need and do use, for proper development, practically all of the essential mineral elements,

experiments have shown in many states, including Maryland, that most of our soils are already supplied with sufficient available amounts of these minerals for satisfactory tree growth and fruitfulness. Nitrogen, however, seems to be deficient in many of the soils and a profitable response often results whenever it is added. It is often necessary to add phosphorus, potassium, and lime for the growing or farm crops on the same soils, where apple trees will show no response to the addition of these fertilizers. Orchards which are cultivated and in which cover crops are plowed under, thus seldom need any addition of phosphorus and potassium as far as the trees are concerned. Phosphorus, however, is of value in the sod orchard for the growth of grass and clovers and may be needed at the time of seeding the cover crop in the cultivated orchard, simply to grow a larger cover crop. Thus, generally speaking, nitrogen is the most important of the soil foods to consider in the care of the apple orchard.

As stated previously, the elaborated or digested foods are the ones, which are used in plant growth and fruit production. Of these elaborated foods, the carbohydrates (starches, sugars, etc.) are very important. These carbohydrates, and the materials formed from them are used by the plant in building up new tissues and in strengthening others. Thus in the case of the apple, the carbohydrates are used in: (a) making new terminal growth over the tree, (b) in increasing the diameter of the main limbs, trunks and roots, (c) in the production of new root growth, (d) in the formation of new fruit spurs, (e) in keeping the old spurs healthy, and (f) in the formation of fruit buds for fruit production.

From the above discussions, it can be seen that orchardists should be particularly interested in the carbohydrate, nitrogen and water supply for fruit trees. The relative amounts of these materials in the tree are also very important and in the following pages the carbohydrates will be represented by the letter C. A large letter C will be used to indicate relatively large amounts of carbohydrates while a small letter c will be used to represent relatively small amounts. Likewise the amounts of nitrogen will be represented either by a large N indicating a good supply or by a small n if the supply is limited.

#### **How Various Orchard Practices Influence the Contents of Carbohydrates and Nitrogen in the Tree.**

Let us now refer to the various orchard practices as outlined on page 2, and see how each of these affect the carbohydrate and nitrogen contents of the tree.

**Proper Spraying:** Discussing the question of spraying first, we all know that if the foliage is not properly protected by spray materials, it will be injured by various insects and

diseases. For instance if **Apple Scab** is not prevented, diseased areas or scab spots, often occur on the leaves. This injury may range from a few diseased areas on the leaves to practically complete defoliation in severe infections. Likewise **Leaf Spot**, the leaf form of **Black Rot**, might seriously reduce the amount of healthy foliage. Insect injury, such as that caused by the **European Red Mite**, which seems to reduce the green (chlorophyll) content of the leaves, giving the orchard a yellowish or bronzed appearance, might result.

**Aphis** may cause the leaves to become distorted and severely curled so that the amount of leaf surface exposed to the sun would be greatly decreased. And thus many other examples might be given. However, it seems quite clear that if proper spraying is not performed, the amount of healthy foliage will be greatly reduced. By referring to page 23 we will recall that the carbohydrates are manufactured in the leaves and we have just seen how important these foods are for tree growth and fruit production. Thus if the leaves, the manufacturing plants of the tree, are reduced we can see that relatively the tree would have less carbohydrates and a small c would result.

**Proper Pruning:** In the case of pruning there are two main problems; namely, when to prune and how much to prune. Under the heading "When to Prune"—the question of **summer versus winter or dormant pruning is presented**. A few years ago, much was heard of the supposed advantages of summer pruning. It can be seen that if pruning was done in the summer time (late June or July) that a large amount of leaf area would be removed. Tree growth in length or terminal growth is usually completed during July in most sections, although this date varies under various different environmental conditions. It can thus be seen, that is the pruning was done at about this time, practically very little new growth and leaves would result. Thus the trees would lose the value of the removed leaves from July until normal leaf fall. In such a case, the amount of carbohydrates which such trees would make for use and storage would be much less than similar trees unpruned in the summer. Of course very early or very late summer pruning probably would not be so detrimental. Possibly in certain special cases, a certain amount of early summer pruning might be desirable for special reasons. However, in most cases experiments have shown that summer pruning is not to be recommended. The vigor of the trees is reduced and production is often less. Plainly summer pruned trees would have relatively less C.

**How much to prune young trees:** If the pruning is to be done then in the dormant season, the question immediately arises of **how much to prune**. Before discussing this phase of the subject, it is necessary to differentiate between young and

moderately vigorous trees and old bearing trees lacking somewhat in vigor.

Experiments in various parts of the country have shown that with young, vigorous trees, heavy pruning has decreased the total amount of new wood growth produced in any one season. With less wood growth, less total spurs were also formed. With less new growth and less spurs, the total leaf area was correspondingly less on the heavy pruned trees. It can thus be seen that with less leaf area, less carbohydrates could be formed. We would expect then that heavy pruning on young trees, by cutting down the possibilities of carbohydrate manufacture would dwarf the trees. Experiments have shown such results. Heavily pruned young trees made less wood growth, less spurs, less fruit buds, had smaller roots, smaller trunks and main limbs and were delayed in both earliness and amount of fruit production. Young trees should thus be pruned only enough to form a good main framework of branches, to remove badly interfering limbs and to allow enough sunlight to enter the tree to keep the various parts healthy and vigorous. Thinning out of limbs is to be recommended instead of continually heading back terminals.

**Pruning Bearing Trees:** In the case of old bearing trees, rather low in vigor, heavier pruning seems advisable. In such trees, the removal of several small limbs evenly distributed over the tree and the moderate heading back of certain of the main limbs to a good side branch gives good results. Such old trees, often have so many spurs and buds on them, that the amount of water and nitrogen which reaches each bud is insufficient to combine with the carbohydrates and cause satisfactory growth. As a result terminal growth is often short, the fruit spurs grow very little and only the healthiest spurs form fruit buds. By the rather hard top pruning, the total number of buds are reduced although the amount of roots remain the same. As a result comparatively more water and nitrogen reaches each bud. New and longer terminal growths are produced upon which new, vigorous spurs are produced the next year, each of the old spurs remaining grow more vigorously and fruit buds are formed. Such old trees thus actually produce more new growth and spurs and become more fruitful following a comparatively heavy pruning.

**Proper Soil Management:** In the handling of orchard soils several objects should be sought. Some of these are: (a) the conservation of moisture, (b) keeping up a good nitrogen supply, (c) the addition of organic matter, and (d) a proper physical condition of the soil. It is rather hard to separate these four factors since it can readily be seen that if a good supply of organic matter is added, the physical condition of the soil would be improved, the nitrogen supply probably

would be increased and the water holding capacity of the soil would be greater.

Considering these points in relation to orchard culture, it can readily be seen that certain soil practices might be better than others. Likewise a certain practice might be satisfactory under one set of conditions and unsatisfactory under a different set of conditions. In general, it can safely be said that if the orchard soil was allowed to grow only a sparse grass covering, which was not cut from time to time, that the grass would be taking from the trees both water and nitrogen. Such trees would probably suffer. On the other hand, if the orchard was given continuous clean cultivation and practically no standard cover crops or natural weed cover crops were plowed under, the soil under such treatment would have a poor physical condition, a poor water holding capacity and would gradually become deficient in nitrogen.

Although there are many modifications of the clean cultivation and cover crop and the sod mulch systems, they will not be discussed in this paper.

If by means of fertilizer, heavy enough sod could be grown in the orchard so that plenty of mulching material would be available, or if an extra supply of a cheap enough additional mulch such as straw, corn stalks, etc., could be obtained so that as much water and nitrogen would be available to the tree and if this would be as cheap a practice as clean cultivation, plus cover crops, then either method would be satisfactory. The decision as to which method to use would depend on the amount of water and nitrogen available, the amount of organic matter added, the cost of the methods and the response of the trees. Nitrification, of course, proceeds faster in cultivated ground than in sod. More nitrates are thus found in cultivated soils. Generally speaking the clean cultivation and cover crop systems have proven more satisfactory to date in most of the eastern orchards which are growing on level ground. Alfalfa, as a permanent sod, is receiving some attention now in the east and may prove satisfactory. The use of alfalfa as a permanent sod is very satisfactory in the irrigated orchards of the northwest. Many of the mountainous orchards in the Piedmont regions are using partial cultivation, thus the tree rows in the young orchards are cultivated and sod mulch is grown in the middle of the rows to prevent washing. In older orchards, every other row is cultivated and the cultivated rows are alternated each year or two.

Since nitrogen is essential for tree growth and since water constituted from eighty-five to ninety per cent of fruits and is essential for the dissolving and intake of minerals, into the plant, that method of soil management should be used which will conserve and add the greatest amounts of these materials.

**Proper Fertilization:** By referring to page 24 it will be seen that nitrogen is most generally the element needed where the cultivated orchard shows any need for fertilization. Sod orchards and cultivated orchards on light, thin soils usually show very favorable and profitable returns from the addition of nitrogen. Stable manure, when it is available, is a very good orchard fertilizer. Dried blood, tankage, nitrate of soda, ammonium sulphate and others are carriers of nitrogen. Usually quick acting fertilizers, such as nitrate of soda or ammonium sulphate, applied early in the spring, give the most satisfactory results. Phosphorus is of value for the grasses and legumes in sod orchards and for cover crops applied at the time of seeding, in the cultivated orchards. Thus fertilization enters into the whole scheme, since one of the soil foods, nitrogen, can be increased for the tree, by simply applying some nitrogen carrier to the soil.

#### **The Relation of Carbohydrates to Nitrogen in Promoting Tree Growth and Fruitfulness.**

We have seen how the common orchard practices such as spraying, pruning, soil management and fertilization might influence the possible carbohydrate and nitrogen content of fruit trees. We have also seen how important these two materials plus water are for tree growth and fruitfulness. Each of the orchard practices have been discussed separately, but it will be recalled—page 22, that these different practices were all interrelated in their effects on tree growth. In other words, before deciding upon any practice to follow, such as nitrogen applications, it was shown that the types of pruning and soil management which were being used, should be taken into consideration. Thus a special type of pruning might produce similar results as far as fruit buds are concerned as the application of fertilizers. Changing from sod treatment to cultivation might produce the desired result as well as special fertilization. Fertilizers in certain cases could easily take the place in increasing fruit buds of either special pruning or cultivation.

Doctors Kraus and Kraybill, working at the University of Chicago, have recently shown that the relative proportions of carbohydrates to nitrogen, within the plants themselves, determine to a great extent their growth and fruitfulness. By analyzing chemically plants which were differing from one another in growth and fruitfulness, they have shown that there must be a certain relation between the carbohydrates and nitrates within the plant before a condition will be caused which is favorable for good growth and at the same time, the formation of numerous fruit buds. They find four different arrangements or relations of these two materials, which influence growth and fruitfulness in different ways. Practically

every condition that the plant or tree may be in, can be interpreted according to the relationship of nitrates on the one hand to the carbohydrates on the other. With certain relationships, we may get very little growth and fruit. Other relationships produce both vigor of tree and fruit, while in others, we may obtain plenty of vigor but no fruit. The other different classes follow:

1. If the supply of nitrate is abundant, but that of carbohydrates is restricted, growth will be weak, slender and feeble and there will be little or no production of flowers. While this condition is not common in orchards it might occur if trees were defoliated yearly by insects, diseases or spray material. Trees pruned heavily in the summer would probably fall into this group also.

2. If the supply of nitrate is abundant, and there are sufficient carbohydrates so that this nitrogen supply is utilized, we get a strong, vigorous wood and leaf growth but still little or no formation of fruit buds. All the carbohydrates have been used up in growth, leaving no excess for fruit bud formation. This condition is well illustrated by our vigorous, rather heavily pruned, young orchards, which continue to grow on certain rich, moist, fertile, cultivated soils and do not come into bearing.

Bearing apple trees, which have been too heavily pruned and headed back in the dormant season, usually fall into this class, for two or three years following the pruning. The carbohydrates, stored up in the limbs, spurs, etc., are cut away in the pruning, leaving the nitrogen in excess. The removal of so many buds also reduces greatly the amount of growth and leaves which normally would have been produced. Thus less carbohydrates would be made and stored.

3. If the nitrate supply is ample and there is an excess of carbohydrates over and above the amounts utilized with the nitrogen, we get not only a good growth of tree, but also an abundant supply of fruit buds. This is the condition found in healthy, producing orchards.

4. If there is a deficiency of nitrates and an abundance of carbohydrates, we get an extremely weak growth, yellowish foliage and either few flowers produced or else a production of flowers too weak to set fruit. This is the condition usually found in our so-called starved or devitalized orchards. Old orchards growing under sod conditions, without fertilization, are often in this class.

If we were to represent these conditions graphically, illustrating the amounts and relations of carbohydrates and nitrates by sizes of letters, the chart would look as follows:

Class I.	$\frac{c}{N}$	=Small amount of fruit.	=Poor growth
Class II.	$\frac{C}{N}$	= Rank growth	=Small amount of fruit.
Class III.	$\frac{C}{N}$	=Fair growth	=Good fruiting.
Class IV.	$\frac{C}{N}$	=Poor growth	=Small amount of fruit.

#### Symptoms and Indications Denoting a Poor Physiological Conditions in Apple Orchards.

Suppose an eight year old boy was sick and a physician was called in. Before prescribing treatment that physician either consciously or unconsciously would diagnose the case. In addition to testing the heart and lungs and determining the fever and pulse, the following observations would probably be made: (a) color of boy—whether his face was pale and yellow, or whether the cheeks had a healthy pink or red color, (b) height of boy, (c) height compared to width, (d) total growth, (e) whether the boy was normally active, vigorous and healthy and thus productive of a certain amount of work.

The treatment prescribed would depend on and vary with these findings. Thus if the boy was six feet tall, very slender, yellow in color and not very active, the treatment prescribed would no doubt be different than if he was four and one-half feet tall, broad shouldered, had a good healthy color and normally active.

The physiological condition of fruit trees can similarly be diagnosed, and the treatments prescribed or used should vary according to the diagnosis. For instance, before prescribing treatment, the symptoms denoting the health of the tree should be studied and observations similar to those made of the boy, should be made. Thus: (a) color of foliage—is it dark green or yellow and sickly looking? (b) height of tree—is it dwarfed for its age or overgrown? (c) height and width of tree—is it very tall and narrow, or is it a well balanced tree? (d) total growth—is it making a satisfactory growth of new wood each year? (e) length of terminal growth—is the terminal growth three inches or four feet? (f) is the tree productive—are the fruit spurs numerous, vigorous and are fruit buds formed? Non-blossoming spurs, which form only about

one-sixteenth of an inch of new growth each year, seldom form fruit buds; spurs making one-fourth of an inch of new growth generally blossom, but often do not "set" very well; spurs making from one-half inch to one inch generally blossom and "set." Spurs which are forced out into long, slender growths often do not blossom.

Thus we have several definite symptoms by which we might diagnosis the physiological condition of a tree in order to intelligently prescribe treatments.

#### Orchard Diagnosis and Prescription.

Having in mind the above symptoms and the aforementioned four classes with their theory of food balance, let us study some hypothetical orchards, diagnose their cases, and suggest a rational treatment. First let us assume a young orchard, about eight years old, on fertile, moist soil, making a vigorous growth. The leaves are large, dark green and dense. The soil is cultivated thoroughly, legume cover crops are plowed under, and the trees annually receive a moderate to heavy dormant pruning. No fruit is being produced nor does it appear that any will be produced for some time. How should such an orchard be handled? Evidently this orchard falls in class II. There are plenty of nitrates and carbohydrates for growth, but not enough excess carbohydrates for fruit production. We must get this orchard into class III. Evidently we must increase the carbohydrates or decrease the nitrogen supply or do both. The latter is the most easily regulated. If a crop is sown early in the spring or the orchard is seeded down temporarily in grass, part of the moisture and nitrogen will be diverted from the trees and used by the crops. The carbohydrates proportionate to the nitrates in the tree will be increased. If these trees are then pruned very lightly the stored carbohydrates in the tree will not be pruned away; more wood for producing leaf area will be left, carbohydrates will accumulate and the orchard should fall into group III and become productive. It is possible also, though a questionable practice, that a deep plowing, thus cutting some of the roots, would reduce the capacity for taking up moisture and nitrate by these trees and thus help in bringing them into bearing. Girdling of such trees, although not generally recommended, would cause an accumulation of carbohydrates above the girdle, and encourage fruit bud formation. In girdling (the removal of a narrow ring of bark from the trunk) care should be taken not to scrape the soft growing cambium or sappy layer from the wood.

Let us assume another orchard of bearing age in which the soil is cultivated; the foliage is healthy and green; the new growth on fruit spurs is about one-half an inch each year, and the terminal growth is from ten to fourteen inches annu-

ally. Good crops are being borne. How should this orchard be handled? Such an orchard is in class III and evidently is being managed properly. No fertilizer, special pruning or special culture seems necessary. Heavy applications of a nitrogen fertilizer might upset the nitrate carbohydrate relation and throw such orchards into class II. Such treatments would be serious mistakes.

Let us now consider one more middle aged orchard under a different set of conditions. This orchard would probably be in sod but it might possibly be cultivated and on light or poor soil. The trees are making very short terminal and spur growths, the leaves are yellowish and small, blossoms are not produced very abundantly and those which are produced do not set well. A chemical analysis of the wood of such a tree would probably show it packed with sugar and starches (carbohydrates) but low in nitrates. Evidently this orchard is in class IV and is in a starved or devitalized condition. What can be done? Evidently there is either a need for more nitrates or the amount of carbohydrates should be decreased. If such trees are given a rather heavy pruning, much of the stored up carbohydrates would be removed. With the same root system to absorb water and nitrates, a vigorous new growth will generally be produced on such trees; some of the carbohydrates would be used up in this growth, and better crops will result. This same result might have been brought about in sod orchards if such orchards were plowed and cultivated. Competition for nitrate and moisture would have been reduced by removing the grass. More nitrates are generally formed in a cultivated soil, and in this case, the increase of nitrates even without carbohydrate reduction, would probably have changed the balance or relation of these two nutrients so that the orchard would have fallen into class III. Still a third way of handling such an orchard, especially if it was a tilled orchard, would be the addition of a nitrogen carrying fertilizer. By adding nitrate the accumulated carbohydrates in the trees would be balanced up and growth and fruitfulness would probably result. In case all three remedies were given, that is, a heavy pruning, cultivation and a nitrogenous fertilizer, quicker and even better results could probably be expected. Care should be taken, however, not to continue such a practice too long for fear of throwing the orchard beyond class III into class II—too vigorous a growth and non-fruitfulness.

Other theoretical orchard conditions might be supposed and courses of treatment outlined, but probably the above examples are sufficient to illustrate how different orchards should be treated to bring the nitrates, moisture and carbohydrates into the proper balance or relation suitable for normal tree growth and fruitfulness.

## GENERAL SUMMARY

From the above discussions, the great importance of understanding tree physiology and how the different orchard practices affect this physiology can be seen. With this knowledge, it is clear that all orchards probably should not receive the same treatments. It is readily seen that treatments should be determined by a careful diagnosis. General recommendations can be given, which will fit many orchards, but in the last analysis, the treatments given to individual orchards should vary with the conditions of growth found in each orchard. Thus the amount and kind of pruning, amount of nitrogen to add and the type of soil management to use should vary with the orchard. These amounts should be based on the growth, fruitfulness and appearance of the orchard. A good treatment in one case might be a bad treatment in another. Pruning, orchard culture, moisture relations and the use of fertilizers—primarily through their effects upon the carbohydrate and nitrate contents and relations within the tree, all contribute to the desirable condition of good growth and fruitfulness.

These orchard practices are so interrelated in their effects upon tree growth and fruitfulness that all of them should be considered collectively when deciding how and to what extent to practice or change any one of them.

**Question:** How are you going to control the mice in the sod?

**Answer:** I have just spent \$75. to put wire protectors around young trees. With the older trees you don't have so much trouble. If the mice were very bad I would put wire protectors around the trees.

A delegate stated that sometimes the mice will burrow down and girdle the roots. Professor Auchter then said that some growers take sweet potatoes, put strychnine on them and put the poisoned potatoes down into the ground around the tree. Holes were made in the ground with a pointed stick and the poisoned potatoes were then placed in these holes.

**Question:** Do you get as good color with clean cultivation as with sod?

**Answer:** Generally speaking, no. However, if you get better growth due to cultivation, then thin out a little bit and let the sublight come in.

Numerous questions were then asked by the growers dealing with the managements of their individual orchards.

**BUSINESS SESSION**    Wednesday Evening, Jan. 21

**R. E. Atkinson:** At the present time there is a movement among agricultural associations to form a state federation. It occurred to us that you might be interested in such a combination. If so we would be glad to have you send a delegate to meet with the other associations who will consider some such movement. We are trying to form the agricultural interests into a body so that they can work together in harmony. I am simply putting the matter before you for your decision.

Moved by Mr. Criswell and seconded by Mr. Fenstermacher that the Horticultural Association send Mr. Atkinson as a delegate to this conference. Agreed to.

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**REPORT OF THE SECRETARY**

S. W. Fletcher, State College.

The paid up membership for 1924 was 812, a net gain of 88 over 1923. There are 138 life members, so that the paying members are now 674.

Over 450 of these are members of the county horticultural societies, and pay the State Association but one dollar. The Association closes the year without deficit, save for the long standing obligation to repay the money borrowed from the life membership fund. The Association also owns Liberty Bonds to the value of \$800. The balance for this fiscal year would have been larger if it had not been necessary to pay nearly \$200 for reporting the annual meeting. This has been done heretofore by the State Department of Agriculture.

The policy of organizing County Horticultural Societies has justified itself. The two most recent additions are Lycoming and Bucks, making the total number seventeen. We still hope to have Allegheny, Wyoming, Lackawanna, Monroe, Schuylkill, Montgomery, Beaver, Erie, Blair and a few others, eventually, but it is evident that the period of most rapid expansion of the Association from this source has passed. We can reasonably expect a total membership of over 1,000 within a few years if the county societies are fostered. Franklin, York and Lancaster are now the leading county societies, as to paid members, in the order named.

**The Summer Trip,** in conjunction with the American Pomological Society tour, was unusually successful. Splendid meetings were held in the orchards of Franklin and Adams counties, with an attendance of over 300 at some points, one day being spent in each county. The Association is under obligations to the officers and members of the Franklin and Adams County Horticultural Societies for the excellent arrangements, and for their hospitality. Shorter, but no less interesting meetings were held in York and Lancaster Counties, under the auspices of the respective local societies. The Summer meetings should be continued, but I suggest that it might be worth while, next summer, to go outside the state, say to western New York, the Hudson River Valley, or Virginia.

**Life Membership:** The question of the future policy of the Association with respect to life membership should be considered. Only three life memberships have been issued during the past six years. Annual members are far more satisfactory from the point of view of Association finances, as they pay their way each year, while we are now carrying 138 life members who contribute practically nothing toward current expenses, the money that they paid having been mostly used in past years. Moreover, it is extremely difficult to keep a check on life members, as to whether they are alive or dead, and as to whether they receive the Proceedings or not, for they are under no obligation to report to the Secretary once a year, as are annual members. We must keep faith with our present life members, but I recommend that no new life memberships be issued.

This brings up the question of a revision of the Constitution and By-Laws. The present instrument is needlessly long and unwieldy. The Executive Board, at its meeting last January, authorized the Secretary to prepare a tentative revised Constitution and By-Laws, merely as a basis for discussion, to be printed in the Proceedings of 1925, and acted on at the next actual meeting. The more important changes suggested, aside from greater brevity, are these:

No new Life Memberships to be received.

The administration of the affairs of the Association to be in the hands of an Executive Committee of seven, consisting of the President, Vice-President, Secretary, Treasurer, and three other members.

A revision of the list of standing committees.

The Association is now on its feet, with a loyal membership of over 800, and no debts. It is in a fair way to become one of the leading State Horticultural Societies in the East, rivaling that of New York, which has long set the pace. The time has come, it seems to me, for the election of a Secretary who shall be a fruit grower, not a professional horticulturist connected with State College or the State Department of Agriculture. It is not likely that the right man can be secured without paying him a nominal salary, say of \$300 or \$400 a year. It may be necessary to increase the annual dues to \$3.00, which is the sum paid by members of New York State Horticultural Society for similar service. The dues are \$2.00 in New Jersey and Virginia, which have paid grower secretaries, but in each of these states the Horticultural Society receives, in addition, a liberal state appropriation.

The Association has performed a useful service for its members during the past year in two respects: it has brought about a more reasonable attitude on the part of the sportsmen of the state toward the depredations to orchards and farms by deer, so that the prospect for some measure of relief is hopeful; and it has inaugurated a self-supporting state wide campaign for advertising fruit, by means of posters and recipe books, published by the Association and sold to members, that has been distinctly successful. It should be continued and extended. The Association has failed, however, in its attempt to make the crop-reporting statistics on Pennsylvania fruit more nearly representative of actual conditions in the state, and will continue to fail so long as members do not respond to the appeal of the Committee on Crop Estimates for their cooperation. This is one of the problems that should receive special consideration this year, as a matter of self interest.

S. W. Fletcher, Secretary.

## PROPOSED REVISION OF THE CONSTITUTION AND BY-LAWS

### Constitution.

**Article 1. Name.** The name of this organization shall be the State Horticultural Association of Pennsylvania.

**Article 2. Object.** Its object shall be the promotion of horticulture in the State of Pennsylvania.

**Article 3. Membership.** The annual membership fee shall be \$2.00. Present life members shall retain their privileges, but no new life members shall be received.

Members of county or local Horticultural Societies shall have membership in the State Horticultural Association under the following conditions:

(1) The county or local Society shall have at least fifteen paid up members and shall hold at least three meetings a year.

(2) The Secretary of the county or local Society shall remit to the Secretary of the State Horticultural Association one dollar for each member, before February 1 of each year, which shall be their dues in the State Horticultural Association for that year.

(3) The Secretary of the county or local Society shall transmit to the Secretary of the State Horticultural Association before February 1 of each year a list of its officers and members, together with a brief report of its work for the preceding year, particularly of those matters that would be of interest to the horticulturists of the state.

(4) The State Horticultural Association shall publish these reports in its Proceedings, which shall be distributed to the members of the county or local societies that have complied with these provisions.

**Article 4. Officers.** The officers of the Association shall consist of a President, Vice-President, Secretary, and Treasurer, all of whom shall be elected by ballot at each annual meeting; also an Executive Committee of seven members, five of whom shall be the elective officers. The Executive Committee shall have the general management of the affairs of the Association when it is not in session.

**Article 5. Quorum.** Twenty-five members of the Association and four members of the Executive Committee shall constitute a quorum for the transaction of business.

**Article 6. Annual Meeting.** The annual meeting shall be held at such time and place as the Executive Committee may determine.

**Article 7. Amendments.** The Constitution and By-Laws may be amended by a two-thirds vote of the members present at any annual meeting, provided such amendment shall have been signed by ten members and presented to the Secretary in writing at least ninety days prior to the time of holding the annual meeting, and mailed by the Secretary to each member at least thirty days prior to the annual meeting.

### By-Laws

1. No member shall be eligible to the office of President for more than two consecutive years.

2. The Treasurer shall disburse the moneys of the Association only after the bills have been approved by the President and the Secretary. He shall execute a guarantee bond for

such amount as the Executive Committee may determine, the premium to be paid by the Association.

3. The President, by and with the approval of the Executive Committee, shall appoint the following standing committees, each of three members: legislation, exhibitions, new varieties, fruit statistics, advertising, plant diseases, insect pests, and such other standing committees as the Executive Committee may deem desirable.

4. The President, by and with the approval of the Executive Committee, shall appoint a nominating committee, a resolutions committee and an auditing committee, each of three members.

5. The rules of the American Pomological Society shall apply in exhibits and nomenclature.

### TREASURER'S REPORT

Edwin W. Thomas, King-of-Prussia, Treasurer

#### RECEIPTS

Cash balance 1-24-1924	\$ 167.33
2- 2-1924—From S. W. Fletcher, Annual dues	304.00
3-15-1924—From interest on \$100 Liberty Bond	2.12
4-12-1924—From interest on \$500 Liberty Bond	10.62
5-17-1924—From interest on \$200 Liberty Bond	4.26
5-17-1924—From S. W. Fletcher, Annual dues	389.00
6-16-1924—From S. W. Fletcher, Annual dues	32.00
9-15-1924—From interest on \$100 Liberty Bond	2.13
10-18-1924—From interest on \$500 Liberty Bond	10.63
10-24-1924—From Porter R. Taylor, State Bureau of Markets	136.50
11- 1-1924—From Porter R. Taylor, State Bureau of Markets	36.30
11-15-1924—From Porter R. Taylor, State Bureau of Markets	54.50
11-15-1924—From interest on \$200 Liberty Bond	4.24
12-20-1924—From Porter R. Taylor, State Bureau of Markets	69.00
12-27-1924—From Porter R. Taylor, State Bureau of Markets	12.50
12-30-1924—From interest on deposits, General Acct.	3.44
1- 6-1925—From S. W. Fletcher, for Adv. in program	58.00
1-14-1925—From interest on Life Membership fund	2.19

Total Receipts ..... \$1,298.76

#### DISBURSEMENTS

1-25-1924—To The Nittany Printing and Pub. Co.	\$ 33.00
1-25-1924—To S. W. Fletcher, Envelopes and Postage	10.50
1-31-1924—To Torsch and Franz Badge Co.	18.20
3- 4-1924—To Platt, Youngman and Co., Treasurer Bond	2.50
3-21-1924—To George M. Darrow	12.19
5-13-1924—To E. E. Moyer	172.60
5-13-1924—To The Nittany Printing and Pub. Co.	20.50
5-13-1924—To F. N. Fagan	1.36
6-11-1924—To H. C. Dunmire Co.	4.00
6-11-1924—To H. C. Dunmire Co., on account	600.00
11- 5-1924—To J. Horace McFarland Co., 1,400 window cards	71.00
11-15-1924—To The Telegraph Printing Co., 6,000 booklets	146.00
12-29-1924—To The Telegraph Printing Co.	94.50
1-19-1925—To cash in bank	112.41

Total Expenditures ..... \$1,298.76

### AUDITOR'S REPORT

We, the undersigned Auditors, have examined the accounts, bills, and vouchers of The Pennsylvania State Horticultural Association, Edwin W. Thomas, Treasurer, and find the same correct.

Auditors:

R. J. GILLAN,  
S. W. FLETCHER.

### REPORT OF EXHIBITION COMMITTEE

Paul Thayer, State College, Chairman.

#### The Fruit Awards

CLASS I. **Delicious**: 1, E. F. Kauffman & Son, York, \$10. **Grimes**: 1, S. L. Smedley, Jr., Newtown Square, \$10; 2, E. F. Kauffman & Son, York, \$5. **Rome**: 1, S. L. Smedley, Jr., Newtown Square, \$10; 2, E. F. Kauffman & Son, York, \$5. **York**, 1, Geo. Myers, Biglerville, \$10. **Stayman**: 1, S. L. Smedley, Jr., Newtown Square, \$10; 2, E. F. Kauffman & Son, York, \$5.

CLASS 2. **Winesap**: 1, S. L. Smedley, Jr., Newtown Square, \$10.

CLASS 3. **Baldwin**: 1, Daniel Rice, New Bloomfield, \$6. **Delicious**: 1, Francis R. Cope, Dimock, \$6; 2, E. F. Kauffman & Son, York, \$4. **Grimes**: 1, E. F. Kauffman & Son, York, \$6; 2, Daniel Rice, New Bloomfield, \$4. **Jonathan**, 1, E. F. Kauffman & Son, York, \$6. **McIntosh**: 1, Francis R. Cope, Dimock, \$6. **Northern Spy**: 1, Francis R. Cope, Dimock, \$6. **Rome Beauty**: 1, E. F. Kauffman & Son, York, \$6; 2, Daniel Rice, New Bloomfield, \$4. **Smokehouse**: 1, Daniel Rice, New Bloomfield, \$6. **Stayman**: 1, E. F. Kauffman & Son, York, \$6; 2, S. L. Smedley, Jr., Newtown Square, \$4.

CLASS 4. **York Imperial**: 1, Daniel Rice, New Bloomfield, \$6. **Golden Delicious**: 2, Francis R. Cope, Dimock, \$4.

CLASS 5. **Delicious**: 1, E. F. Kauffman & Son, York, \$6; 2, F. G. Sattethwaite, Yardley, \$4. **Grimes**: 1, Gillan Bros., St. Thomas, \$6; 2, S. L. Smedley, Jr., Newtown Square, \$4. **Jonathan**: 1, S. L. Smedley, Jr., Newtown Square, \$6. **McIntosh**: 1, Gillan Bros., St. Thomas, \$6. **Rome**: 1, S. L. Smedley, Jr., Newtown Square, \$6; 2, E. F. Kauffman & Son, York, \$4. **Smokehouse**: 1, E. F. Kauffman & Son, York, \$6; 2, Daniel Rice, New Bloomfield, \$4. **Stayman**: 1, S. L. Smedley, Jr., Newtown Square, \$6; 2, E. F. Kauffman & Son, York, \$4. **York Imperial**: 1, Beaufort Farms, Harrisburg, \$6; 2, George Myers, Biglerville, \$4.

CLASS 6. **R. I. Greening**: 1, Everbreeze Fruit Farm, West Chester, \$6. **Black Twig**: 2, E. F. Kauffman & Son, York, \$4.

CLASS 7. **Delicious**: 1, S. L. Smedley, Jr., Newtown Square, \$6. **Grimes**: 1, S. L. Smedley, Jr., Newtown Square, \$6; 2, Daniel Rice, New Bloomfield, \$4. **Jonathan**: 1, Everbreeze Fruit Farm, West Chester, \$6; 2, S. L. Smedley, Jr., Newtown Square, \$4. **Rome**: 1, S. L. Smedley, Jr., Newtown Square, \$6; 2, Daniel Rice, New Bloomfield, \$4. **Smokehouse**: 1, S. L. Smedley, Jr., Newtown Square, \$6; 2, Daniel Rice, New Bloomfield, \$4. **Stayman**: 1, S. L. Smedley, Jr., Newtown Square, \$6; 2, Everbreeze Fruit Farm, West Chester, \$4. **York Imperial**: 1, Daniel Rice, New Bloomfield, \$6.

CLASS 8. **R. I. Greening**: 1, Everbreeze Fruit Farm, West Chester, \$6. **Summer Rambo**: 2, S. L. Smedley, Jr., Newtown Square, \$4.

CLASS 9. **Baldwin**: 1, Daniel Rice, New Bloomfield; 2, Clarence McHenry, Indiana, \$2. **Delicious**: 1, H. S. Nolt, Columbia, \$4; 2, Masonic Home, Elizabethtown, \$2. **Grimes**: 1, D. M. Wertz, Mt. Alto, \$4; 2, S. L. Smedley, Jr., Newtown Square, \$2. **Jonathan**: 1, Daniel Rice, New Bloomfield, \$4; 2, H. S. Nolt, Columbia, \$2. **McIntosh**: 1, Shaffer Bros., Gravity, \$4; 2, Gillan Bros., St. Thomas, \$2. **Northern Spy**: 1, Jacob E. Hinkle, Oley, \$4; 2, J. L. Reitz, Lewisburg, \$2. **Rome**: 1, Daniel Rice, New Bloomfield, \$4; 2, Guy L. Hayman, North Brook, \$2. **Smokehouse**: 1, Jacob E. Hinkle, Oley, \$4; 2, C. B. Snyder, Ephrata, \$2. **Stayman Winesap**: 1, Masonic Home, Elizabethtown, \$4; 2, C. B. Snyder, Ephrata, \$2. **York Imperial**: 1, D. M. Wertz, Quincy, \$4; 2, G. W. Myers, Biglerville, \$2.

CLASS 10. **R. I. Greening**: 1, Everbreeze Fruit Farm, West Chester, \$1; 2, Clarence McHenry, Indiana, 50c. **Stark**: 1, Jacob H. Hinkle, Oley, \$1; 2, Mertz Bros., Northumberland, 50c. **Senator**: 1, McClelland Bros., Canonsburg, 50c. **T. King**: 1, Mertz Bros., Northumberland, \$1; 2, D. K. Sterrett, Shippensburg, 50c. **Ewalt**: 1, Mertz Bros., Northumberland, \$1; 2, Mertz Bros., Northumberland, 50c. **Pewaukee**: 1, C. B. Snyder, Ephrata, \$1; 2, Ray A. Briggs, Nescopeck, 50c. **Summer Rambo**: 1, Masonic Home, Elizabethtown, \$1; 2, S. W. Wolff, Lima, 50c. **Black Twig**: 1, D. M. Wertz, Quincy, \$1. **York Stripe**: 1, Mt. Breeze Co., Scotland, \$1; 2, Geo. E. Shaw, Lewistown, 50c.

**Maiden Blush**: 1, Everbreeze Fruit Farm, West Chester, \$1. **Fall Pippin**: 1, F. B. Wolff, Lima, \$1; 2, R. A. Briggs, Nescopeck, 50c. **Wealthy**: 1, F. B. Wolff, Lima, \$1; 2, Everbreeze Fruit Farm, West Chester, 50c. **Nero**: 1, Gillan Bros., St. Thomas, \$1. **Russet**: 1, Gillan Bros., St. Thomas, \$1. **Gano**: 1, D. M. Wertz, Mt. Alto, \$1; 2, Ray A. Briggs, Nescopeck, 50c. **Ben Davis**: 1, D. M. Wertz, Mt. Alto, \$1; 2, Crawford Bros., Fayetteville, 50c. **B. Gilliflower**: 1, Peter R. Boltz, Lebanon, \$1; 2, E. A. Baron, Erie, 50c. **Fallwater**: 1, Dan. Rice, New Bloomfield, \$1; 2, Masonic Home, Elizabethtown, 50c.

**Hubbardston**: 1, Dan. Rice, New Bloomfield, \$1; 2, M. T. Wenger, Denver, 50c. **Smith Cider**: 1, Dan. Rice, New Bloomfield, \$1; 2, Everbreeze Fruit Farm, West Chester, 50c. **Wagner**: 1, Dan. Rice, New Bloomfield, \$1; 2, D. K. Sterrett, Shippensburg, 50c. **Bellflower**: 1, Ray A. Briggs, Nescopeck, \$1. **Gravenstein**: 1, Ray A. Briggs, Nescopeck, \$1. **Fall Rambo**: 1, S. L. Smedley, Jr., Newtown Square, \$1. **Winesap**: 1, S. L. Smedley, Jr., Newtown Square, \$1; 2, Dan. Rice, New Bloomfield, 50c; **Fameuse**: 1, D. M. Wertz, Mt. Alto, \$1; 2, Everbreeze Fruit Farm, West Chester, 50c. **Winter Rambo**: 1, D. M. Wertz, Mt. Alto, \$1. **Twenty Ounce**: 2, Ray A. Briggs, Nescopeck, 50c.

**Ensee**: 1, McClelland Bros., Canonsburg, \$1. **Paradise**: 1, C. B. Snyder, Ephrata, \$1; 2, Peter R. Boltz, Lebanon, 50c. **N. W. Greening**: 1, D. M. Wertz, Quincy, \$1; 2, Gillan Bros., St. Thomas, 50c. **Golden Delicious**: D. M. Wertz, Quincy, \$1. **Red Stark**: 1, H. L. Faucett, West Chester, \$1. **Shackleford**: 1, D. M. Wertz, Quincy, \$1. **Red June**: 1, Everbreeze Fruit Farm, West Chester, \$1. **King David**: 1, H. S. Nolt, Columbia, \$1. **Golden Winesap**: 1, Dan. Rice, New Bloomfield, \$1. **W. Banana**: 2, McClelland Bros., Canonsburg, 50c.

CLASS 11, COUNTY EXHIBITS. 1, Chester-Delaware County Horticultural Association, West Chester, \$100; 2, Luzerne County Horticultural Society, Wilkes-Barre, \$75; 3, Lancaster County Fruit Growers Association, Lancaster, \$50.

CLASS 14, PEARS, **Verz**: 1, M. P. Wenger, Denver, \$1.

**President Drouard**: 2, Peter M. Boltz, Lebanon, 50c.

CLASS 16B. **Black Walnuts**: 1, Mrs. D. A. Speece, Dauphin, \$1; 2, Clarence Blouch, Jonestown, 50c.

**Shelbarks**: 1, Eric Ridal, Berwick, \$1; 2, Clarence Blouch, Jonestown, 50c.

## PROMISING NEW VARIETIES

### REPORT OF THE GENERAL FRUIT COMMITTEE

R. D. Anthony, State College, Chairman

For the past three years the report of this committee has dealt with the selection of a list of the best varieties of tree fruits for planting in this State. The present report also deals with varieties but from a different point of view—what new varieties are worthy of a place in our trial plantings? We should make a sharp distinction between varieties which fall in our list of possible commercial plantings and those for test plantings. The first kind should have had years of careful trial and have proved themselves adapted to our particular conditions; the second kind may be of very recent origin and be untried in our own region. It is unfortunate that some

growers have failed to realize this difference and have made large plantings of untried varieties.

Both as a Society and as individuals we should do every thing in our power to prevent the commercial planting of undesirable kinds. A mistake of this kind means eventually a neglected orchard in our midst and poor apples on our market; both of these hurt our business.

Our list of commercial varieties changes from time to time to meet new market demands and to make room for better sorts. There should be three or four trees of each of the more promising varieties in each fruit community. It should be an important function of each County Horticultural Society to keep its members informed as to the location in that county of plantings of new sorts and the results obtained; and it should be a function of the State Association to do this same thing, in cooperation with the county societies, for the State at large.

The sources to which we should go for the first report of a new variety should be our own State agricultural experiment stations. The New Jersey Station at New Brunswick is doing a very fine piece of work both in breeding and in testing new peaches and is also testing a considerable number of apples. The New York Station at Geneva is the pioneer both in breeding and in testing new sorts and is now sending out some very promising new seedlings. You will find these new varieties discussed in a series of bulletins published by the Geneva Station called "New or Noteworthy Fruits." The seventh number of this series was published a year ago. The Central Experimental Farms at Ottawa, Canada, maintained by the Canadian government, are developing some promising sorts for regions demanding hardy fruits. Your own Station at State College has over ten acres devoted to variety testing.

Below are briefly discussed some of the most promising of these newer sorts:

**Early McIntosh:** This is a cross of Yellow Transparent and McIntosh made on the grounds of the New York Experiment Station at Geneva. Except that it ripens a week later than Yellow Transparent it is very similar to McIntosh.

**Starr:** This variety originated in New Jersey over fifty years ago. In the Southeastern Region, Starr is finding a place in the commercial plantings as a desirable sort to follow Yellow Transparent. In the rest of the State, however, the variety needs thorough testing before being planted on a commercial scale. In trials at State College the trees have been killed by fire blight.

**Melba:** This is a McIntosh seedling originated at Ottawa, Canada, which ripens just before Oldenburg. It is similar to McIntosh in quality but much of the bright carmen color is

## REPORT OF GAME LAWS COMMITTEE

R. T. Criswell, Chairman.

This committee was appointed "to meet with similar committees from the state-wide sportmen's organizations of Pennsylvania, together with representatives of the State Game Commission and of the State Department of Agriculture for the purpose of endeavoring to arrive at a solution of the game question in its relation to agriculture, that shall be fair to all concerned."

On October the 9th last the members of the Game Commission of the Commonwealth, representatives of the Department of Agriculture of the Commonwealth, including the Secretary and Deputy Secretary, members of Sportmen's Associations, officers of the State Grange, your committee appointed for the purpose above stated, and a number of citizens who had suffered from damage by deer made a tour of the South Mountain District inspecting damage done by deer, and that evening held a conference in the Senate Caucus Room at the State Capitol and discussed the various phases of the deer damage problem. Before adjourning this conference passed a resolution that a committee of three be appointed by the State Agricultural Council to meet with a committee of three from the State-wide sportmen's organizations in conference with the Board of Game Commissioners "for further discussion and formulation of plans for legislation to control the matter of damage by game."

The Agricultural Council appointed as its committee of three for the purpose above stated C. J. Tyson, Miles Horst and R. T. Criswell.

The date of this conference was set for January 5th, 1925. Your committee met with the Agricultural Council committee on the evening of January 4th at the Penn-Harris Hotel, Harrisburg, when plans of the stand to be taken by the committee of the Agricultural Council were formulated, and your committee approved these plans.

Your committee attended the conference next day, January 5th, 1925, and, after this conference adjourned, met and decided to support the legislation proposed by the conference. The resolutions proposing legislation were as follows:

1. RESOLVED, That as a protection to farming districts against injury caused by deer, we recommend the introduction and passage by the Legislature of an amendment to the present game law authorizing the Game Department, in counties where in their judgment the same is necessary, to declare an open season on does, that the special license for killing does in such season be fixed at \$1.00, and that the length of such

in splashes, not the solid washing we find on the McIntosh. The tree is hardy and bears young. The variety has been reported promising in New Jersey.

**Lobo:** The origin of this is the same as Melba. It is in season slightly before McIntosh and closely resembles that variety. Lobo was awarded the Wilder Medal in 1923.

**Cortland** is a cross of Ben Davis and McIntosh developed at Geneva. Without too serious a loss of quality it carries enough of the rough and ready qualities of the Ben to give a fruit which can stand commercial handling better than the more tender parent. It is from one to three weeks later than McIntosh and hangs to the tree better than its parent.

**Macoun:** This is a cross of Jersey Black and McIntosh made at Geneva that is hardly distinguishable from McIntosh except that it is from one to two months later. As grown at Geneva the fruits are a little smaller than McIntosh.

**Golden Delicious:** Although the parentage of this variety is unknown, from its appearance it would seem to be a seedling of Grimes. It has the color of Grimes and a suggestion of its quality, but in shape it looks like Delicious. This is being tried in many places in the State and the chief reason of including it in this list is to give the warning that the worth of Golden Delicious is still to be proven and consequently we should be very slow about making commercial planting, though it should be widely planted in the test orchards.

**Red Rome:** A number of years ago U. T. Cox of Proctorville, Ohio, sent out a solid red sport of Rome Beauty. A number of trees in the test orchard at State College were top worked to this Red Rome. As far as can be detected they are identical with Rome Beauty except that the color is nearly solid and distributed over a greater proportion of the fruit than in the ordinary Rome. Since one of the objections to Rome has been its failure to color well under certain conditions, it is seen that this red sport is worthy of much more extended trial.

The Red Stark, a more highly colored type of the Stark, is also finding favor in certain sections of Pennsylvania, particularly the northeastern counties.

In the above list of varieties McIntosh blood predominates. Fruits of this breeding we would expect to find better adapted to the northern portions of the State than to the fruit regions of south and southeastern Pennsylvania. Here it is still a question as to whether McIntosh should be planted to any considerable extent in competition with Summer Rambo, Smokehouse, Delicious, Jonathan, and Grimes.

open season be determined by the Game Commission, with proviso that farmers and tenants hunting on lands owned or occupied by them be granted such license, on application, without charge.

2. RESOLVED, That the present law be amended by permitting the owner or tenant of a cultivated farm, and his regular employes, to kill deer and bear found committing injury to farm lands or crops or where injury has recently been committed, and to keep the carcass, upon making report thereof to the Game Department.
3. RESOLVED, That the present game law be so amended as to permit the Game Department to curtail the open season and bag limits on any species of game, or to extend the open season generally or in districts, under such regulations as they may deem necessary.

Your committee recommends that the Horticultural Association support this proposed legislation. However, we deplore that more prompt and more adequate relief from this serious damage by game was not obtainable through this conference.

R. T. CRISWELL,  
Chairman, Game Damage Committee.

#### NOTES ON CONFERENCE ON DAMAGE BY GAME

Senate Caucus Room, State Capitol

Harrisburg, Pa., October 9, 1924

By, Seth Gordon, Executive Secretary, Board of Game Commissioners.

Fruit growers and farmers of the state who have experienced damage to orchards and farm crops by game, principally by deer, requested, at the time of the State Farm Show in January, 1924, that representatives of the Department of Agriculture, the Board of Game Commissioners, the State Horticultural Association, the State Grange, and leading sportsmen's organizations, meet with them for a conference to consider some constructive plan whereby legislation may be enacted in an attempt to protect fruit trees and farm crops against destruction by game.

A full-day field trip into the South Mountain belt, (Adams, Cumberland and Franklin Counties) to inspect conditions was made under most favorable weather conditions. The inspection trip covered varied conditions, including places where general farm crops and orchard trees have suffered because of the presence of deer in large numbers in nearby State Forests. Deer-proof fences erected by property owners and the

State Game Commission jointly were also inspected. The total distance covered by auto on the trip was 165 miles.

Upon returning to Harrisburg the delegation assembled in the Senate Caucus Room, and the meeting was called to order by Dr. H. J. Donaldson, President of the Board of Game Commissioners, who requested Executive Secretary Gordon of the Board of Game Commissioners to review legislation covering game when destroying growing crops, and the procedure to reduce the number of deer by opening the season on does.

Doctor Donaldson then stated that since it would be proper for State officials to hear both sides of the case impartially he would yield the chair to Doctor S. W. Fletcher, Professor of Horticulture, State College and Secretary of the State Horticultural Association, who acted as chairman of the Conference.

R. T. CRISWELL, Chambersburg, Chairman, Committee on Legislation Pertaining to Game Damage, State Horticultural Association.

Mr. Criswell stated that their Committee, consisting of five members of the Horticultural Association, had not formulated any definite policy as to procedure, but hoped to secure some information from the conference along the line of suggested legislation. The following memorandum was then read by Mr. Criswell:

"WHAT DAMAGE IS DONE?"

"Reports from all parts of the State indicate that the damage is not general but that within certain restricted areas it is severe, particularly where fruit belts and deer in a mountain range territory are adjacent, and particularly on young orchard plantings.

"WHOSE PROPERTY IS DAMAGED?"

"Persons sustaining the damage are the individual farm owners or tenants who have their crops tramped over or grazed upon; in the case of young trees having the tips nipped off and older trees the fringes of terminal buds within reach of the deer. In other words, the **private individual is damaged.**

"WHO OWNS THE ANIMALS DOING THE DAMAGE?"

"Wild life is stocked, bred and protected by the State through the Game Commission for the benefit of the public at large. Chief financial support has come through hunters who have been willing to pay licenses for the privilege of hunting and shooting certain game. They pay these licenses to the State through the administration of Game Commission and anyone breaking the laws protecting wild life is prosecuted by the State through the Game

Commission. Therefore, it seems that the State assumes the ownership and responsibility for the protection of this wild life.

"WHO SHOULD BE RESPONSIBLE FOR THE DAMAGE?"

"Since the State is the owner of this wild life and assumes the responsibility of its protection and is collecting money from those who enjoy the pleasure and privilege of hunting certain game, then the State should likewise be responsible for any damage done by its property; namely, the deer, to private individuals; namely, those who have sustained damage to their property or crops.

"WHAT PROVISION MIGHT BE MADE FOR PAYMENT OF SUCH DAMAGE?"

"Having established that the State is responsible for the damage, additional legislation should be provided covering the following points:

"The person sustaining the damage shall so notify the Game Commission and request their representative to appear for an inspection and agree on the damage. In case of failure to agree, each of the parties concerned shall select an arbitrator and they in turn shall select a third disinterested party. The decision of these three shall be accepted as the legal grounds for settlement. The amount of the damage having been established, the Game Commission shall then pay the same to those sustaining the loss.

"WILL THE DAMAGE BE A LARGE AMOUNT?"

"The legislation should not be made retroactive, and with the protective measures that the Game Commission can employ and considering that the damage is not general throughout the State, the total amount should not be large.

"Assuming, however, that the damage is large, **this is all the more reason for the State fulfilling its obligation** of paying for damage done by its property to the private individual.

"HOW MAY THE DAMAGE BE REDUCED?"

"The Game Commission should have power, and in most cases does have power to reduce the number of deer where damage is severe, by the following and other methods:

1. By trapping and removing to areas to be stocked.
2. By decreeing an additional open season. This was done in one case last year but the way for such action had not been paved and the sportsmen looked upon it as a move that would destroy their natural hunting

rights as they saw it and took steps to make the open season ineffective. If, however, in the future they were faced with the option of seeing their money go to pay for a large amount of damage done by deer to property owners or of having the number of deer reduced by an extra open season in which they could participate, then it is probable that the additional open season would be decidedly effective.

3. By having the game wardens kill off the offending deer. This is the proper duty of the representatives of the Game Commission and should not be imposed upon the property owners. The property owner would not shoot his neighbor's animals if they came on his property and neither should he have placed upon him the trouble and ill will of the neighborhood from killing the deer. It is probable that if the wardens killed off a limited number of the leading offenders there would be much less trouble from the balance.

4. By fencing out the deer. This is provided for at present in conditions whereby the State pays 50% of the cost of an 8 foot fence under certain conditions. This is a corrective that is in need of further study before knowing to what extent it is feasible and effective.

“IS THERE ANY PRECEDENT ON ANY OF THESE QUESTIONS?”

“The State pays for damage by dogs. Those who wish to own a dog pay for this privilege a license which is collected by the State, through the Bureau of Animal Industry of the Department of Agriculture as the administrative of the State. Certain dogs do damage in the way of killing livestock, particularly sheep, and the State, through its administrative agent, pays to those sustaining loss the full damage, based on the decision of the local board of auditors. The responsibility of the State in this case is not nearly as evident as in the case of the wild life of which it is owner. Nevertheless, it sees that those sustaining damage by dogs are paid.

“In the case of wild life damage, the State collects, through its agent the Game Commission, a large sum of money which sportsmen are willing to pay through their license fees for the special privilege which they enjoy. If by the protection and increase of this wild life on the part of the State certain individuals sustain damage, certainly the State should pay such damage from the revenue obtained because of such wild life. Since the hunter is not the only one who enjoys the wild life, for practically everyone, with improved roads, gets to the country and mountains and likes to see the wild life in its native state,

it is possible that part of the payment of the damage sustained should come from general appropriations rather than from license fees. This is a question to consider so as to treat all fairly.

“Act No. 271, passed at the last legislature, provides that damage done by bears to livestock, bees and poultry be paid up to the amount of \$10,000.”

Mr. Criswell stated the practical thing to do in the South Mountain is to have an open season which will be effective in reducing the number of deer. Thinks there should be governmental authority to determine when and how often the open season for bucks should include a season for does.

HON. FRANK P. WILLITS, Secretary of Agriculture:

Mr. Willits stated that he believes many farmers are not able to pay their share in erecting deer-proof fence, and that it works a hardship upon them. Does not believe in destroying wild life but feels the conserving of it can be overdone when men are forced out of their business, as seems likely in the South Mountain section. Suggests killing off superabundance of deer. Believes those interested along the mountain side should get together and come to an understanding among themselves, then meet with the Game Commission and endeavor to come to some amicable conclusion. Farmers and horticulturists do not now agree among themselves as to the right method to pursue.

FRED BRECKMAN, Secretary, State Grange:

Mr. Breckman expressed his appreciation of the fact that wild life is returning. He feels, however, that the people whose interests are at stake in sections where game is protected should be given adequate protection, as it is not a statewide problem because in many localities game, particularly deer, is very scarce. It is his opinion that sportsmen and farmers should get together and work out some suitable plan in an endeavor to solve the problem, the sportsmen keeping in mind that the farmer must have some protection.

Mr. Breckman said the State is not going as far as it should in contributing to the cost of erecting deer-proof fences. Believes State should pay three-fourths of cost instead of only one-half. Desires fair play on both sides.

R. P. KESTER, Editor, Pennsylvania Farmer:

Mr. Kester stated from his observations there is a superabundance of deer in the South Mountain region, and that the logical step is to reduce their number. He is not in favor of having an open season on both male and female deer at the same time. Since efficient rules have been adopted for the protection and upbuilding of game, Mr. Kester feels that equally efficient rules can be adopted to check such developments and thus prevent much damage to fruit and crops.

MILES HORST, Representing National Stockman and Farmer:

Mr. Horst stated that the Game Commission should avoid stocking deer in sections where agriculture is the predominant industry, and where deer are likely to become destructive. Is in favor of sport, but believes it should be controlled in order that agriculture may not be destroyed.

DAVID PRITCHARD, President, United Sportsmen of Pennsylvania:

Mr. Pritchard stated that the sportsmen are all in sympathy with farmers who are suffering from losses, and that they are willing to go more than half way to make things equal. Does not believe that many farmers are unable to bear fifty per cent of the cost of erecting deer-proof fences, and that \$1.38 per rod, the share of the farmer, is not excessive. Suggests that farmer bear his expense by furnishing the posts and labor to erect the fence.

Mr. Pritchard asked that farmers recognize the sportsmen and not antagonize them. Prejudice should not exist between farmers and sportsmen because the sportsman is a friend of the farmer and not an enemy. He further suggested that the Game Commission deputize experienced men to go into the woods and slaughter barren does. Mr. Gordon later informed the conference that no human being could do this with any degree of accuracy, and that having officers of the Board killing off surplus doe deer, and trapping is about out of the question.

GEORGE W. HAAG, Representing Montgomery County Sportsmen's Association:

Believes something should be done for the protection of fruit growers and farmers, either by erecting fences or reducing the number of deer by open season on does.

A. H. READER, Representing Blari County Sportsmen's Association:

Believes only plan is to erect fences or kill off surplus deer.

JOE MELLON, Representing the Penna. State Game and Fish Pro. Asso.:

Mr. Mellon stated something must be done for the people who have built up the South Mountain as an agricultural district. Suggests open season for does last two weeks in January, because they are driven from original haunts by the open season during the first two weeks of December. Recommended purchase of Gardner property near Pine Grove Furnace, Cumberland County, to be used for refuge and cleared patches sown to grain for game food.

DR. H. J. DONALDSON, President, Board of Game Commissioners:

Stated sentiment among sportsmen's organizations is strong against killing does, and recommended that orchards be fenced to keep out deer. Paying damages in cash would take too much money and would lead to much trouble because of the great numbers of "fake" claims which would be presented. Pointed out the impossibility of paying for damage done by all game, but willing to make every effort toward offering protection in the way of constructing deer-proof fences. Suggested that farmers board hunters as the return from housing sportsmen is far greater than the damage done by game.

J. A. RUNK, Horticulturist, Huntingdon County:

Mr. Runk strongly opposed protection of female deer when such protection deprives people of earning a livelihood, and that there should be no more reason for recognizing sentiment against killing off female deer than we do about female domestic animals of any sort. Estimated his loss to date at \$16,000. Feels that the sportsmen do not understand the problem of the farmer and fruit grower. Mr. Runk stated either they must give up the agricultural interests or control the deer. Stated certain areas are infested with deer while adjacent territory is immune. Favors an open season on female deer without a special license to shoot them.

ARTHUR GRIEST, President, Horticultural Association:

Mr. Griest feels that small farmer as well as fruit growers should be given consideration. Would dislike to see does killed, but suggests sentiment be laid aside and an open season be declared where deer are committing depredations. Does not believe it wise to open the season for does all over the State because of the scarcity of deer in some districts. Recommends fencing as another solution to the problem, but to fruit growers only is that a remedy, and other crops are damaged as well.

ADOLF MULLER, Member of the Board of Game Commissioners:

Believes that much damage is being ascribed to deer which they could not accomplish. Deer cannot convey disease to trees though they do injure them otherwise and that in some cases losses were the result of disease and not deer damage. Believes the problem can be solved only when all interests become fair and open minded in their views, willing to aid in any way possible.

D. MAURICE WERTZ, Horticulturist, Waynesboro, Franklin County:

Mr. Wertz stated something is radically wrong with the underlying principle of affairs when a man is penalized who

tries to work and earn an honest living as is the case when he cannot protect his property against destruction by deer. Believes the fencing proposition is not satisfactory and in the course of time will be found to be so. Believes killing off surplus deer will remedy the trouble for only short time.

MR. STRAUSBAUGH, Horticulturist, Adams County:

Questions constitutionality of laws depriving citizens of right to protect their property. Feels that people should be paid for damages if wild life is worth more to the State than orchards and farms. People who derive the benefit of the wild life should be willing to buy properties and turn them into game preserves.

HON. JOHN M. McKEE, Deputy Secretary of Agriculture:

Secretary McKee stated that in their investigations regarding damage done by game they find that Pennsylvania is ahead of other states in game protection work. Mr. McKee feels that it is not fair to turn state property loose on private property and place the burden for the damage done by game upon owners of private property. If sportsmen are not willing to reduce the number of deer, farmers and fruit growers will be forced to abandon their industry and move to other regions. Favors \$25,000,000 bond issue to purchase forest areas, etc., but deplores the fact that sportsmen in general do not favor reducing the number of deer in infested districts.

SECRETARY GORDON, State Game Commission:

Called attention to the fact that the delegates had been practically talking about relieving conditions in the South Mountains, but that a number of other sections are similarly affected and deserve consideration and relief at the same time no matter what form of relief may be decided upon.

At the close of the discussions, Mr. Fred Brenckman, Secretary of the State Grange, made a motion that a committee composed of three representatives from sportsmen's organizations, and three representatives from the State Agricultural Council of which the State Horticultural Association is a branch, be appointed to confer with the Board of Game Commissioners at such time prior to the meeting of the 1925 legislature as may be mutually satisfactory for further discussion and formulation of plans for legislation to control the matter of damage by game. The motion, seconded by Mr. Griest, was carried.

Secretary Gordon of the Game Commission was directed to arrange the time and place of the suggested meeting.

It was the concensus of opinion that the inspection trip had been well planned and that the Conference was

the first constructive effort to get together and solve the problems involved.

SETH GORDON,

Executive Secretary, Board of Game Commissioners.

#### DISCUSSION OF THE REPORT OF THE GAME LAWS COMMITTEE

**R. T. Criswell:** The committee has done what it could. Unless instructions are received to the contrary, we intend to follow up the matter of putting through this bit of legislation. The Agricultural Council stood out to the bitter end for the money payment for damage, but without support, either on the part of the Game Commission or the sportsmen. I would suggest that if the committee is continued that they be authorized to go further than dealing with the Game Commission, and be empowered to do as they think best in regard to securing relief legislation.

**D. M. Wertz:** For one, I feel that sufficient work has not yet been done. I think the result of that conference is totally unsatisfactory as will become evident if it once becomes a law. We will then realize that practically nothing has been accomplished and we have been given very little relief. It seems to me that a still greater effort should be made in the matter of self protection in this very serious matter. What is passed now will be for the next two years and there are some of us who realize what serious results there will be in those two years.

Moved by Mr. Wertz and seconded by Mr. Fenstenmacher that the report of this committee be received with thanks and filed; that the committee be continued with power and authority to go still further into this subject in any direction that they may see fit. Agreed to.

#### REPORT OF RESOLUTIONS COMMITTEE

RESOLVED, that since nursery stock is the foundation of our orchards, that a committee be appointed to work out some plan of tree certification in Pennsylvania, so that we may be sure to secure trees that are true to name.

RESOLVED, that farm storage is a most important factor in Pennsylvania horticulture and is annually growing more so, and that this Society extend its sincere thanks to Mr. L. M. Marble, Canton, Pennsylvania, who has been spending so much of his time and private funds for the welfare of the public, in farm storage research.

RESOLVED, that this Society approves of a State census of commercial fruit trees by age and variety, sim-

ilar to that taken by many other horticultural states, and that our Legislative Committee be directed to work most earnestly for a State appropriation for this purpose.

RESOLVED, that this Society looks with disfavor upon the Pennsylvania State Highway Department, in the manner in which they hire men, by transporting them to and from work on the State's time, as well as the high wages paid, so that horticulturists in these communities cannot afford to compete with the State in wages paid in gathering and marketing their crops, even though their own taxes are a part of the fund the State so expends, and that in so doing the Highway Department works a hardship on the agricultural interests.

RESOLVED, that this Society should exert greater effort to convince the authorities of this great agricultural and horticultural State recognize the fundamental truth that since the State protects wild animals, the State is thereby made absolutely responsible for any damage such animals may do to the property of all the citizens and taxpayers of the State.

RESOLVED, that this Society calls the attention of our Legislative Committee to the deficiency in our Pennsylvania State laws with reference to the incorporation and conduct of cooperative purchasing and marketing associations, and, in cooperation with other farm organizations, steps should be taken to secure adequate legislation on this important matter.

D. M. WERTZ, Waynesboro, Chair'n.  
LUTHER P. CREASY, Catawissa,  
SAMUEL DICKEY, Oxford.

**Member:** With reference to the naming of trees, I think there should also be a statement "Free of Disease." We have had considerable trouble in buying trees free of disease.

**C. H. Hadley:** All stock that is grown inside the state is subject to inspection. When you buy stock from outside the state and it is infected, do not accept it.

**The Chairman:** Do I understand that nursery stock coming from outside the state carries no inspection?

**C. H. Hadley:** The State Department of Agriculture has no jurisdiction over stock grown outside of the State. If it is grown inside of the state we can see to it that it is not diseased. If so, we can destroy it. When stock comes from outside the state it is entirely up to the purchaser and it is our suggestion that if it is diseased that he does not accept it.

**Member:** I would like to ask Mr. Wertz how much the men who work on the highways receive in the section he had in mind.

**D. M. Wertz:** There are a number of sections throughout the state paying higher wages. Generally speaking, the wages are above the wages paid by the agricultural interests, —above what they can afford to pay.

**Member:** The fellow who works on the road does not get a penny more than enough to live on. I don't want to see wages go down. The trouble is that the farmer does not get enough and pay enough. How is a man going to pay \$20 or \$25 a month rent when he only receives fifty cents an hour for the hardest kind of work. Those who have worked on a concrete road know what it is.

On motion, the report was adopted as read.

#### REPORT OF COMMITTEE ON NOMINATIONS

For President, H. C. Brinton, Hanover; for First Vice-President, S. L. Smedley, Jr., Newtown Square; for Second Vice-President, Dr. M. L. Bertolet, Mt. Penn; for Secretary, S. W. Fletcher, State College; for Treasurer, Edwin W. Thomas, King-of-Prussia.

F. H. FASSETT, Chairman,  
P. S. FENSTENMACHER,  
H. F. HERSHEY.

On motion, these nominees were duly elected, on ballot cast by the retiring President.

The Secretary announced that he could not serve after the current year. On motion, the Secretary was authorized to appoint an Assistant Secretary, who would be responsible for membership.

**The President:** I declare Mr. H. C. Brinton elected as President and Dr. S. W. Fletcher elected as Secretary. In retiring from the Presidency of this Association I desire to thank the members for their splendid cooperation during my term. I am now going to call upon Mr. Brinton to take the Chair.

**H. C. Brinton:** I want to thank the members of this Association for the honor they have conferred upon me. It has been my pleasure for some years to be in touch with the work of this Association and I feel that it is largely responsible for making Pennsylvania the great fruit state it is. I assure you that I will do everything possible to continue the work of this Association and I ask you to give me the same undivided support which you have accorded your officers in the past.

Moved and seconded that a vote of thanks be given to the President and other officers of the Association for their work during the past year. Agreed to.

**THURSDAY MORNING SESSION, JANUARY 22.**  
**LIFE HISTORY OF ORIENTAL FRUIT MOTH IN**  
**PENNSYLVANIA**

C. H. Hadley, Pennsylvania Bureau of Plant Industry.

At the last annual meeting of this Society, the writer gave a brief report on the status of the Oriental fruit moth in Pennsylvania. At that time but little investigation had been made of the actual situation, with particular reference to the life history and habits of the insect, and the data given were based largely upon investigations carried on elsewhere.

This Society in a resolution presented at last year's meeting urged that the State Department of Agriculture and the Pennsylvania State College cooperate in a joint investigation of the status of the insect in Pennsylvania, and in finding methods for controlling it. This suggestion has been carried out, and the data recorded herewith, covering the life history and habits of the insect, have been secured by members of the Bureau of Plant Industry of the Department of Agriculture and particularly by Messrs. T. L. Guyton, A. B. Champlain, H. B. Kirk, J. R. Stear, and C. S. Anderson. Observations were carried on at several points, including Harrisburg and vicinity, Manchester, York, Chambersburg, and Stewartstown.

It should be remembered that the data presented herewith are based on one season's observations only, and that this season may not have been what might be considered an "average season." It is quite possible, therefore, that observations continued through later seasons may show results somewhat at variance with those of the season just passed.

**Distribution in 1924**

There has been apparently something of a spread of the insect during the season just passed as compared with the area known to be infested during the previous season. During the 1924 season the insect was found in Franklin, Adams, York, Chester, Delaware, Philadelphia, Montgomery, Bucks, Berks, Schuylkill, Lebanon, Lehigh, Dauphin, Lancaster, Cumberland, Perry, and Northumberland Counties. It is quite possible, however, that the pest is present in other counties of the state than those mentioned, and beyond any doubt the insect must be considered as one of the outstanding fruit pests of today.

**Life History and Habits**

The Oriental fruit moth overwinters in the larval stage in slight cocoons, using particles of bark, grass and dirt in addition to the silk which holds together the other matter. They are found in the dried situations on the trunks of trees, beneath loose bark, in cracks and crevices on the bark, in tight

crotches, in old borer holes, in mummied fruit on the trees, in curls of peach bark, and rarely on bark in exposed places. They may also be found on other trees adjacent to infestation, on fence posts and in weed stems—but not in numbers comparable to those found on tree trunks.

Transformation to the pupal stage takes place in early spring, April 8th at Harrisburg being our first observation. This is at the time of the first showing of pink in the peach buds and the first opening of quince buds.

There are often old trees in an orchard where the dead branches, and oftentimes the trunks and larger limbs are covered with lichens and loose rough bark—these are the ideal situations for the hibernating larvae; pruning of dead limbs and scraping off the loose bark would materially reduce the numbers of spring moths.

Maximum spring pupation appears to be from April 15th to 20th. Adults were first observed April 24th at Harrisburg and vicinity in 1924. At that time the quince leaves were unfolding and the peach blossoms were half out.

There was a flight of moths observed during the middle of the day on May 6th. Large numbers of the moths were observed flying about through the tree tops. Numerous individuals were taken for determination. Pairs were observed mating. No evidence of egg deposition was noted at the time. The weather was bright and warm for the time of the year. This was followed by a period of cloudiness and heavy rainfall which extended over the following two weeks. At the end of this period few moths could be found in the orchard. The habit of daylight-flying was noted a number of times throughout the season, although at no later time was the number of moths nearly as great as in the first flight.

The moths are somewhat smaller than the codling moth, with dusky brown mottled wings. The wings are folded against the body when the moth is at rest.

Eggs are deposited usually on the under side of the leaves in the case of peach, although we found some eggs upon the upper surface. In the case of quince they were always found upon the upper side on account of the hairy under surface. Eggs are also deposited on the persistent calyx of the quince fruit and on the stems of new shoots.

The eggs are transparent when empty or translucent and iridescent before hatching. They are circular in outline, scale-like, somewhat convex and with flattened edges. The center is whitish or grayish with a slight polish. The whole egg is about the size of a pin head. The eggs hatch in from four to ten days.

In general appearance the larvae resemble the codling moth larvae but are somewhat smaller; they vary in color dur-

ing the different stages of development, the younger larvae are a dirty cream color varying to pink which is intensified as they grow older.

Upon hatching the young larva immediately start out to find favorable feeding places. The length of time required for the larvae to develop fully is from eight to sixteen days, depending on weather conditions.

The first two generations of larvae (there are five altogether) feed mainly in the terminals of peach, cherry and quince. A part of the third generation larvae are found in the terminals. Very few individuals of the remaining generations enter the twigs. In one orchard where the trees were old and the twig growth slight, many of the larvae of the first generation went into the small peaches.

Larvae of the remaining generations feed in fruit; mainly peach, quince and apple, the latter are usually attacked in the ripening condition and after the harvesting of peaches.

The full grown larvae of the summer generations when leaving the fruit or stems to transform, prefer to form their cocoon on the sides or between the fruits, where they utilize the fuzz or hairs on the fruit together with silk in making cocoons. Fruit baskets and corrugated board covers are also favorite places for pupation. Larvae of the third, fourth and fifth generations coming from picked fruit are found in such places, and this no doubt constitutes a means of spread of the moth.

#### Life History in 1924

Life history of the Oriental Moth as worked out for 1924 may be summarized as follows: The over-wintering larvae begin to pupate the first week of April and continue in this stage until the second week of June. The first generation moths begin emerging the last week of April and continue to the first of July. Egg laying begins May 20 and continues to July 20. Larvae feed from about the last week of May until the first week of August. The second generation of moths begin emerging the last week of June and continue up to the last of August. Egg laying by this generation extends from the last week of June up to the first of September. Moths of the third generation begin emerging about the middle of July and continue up to the last week of September. Egg laying by these moths begin the last week of July and continues up to the first of October. A part of these larvae over-winter. The fourth and fifth generations are so much over-lapped that the time of emergence and egg laying come at the same time. Egg laying extends from the middle of September up to the middle of October. A part of the larvae of the fourth and all of the fifth generation over-winter in the cocoons already described.

A study was made of the parasites attacking the Oriental fruit moth. Only four species were reared this season. None of these species were numerous enough to have any marked effect on the rate of infestation in the orchards. There was a marked increase in the known area of infestation this year over that of last year. The loss occasioned by the insect in most orchards was equal to that of 1923, or in some cases much heavier than that of 1923. The rate of infestation varies throughout the infested area; in several places Elberta peaches were as much as 20% infested, varieties ripening before Elberta were not nearly so heavily infested. Later varieties in some orchards were entirely ruined by the larvae, while in nearly all instances quinces were made quite worthless.

**Question:** Was this life history record taken near Harrisburg?

**C. H. Hadley:** The chart as a whole is something of a composite, composed of observations which extended from Harrisburg down to Stewartstown.

**Question:** Is there any reasonable supposition that the bad weather last spring had anything to do with making the pest worse than usual?

**C. H. Hadley:** I do not think so.

#### EXPERIENCES IN ORIENTAL FRUIT MOTH CONTROL

H. E. Hodgkiss, Entomologist, Dept. of Agricultural Extension.

The Pennsylvania State College.

This part of the discussion, as indicated by the title, is to be restricted to the repressive measures used against the insect. Before elaborating on that phase of the topic I purpose to preface my remarks with a brief outline of the situation as regards Oriental fruit moth control, in order that growers may understand these conditions and be better able to make their own deductions, as to the merits of the practice.

The situation with which we were confronted in 1924 was more serious than many orchardists realized. At the time the work was undertaken there was little definite experience with repressive measures which could be relied upon to effectively control the pest. In our educational work the program was based on recommendations of Entomologists working in the infested region who cooperated with us in formulating a tentative schedule for applying insecticides, and in determining the most suitable method of control.

This program was suggested to peach growers and in order to ascertain the real value of these measures a number of demonstrations were conducted by the College in repre-

sentative districts throughout the infested area in Pennsylvania.

In any discussion of the merits of this program it should be borne in mind that this work was in no sense experimental. It was, however, a demonstration of the results of experimental researches. Whatever conclusions may be drawn in this paper therefore, will be on the basis of economy in orchard operations rather than on the merits of the control practice.

#### The Program

The feeding habits of the caterpillars, as pointed out in the previous paper are of a nature which seem to discount the value of any material which might kill the young larvae before they enter the twigs. There is apparently only one other means of attack, which is to kill the eggs or the newly hatched larvae before they have a chance to enter the stems. The eggs of the Oriental peach moth appear to be quite susceptible to the action of insecticides which kill either by contact or by the gassing properties of the materials. This offers a promising means of control and is the practice on which the most reliance has been placed.

In the planning of an insect control program consideration must be given not only to the normal development of the pest but also to the probability of seasonal variations from its normal habits. With the species under consideration it may be recounted that its period of complete development occurs not only once but there may be as many as five complete generations in one growing season of the trees. That is there are four or five periods when eggs are being deposited.

If there is to be any appreciable reduction in the numbers of the caterpillars of the later generations, the eggs of each brood must be attacked. Peach growers who have tried this practice realize that the job is not an easy one. The most that can be expected is to apply the ovicide during a period when observation indicates that the most of the eggs have been laid. For the most part the periods of maximum egg deposition coincide with the times at which the usual peach sprayings are made. This forms a basis for a forecast as to when ovicides may be applied with the least disruption of the orchard program and with a reasonable assurance of success.

The selection of an ovicide was not particularly difficult as it will be recalled that the egg laying of all the broods is accomplished during the growing period of the peaches. This necessarily limits the choice to a single material on account of the probable danger to foliage and later the fruit from other insecticides even though they may be the more effective. Nicotine preparations were chosen on account of their ovicidal properties and the safeness accompanying their use. The nicotine was applied either as a dust or as a liquid.

#### The Tentative Spraying Schedule.

In the initial survey it was believed that at least five applications of the nicotine should be made to the trees. A schedule was suggested as a tentative guide for peach growers in their orchard operations which included five applications of nicotine. These were to be used as the blossom petals dropped, when the calyces were breaking, and again in about two weeks. A special application of the nicotine was suggested about three weeks later and also one in the usual brown rot spray before the fruit ripened. It was believed that these sprayings or dustings would then be made during the period of greatest abundance of the eggs of each successive brood.

Unfortunately for the schedule the seasonal difference delayed the initial egg laying so that this system was not followed in its entirety. Although many growers made several treatments using the nicotine the average as finally determined was four instead of the five which we at first recommended. This change was suggested as the season advanced when according to our observations a fewer sprays would be as satisfactory and make the control less expensive to the grower.

#### Results of Control Efforts in Orchards

Ten demonstrations were conducted in six counties. For the sake of brevity in this discussion only two of the orchards which are representative of the work will be considered. In the orchards of Mr. Arthur S. Linvill, Middletown, Delaware County, 1,200 trees were chosen on account of the previous years heavy infestation. The varieties were Matthews Beauty and Iron Mountain. The program included the following schedule of spraying and dusting using nicotine as the ovicide.

Table I.—Schedule of Treatments in Linvill Orchard.

Date	Check	Dusted	Spray	
			1-800	1-500
April 7-12		Dry mix		
Dormant	Lime Sulphur 1.03	Lime Sulphur 1.03	L. S. 1.03	L. S. 1.03
May 26			Dry Mix 2 lbs.	
Petal Fall			Lead Nicotine 1-800	
May 28			Dry mix 2 lbs. Lead 2-100 Nicotine 1-500	
May 29	Dry mix 2 lbs. lead			
June 2				
July 25-26				
July 29	Dust. 70 lbs. sulphur 10 lbs. lead	65 lbs. sulphur 20 lbs. lime 10 lbs. lead & 2% nicotine		
Aug. 4		75 lbs. sulphur 20 lbs. lime 2% nicotine	20 lbs. lime Nicotine 1-800	4 lbs. soap per 100 Nicotine 1-500
Aug. 13		70 lbs. sulphur 20 lbs. lime 5 lbs. lead 2% nicotine		
Aug. 19			Dust 40 lbs. sulphur 50 lbs. lime 10 lbs. arse- nate	Dust

These applications were made by the owner of the orchard and they are probably representative of what occurs in the average orchard spraying in the State.

#### Determination of Effectiveness of Applications

The determination of the effectiveness of the practice and the comparative efficiency of the insecticides brought to our attention a condition which casual observers may have overlooked. Mr. MacLeod, who directed the demonstrations, is of the opinion that its importance is second only to the actual damage to the individual fruits. In order to illustrate the point a table has been prepared in which figures are given based on the external appearance of fruits with respect to infestation and the actual infestation ascertained by splitting open each fruit.

Table II.—Error in Estimating the Efficiency of Oriental Fruit Moth Spraying by External Examination of Fruits.

Treatment	External Examination		Cut Fruits		Percentage of Error		
	Visibly wormy.	Apparently clean.	Clean but visibly wormy.	Wormy but appar. clean.	Clean but visibly wormy.	Wormy but appar.	Total error.
Check	No. 41	No. 59	No. 8	No. 21	P. ct. 20	P. ct. 36	P. ct. 56
Nicotine 1-500	46	54	14	9	17	30	47
Nicotine 1-800	44	56	24	10	55	18	73
Nicotine dust 2%	41	56	19	15	46	27	73

Table II shows that it is impossible to determine the actual condition of a peach fruit as regards injury without cutting it open and examining it internally. The indicated error from external examination only is approximately from 50 per cent to 75 per cent. The average is about 60 per cent. In other words a peach grower has no means of determining the condition of a basket of fruits unless he cuts the individual peaches. This is of course an impossibility.

In tabulating the results of the work all counts were based upon peach fruits split open and examined for internal as well as for the external injuries.

#### Results of the Demonstrations

In the Linvill orchard there was a direct comparison of dust and spray according to the usual practices. In addition an application of 40% Nicotine sulphate was made at an increased strength. On account of the comparisons these results are used for the illustration.

Table III.—Indicated Results of Oriental Peach Moth Control

Treatment	Variety	Fruits exam.	Condition of fruits when cut open		
			Clean	Wormy	Amount Clean
		No.	No.	No.	P. ct.
Check	Iron Mt.	100	39	61	39
Nicotine 1-800	Iron Mt.	100	70	30	70
Nicotine 1-500	Iron Mt.	100	59	41	59
Nicotine dust 2%	Iron Mt.	100	60	40	60

### Costs of Spraying

Cost records of the liquid applications in the Linvill orchard were kept for the demonstration block. In this block there was an increase of 31 per cent in the number of marketable peaches. Dry mix was used as the fungicide and carrier for the nicotine.

#### Cost of Spraying Peaches for Oriental Moth Orchard of Arthur Linvill, Middletown, Pa.

Materials	Amounts per Application						Total Amt. Used.	Cost per lb or gal.	Total Cost
	1	2	3	4	5	6			
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.		
Lime—lbs.	20	20	20	25	12½	97½	12½	¾c per lb.	\$ .74
Sulphur—lb.	40	40	40		10	130	10	3c per lb.	3.90
Arsenate—lbs.	2½	2½	2½		2½	10	2½	18½c per lb.	1.85
Nicotine—pints	1¼	1¼	1¼	1¼		5	5	1.41 per pt.	7.05
Casein—lbs.	3	3	3			11	11	18c per lb.	1.98
Lime-sulphur gals.	15	15	15			15	15	14½c per gal.	2.34

The total cost of protecting the fifty trees was \$17.85 which is a cost of about thirty-five cents per tree. Of this cost seventeen cents was chargeable as moth protection.

The yield of fruits amounted to 107 bushels. On the basis of yield the cost of protection from moth was 8 cents for each bushel of peaches. At an average price of \$1.54 per bushel the increase due to moth protection was \$51.13.

### Costs of Dusting

Some worth while figures were obtained from Mr. John W. Baer, York county on the costs of dusting of his peach orchard of 4,000 trees. There was an actual reduction of injury of twenty per cent owing to the operation. The dust preparations were mixed and these figures represent the costs exclusive of labor in applying the material.

#### Cost of Dusting Peaches for Oriental Moth and Diseases Orchard of John W. Baer, York No. 10—4,000 trees

Materials	Amounts per Application.									Total Amt. Used lbs.	Cost Per Unit	Total Cost.
	1	2	3	4	5	6	7	8	9			
Lime	1000	1344	1000	1344	1000	1344	1504	1504	1504	11,544	\$16.00 ton	\$92.32
Sulfur	1500		1500		1500					4,500	\$3.50 Cwt.	\$157.50
Arsenate		160		160		160			Third Brood	480	\$18.00 Cwt.	\$86.40
Nicotine 96	96		96		96		96			576	\$110.00 Cwt.	\$633.60
Totals	2500	1600	2500	1600	2500	1600	1600	1600		17,100		\$962.82

The total cost of the dust was \$969.82 and represents a cost per tree of 24.2 cents. Of this amount about 18 cents represents the expenditure for moth control. Looking at it from the angle of production the total cost was 13.8c per bushel. Of this, moth control amounted to about 10.3 cents per bushel of fruit marketed.

There was a yield of 7,000 bushels peaches. Of this amount there were probably 1,400 more bushels of perfect fruits on the treated than as against trees which did not receive all of this treatment. This means in dollars and cents that from the increased return after deducting the cost of the dust there was left \$1,380. This represents therefore the real benefit from the operation.

### Program for 1925

The past year's experiences have shown that while there have been reductions in injury by spray and dust applications yet these are not an economical practice. There is no extensive body of evidence which indicates that we will have in the near future any definite experimental data on which to base control recommendations. In the light of the past summer's experience it appears that the peach grower will be fully justified in revamping his tentative program to the extent of reducing the nicotine applications in the spraying schedule.

Attention is directed to the following discussion of practices which are embodied in the program which is suggested for peach orchard operations during the season of 1925.

**Plowing and disking the orchard.** The cultivation of an orchard for the purpose of turning under leaves or other debris which may harbor insects or fungus diseases is recognized as a good orchard practice. Experiments being conducted at the New Jersey Experiment Station indicate that there is a considerable reduction in damage to fruits where the soil has been turned over and mummied fruits or leaves were buried to a depth of at least four inches. While it is not known that the insect winters in the soil or that there is any great amount of hibernation in fallen leaves or on weeds it is believed that much good will come from the general adoption of such practices among orchardists.

**Paradichlorobenzene:** This material where used against the peach tree-borer apparently effects a reduction in the hibernation of the insect near the base of the trees. Just why it does this is not clear. However observations in treated orchards point to the suggestion that a more general adoption of the P. D. B. treatment may result in a lessening of the intensity of peach moth infestation in any particular community.

## NICOTINE SULPHATE TREATMENTS

**Liquid Applications:** Reliance should be placed on the wet spray which is to be used against the eggs. The demonstrations indicated a greater killing with the liquid applications and it is apparent that the contact is more the killing agent than the gas evolved from the spray. From our observations it is believed that if nicotine in the proportion of one pint to 100 gallons of dilute spray is used in the usual application to the trees, the fruit will be protected from injury as well as if the number of treatments was increased. In some instances the latest maturing varieties may need additional protection but it appears in general that the amount of protection may be reduced by this practice and thus afford a corresponding lessening of cost in the orchard operations.

**Dusting:** Applications of a two per cent nicotine dust were not as efficient as the liquid when applied in a similar manner. The better practice is to make two treatments about ten days apart for each brood of eggs. Even this did not in our work afford as high a reduction in fruit damage as the liquid. It was true however that a fair control was obtained. Where there are men who favor this method it is suggested that the treatments be split and the dust applied to the row of trees from one side at the first dusting. In ten days the operation should be repeated and at this time the treatment should be made to the trees from the opposite side.

**Question:** Has there nothing been found yet whereby we can definitely know when to make the application?

**H. E. Hodgkiss:** Up to last year the work that had been done had not been on a sufficiently large enough scale, or sufficiently close, to give us any reliable evidence as a guide for the fruit grower. In the next two or three years perhaps we will have something definite to go on.

## THE VALUE OF OILS IN DORMANT AND DELAYED DORMANT SPRAYING

S. W. Frost, Arendtsville Field Laboratory

Oil emulsions in one form or another have been in use for a number of years but have never in the history of spraying, found a permanent place on our spray schedule for apples or other fruits. The use of oil as a spray material is almost as old as lime sulphur itself. As early as 1763 we have reference to the use of oil as a spray and kerosene has been used to destroy insects almost from the time of its first general use for illuminating purposes. The Use of red-engine oil-emulsions are, however, of rather recent date. Milk, soaps, alcohol, acids and a host of other materials have been used to emulsify oils. The recent introduction of numerous commercial miscible oil mixtures has greatly developed the oil problem.

In considering oil sprays, one must remember that lime sulphur solution is a standard spray material which early gained a permanent place on our spray schedule and for over fifty years has been a standard spray. It is compatible with nicotine sulphate, arsenate of lead and other insecticides, which has helped to give it the permanent place that it now occupies. It is therefore with some reluctance that fruit growers and scientists are willing to give up lime sulphur for other spray materials.

Several questions naturally arise; (1) what has been the reason for the renewed interest in oil sprays at the present time? (2) should oils be used, when and for what purposes?

The renewed interest in oil sprays was first brought about by the enormous increase in San Jose scale, especially in the Middle and Western States, together with the lack of control secured from the use of lime sulphur solution. This resulted in 1923 in a conference called at Vincennes, Indiana, to study the results of the past three years experience on the control of the San Jose Scale which had become a very serious menace to the fruit growers of Indiana and Illinois. As a result of this conference, oil sprays were recommended in the place of lime-sulphur for San Jose Scale.

In 1919 the red spider problem confronted the fruit growers of Eastern United States. This insect, related to the red spider of citrus fruits and sometimes called the European red spider, attacks the foliage of the apple giving it a bronzy color. The solution of this problem was soon found in the application of oil sprays during the delayed dormant. The control is also supplemented by lime sulphur sprays for the summer broods of red spider. A detailed account of control was given in a preceding issue of the proceedings of the Pennsylvania State Horticultural Society showing conclusively that from 90 to 100 per cent of the eggs of the red spider can be killed by a delayed-dormant oil spray. It was also shown that lime sulphur has little or no value as it kills but a very small percentage of the eggs. The recent work of the Connecticut experiment station bears out our results.

Experiments conducted at the research laboratory at Arendtsville, Pennsylvania, have also shown that a delayed-dormant oil spray kills the eggs of the red bug. A large number of counts have been made over a period of three years. These figures have been summarized and will be published in one of the journals of economic entomology. They show very plainly that oil sprays kill the eggs of the red bug. It is sufficient to say here that we are convinced that the delayed-dormant oil spray has additional value in this respect. On the other hand an oil spray applied in the true dormant, failed to kill the eggs of the red bug.

Oil sprays are recommended for apple only during the dormant and delayed dormant periods. The delayed dormant application seems more valuable and more advisable than the dormant spray because it is more timely from the standpoint of the injurious insects concerned. In 1918, the Massachusetts Agricultural Station emphasized the value of the delayed-dormant spray in preference to the true dormant application. In 1919 the Missouri Experiment Station pointed out that scale could be controlled equally as well in the delayed dormant as in the dormant spray. Considering that the eggs of both the red bug and the red spider can be killed in the delayed dormant oil spray and also that scale and aphids can be killed at this time, we must recognize that the delayed-dormant application has considerable value. Nicotine sulphate must be added for aphids at this time.

This brings us to a consideration of the materials to be used. This is a matter largely of personal preference. Numerous miscible oils are now available upon the market that have proved highly valuable. Many formulae have been proposed for making oil emulsions at home. We are well aware that there is a great difference between a commercial oil, called sometimes a miscible oil, and the home-mixed oil, which is an emulsion. The writer is partial to the kayso, red-engine oil emulsion that has given very satisfactory results in various tests conducted in orchards in Adams County, Pennsylvania. The emulsion is made after the formula of the Missouri Experiment Station, using, however a larger quantity of calcium caseinate. One pound of calcium caseinate is mixed in one or two gallons of water, three gallons of light paraffin oil is added and the mixture emulsified by means of a pump and a spray nozzle pumping the whole mixture once through the nozzle. A creamy yellow mixture results. This is added to 100 gallons of water giving a three per cent oil emulsion.

As an index to the quality of the home-mixed emulsions, various samples were taken and the oil globules measured beneath a microscope. Milk, which we know as a perfect emulsion, was used for comparison. In Guernsey milk, the size of the oil globules ranged from .0068 to .0017 millimeters in diameter. In the home-mixed emulsions described above, the oil globules measured from .0578 to .0017 millimeters, comparing favorably with the milk. Many of the commercial oils were measured in similar manner and were found to have oil globules even smaller than the home-mixed emulsions. In one of the oils, the oil globules were found as small as .0004 millimeters. This of course is one of the factors adding to the value of such sprays.

Tests were also made in the laboratory to determine the stability of the home-mixed emulsions as well as various commercial mixtures. It was found that the home-mixed emul-

sions compared favorably with the commercial mixtures in this respect. Free oil was found in no case upon the surface of the test mixture, even when allowed to remain standing for a month or more. The oil and the calcium caseinate both being lighter than the water, come to the top at the same time forming a gelatinous mass which readily mixes with the water again. The cheapness of the home-mixed emulsions of this kind, lends a possible solution of the oil problem for those who desire to make their own emulsions.

Numerous tests have been made to determine the immunity of home-mixed emulsions from burning. Stayman Winesap trees twelve years old, were sprayed with a three per cent emulsion as well as a one and one-half per cent emulsion up to and including the petal fall application without burning. A three per cent emulsion is the regular dormant strength and in as much as no burning resulted from this treatment it was decided that a delayed dormant oil spray would cause no serious injury. The Missouri Experiment Station in 1923 reported that they used oil sprays as late as the petal application without burning. O'Byrne states in the quarterly of the state plant board of Florida, that a bordeaux oil emulsion is less injurious to the foliage of citrus fruits than plain bordeaux. From these facts it would appear that miscible oils and oil emulsions are safe at least as late as the delayed-dormant application.

The question of scab control remains. While this is remote from the field of the writer, nevertheless throughout all his experiments he noticed the lack of scab control where oil emulsions or miscible oils were applied without the addition of a fungicide. Bearing in mind that oils are used chiefly in the delayed dormant spray and that a noticeable amount of scab is controlled at this time, it seems necessary to consider the fungicidal value of this spray. The writer has encountered numerous occasions where serious scab injury resulted even upon York Imperial, a comparatively non-susceptible variety, when oil sprays were used in the delayed-dormant. We must admit then that straight oil sprays have no fungicidal value, at least against the apple scab. A fungicide should be added to the oil spray especially when susceptible varieties such as Rome Beauties and Stayman Winesaps are being sprayed with oil in the delayed-dormant. Soluble sulphur can be added to the oil spray at the rate of five pounds to one hundred gallons of spray solution. Bulletin 1178 of the Bureau of Entomology, Department of Agriculture, Washington, D. C., gives directions for the addition of a 3-3-50 bordeaux mixture to the oil spray. Both of these add the necessary fungicidal value for scab control. This, however, is a new field in apple spraying and needs further investigation.

It appears from the foregoing studies that miscible oils or oil emulsions are not substitutes for lime sulphur. Oils are not fungicides and must be supplemented by the addition of fungicides where they are required. Lime sulphur on the other hand is primarily a fungicide, although it has been used for years to control certain insects as San Jose Scale, blister mite and a few others. As pointed out before, certain insects as the red spider have demanded the use of oils. Likewise serious outbreaks of San Jose Scale demand an oil spray. It is evident then that the use of oils depends upon special problems of the fruit grower. Fruit growers would be wise to stick to the standard lime sulphur solution unless their special problems demand oil sprays.

**Question:** Where the scale is very bad on an old orchard that has not been sprayed, would it hurt to make the oil spray stronger?

**S. W. Frost:** I do not think it would be necessary.

**Question:** Would powdered milk be as good as Kayso?

**S. W. Frost:** I have not tried it myself. I do not see why it would not. It is a question of getting the oil particles broken up so that they mix with the water.

**Question:** Is there any chance of hurting the trees through the continued use of oils for several years?

**S. W. Frost:** I have not conducted the work long enough to say this. I would want five years experience before attempting to state the cumulative effect of oil. There is some evidence that there is a cumulative effect, but it is not conclusive.

**Question:** Do you think engine oil would be as safe as the commercial oil?

**S. W. Frost:** I have used both and have had no burning. This is the third year we have been using engine oil. We have had no case of burning.

**Question:** How about putting on the oil early in the fall. Is there danger of damage from freezing?

**S. W. Frost:** That is a local question. It is not, however, good practice to put on the spray in freezing weather. If the material freezes, the water is removed and the free oil is left.

**Question:** With a temperature of 40 degrees, do you think it would be safe to apply oil?

**S. W. Frost:** If it does not get down to freezing you will have no trouble.

## CAUSE OF THE PEACH DROP IN 1924

R. C. Walton, Arendtsville Field Laboratory

In July, 1924, my attention was called to an abnormal drop of the peaches in one large orchard in Adams County. An investigation revealed the fact that the trouble was broadcast over the County and that the cause of the drop was the presence of small dead areas or cankers located at the base of the fruit spurs and buds. Many of these cankers had penetrated to sufficient depth to cut off the food supply with the result that the peaches withered and dropped. The matter looked so serious that Mr. McCubbin, Plant Pathologist of the Bureau of Plant Industry at Harrisburg was called down and a day spent with him in touring the county and investigating all phases of the problem in an effort to determine the cause of the cankers.

### Description of Cankers

The cankers are not confined entirely to the fruit spurs but are found at the base of the leaf buds and also sometimes between the buds. When around the buds the injury may be called bud canker. These cankers can be found mainly on the one year old wood but are also present on the new growth where they are small, seldom more than half girdling the twig, and practically always found at the base of the buds nearest the junction of the old and new wood. These new wood cankers are slightly sunken, dark brown, and have very definite margins. The bark adjoining the dead areas has a decidedly reddish color.

On one year old wood, the cankers are much larger, up to one inch in length, sometimes almost girdling the twig extending above as well as below the buds, and have less definite margins than those on new growth. Both fruit spurs and leaf buds may be killed outright and especially is this true on the inner branches.

A serious type of canker is frequently found at the point where the new wood joins the old. Here the branches are frequently girdled and the wood becomes so brittle that the branch is easily broken off. In September my attention was called to an orchard in Chester County which had this type of injury so seriously that the trees had the appearance of apple trees severely affected with twig form of fire blight. Earlier in the season this type of injury can readily be located by a slight yellowing of the leaves which also have symptoms of curling and a shot hole appearance. In rainy weather when the soil is filled with moisture, quantities of gum will exude from the cankers, which fact however is not characteristic of this trouble only, because many peach diseases are accompanied by exudation of gum.

In Adams County all three types of injury are present and in 1924 assumed quite serious proportions because in many orchards the crop was reduced to half of what was expected. The cankers were found to be much more abundant and serious on the inside branches where a high percentage of the small twigs were killed outright. This is really very serious because in Adams County many growers follow a system of pruning which causes the trees to bear a large percentage of the crop on the inner branches. Consequently, with these twigs killed an entirely new crop of twigs will have to be grown before the trees can resume their habit of bearing peaches on the inside branches.

#### Theories Suggested as Cause of Cankers

Of the various theories suggested as the cause of the cankers, the following appear to be the most plausible: Winter Injury, Combination of Spray Injury or Winter Injury with Parasitic Organisms, Brown Rot, Bacterial Spot, Injury from Paradichlorobenzine the abnormally cold, wet spring of 1924, and Spray Injury.

**Winter Injury:** This theory had much to commend it at first when the cankers were noticed only on the one year old wood. However, when they were found on new growth, and in some orchards they are very abundant there, this theory had to be abandoned. At first it had seemed very plausible because of the fact that the summer of 1923 had been unusually dry followed by a wet fall which had forced the peach trees out into secondary growth. It was supposed that the trees had gone into the winter in an unripened condition and had therefore been injured. This theory was further substantiated by the fact that in one four years old Adams County orchard which had been sickly from the start and which had shown very poor growth for 1923, the trouble could not be found. It was thought that these trees which had not been forced into secondary growth, had been better able to withstand the winter. Had the cankers not been on new wood in other orchards throughout the county, this winter injury theory would have been a very plausible one.

**Combination of Winter Injury or Spray Injury with Parasitic Organisms:** The theory was advanced that possibly certain sprays or the severe winter had caused the cankers into which had entered parasitic organisms which had extended and enlarged the dead areas and thereby produced injurious results.

Many cankers were collected and thoroughly examined both by Mr. McCubbin and the writer. Attempts were made to isolate organisms which could be held responsible but none were found. The cultures almost invariably were sterile and therefore this theory was abandoned.

**Brown Rot:** Many of the larger cankers, especially those containing exudation of gum, were very similar in appearance to brown rot cankers but the organism producing this disease could not be recovered. The writer has learned that investigators in some of the other states where the trouble has appeared, have also failed to isolate the brown rot organism from the cankers.

**Bacterial Spot:** This disease which is a common one in the southern states, was thought by Pathologists in two different states to be the cause of the cankers but as stated above, all efforts to isolate parasitic organisms in Pennsylvania failed.

**Paradichlorobenzine:** Since this chemical has been used so extensively of late years for the control of the peach borer, the theory has been advanced that it might be responsible for the cankers. However, those familiar with the injury resulting from its use claim that the damage occurs only on the trunk at the base of the tree. Furthermore, the cankers have been reported from orchards which have not been treated with paradichlorobenzine.

**The Abnormal Cold Wet Spring of 1924:** The advocates of this theory are many in Pennsylvania mainly because the peach trouble was noticed for the first time shortly after the very unusual wet weather of May and June. The growers are of one mind in believing that the unusual spring of 1924 had something to do with bringing on the peach drop. The writer is also of the opinion that this theory is at least partially responsible and that it, in combination with spray injury, may be the solution of the problem.

**Spray Injury:** This theory was one of the first to be suggested and undoubtedly has more advocates than any other single theory. In New Jersey where the cankers have been noticed for the past three years, the investigators are so thoroughly convinced that arsenic used in the spray mixtures is the cause of the cankers, that they are prepared to publish their results. They have conducted spraying tests in which they used plots without lead and with various amounts of lead, and also with various amounts of lime. The results of these tests have proved to them that arsenic can cause the cankers and also that an extra amount of lime added to the spray mixture will remedy the trouble. They find that the standard 8-8-50 self boiled lime sulphur will largely eliminate the trouble probably because of the large amount of lime used. It is also their opinion that cankers come at the time of the shucks spray.

Since 1924 was the first season the cankers were observed in Pennsylvania, no spraying experiments were conducted. However, extensive tests are being planned for the 1925 season.

**Sprays Used in Orchards Affected with Canker:** In Adams County in the last two years, the Peach Growers have largely used Dry Mix or 80-10-10 dust in place of the self boiled lime sulphur and this fact in its self may be a very important factor.

The trouble is to be found all over the county in both sprayed and dusted orchards and, with one or two exceptions, on practically all varieties. Practically the only dusts used on peaches in the county are the 80-10-10 and pure sulphur mixtures. The former is always used at the time of the shuck application. Orchards which received nothing but 80-10-10 in 1924 were heavily affected with the canker.

One of the worst affected orchards in Adams County was sprayed at the time of the shuck application with the following formula: Arsenate of lead 5 pounds, Lime 12 pounds, and Black Leaf 40 one quart, and water 200 gallons. If the cankers were due to the arsenic then the 12 pounds of lime were entirely too few to counteract the effect of the arsenic. Following this application there were two sprays of Dry Mix with 5 pounds of arsenate of lead.

Occasionally growers report the cankers on unsprayed trees. Two of these cases were investigated. In one place the peach trees were interplanted with apple and although the peach trees were not sprayed intentionally they could not have helped but receive a pretty thorough coating from the adjoining apple trees. In the other place the trees were in a garden with an orchard adjoining it. An occasional indefinite canker could be found but they were rare and since there was slight danger of the trees receiving some spray mist, no definite conclusion could be drawn.

Three orchards which were known absolutely never to have received a drop of spray were examined thoroughly. Two were three years old and one two years old. Not a single case of canker could be found on any of the trees.

#### Prevalence of the Canker

The presence of the trouble in states adjoining Pennsylvania was investigated by personally interviewing Plant Pathologists of the various institutions. Ohio, West Virginia and New York report that the trouble has not been found. Virginia reports it and attributes the canker to be due to Bacterial Spot although no definite experiments were performed to substantiate these conclusions. Maryland has noticed it for three years and has done some investigational work. Their investigators are of the opinion that more than one factor is involved and they report finding similar cankers on unsprayed trees. They are positive however, that the cankers can be produced by arsenic in the spray mixtures. Delaware reports the trouble to a moderate extent. Dr. Waite of the U. S. Department of Agriculture, thinks it is very characteristic of spray

injury and states that the reason why it is more prevalent and serious on the inner branches is because the spray does not dry so readily and remains in drops for a longer period of time. The views of New Jersey have already been given.

The observations in Adams County, Pennsylvania, have already been stated and to these the writer would like to add that it is his opinion that the spray mixtures are at least partly responsible but he is also of the opinion that the excessive rainfall of May and June, 1924, was very instrumental in making the trees more succulent and tender and therefore more susceptible to injury.

Consequently, from this resume of the peach trouble in this and other states, it will be noted that the prevailing opinion is that the cankers are due to the arsenic in the spray or dust materials. If the experiments which will be conducted in Pennsylvania in 1925, conform in results secured, to those in New Jersey, the trouble can be remedied by the use of additional lime.

#### PRESENT STATUS OF PEACH YELLOWS IN PENNSYLVANIA

W. A. McCubbin, State Department of Agriculture

The peach yellows inspection was carried out in 1924 under much better conditions than in any previous year. Not only was it begun earlier in the season but it was conducted throughout without any serious interruptions such as happened in other seasons because of the necessity of detailing some of the inspectors to other work in the height of the season.

In addition to the inspection I was able to do in person the inspection staff and the counties covered by them were as follows: F. L. Holdridge—Lancaster, Chester, Montgomery; E. L. Pierce—York, Adams; A. W. Buckman—Bucks; Edgar Tomer—Berks, Lebanon, Lehigh; P. G. Wilson—Dauphin, Cumberland; J. R. Stear—Franklin.

A summary of the work shows that in the 13 counties in the south-eastern part of the state in which inspection was done, 456 orchards were covered. This is the greatest number of orchards yet inspected in any one year, the nearest being 422 in 1922. These orchards contained 674,012 trees also the greatest number of trees covered in any year, being far in advance of the previous record of 482,614 in 1923. For more complete details see Table I. In spite of the increase in orchards and trees coming under inspection, the trees marked for yellows (and little peach) are outstandingly fewer than ever before. The number was 6,064 or scarcely more than one-third of those marked in 1921 when 132 fewer orchards were inspected. This gratifying reduction in the amount of disease is better shown by the fact that the 1921 inspection gave 4.45%

of yellows in the trees covered while in 1924 the actual amount of disease recorded falls to the very low figure of .89%

It is possible that this present low mark for disease may be in part accounted for by vagaries of the disease which is said to have periods of rise and fall, but I feel sure that if one considers the persistence and spread of yellows in the last few years in the numerous small orchards not covered by inspection, one cannot help but consider the present fortunate situation as the logical outcome of a continued and thorough and methodical inspection, backed up by the promptness of the growers in removing infected trees.

When this inspection service was started in 1920 the goal of our ambition was to get the percentage of yellows in our orchards down to 1%. It was felt that if the disease could be reduced thus much in future periods of natural increase it could never rise to menacing proportions from such a small beginning, and the loss at that percentage is not serious. The attainment of this goal in the present year is not only a source of gratification to the Department and to the peach growers themselves, but it is important in the assurance it seems to give that we can look forward into a future untroubled by the bugbear of yellows.

It is worthy of note at this time that though all the inspection done on peach yellows from its beginning has been carried out under the Horticultural Inspection Act which gives the department full power to require the destruction of all diseased trees, yet the campaign has been carried out to its present successful point **without a single prosecution** or the necessity of forcible destruction.

#### SUMMARY OF PEACH YELLOWS INSPECTION IN 1924 BY COUNTIES

TABLE I.

County	No. of Orchard	No. of Trees Inspected	No. Trees Blazed	% with Yellows
Adams	58	54,656	453	.83
Berks	43	114,003	668	.58
Bucks	37	77,569	330	.42
Cumberland	37	44,718	558	1.20
Chester	19	19,833	119	.60
Dauphin	59	25,325	479	1.80
Delaware	11	6,216	42	.67
Franklin	50	126,948	827	.65
Lancaster	37	37,407	370	.98
Lebanon	19	27,475	345	1.20
Lehigh	5	18,750	785	4.10
Montgomery	23	30,090	580	1.90
York	58	91,022	508	.55
Totals (1924)	456	674,012	6,064	.89
Totals (1923)	417	482,614	10,698	2.21
Totals (1922)	422	442,507	11,052	2.50
Totals (1921)	324	287,466	17,376	4.45

#### YELLOWS IN TREES OF DIFFERENT AGES

Our records contain the number and age of each block of trees together with the number of yellows trees found therein; consequently it is possible to summarize the yellows situation with respect to the amount of disease occurring in trees of different ages. The large number of trees covered will tend to make the possible error very small. In the table, the summary of this phase of the record is presented.

TABLE 2.

#### SUMMARY OF PEACH YELLOWS FOUND IN TREES OF DIFFERENT AGES IN 1924

Age of Trees	No. of trees inspected	No. of trees blazed	% with yellows
1 year	9,268	0	0
2 "	68,667	5	.007
3 "	104,884	193	.18
4 "	155,506	625	.40
5 "	70,169	520	.74
6 "	41,234	384	.93
7 "	34,738	604	1.73
8 "	25,829	799	3.09
9 "	19,297	686	3.55
10 "	16,493	287	1.74
11 "	15,359	507	3.30
12 "	22,416	476	2.12
13 " and over	90,152	978	1.08
Totals (1924)	674,012	6,064	.89
Totals (1923)	482,614	10,698	2.21
Totals (1922)	442,507	11,052	2.5
Totals (1921)	387,466	17,376	4.45

#### SPRING INSPECTION

It has long been noted that peach trees affected by yellows are stimulated into early growth in spring and their buds swell sooner and blossoms open before those of normal trees. In the spring of 1924 Mr. F. L. Holdridge and Mr. E. F. Pierce undertook an inquiry into this early growth character with a view to determining whether these symptoms of prematurity could be safely used in diagnosing yellows. It is obvious that if one can determine whether a tree has yellows by symptoms showing so early in the season, it would be a valuable addition to our inspection methods. A saving of half a season might be a very important factor in the control of a disease where prompt removal is so advantageous.

The investigation followed the method of placing metal tags in certain orchards on all trees with premature bud, blossom or foliage development; subsequently in mid-summer these orchards were inspected in the usual fashion and the results summed up in three lists—(a) tagged trees which later showed yellows; (b) tagged trees which did not show yel-

lows; and (c) trees which had not been tagged but which later showed yellows. If the trees in which yellows was present in mid-summer consist only of trees tagged in spring or even if they included all those tagged in spring, it would indicate that spring inspection could either be employed successfully or at least that it had some value.

Unfortunately, so many trees in the investigation fell into the second and third groups mentioned that we were forced to conclude that premature growth of buds or bloom in spring could not be relied on for inspection purposes to a degree that would have any practical value.

### NURSERY STOCK AND YELLOWS

Nursery stock has often been blamed as a source of infection for peach yellows. If there is any basis for complaints of this kind, the growers, the nurserymen and the department are all equally anxious to know it. The completeness with which our yellows inspection records are now kept suggested one simple means of obtaining light on the subject and accordingly it was tested out in 1924.

If any nursery or nurseries are putting out stock which contains an excessive amount of yellows infection a comparison of the amount of yellows developing in the stocks of different nurseries ought to indicate which, if any, of the nurseries is open to blame in this matter. Our yellows records give the age of each lot of trees and the amount of disease therein; a return post card questionnaire was sent out to the owners of all these orchards asking them to supply the data lacking, viz. the origin of the nursery stock in each case. With this information at hand, lists could be prepared of orchards derived from various nurseries, and when to these lists there was added the amount of infection present a comparison could be made of the output of the different nurseries on a scale large enough to bring out any guilt that might exist in spread of yellows.

Less than half the question cards have been returned to date (January 20). Those to hand have been sorted out, compared with the yellows records and tables prepared for each nursery involved.

These tables at the present time show no indication that any nursery stands out by reason of yellows stock coming from it. When the remaining cards come in this work will be completed and reported in full, but enough answers have already been obtained to suggest that the final results will not show blame attached to any nursery or nurseries for spreading peach yellows in its stock.

### THE COST OF PICKING AT ONE OPERATION COMPARED WITH THE COST OF PICKING IN TWO OPERATIONS

A. F. Mason, New Brunswick, N. J.

All of us have observed that small under-colored fruit in the inside reaches of the tree which may have been missed by the pickers, will color up and size up markedly in a week or two after the first harvest. Our growers have asked whether it would pay to make two pickings, taking the large well-colored specimens from the outside branches first, returning two weeks later to gather the rest after it had received the benefit of sunlight and nourishment following the removal of the bulk of the crop. The main obstacle in the way has always been considered to be the cost involved.

Without having any data on the increase in size and color, we have secured some on the cost of picking. On trees which were well loaded, it cost 5.24 cents per bushel to do the operation at one time, as compared with 6.6 cents per bushel where it was carried on in two operations, the trees bearing the same crop. The following table gives the data:

#### COST OF PICKING IN ONE AND TWO OPERATIONS

Picking in 2 operations	1st picking Oct. 16	9 pickers, 8 hrs. 2 men, 4 women & 3 children	\$12.30	206 bu.	
	2nd picking Oct. 24	9 pickers, 4½ hrs. 3 men, 4 women & 2 children	\$9.41	103 bu.	
			\$21.71	309 bu.	6.6c per bu.
Picking in 1 operation	Oct. 16	9 pickers, 8 hrs. 3 men, 4 women & 2 children	\$16.00	305 bu.	5.24c per bu.

#### THURSDAY AFTERNOON SESSION, JANUARY 22 CONSTRUCTION OF A CONCRETE STORAGE CELLAR

N. S. Grubbs, Mt. Holly, N. J., Representing the Portland Cement Association, Philadelphia

State wide interest in farm storage in Pennsylvania has been on the increase due to the extension of good roads into the rural districts and to the development of local markets.

In discussing the subject of farm storage construction I do not expect unanimous approval of each phase of the subject for if everybody had thought as I thought then everybody would have wanted to marry my wife.

**Directions for Mixing Concrete:** Before discussing construction details it may be profitable to speak at this time about

some faction pertaining to making good concrete on the farm.

First, select good clean sand and stone or gravel and have a supply of it free from silt, acids and other impurities.

Second, measure by volume the material and mix in definite proportions. Usually measures can be discarded after work has been started where wheel barrows are used. A 1-2-4 formula means—one sack cement, two cu. ft. of sand and four cu. ft. of crushed stone.

Third, it is advisable to avoid using too much mixing water as a sloppy mixture reduces the strength of the concrete.

Fourth, thorough mixing makes uniform concrete and distributes the cement throughout the mass.

Fifth, proper curing calls for protection of the newly made concrete to prevent the water from evaporating. The water in the concrete aids in the crystallization or setting of the concrete. Usually straw, old bags, tarpaulins and the like are used for this purpose.

**Size and Capacity:** One of the first problems to be given consideration is the size of cellar to build. The following table is compiled as a guide to suggest the dimensions of a proposed cellar:

(Dimensions)			(Bushel Capacity)	
Wide	Long	High	Bulk	Crates
10	20	7	700	550
12	25	8	1,200	900
16	25	8	1,600	1,200
20	40	8	3,000	2,300
20	50	8	4,000	3,000
30	50	9	6,500	5,000
30	70	10	10,000	7,500
30	100	10	15,000	11,000
40	100	10	20,000	15,000

Excavations should be 10 or 12 inches larger on all sides than the outside dimensions of the plan. The soil should be placed in such a position that it can be used to back fill and cover the cellar when it is finished.

In most cases it is advisable to lay drain tile level with the footing on its outside laying them so they will drain any water that might collect near the wall to a low point some distance from the cellar.

**Types of Walls:** The exterior walls of the cellar may be constructed in one of three ways—By placing concrete in forms set up rigid to hold the concrete in place until it sets (monolithic); by laying up concrete block with dimensions of 8"x8"x16" or 8"x12"x16", or by using movable forms to build up two 4" or 5" walls with 2" of air space between them. The two walls in this case are tied together with 4" of concrete every 4 ft. and by 1/8"x3/4" strap irons 10" long appear-

ing 2 ft. apart. These movable forms are 4 ft. long x 9 in. high and are made to move as soon as they are filled. A relatively dry mixture of concrete is essential to operate the forms with success.

For the walls and footing a 1-2-4 mixture is recommended. Concrete placed into forms is called monolithic concrete and it is when making monolithic concrete that spading or tamping into the forms becomes necessary. Spading excludes air pockets and tends to make the mixture one dense mass, which, when cured, will give strength, resist moisture passage and have a better appearance.

If the plan calls for columns and girders they can be made of concrete, using forms for their construction. As a rule the columns and girders are made before attempting to start placing the roof slab. Reinforcing steel cut in definite lengths and of a definite diameter add tensile strength to the concrete and make the case of expensive steel I beams and columns unnecessary.

The preliminary steps to placing the concrete roof slab call for form lumber to be carefully built in place, which is called decking. This decking, when properly supported underneath, carries the steel reinforcing and the newly made concrete until it is sufficiently hard to carry its own load. At least three weeks are required for curing before removing the decking. Keeping the concrete moist and covered with straw or tarpaulin assists in the curing processes. Ordinarily a 1-2-3 mixture is used in the roof slab.

It is generally advised to provide the cellar with a concrete driveway and leave the large part of the floor, earth. This aids in humidity control.

**Ventilation:** The design for the modern cellar eliminates the old style system of elaborate intakes and outlets. Using a dirt floor and providing the cellar with large openings at the ends of the structure has proven to give the best results for either apples or potatoes. The temperature of the interior of the cellar follows more closely the temperature of the soil surrounding the cellar than it does the outside air, even though ample ventilation facilities are provided. Therefore, it is found expedient to have the cellar planned to be rectangular in shape with a large driveway door at each end; or a large door at one end and a large opening at the other end, so that a large volume of air can be circulated, thus keeping the air in the cellar sweet and at the same time prohibiting condensation. The ventilation controls the humidity of the cellar and its contents.

**Cost:** It is a difficult matter to arrive at costs unless something definite is known concerning materials, labor conditions and excavation details. Concrete cellars that have been erected in Pennsylvania have ranged in cost from 25 cents

to 65 cents per bushel capacity depending on labor costs, materials, location with respect to freight stations, etc.

It is the purpose of the Portland Cement Association to assist in locating, planning and working up specifications for concrete storage cellars or similar farm structures and to become of service to the agricultural interests just as long as the work is kept on an educational basis.

## EXPERIMENTS IN THE VENTILATION OF BANK STORAGE CELLARS

R. D. Anthony, State College

Before starting our discussion of ventilation it seems wise to repeat three storage facts which have been presented before this Association in previous years through Mr. L. M. Marble's reports. He has shown:

1. If apples cannot be placed in immediate 32° storage, a temperature of 34° to 36° is low enough and that apples can be kept successfully in storages where the fall temperature may be as high as 40° to 42°.

2. Apples stored at 34° to 36° in open packages will keep throughout the normal storage period for that variety, provided adequate ventilation is given.

3. To secure the full benefits of ventilation there should be a constant movement of air through the storage though for short periods, during times of extreme cold, the ventilation may be cut down to a few hours each day without serious injury.

The two storages used in the experiments discussed here are both bank storages with stone walls and dirt floors. **Entirely different results would have been secured had we used above-ground storages.** One of these storages is located at State College. It is approximately 40 x 60 and has large doors in one end with windows for cross ventilation. The other storage is at the Marble Laboratory at Canton. It is 125 x 25 and has a 5 x 7 door in one end, a 4 x 4 window in the other and a large door in one side, opening into a work room which in turn has large outside doors. Most of the work has been done at the latter storage. By the use of standard mercury thermometers, electric resistance thermometers and recording thermographs, the temperature of the air at many different places in the storage could be determined and also the temperatures of the ground against the side wall and below the floor were found. By hanging narrow strips of tissue paper throughout the room and by the use of an anemometer the air movements in the storage could be determined.

In working with the bank storage we have two different sets of conditions at different periods in the storage season.

During the fall days the outside air is warmer than the temperature we would desire in our storage while, during most of the winter, the outside temperature is colder than we want. In late September and October, when the nights may drop to 35 or 40 degrees while the day temperature may rise to 75 or 80 degrees should we shut up the doors and ventilators in the morning to keep out the heat and then open them at night to cool off the house? Contrary to what we would expect, this is not the best practice. Leave all doors and ventilators wide open during the fall!

**Fall Ventilation:** The history of a day's results at Canton will show what happens when the doors are open in warm weather. August 24 was one of the hottest days of last summer. At 2 P.M. the temperature just outside the north door of the storage was 83. At that time all doors and ventilators which had been closed until then were opened. Before the doors were open the temperature inside the storage ranged from about 60 near the floor to a little over 62 near the ceiling. At 4 o'clock when the doors had been open for 2 hours the outside temperature had risen to 84 while inside the cellar the temperature near the floor had gone up less than half a degree and at the ceiling the increase was only about 3 degrees to about 65, a difference of nearly 20 degrees between inside and outside though there had been a steady movement of the warm air into the storage for two hours. At 4 o'clock a 15 inch ventilating fan was mounted in the north doorway and run until 5:30 pushing out the cold air and drawing in the warm air. At that time the outer air was 81°. The temperature within the storage had risen another half degree near the floor and less than a half degree near the ceiling.

How was it possible to push this hot air into the storage for 3½ hours without raising the storage temperature more than 4 degrees? The floor is dirt and the entire west wall is stone banked with dirt. The temperature of the ground just below the floor during this test was 54 degrees, 30 degrees lower than the outside air and approximately 10 degrees lower than the storage air. Because of the relatively small amount of total heat in air it is cooled quickly when in contact with a cold surface. The ground is such an enormous reservoir of cold that it can cool the air coming into the storage all day long without the ground temperature being warmed more than a degree in the hottest day.

In the storage at State College there were windows on the south side which permitted the sun to shine directly into the storage. Every day at about 10 o'clock the storage temperature jumped up 10 to 15 degrees. As soon as these windows were covered with black paper this trouble was corrected. The large amount of heat from the sun was more than could be controlled by the ground temperature.

**Ground Temperatures:** The ground temperature shows the same modifying influence when the outside air temperature is lower than the ground temperature. On September 23, the outside temperature at 8:30 at Canton was 38 and had probably been several degrees colder during the night. The outer door of the storage was open throughout the night. At 8:30 the temperatures in the storage ranged from 41 to 44 degrees while the ground temperature was 48. At 3:30 the same day the outside temperature was 54 and the storage temperatures ranged from 44 to 48.

While the ground temperatures are high it is probably impossible to cool the storage more than 8 or 10 degrees below the actual ground temperature and, because of the length of day and the high mid-day temperatures, the storage is usually a few degrees warmer than the ground temperature. During the latter part of August the ground was 54 degrees. By September 23 it had slowly dropped to 48° and by October 20 the temperature was between 45° and 46°. On November 18 it was 43° and by December 20 it had gone down to 39° and a month later to 36°. From the temperature it can be seen that it will be difficult to maintain storage temperatures as low as 40° until late in the fall when both ground and outside air temperatures have dropped. Last year Mr. Marble recommended to this Association that fall apples which could not be placed in immediate 32° storage be kept in an open shed or in the orchard protected from the sun until there was danger of freezing weather. The reason for this is that during the early fall the night temperatures are considerably lower than the storage temperatures while the air temperature in the open shed at mid-day is not enough higher than in the storage to influence the fruit materially. Fruit stored in the open shed gets maximum ventilation at a time when it needs it most.

**Winter Ventilation:** When we come to a period of the year when the outside temperature drops below 32° certain precautions are needed in our storage. In the early morning of November 17 there was a rapid drop in the temperature of the outside air. At this time the large door of the Canton storage was wide open. A thermometer standing four feet inside the door recorded as low as 26° but 10 feet further in the storage potatoes were undamaged. At 8:30 on November 19 the outside temperature was 19. At that time all doors and ventilators were closed and the large ventilating fan was started to drive air from outside through the ducts which come through the ground into the storage. The air took considerably less than a minute to make the trip from outside where the temperature was 19°, through from 20 to 50 feet of underground pipe out into the storage. Its temperature as it entered the storage was 38°. The temperature of the ground was 42°.

It is only in the larger storages that it is economical to

ventilate by forced draft and that the modifying influence of the ground can be used to greatest advantage. In most of our storages we must trust to proper handling of the doors for our ventilation. As long as the ground temperature is above 40° the incoming air can be considerably below 32° without danger and the outer doors can be open. As mid-winter temperatures are approached the ground temperature is so near the danger point for apples that it can not exert much modifying influence on incoming air that is much below 32°. At such time the doors can be opened only when the outer temperatures are above 27 or 28.

**Tempering the Air:** In the colder portions of the State the outer temperatures may run so low that even with all doors closed the storage temperature may go below the danger point and, even when the storage is so well banked and insulated that the temperature does not drop below 29°, long periods of cold may so interfere with ventilation that the health of the fruit is threatened. To provide for these cases, it is well to have a work room in one corner of the storage with an outer door and a door opening into the cellar. A heater in the work room can then be used to raise the cellar temperature and fresh air can be warmed before it enters the storage. During the extreme weather of Christmas week, the plan was followed in the storage at State College with excellent success.

The storage at the Marble Laboratory is equipped with four 22 inch ventilating shafts with ventilating cowls. A careful study of these has led us to believe that they are not of sufficient value in fruit storage construction to justify their cost. During very cold weather cold air settles down them and may freeze fruit directly under them. When there is any possibility of opening the doors the amount of air moving through the ventilating stacks is small in proportion to the amount entering and leaving the doors.

We should stress the importance of large doors at opposite ends of the storage. Where the bank does not permit a door at each end a large window may be used. These give cross ventilation and permit the movement of a considerable volume of air which, as it sweeps through the storage, clears out air pockets and completely renews the air many times a day.

#### OUR COMPETITORS

C. J. Tyson, Flora Dale

Competition is the life of trade says the old adage and without doubt our business is better for healthy competition. It is when this competition comes too strong or unfair means are used that we suffer.

The more we know about our competitors the better we can prepare to meet competition when it comes.

Our competitors are not always the same. Your competitors may not be mine. One man may be interested in those who send fruit to his local market. Another may be concerned with those who ship to the same large city.

The competition which all of us meet in greater or less degree is that of the Northwest. Necessity has driven the growers of that district to improve their method of growing and packing and to devise a marketing system which has carried their well grown, rigidly graded and securely packed apples into every important market in the country. More than this, their advertising and sales effort has put their apples into markets which never until recently could have used apples in carload quantities. Rigid laws have been passed and freight rates have been made to further control the shipment of fruit from these states. It is illegal to pack and ship apples with certain defined blemishes and it is nearly impossible because of freight rates to ship in bulk or in barrels or baskets from the states of Washington and Oregon. Some apples are shipped from Idaho and Colorado in bushel baskets. A few of these come as far as Chicago but more generally they go to the cities and country towns west of the Mississippi.

The apples of the Northwest do not equal the same varieties grown in the east in flavor and juiciness. The almost perpetual sunshine every day of the growing season, gives color and finish which is seldom equalled in the east, moreover the skin is thicker and tougher. These things coupled with the careful grading and packing assure to the grocerman that when he buys a box of Northwestern apples his trade will be attracted by the appearance and he will have a minimum of loss from bruising or decay. Some important southern markets left barrels for boxes almost entirely in 1923-24.

Twenty to thirty thousand carloads of these apples per year means real competition and yet it would be worse for us to have a similar quantity of bulk junk dumped on our markets.

One effect of the apple development in the Northwest has been to greatly extend the consuming season. The Newtons of Hood River and Watsonville and the Winesaps of Wenatchee and Yakima are the main dependence of many markets in the months of April, May and June.

The Mississippi Valley competes with us when that territory has a crop of Jonathans. Their Winesaps and Bens are also felt in the Mid-Western markets as are the Grimes of Illinois and Indiana. St. Louis, Cincinnati, Chicago, Louisville and even Milwaukee and St. Paul are good markets for Pennsylvania apples when the crops of the Middle West are not too heavy.

The Dutchess of Michigan and New York compete with our Wealthy and Rambo in the larger markets while a large crop of Wealthy, King and Twenty Ounce in these states often hurts our markets for later fall varieties.

A large crop of Greenings in New York practically supplies the market for cooking apples in New York City from November to March and to a less degree in Philadelphia, Pittsburgh, Cleveland and Detroit. This variety does not sell to advantage south of Philadelphia.

The real competition from New York is of course the Baldwin and when there is a good crop of this variety we all feel it. The large Eastern markets are filled up and many of the smaller industrial cities and towns are favored with frequent consignments of Baldwins. One unfortunate feature of this competition is the fact that our nearness to Western New York makes our Pennsylvania markets an easy dumping ground for inferior fruit in bulk.

We feel the competition of New England mostly because a full crop there shuts us out of the desirable markets of Providence, Hartford and Boston.

New Jersey does not greatly affect our sales in New York, even though much of her summer fruit goes there. Philadelphia is the common ground where many Pennsylvania growers meet New Jersey and Delaware competition not only in summer varieties but more and more in Staymans, Romes, Grimes and other winter kinds.

Maryland, West Virginia and the Valley of Virginia are the chief competitors of Southern Pennsylvania in Yorks, Staymans and Grimes both in domestic and foreign markets.

The Piedmont of Virginia grows large quantities of Albe-marle, Pippins and Winesaps while the Valley grows many Bens. Most of these, however, are marketed in the large markets and abroad after Pennsylvania apples are gone.

Southern Virginia and North Carolina have not affected apple markets seriously until the past few years. There have been some large plantings in this territory and this season south eastern sea-board was quite largely supplied up to Christmas time with home-grown apples.

These are our chief apple growing competitors. We can meet them best by growing good fruit and by packing it carefully. We have real advantages over many of them. We have excellent markets in our midst. We have decided freight advantage over the North West. If money is to be made in apple growing, we have a fair chance in Pennsylvania.

After all the competition which concerns me most is not apple but citrus. An over supply of cheap oranges will turn the peddler and the fruit stand away from apples for the simple reason that oranges will stand more abuse and will yield more

profit. And there are too many oranges and grapefruit trees in Florida and California—too many of them owned by health and pleasure seekers who do not need to make a profit. This makes hard competition for the apple grower whose bread and butter depends on the profit from his orchard.

It was the citrus competition, the deluge of cheap oranges and grapefruit which put the final crimp in the markets of last year; and even this year with only a moderate crop of apples, comparatively cheap oranges have kept the prices from going as high as they should.

I do not know the remedy. Perhaps there is none. In the mean time people are consuming more fruit and fruit products. Nature takes a hand in the shape of a freeze now and then and things are balanced up.

After all, competition keeps us on our toes to do our best and if we do just that I believe we shall survive.

#### RESOLUTIONS ON GAME LAWS

After further discussion of the report of the Game Laws Committee, the following resolution was unanimously adopted:

"We endorse the action of the Committee on Game Laws in the measure it has taken thus far, and empower this committee to take such further steps as may in its judgment accomplish ultimately the main objective, which is recognition by the State of its full responsibility for damage to property by deer, either by prevention or by payment for damages.

#### ACTION ON COOPERATIVE BUYING

R. E. Atkinson reported concerning the proposed state federation of cooperative agencies. He stated the proposition was apparently agreed upon by the delegates from six organizations. There has been unnecessary competition and overlapping of the various agricultural organizations and so an effort was made to get these organizations together into a state federation. For the last two or three years the machinery for such an organization was in existence under the name of the Pennsylvania Farmers Cooperation Federation which was organized under the law of 1919 providing for the incorporation of cooperative associations without capital stock. The proposition which the present directors authorized was simply to get together on a common ground if possible. What we agreed upon last night, therefore, was to take the old structure and have on the Board two members from each of the state-wide organizations. This Association would have one or two members, depending upon what part they wished to take.

**The Chairman:** You have heard the report. Do you wish to take action along the lines suggested. Does the Association wish to join the Federation?

**Mr. Fletcher:** Does this commit the Association to cooperative buying?

**R. E. Atkinson:** I do not know that it does, absolutely. Just what scope the organization will take will depend upon the Board of Directors. In other words, the Federation as it is planned at present does not propose to dictate any definite policy. It will be up to the new Board of Directors to decide what the policy will be.

**S. W. Fletcher:** I think it is the history of all state horticultural associations that the more closely their efforts are confined to educational work the better. Difficulties are sure to arise when they attempt to engage in buying and selling. I think it would be prejudicial to the interests of this organization to launch into any such business enterprise. Cooperative buying is the province of local groups, not of a state-wide educational organization like this.

**A Delegate:** As I understand it, we would do business under this new organization. The State Horticultural officers would not become purchasing agents for us. The Horticultural Association would, as I understand it, still retain its educational features, and the members would also belong to an organization which would enable them to buy necessary products cheaper. As I see it, it would not affect the primary purpose of this organization as it now exists.

After a very thorough discussion the matter was laid on the table.

#### GROWER'S EXPERIENCE MEETING ON PACKAGES AND ADVERTISING

Led by Porter R. Taylor, State Bureau of Markets

##### The Barrel

By D. M. Wertz, Waynesboro

The barrel is probably the oldest and most used apple package and is especially well known in the East.

It seems to be the opinion of most people that it should continue to be the eastern package even though the western sections are pushing the box package very much on present markets.

It seems our Eastern growers cannot grow sufficiently good and well colored stock to pack boxes to the same advantage they are packed in the west.

Barrels should be very well and carefully made. In many sections chestnut wood is used for staves and since the chest-

nut blight this wood is becoming more brittle and should be watched very carefully else the staves will not be strong.

Likewise different materials are used for heads and care should be taken that they are also good and strong and will stand the proper filling of barrels as well as the handling later on.

Hoops are one of the most important features of the barrel and should be well looked after. Some packers prefer steel wire hoops, others object to them. The general use however is six elm hoops per barrel but these hoops should be carefully seen to and properly secured to the barrels.

These six hoop barrels are better liked in cold storages and also preferred for export. However many shippers use the eight hoop barrels instead of the six since the handling is so frequent and so rough.

In making the barrel the croze should be looked after very carefully, that is the slot on which the head rests. If it is not well and mechanically cut out, the head will not rest on the croze securely and is liable to burst out under pressure. On the other hand the croze should not be cut too deep else it weakens the end of the staves.

It is the general practice to use liners, two on each end to help keep the heads more secure. These are placed across the joints of the head and usually nailed with four small nails and when properly applied are quite a help in strengthening the head.

Care should be taken to not use barrels except those of standard size and measurements and it is desirable to have the material quite well seasoned before making the barrel.

Barrels should not be left out in the weather as they are liable to swell and burst the hoops or become ill-shaped. They should also be kept clean as a bright fresh package, even though it is only an apple barrel will help very much in the sale of the product.

### APPLES IN BOXES

P. S. Fenstenmacher, Allentown

Our experience in the packing of apples in the bushel box for several years, and more especially of the crop of 1924 when the same grade of apples packed in barrels are bringing the same price as specially selected apples for boxing has brought us to a conclusion that the box package is not a desirable one for eastern grown apples.

The "Sun-Kissed" irrigation grown apples of the northwest are so far superior in size and color that in comparison with the eastern apples they will always be superior in these

respects, and consequently commands higher prices in the open markets. Packed in barrels or bushels the product of the eastern orchards comes only into competition with the apples grown under the same conditions, and here the Pennsylvania apple can hold its own against the best of this pack.

One of the questions pertinent to box packing quite naturally presents itself, would it not be profitable to pack just the very choicest of each variety in boxes and place what is left over in bushels or barrels? This idea may work out all right as far as the boxed fruit is concerned, but what about the appearance and prices derived for the left over fruit after all the choicest specimens are taken out? Will the extra returns on the boxed fruit pay for the depreciation of the left over stuff? This and similar questions pertaining to the box package as a container for eastern fruit will have to be weighed and decided by conditions and circumstances of each particular locality. As for us in Lehigh County, we found that as long as we confined our box packing to from a thousand or two boxes our local buyers would take them at remunerative prices. But this year, when this pack was materially increased and we were obliged to sell in the big markets, the net returns were not any higher than A grade, barrel packed fruit. We conclude that the extensive packing in boxes was not advisable for eastern growers.

**Hampers:** R. E. Atkinson, of Wrightstown uses the hamper as an apple package for all purposes—picking, storing and selling. They can be piled seven baskets high in storage, stacked close and provide good ventilation. Crates are better, but cost too much.

### "FI-BO-PAK"

S. C. Eshelman, McKnightstown

You have heard reports on the various other packages which are used on the markets of which I shall try not to detract from.

The most of you have used some of these packages, some have used all of them. But I realize the package I have been asked to talk on is comparatively new from the standpoint of your experience.

We have used the Fi-bo-pak box for three years, with great success.

My reasons for adopting this box was first, because of the convenience of the package in shipping that it nests so well and does not take much room to store in packing house, comes complete, ready to pack without any extra caps, etc., and second because of the mineral oil used in the box. This adds a very important feature to the box; in

keeping the fruit. In 1923 we examined fruit in the Gettysburg cold storage, sometime in April without finding any decay or waste in the Fi-bo-pak box, while baskets and barrels in same room showed considerable waste and scald, as much as 75% scald in barrels and quite a bit of decay in baskets which made it necessary to repack. In spring of 1924 we drew the last of our fruit out of storage. Stayman Winesaps—first of June, in perfect condition with original juice and primeness. We did not have to repack a box. These packages cost no more than others, and when you can store in a package that you can hold till that late without repacking, it is a revelation to the fruit grower. There are many other packages on the market but I firmly believe men that here is a box worthy of your consideration.

### IMPROVED ORCHARD AND STORAGE CRATE

L. M. Marble, Canton

Following are specifications for the crate used in the Marble Laboratory.

#### Material:

- 4 pcs.  $13\frac{1}{2} \times 1 - \frac{3}{8} \times \frac{7}{8}$ " thick, surfaced, ends to be mitered.
- 4 pcs.  $12\frac{3}{4} \times 1 - \frac{3}{8} \times \frac{7}{8}$ " thick, surfaced, ends to be mitered.
- 10 slats  $12\frac{3}{4} \times 2 \times \frac{3}{8}$ " thick, edges to be rounded on one face.
- 16 slats  $17\frac{1}{4} \times 2 \times \frac{3}{8}$ " thick, edges to be rounded on one face.

#### Construction:

Heads should first be nailed together complete with slats. It is recommended that corrugated nails be used for the frame pieces of the heads, the nails being driven on both sides of the head.

Where corrugated nails cannot be obtained, crate staples may be substituted, or the head nailed together with 4d. cement coated nails. End slats should be placed so as to run up and down and nailed with two nails in each end, 2d. cement coated nails being used. Slats should be evenly spaced.

Side and bottom slats should be nailed, two nails in each end, slats being evenly spaced, five slats on each side and six slats on the bottom. 2d. cement coated nails used throughout.

In working up the slat material, it is recommended that 1" stock be used, ripped 2" wide, and run through a moulder fitted with side knives having a full double oval curve. The moulder should be set so that the material will be delivered  $\frac{7}{8}$ " thick. The slats should then be re-sawed.

Crates hold slightly more than a bushel, so that they may be piled together without danger of bruising the stock.

## ADVERTISING PENNSYLVANIA FRUIT

### REPORT OF APPLE WEEK COMMITTEE

Dr. J. S. Rittenhouse, Lorane, Chairman

The special Apple Week Committee appointed a year ago decided that it could best achieve its purpose by arranging for supplies of advertising material through the Association which could be furnished to the growers in small quantities and at reasonable cost. Following this plan, an attractive colored poster was arranged for and 1,400 copies distributed. In addition, a sixteen-page recipe book was arranged for and prepared for general distribution through the growers. The initial order of 5,000 was soon exhausted and a reprint of the same number was secured. Of the 10,000 copies which were printed there are approximately 1,400 on hand now. The recipe book in particular has been a distinct success and the demand for the reprint of the poster indicates that it was a line of activity well worth continuing. In all the material has been used in nineteen counties in the state.

We would suggest that the special Apple Week Committee be discontinued in the future and that its work be made a part of the work of a permanent Committee on Advertising, having in mind the continuation of activity over the entire year rather than at only one season. We believe that with the excellent start that has been made that the association can take a leading position in the promotion of the use of Pennsylvania fruit. The service which the organization can render to the growers of the state is of decided value. It is, obviously, impossible for individuals to secure advertising material at a reasonable expense in the same way that the association can secure it for them. We would, therefore, suggest the continuation of the present lines of activity by the association.

A well developed program of advertising should be prepared which will make it possible for the growers to secure recipe books, poster material, newspaper material, and other forms of advertising through the association. We believe that the preparation of this material should be arranged by the Committee and that those members of the association who avail themselves of the use of this material should pay a proper charge to cover the entire cost of the service rendered. Up to the present time the work has been practically self-sustaining and this policy should be continued in the future.

This is a line of constructive activity which the association can carry on to the mutual advantage of everyone interested. The support of all other organizations should be secured as far as possible. We feel sure that development of this work will be an asset to the fruit industry of Pennsylvania.

## ADVERTISING BY A LOCAL MARKETING ORGANIZATION

H. C. Barker, West Chester

Down in our corner of Pennsylvania, we grow a good many apples, and for the past fifteen years or so, West Chester has been the home of our Chester-Delaware Counties Fruit Growers' Association.

This is a live organization with a 1924 paid-up membership of fifty-seven. Of these, perhaps twenty might be rated as commercial fruit growers with most of the others owning or caring for anywhere from half a dozen trees to a few acres of apples or other fruits. The ambitions of this Association have not extended beyond general educational undertakings. It has, however, fostered a close and intimate knowledge of our several problems, and in many ways has promoted the production of fruit. Not least among the factors which have brought our troubles into the spotlight with the resultant remedy have been the frequent attendance at our meetings and field trips of State College and Department of Agriculture experts, who have without mercy exposed our shortcomings before our very own and our neighbor's eyes. This has tended to increase the quality and quantity of our output, and with new orchards coming into bearing, we have watched our markets become more saturated, competition keener and prices less satisfactory, until it became apparent that while we had been giving the production end of our business some skilled attention, the marketing end was wholly at the mercy of conditions which caused a glutted and low market throughout the Fall and early Winter, with the later winter and spring generally experiencing fancy prices for fancy apples in boxes on which 80 cents transportation charges had been paid since they left their base some hundreds of miles beyond the Rocky Mountains.

Thinking that this sort of thing had gone on long enough with the local grower holding the tarred end of the stick, a number of our larger growers got together, formed a cooperative association with packing, storage and marketing facilities and undertook to do for each other and for the group as a whole what as individuals they could not do for themselves.

Like every other section of the globe, our own apples have better color and better flavor than apples grown in any other place. Of course, in our case, this is the gospel truth, but our trade, not being so thoroughly convinced of this, was thoroughly accustomed to buying at the lowest possible figure the good, bad and worse of the seasonal offerings and by ground hog day forgetting entirely that our beautiful Brandywine is flanked on both sides by hills covered with apple trees,

which so recently were bending with Smokehouse, Stayman and Romes. So we had to advertise.

We are having to advertise, not only our products, but ourselves—our Association. Some of our West Chester and adjacent folks, like those in your home town, are afraid that our little cooperative association is going to corner the market, boost prices, and, in general, wreck the constituted good order; they still don't know that the only thing that ever did, or probably ever will, within certain limits, determine the price that will be paid is **supply** and **demand**. So our first advertising undertook to explain to the trade that cooperation amongst ourselves was necessary to provide the machinery and facilities to properly grade and handle our crops, and that the results should be equally as satisfactory to them as to the growers in that a large supply of fruit of known grade, size and kind would be made available for their use, and the usual inferior ungraded supply, which hurts every market, largely eliminated; and that we proposed to supply them with apples worth a hundred per cent more at a cost of perhaps twenty per cent more.

Relying on the assumption that with most people seeing is believing, we have made as a principal plank in our advertising program "PUT UP AN HONEST PACK AND LET THE PACKAGE SPEAK FOR ITSELF." Every hamper is labeled as to its contents, and we expect to build our reputation on a high standard of grading, so that the contents will be exactly as the label indicates.

There are conspicuous instances where extensive and lavish advertising campaigns have created an enormous demand for certain products. In general, however, it is safe to conclude that the use of a staple like apples cannot be greatly increased through advertising. The most a local organization can hope to do by good advertising, backed up by real goods and real service, is to capture the business that exists. This may be done by crowding out of the market goods usually shipped in from some other section; or through **educational** advertising where the market is accustomed to inferior goods, it may be possible to supplant these by better products. The very best plan of doing this in the case of apples is to show people what a good apple looks like. Nixon says a good apple twenty years ago won't pass for as good an apple today. The way to show the housewife that greater value is to be found in the use of sound apples sized to suit the particular use to be made of them is to show good apples at county fairs and farm products shows and wherever occasion offers.

At our booth in our local products show, in addition to exhibiting fine specimens of different varieties, we had apples prepared in a dozen different ways, and gave out recipes tell-

ing how the different things were made; this sort of thing creates a lot of interest.

We have a good daily paper in our town, and the whole countryside has learned that if they want anything from a hot-bed sash to a new cook, the Local News is the place to look for it. We have made considerable use of the columns of this paper. All our display advertisements are easily recognized by our Keystone cut bearing our trade brand "Brandywine Fruits." We also use this trade brand printed on light cardboard in the containers of our best grades of apples.

During and since Apple Week, we used a few hundred of the large posters with the red apple distributed by the State Horticultural Association. These were displayed in shop windows and carried by trucks and wagons. I think this poster well gotten up, and there is no mistake as to its intention to advertise apples.

One of the best pieces of advertising we have done was the publication of a booklet of some fifty choice recipes, together with a statement of the main varieties grown in our section and the particular uses to which each variety is best suited. We had five thousand of these printed, and the demand for them is evidence that they have attracted attention and have some merit.

One other advertising attempt is worth mentioning. A few months ago we gave a dinner to the merchants with whom we do business, some of the bankers and members of our Board of Trade and others of our town. We not only filled them full of music and the best grub that Chester County could produce, but we had three or four of the best speakers we could corral and put some of our ideas across. With all due respect to Mr. Sampson, as expressed by him at our meeting last night, the good effects of this dinner have not worn off yet.

#### COOPERATION IN ADVERTISING LUZERNE COUNTY APPLES

Howard Lewis, of Pittston, reported that the growers catering to the Wilkes-Barre market are about to cooperate by adopting a uniform brand, agreeing upon uniform grades and packages, and requesting frequent inspection of their products by the inspector of the State Bureau of Markets stationed at Wilkes-Barre. Similar cooperation might be practicable among growers supplying Reading, Lancaster, York, and other local markets. He believes that the best method of advertising is to display the fruit in quantity at their County Fruit Show. "Of course," he said, "it is only a little county show, and in a coal region too, and we could not expect to have one as large or attractive as the State Fruit Show at Harrisburg; but we usually have about 400 plates of apples, 225 bushel baskets

of apples, and an attendance of about fifteen thousand." The full measure of this gentle sarcasm is felt when we know that the State Fruit Show at Harrisburg this year was scarcely half as large as the "little show" in Wilkes-Barre. This is a good natured prod which the rest of the state would do well to heed.

E. B. Mitchell, of Harrisburg, finds the local papers his best medium of publicity, using a one-inch ad, and occasionally an item in the news columns. He distributed 2,000 of the Association's apple recipe books, mainly through the stores that handle his apples. He believes we must get together on a general campaign for advertising the apple. "While we are spending a few hundreds of dollars in distributing these recipe books, the orange growers are spending over \$100,000 in Pennsylvania alone for boosting the sale of oranges."

#### NATIONAL APPLE WEEK ASSOCIATION, INC.

W. L. Minick, Chambersburg

The National Apple Week Association, Incorporated, developed from National Apple Day—National Apple Day, was observed about eleven years ago. The International Apple Shippers' Association has handled the project from its inception and is peculiarly fitted for handling same due to the fact that it has an organization in every part of the United States at both the producing and shipping ends and at points of distribution. It also has the necessary organization in Canada, the United Kingdom, Germany and Scandinavia.

Other large interests have been tied to this project in such a way that a remarkable cooperation and contribution to the success of the week have been given by such interests as the railroads, steamship lines, chambers of commerce, educational leaders, ministers, schools, doctors, and the public generally. As two small examples of this, I cite the action of the International Mercantile Marine in running an advertisement at its own expense in relation to apples during National Apple Week in the New York Times, World, Herald Tribune and Boston Transcript, which cost not a cent less than \$5,000. The Union Pacific Railroad alone, in addition to its activities, has printed and distributed at its own expense upwards of \$20,000 in Apple Recipe booklets. All of the other leading carriers, steamship lines, and a host of civic bodies have done their full part and given a truly amazing cooperation.

The distributing trade throughout the United States has for years taken a splendid interest and contributed most freely of its time and money. Thousands of dollars have been expended by them and days and days of time and effort.

The growers themselves have thus far done little or nothing to support National Apple Day and Week, and neither have points of origin or producing sections, with the exception of Yakima and Wenatchee. These two districts have for several years supported the project most liberally, not only by money, but by gifts of entire carloads of apples for free distribution to charitable institutions. I am not in any way blaming the growers, and I believe that the leading ones will be only too glad to support the project when the matter has been called to their attention.

Very few people have any idea of the extent to which the apple is advertised during National Apple Week or the value which accrues therefrom throughout the entire year. It is truly amazing. The publicity obtained this year, if paid for at current rates, would have much exceeded a half million dollars; but it must be borne in mind that the greater portion of the publicity which has been obtained could not be purchased at any price. National Apple Week has captured the public fancy and occupies the front pages of the newspapers and reading notices. It commands the ability of cartoonists and poets, the support of public men and civic bodies, the theatre, the radio, public schools, universities, leading citizens in all walks of life, and this support would be unpurchasable, if one attempted to purchase it. It has only been obtained purely as a cooperative matter through the central office of the International Apple Shippers' Association at Rochester.

Obviously I can't cover the things that were done in detail in a five minute talk; but I do want to cite you, however, to St. Louis, where the distributing trade organized a staff of some forty men and personally called on over 4,400 retail distributors in St. Louis prior to National Apple Week, interested them in the Week and left with them proper window cards and other advertising material, and then the day before National Apple Day a staff of telephone operators was organized and these 4,400 retailers were called on the telephone and reminded that the next day was Apple Day and to prepare for it. One retailer alone in St. Louis, operating some chain stores, purchased 2,000 barrels of apples for National Apple Week solely on account of the publicity which was given. Then every waiter in every hotel and restaurant in St. Louis was presented by the International Apple Shippers' Association with a badge in the shape of an apple and containing the words "Eat More." The success given to apple consumption in St. Louis was very marked. As a further example, a radio talk given by Jim Bawden on apples was heard by Mr. W. L. Wagner at Bradentown, Florida, who immediately wired St. Louis congratulating them. These are only illustrations of what goes on over the entire country. As a further example of the carry over and the lasting impressions made, the Inter-

national Apples Shippers' Association begins to get letters commencing in June from pretty nearly every part of the United States from hundreds of school children, school teachers, professors, ministers, chambers of commerce and many distributors, asking the dates for National Apple Day and Week, which show that they have been thinking and planning apples the entire year.

National Apple Week is a tremendous factor in popularizing the apple and beyond the shadow of a doubt is one of the reasons why apple consumption has increased very much faster than population and faster than practically any other fruit or vegetable.

I am not in favor of attempting to advertise the apples of any particular district. In the first place, sufficient funds cannot be raised to carry on such a project. The minute that it is attempted the entire burden will fall on the district that attempts it and they cannot expect assistance from outside agencies. The people who spend their time and their money in the distributing markets in pushing apples necessarily handle apples from many or all sections and they cannot as a business proposition be expected to show partiality. In the second place, all of these outside interests will not contribute their funds and time to the boosting of any particular locality but they will come in on the broad general proposition of the APPLE as the King of fruits. From the beginning the International Apple Shippers' Association placed emphasis on publicity for apples as such and has consistently refused to accept any one's money except on that understanding. This is applied in every instance. For example, from the contributions from Wenatchee and Yakima, they understand that neither box apples nor apples from Yakima or Wenatchee will be advertised, and they have been entirely willing to contribute to the cause as a whole for the boosting of just apples. The main thing is to get people to eat apples, and when that is accomplished they will consume the entire crop so that every district will be equally benefited.

National Apple Week benefits the grower tremendously. We are asking him and all others to contribute only a very small sum to help perpetuate and enlarge the work which has been established. On a three-year basis we are asking each one to contribute a little over \$13.00 per year, or \$20.00 for the first year and \$10.00 for each of the next two years. If it isn't worth this small amount, then it isn't worth anything and the quicker we find it out and discontinue National Apple Week the better. For example, a man who has 2,000 barrels of apples per year for three years, or a total of 6,000 barrels, would pay at the rate of about six-tenths of a cent per barrel, and if he had 4,000 barrels per year for three years, he would pay a little over three-tenths of a cent per barrel. If it isn't worth

this much to popularize apples, then we are off on the wrong foot. As a matter of fact, a large grower ought to take out more than one membership. Think of it, it only costs \$40.00 for three years.

Of all the many publicity and advertising projects which have been proposed and tried out from time to time, all the way from the Pacific clear across to the Atlantic, National Apple Day and National Apple Week, regardless of any defects they may have, actually worked and have survived the test of practical experience. The method has actually been tested, proved and developed during the last eleven or twelve years, and after all results count.

The New York Packer in a recent issue stated that the Vegetable Growers and Shippers of California have raised and will spend one million of dollars for advertising the present crop. What have the apple growers paid? Think, Gentlemen, think!

**D. M. Wertz:** As Chairman of the Resolutions Committee, a resolution has been handed me with the hope that it may receive favorable action: "Resolved that it is the sense of this Association that the proposed child labor amendment is very unwise and unjust and that everything possible be done to defeat the amendment in the present session of the State Legislature.

This resolution was unanimously adopted.

After discussing the sale of cider and other items of interest, the meeting adjourned.

### VEGETABLE SECTION

No papers were presented before this Section, the discussions being wholly informal, and no notes were taken by the Secretary, W. B. Nissley, for publication.

The following officers were elected: Chairman, Thomas Biddle, Bustleton; Secretary, W. B. Nissley, State College.

### SPRAYING AND DUSTING PROGRAM FOR FRUITS

H. W. Thurston and F. N. Fagan, State College  
**Apple**

For controlling Apple Scab should be made at the delayed dormant period, when the leaves of the blossom buds are expanded from one-fourth to one-half inch. Material, lime-sulphur 1.03 Sp. Gr. (after dilution). Nicotine is usually included in this application for aphid, three-fourths of a pint of nicotine sulphate to one hundred gallons of spray. Arsenate of lead powder, three pounds to one hundred gallons of spray, is

also used with this application for Bud Moth, Case Bearers and Leaf Rollers.

As far as Apple Scab is concerned, the aim of the grower should be to spray often enough after this time to keep the young foliage and flowering parts well covered and protected until two weeks after the petals fall. Depending upon the season, rain fall, and rapidity of growth, this means THREE and sometimes FOUR applications in addition to the delayed dormant. One of these should be the petal fall treatment, immediately, after the petals drop.\* For these applications, use lime-sulphur to test 1.008 specific gravity (out of the spray tank). Arsenate of lead powder at the rate of three pounds to one hundred gallons should be used in each application. If Aphid are not under control after the delayed dormant, nicotine should be added to the first application following the delayed dormant. Where Red Bug is a factor, nicotine should be included at the petal fall application and that given two weeks after the petal fall.

The above recommendations differ from previous recommendations in that at least one spray is suggested before the pink, primarily for controlling apple scab. Whether or not this application takes the form of a delayed dormant, or pre-pink, will depend largely upon the season and rapidity of growth, causing unprotected foliage. The size of the orchard is often a factor in determining whether the grower will complete the application as a delayed dormant or run over into the pre-pink or even the pink application.

If the above applications have been timely and thoroughly applied the necessity for late summer applications will depend upon the presence of other pests, such as Fruit Spot, Sooty Fungus, Late Curculio and Late Codling Moth.

If Apple Blotch is a pest, two applications of Bordeaux mixture should be made, the first one ten days or two weeks after petals fall and the second application about two weeks later.

### Dusting the Apple

If the grower wishes to use dust he should follow the same schedule as outlined above for spraying, using 80-10-10 dust for all applications except the ones calling for nicotine, which should be made with an "All-in-one" dust, or an extra application of a nicotine dust should be made following applications of the 80-10-10.

An 80-10-10 dust is composed of 80 per cent sulphur, 10 per cent lime and 10 per cent Arsenate of lead powder.

### Pears

If the apple spray program is followed in the pear orchard, control of the common pear pests (except fire blight) can be secured.

### PEACHES

First Application: Dormant, before buds swell in winter or early spring. Use lime-sulphur testing 1.03 specific gravity, (out of the spray tank) for Leaf Curl and San Jose Scale. If Lecanium Scale is present one of the oil sprays must be used.

Second Application: When shucks are dropping from the small peaches, use self-boiled lime-sulphur and arsenate of lead powder (2 pounds to 100 gallons of spray); or dry-mix and the same amount of arsenate; or 80-10-10 dust. For scab, Brown Rot and Curculio.

Third Application: Two to three weeks after second application, use self-boiled lime-sulphur and two pounds arsenate of lead to 100 gallons of spray; or 80-10-10 dust; or dry-mix and arsenate; for Scab, Brown Rot, Curculio.

Fourth Application: Four or five weeks before fruit ripens, repeat the third application, omitting the arsenate of lead. For Brown Rot.

### PLUMS

First Application: Dormant, before buds open. Use lime-sulphur 1.03 specific gravity, (out of spray tank). For San Jose Scale. If Lecanium scale is present substitute one of the oil sprays for lime-sulphur.

Second Application: As young plums are pushing out of the calyx shucks and as shucks are dropping, use self-boiled lime-sulphur and arsenate of lead powder two pounds to 100 gallons of spray; or 80-10-10 dust; or dry-mix and arsenate. For Brown Rot, Leaf Spot and Curculio.

Third Application: About two or three weeks after second application, use same material as in second application. For Leaf Spot, Brown Rot and late Curculio.

Fourth Application: If Leaf Spot and Brown Rot are not under control it is necessary to repeat the third application about three weeks later, using self-boiled lime-sulphur or dry-mix or dust but without the arsenate.

### CHERRIES

First Application: Delayed dormant. When the green is showing first in the buds, use lime-sulphur testing 1.03 specific gravity, and nicotine sulphate one pint to 100 gallons. For San Jose Scale and Aphis.

Second Application: When the petals fall from flowers, use self-boiled lime-sulphur and arsenate of lead powder two pounds to 100 gallons of spray; or dry-mix and arsenate; or 80-10-10 dust. For Leaf Spot, Brown Rot and Curculio.

Third Application: When young fruits are pushing out from calyx shucks, repeat second application.

Fourth Application: Before fruit begins to color repeat third application. For Leaf Spot, Brown Rot and Fruit Fly, also early Slugs.

Fifth Application: After cherry harvest, repeat fourth application. For Leaf Spot and Slugs.

If pest have not been serious one can often omit the second application and fifth applications.

### DRY MIX SULPHUR SPRAY

From 1924 Proceedings, Page 137

This is largely replacing self-boiled lime-sulphur, being easier to make and equally effective.

The standard formula for preparing Dry Mix is:

Sulphur	8 pounds
Hydrated lime	4 pounds
Calcium caseinate	8 ounces

The above amounts are sufficient to make 50 gallons of spray mixture, and may be proportionately increased or decreased to meet the requirements of any spray tank.

A high grade of superfine dusting sulphur has been recommended for use in preparing Dry Mix, but there is every reason to believe that a good grade of commercial ground sulphur flour will make just as effective a mixture. The commercial sulphur flour is not only cheaper but also easier to handle than the superfine material.

It is very important that fresh hydrated lime, free from grit and dirt be used in preparing Dry Mix. The grade of lime designated as "finishing lime" will be found more satisfactory than any of the lower grades. Low grade lime usually contains grit that clogs nozzles, and strainers and wears out pump cylinders.

The sulphur and lime are mixed thoroughly in a dry form and then sifted into the spray tank. If arsenate of lead is added, it should be at the time the spray is to be used.

### BORDEAUX MIXTURE

Copper sulphate (Bluestone)	4 pounds
Lime (best grade stone lime)	4 pounds
Water	50 gallons

This is the 4-4-50 formula; a 3-4-50 mixture would have one pound less of bluestone. The bluestone may be conveniently dissolved in a few gallons of hot water, and made up to 25 gallons. Slake the lime to an even paste and add water to make 25 gallons. Mix these dilute solutions by pouring together slowly and churning constantly. Strain and use fresh.

Stock solutions can be made up in large amounts by slaking lime 1 pound to a gallon of water and dissolving bluestone, 1 pound to a gallon of water. The one gallon of each is equal to one pound of each material respectively. However, when using a stock solution both stock liquids should be diluted to their respective total dilution before mixing them to make the Bordeaux mixture. Increasing the amount of lime to six pounds helps to prevent the burning sometimes caused by this spray.

### OIL EMULSION SPRAYS

From 1924 Proceedings, Page 139

Following is the formula used in preparing the stock solution recommended by the United States Department of Agriculture:

Red Engine Oil (such as Diamond, Paraffin or Nabob)	1 gal.
Potash Fish Oil Soap	1 lb.
Water	1/2 gal.

The materials are put together in a kettle and heated until the boiling point is reached. Just before boiling a brown scum appears. As the boiling begins the brown scum begins to disappear. At this point the cooking is stopped and the material is pumped twice while still very hot at a pressure of 60 pounds. This completes the preparation of the stock solution. In preparing large quantities it is convenient to use a 200 gallon galvanized cooking tank and place in it a 50 gallon barrel of oil, 50 pounds potash fish oil soap and 25 gallons of water. In emulsifying large quantities, a power sprayer can be used for pumping the oil emulsion. The disc plate can be taken out of the spray gun. The hot oil is hard on packing and hose and it is best to use rather old hose for this purpose. The stock solution can be kept in barrels until ready for use. However, precaution must be taken against freezing which occurs at about 15° F. If the stock solution is allowed to freeze, it cannot be emulsified again. The stock solution is used at the rate of 3 gallons to make 100 gallons of spray, which gives a 2% emulsion.

In using oil emulsion some difficulty is encountered where lime-sulphur has previously been used in the spray tank and where it is necessary to use hard water. Soft water or rain

water is preferable for making this spray. If the spray tank contains a deposit of lime-sulphur it should be thoroughly scraped and cleaned out and the pump line cleaned with a strong solution of caustic soda or lye. If the water is too hard to make a good emulsion the difficulty can usually be overcome by diluting with weak Bordeaux of a 1/4-1/5-50 strength. Many growers dilute with a weak Bordeaux throughout the application thinking that it gives a more satisfactory emulsion.

Lubricating oil emulsion is pleasant to handle and because of this most operators do a very good job of spraying. It has excellent spreading qualities. In fact growers who have had experience with it think that it goes about 25% farther per unit of spray than lime-sulphur solution. It costs one-third to one-half as much as the lime-sulphur spray, dormant strength.

See also page 66 of this Report.

## THE PENNSYLVANIA FRUIT LIST

### Tree Fruits Recommended for Planting in Pennsylvania by the State Horticultural Association

#### Apples

Five leading varieties, named in order of importance, for wholesale or car lot plantings in each region:

**Southern Region.** (Adams and adjoining counties) Stayman, York, Grimes, Jonathan, Rome.

**Southeastern Region.** (East of York City and south of North Mountain) Stayman, Smokehouse, Grimes, Rome, Delicious.

**Northeastern Region.** (East of Sunbury and Troy) Baldwin, Northern Spy, Satyman, Rome McIntosh.

**Western Region.** (West of Greensburg, Kittanning, and Corry) Baldwin, Northern Spy, Rome, Stayman, Stark.

**Central Region.** (For northern half, use varieties of Northeastern Region) Stayman, York, Rome, Delicious, Jonathan.

Leading varieties for local market planting, arranged in order of season of marketing. Chief sorts marked \*\*\*; secondary varieties \*\*; varieties of limited value\*.

Region	S.	S. E.	N. E.	W.	C
Yellow Transparent	**	**	*	*	*
Oldenburg (Duchess)			*	*	*
Williams	*	**			
Summer Rambo	***	**			
Maiden Blush		*		*	
Wealthy	**	**	**	***	*
McIntosh	*				
Smokehouse	**	***			
Grimes	***	***		*	**
Jonathan	***	***		**	***
Delicious	***	***	**	**	***
R. I. Greening			**		
Wagener		*	*	**	*
Baldwin			***	***	**
Stayman	***	***	***	***	***
Northern Spy			***	**	***
York	*				*
Rome	***	***	***	***	***
Stark	*	**	**	*	*

The following additional varieties, because of their quality, are worthy of a place in the **home planting only**. They are arranged approximately according to seasons of ripening.

Early Harvest, Fanny, Gravenstein, Jefferis, Fall Pippin, Mother, Twenty Ounce, Cortland, Cox Orange, Salome, Tompkins King, King David, Esopus, Tolman Sweet, Red Canada, Golden Russett, Yellow Newtown.

#### Peaches

Leading varieties for commercial planting arranged according to season of ripening.

Region	S.	S. E.	N. E.	W.-S. of Erie	W. Erie Shore	C.
Admiral Dewey					*	
Greensboro		*	***	***	*	**
Carman		*		*	**	
Hiley	**	**				
Champion		*	*	*	**	*
Belle of Georgia	***	***	*	*	*	*
Rochester					**	
Hale	***	*		*	*	*
Elberta	***	***	***	***	***	***
Crosby					**	
Fox		**				
Salway	*	**	**	*		**
Smock		*				*
Iron Mountain	*	*	**			

#### Pears

The three leading commercial varieties throughout the state are: Bartlett, Seckel and Kieffer. Additional varieties of high quality for home use arranged in season of ripening are: Tyson, Clapp Favorite, Bosc, Sheldon, Clairgeau, Angouleme (Duchess), Winter Nelis.

#### Plums

Commercial plums which may be recommended are, in order of ripening: Red June, Shiro, Burbank, Lombard, Bradshaw, Reine Claude, (Green Gage) Italian Prune, German Prune, Shropshire Damson.

The following are of **high quality** and worthy of trial in the **home plantings** of the state, arranged in order of ripening: Abundance, Tragedy, Hand, Miller Superb, Pacific, Pearl, Tenant, Washington, Agen, Imperial Epineuse, Jefferson, Golden Drop, Late Mirabelle.

#### Cherries

Only three sour cherries are of commercial importance: Early Richmond and Montmorency, both with light juice, and English Morello, with dark juice.

The following sweet cherries are recommended for commercial planting: Yellow Spanish and Napoleon (Royal Ann), for light cherries; Black Tartarian, Schmidt, Lambert, and Windsor, for dark cherries.

In addition to these, the following sweets are worthy of trial for the **home plantation**: Early Purple, Coe, Ida, Elton, Bing, Centennial, Republic.

The following "Duke", or hybrid, cherries should be tried in the **home plantings**: Empress Eugenie, May Duke, Abbess d'Oignies, Nouvelle Royal, and Reine Hortense.

## AFFILIATED COUNTY HORTICULTURAL SOCIETIES

The following County Horticultural Societies are affiliated with the State Horticultural Association, under Article II of the Constitution.

### ADAMS COUNTY FRUIT GROWERS ASSOCIATION

Reorganized March 10, 1922

#### OFFICERS

President, C. A. GRIEST - - - - - Guernsey  
 Vice President, W. E. GROVE - - - - - York Springs  
 Secretary, EDWIN C. TYSON - - - - - Flora Dale  
 Treasurer, WM. S. ADAMS - - - - - Gardners

#### MEMBERS

\*Adams, Wm. S.....Aspers  
 Bream, W. A.....Gettysburg  
 Boyer, W. W.....Arendtsville  
 \*Baugher, H. G.....Aspers  
 Baugher, G. L.....Aspers  
 Bittinger, C. H.....R. D. 6, Hanover  
 Benner, B. E.....Virginia Mills  
 Boyer, E.....Biglerville  
 \*Crouse, E. A.....Gettysburg  
 \*Cation, W. R.....Orrtanna  
 Dock, Miss Mira L.....Fayetteville  
 \*Eldon, Robert M.....Aspers  
 Eshelman, S. C.....Gettysburg, No. 5  
 Frost, S. W.....Arendtsville  
 Fraim, Merritt L.....Aspers  
 \*Griest, C. Arthur.....Guernsey  
 \*Griest, Frederick E.....Flora Dale  
 \*Garretson, Eli P.....Biglerville  
 Gardner, L. M., Jr.....York Springs  
 \*Grove, W. E.....York Springs  
 Huber, Charles H.....Gettysburg  
 \*Hartman, George R.....Biglerville  
 Jacobs, Daniel C.....Gettysburg, No. 5  
 \*Keller, S. C.....Gettysburg, No. 5  
 \*Keller, Paul.....Gettysburg, No. 5  
 Knab, Mrs. George N.....New Oxford  
 \*Large, Katherine S.....Orrtanna  
 Large, Mrs. E. S.....Orrtanna  
 Musselman, C. H.....Biglerville  
 Miller, E. M.....Hanover  
 Minick, W. L.....Waynesboro  
 Prickett, Josiah W.....Biglerville  
 Peters, Jno. B.....Gardners  
 Raffensperger, Charles E.....Arendtsville  
 Rice, A. E.....Biglerville  
 Riddlemoser, H. E.....McKnightstown  
 Spangler, George E.....Gettysburg  
 Snyder, E. Bane.....Jack's Mountain  
 Stock, G. M.....Idaville  
 \*Strasbaugh, E. F.....Orrtanna  
 Stoner, H. S.....Orrtanna

\*Tyson, Edwin C.....Flora Dale  
 \*Tyson, Chester J.....Flora Dale  
 \*Tyson, Wm. C.....Guernsey  
 Trostle, Francis.....Gardners  
 Wolfe, C. A.....Aspers  
 Wolff, Dr. W. E.....Arendtsville  
 Weaner, W. C.....Aspers  
 Wible, R. E.....Gettysburg  
 Wilson Bros.....Aspers

### BEDFORD COUNTY HORTICULTURAL SOCIETY

Organized January, 1924

#### OFFICERS

President, N. F. RICHARDS - - - - - Schellburg  
 Vice President, LLOYD WRIGHT - - - - - Spring Hope  
 Secretary, CLAYTON SMITH - - - - - Bedford, R. 4  
 Treasurer, A. A. HYDE - - - - - Manns Choice

#### MEMBERS

Blackburn, W. D.....Bedford  
 Bowser, J. C.....Wolfsburg  
 Claycomb, Irvin.....Osterburg, R. D. 1  
 Diehl, D. W. W.....Bedford, R. D. 4  
 Drenning, C. R.....Bedford, R. D. 3  
 Drenning, H. D.....Bedford, R. D. 3  
 Drenning, John L.....Bedford  
 Egolf, J. W.....Schellburg  
 Elder, H. C.....Cumberland Valley  
 Furry, E. S.....New Enterprise  
 Heacock, F. J.....Bedford  
 Howsare, J. C.....Bedford, R.D. 3  
 Hyde, A. A.....Manns Choice  
 Hyde, Clarence.....Manns Choice  
 Knisely, Samuel.....Bedford, R. D.  
 Mason, John C.....Hyndman  
 Mickel, J. Warren.....New Paris  
 Mollenauer, L. R.....Bedford  
 Richards, A. C.....New Paris  
 Richards, N. F.....Schellburg  
 Shaffer, R. E.....Schellburg  
 Slick, J. T.....New Paris  
 Smith, Clayton.....Bedford, R. D. 4  
 Wertz, J. N.....Bedford, R. D. 3  
 Williams, H. P.....Schellburg  
 Wright, C. E.....Spring Hope  
 Wright, Lloyd.....Spring Hope

### THE BERKS COUNTY FRUIT GROWERS ASSOCIATION

Organized 1922

#### OFFICERS

President, SHELDON FUNK - - - - - Boyertown  
 Secretary, W. W. LIVINGOOD - - - - - Robesonia

#### MEMBERS

Berky, D. W.....Sewanee  
 Bertollett, M. L.....Mt. Penn  
 Bridenbaugh, John H.....Reading, Liberty Bank Bldg.

Deiner, W. S.....	Boyertown, R. D. 2
DeLong, Cletus Y.....	Mertztown, R. D. 2
Doty, H. M.....	Stony Creek Mills
Doty, Richard.....	Stony Creek Mills
Eagleman, J. G.....	Guigers Mills
Fry, John L.....	Reading
Funk, Sheldon.....	Boyertown
Gerhard, Owen S.....	Clayton
Haring, S. A.....	Reading, 901 N. 11th St.
*Hershey, H. F.....	Hamburg, R. D. 3
Hinkle, Jacob E.....	Oley, R. 1
Johnson, Dr. E. E. S.....	Hereford
Kruppenbach, Harry H.....	Robesonia
Lenhart, Richard L.....	Reading, Kline, Eppihimer Co.
Livingood, W. W.....	Robesonia
Lingard, Geo. W.....	Lenhartsville
McGinnes, C. G.....	Reading, 1507 Colonial Trust Bldg.
Markely, N. S.....	Shanesville
Mayer, L. E.....	Boyertown
Melcher, Bennett A.....	Bally
Melcher, George W.....	Bally
*Rick, John.....	Reading, 434 Oley St.
Rittenhouse, J. H.....	Lorane
Rittenhouse, Samuel.....	Lorane
Rohrer, G. W.....	Mertztown
Ruth, B. F.....	Reading
Shearer, Walter J.....	Vinemont
Sheble, Earl.....	Hamburg
Shultz, Adam S.....	Hereford
Shultz, Chester.....	Barto
Strohmster, Herman A.....	Gouglerville
Schmick, Wilson E.....	Hamburg
Thompson, J. H.....	Wernersville
Uibel, Geo. D.....	Reading, Boys' High School
Wertz, Samuel H.....	Leesport
Witman, John.....	Reading
Yoder, C. L.....	Boyertown, R. D. 1
Zellers, R. J.....	Sinking Spring

### BUCKS COUNTY FRUIT GROWERS ASSOCIATION

Organized 1924

#### OFFICERS

President, ROBERT W. ATKINSON - - - Wrightstown  
 Secretary, FREDERICK G. SATTERTHWAITE - - - Yardley

#### MEMBERS

Allen, Jas. D.....	Stockton, N. J.
Amos, William J.....	Warrington
Atkinson, Robert E.....	Wrightstown
Broadhurst, Horace.....	Halicong
Carrell, Frank B.....	Neshaminy
Crowell, Ralph T.....	Buckingham
Everitt, Samuel.....	Bristol
Lovett, Robert P.....	Fallsington
Moon, R. Barclay.....	Morrisville
Paxson, Edw. M.....	Lumberville
Satterthwaite, Frederick G.....	Yardley
Snyder, Stover S.....	Coopersburg

Sterninger, Charles B.....	Coopersburg
Transue, R. E.....	Lumberville

We held four meetings and an orchard inspection trip.

At three of the meetings we had specialists from the Pennsylvania State College. The presence of these men was appreciated.

Just one year of the Association's activities has been a great help and it is a pleasure to meet the members who are engaged in like work.

FREDERICK G. SATTERTHWAITE, Secretary

### CHESTER-DELAWARE FRUIT GROWERS ASSOCIATION

Organized 1921

#### OFFICERS

President, A. S. LINVILLE - - - - - Media  
 Vice President, H. RUSSELL WORTHINGTON - - - West Chester  
 Sec.-Treas., HERBERT C. BARKER - - - - - West Chester

#### MEMBERS

Barker, Herbert C.....	West Chester
Barnard, C. P.....	Northbrook
*Bartram, George & Son.....	West Chester
Bird, Anna C.....	Brandywine Summit
Campbell, W. S.....	Phoenixville, Rt. 4
Crowell, A. & T.....	Avondale
Darlington, Hibbert.....	West Chester
Dickey, Samuel.....	Oxford
Dodge, Geo. P.....	East Downingtown
Dunlap, George P., Hillwood Fruit Farm.....	Glen Riddle
Hayman, Guy L.....	Northbrook
Hayward, Charles E.....	Westtown
Ivins, William A.....	Media
Kelly, Margaret.....	West Chester
Keech, M. H.....	West Chester
Linville, Arthur.....	Media
Lippincott, S. A.....	Downingtown
Malone, Mary.....	Brandywine Summit
Nolan, John V.....	Malvern
Parker, Caroline R.....	West Chester
Passmore, N. S.....	Chester Heights
Perrigo, A. H.....	West Chester
Phillips, Charles S.....	Ocopson
Ray, J. E. S.....	West Chester
Romig Brothers.....	Downingtown
Sargent, George.....	Glen Mills
Scott, A. H.....	Wallingford
*Smedley, S. L.....	Newtown Square
Smedley, S. L., Jr.....	Newtown Square
Smedley, Walter.....	Media
Thomas, Carl.....	West Chester
Vandergrift, William.....	West Chester
Walker, James.....	Westtown
Welsh, George A.....	Moylan
Wolff, F. B.....	Lima
Worthington, Russell.....	West Chester

The Association is in a very healthy condition. We are making a real effort to produce better fruit in this section and to eliminate all but standard varieties. We have entirely too many varieties as seems to be the case everywhere. It will take a number of years to get down to our most satisfactory commercial kinds, but by discouraging planting of certain varieties, by top working, and by liberal use of the axe, we expect to get this done.

Field trips to orchards where special treatments are being tried were made during the summer. Our June tour was made by about 150 persons. Professors Nixon, Hodgkiss, MacLeod and others gave talks or demonstrations, adding much to the pleasure and value of this trip.

H. C. BARKER, Secretary

### CUMBERLAND COUNTY FRUIT GROWERS ASSOCIATION

Organized 1922

#### OFFICERS

President, GALEN H. GATES - - - - - Shippensburg  
 Vice President, C. M. MILLER - - - - - Newville  
 Secretary, H. F. MOWERY - - - - - Shippensburg  
 Treasurer, JAMES DUNLAP - - - - - Shippensburg, R. D.

#### MEMBERS

Allison, Herbert W.....Shippensburg, R. D.  
 Angle, H. M.....Shippensburg  
 Barbour, J. B.....Shippensburg  
 Basehoar, Dr. C. S.....Carlisle  
 Berry, Dr. E. S.....Shippensburg  
 Boyer, Elton.....Biglerville  
 Bramon, J. B.....Shippensburg, R. D.  
 Brinkerhoff, H. J.....Lees Cross Roads  
 Bushman, H. M.....Carlisle  
 Cameron, John.....Carlisle, R. D. 1  
 Dennis, R. M.....Carlisle  
 Dubbs, H. J.....Carlisle, R. D.  
 Duncan, D. G.....Shippensburg  
 \*Dunlap, James M.....Shippensburg, R. D.  
 Gates, G. H.....Shippensburg  
 Harmon, C. B.....Shippensburg  
 Heberlig, Herbert.....Newburg  
 Henry, Harold.....Shippensburg  
 \*Leonard, Frank.....Carlisle, R. D.  
 Miller, C. M.....Newville  
 Mowery, H. F.....Shippensburg  
 Mowery, N. E.....Shippensburg  
 Smith, Jos. H.....Carlisle  
 Stough, Mulford.....Shippensburg  
 Sunni-Glo Gardens, Inc.....Boiling Springs  
 Torr, W. H.....Mechanicsburg  
 Worst, D. C.....Carlisle, R. D.

### FRANKLIN COUNTY HORTICULTURAL SOCIETY

Organized January 21, 1922

#### OFFICERS

President, H. W. SKINNER - - - - - Chambersburg  
 Vice President, J. W. REICHARD - - - - - Waynesboro  
 Treasurer, D. EDWARD LONG - - - - - Chambersburg  
 Secretary, C. FRANK GILLAN - - - - - St. Thomas  
 Assistant Secretary, R. J. GILLAN - - - - - St. Thomas

#### MEMBERS

Alexander, W. M. & Son.....Dry Run  
 Barr, I. C.....Greencastle, R. 2  
 Bingham, A. H.....St. Thomas  
 Bingham, W. O.....St. Thomas  
 Bikle, Philip M.....Chambersburg, R. No. 11  
 Bream, D. M.....Chambersburg  
 Brereton, O'Hara D.....Edenville  
 Crawford, J. B.....Fayetteville  
 Criswell, R. T.....Chambersburg  
 Davison, Norman.....Chambersburg  
 Diehl, E. W.....St. Thomas  
 Diehl, Edgar B.....St. Thomas  
 Doan, J. L.....Chambersburg, R. 2  
 Duke, D. R.....Chambersburg  
 Duke, B. F.....Chambersburg  
 Gehr, Harvey J.....Waynesboro, R. No. 1  
 Gelwix, Dr. John M.....Chambersburg  
 Gillan, C. Frank.....St. Thomas  
 Gillan, G. G.....St. Thomas  
 Gillan, R. J.....St. Thomas  
 Hagerstown Spray Material Co.....Hagerstown, Md.  
 Heisey, S. A. & Bro.....Greencastle, R. No. 4  
 Hess, Daniel.....Waynesboro  
 Hess, Paul G.....Mont Alto, R. No. 1  
 Hess, Ralph C.....Waynesboro  
 Hess, Ray B.....Mont Alto, R. No. 1  
 Hess, Willis A.....Mont Alto, R. No. 1  
 Horn, W. H.....Chambersburg, R. No. 10  
 Krebs, H. B.....Mercersburg  
 Karns, J. H.....Chambersburg  
 Landis, D. L., Jr.....Chambersburg, R. No. 1  
 Latshaw, J. E.....Marion  
 Long, D. Edward.....Chambersburg  
 Long, W. G.....Fayetteville  
 McAllen, R. W.....Fannettsburg  
 McIlvaine, J. S.....Fayetteville, R. No. 1  
 Miller, Clayton.....Marion  
 Miller, D. L.....Waynesboro  
 Mish & Croft.....St. Thomas  
 Nicodemus, E. A.....Zullinger  
 Omwake Brothers.....Greencastle  
 Orr, B. G.....Chambersburg  
 Rearick, J. W.....Chambersburg  
 Reasner, J. E.....Shippensburg  
 Reed, Fred B.....Chambersburg  
 Reichard, Charles W.....Waynesboro  
 Sharpe, Walter K.....Chambersburg  
 Skinner, H. W.....Chambersburg  
 \*Stear, J. R.....Chambersburg  
 \*Wertz, D. Maurice.....Waynesboro

## INDIANA COUNTY HORTICULTURAL SOCIETY

Organized February, 1924

### OFFICERS

President, T. C. HOOD - - - - - Saltsburg, R. D.  
 Sec.-Treas., H. W. STONEBREAKER - - - - - Indiana, R. D. 7

### MEMBERS

Akerson, S. A.....Blairsville, R. D. 4  
 Altman, L. A.....Blairsville  
 Black, H. M.....Idamar  
 Brown, Bert C.....Marion Center  
 Brown, H. M.....Indiana, R. D. 5  
 Brown, R. A.....Homer City, R. D. 2  
 Buterbaugh, M. S.....647 Water St., Indiana  
 Caldwell, E. P.....Marion Center  
 Clark, B. M.....Indiana  
 Clark, Fred E.....Indiana  
 Conner, L. J.....Penn Run  
 Diven, W. C.....Livermore  
 Elbel, Geo. H.....Rossiter, R. D. 1  
 Fyock, Frank.....Rochester Mills, R. D. 1  
 Gahagan, Vernon.....Loop  
 George, T. K.....Homer City  
 Gibson, Ira.....Indiana  
 Hamilton, R. W.....Home, R. D. 2  
 Hood, T. C.....Saltsburg, R. D.  
 Irwin, S. B.....Punxsutawney, R. D. 1  
 Keith, C. W.....Barnesboro  
 Lydic, J. M.....Blairsville, R. D. 1  
 McCrea, F. C.....Blairsville  
 McCrea, W. P.....Blairsville  
 McHenry, Clarence.....Indiana  
 Murraray, Ed A.....Punxsutawney  
 Nibert, William.....Indiana  
 Opdyke, F. A.....Homer City  
 Overdorff, H. W.....Blairsville  
 Rosensteel, L. C.....Edri  
 Simpson, J. A.....Indiana, R. D. 5  
 Snyder, Fred.....Avonmore, R. D. 1  
 Stephens, Ben.....Clymer, R. D. 2  
 Stephens, Zenas.....Clymer  
 Stonebreaker, H. W.....Indiana, R. D. 7  
 Strong, T. M.....Blairsville, R. D. 1  
 Wetzal, Wm. S.....Marion Center  
 Williams, F. W.....Indiana, R. D. 4

## LANCASTER COUNTY FRUIT AND VEGETABLE GROWERS ASSOCIATION

### OFFICERS

President, P. R. KRAYBILL - - - - - Rheems  
 First Vice President, L. B. HUBER - - - - - Lancaster, R. 5  
 Second Vice President, ROY N. PERIS - - - - - Florin  
 Third Vice President, M. A. MOORE - - - - - Lititz  
 Fourth Vice President, ELIAS H. VOGEL - - - - - Lancaster, R. D. 3

Secretary, LOWELL F. HALLIGAN - - - - - Lancaster  
 Treasurer, S. E. FORRY - - - - - Ephrata, R. D. 1

### MEMBERS

Barr, Frank S.....Narvon  
 Betz, W. E.....Stevens, R. 2  
 Bollinger, Jacob.....Lititz, R. 1  
 Borry, E. E.....Stevens, R. 2  
 Brossman, J. F.....Ephrata  
 Brossman, Morse.....Mohnton, R. 2  
 Brossman, Rudy.....Ephrata  
 Brubaker, J. C.....Lititz, R. 1  
 Bucher, E. B.....Ephrata, R. 1  
 Burkholder, A. Z.....Ephrata, R. 1  
 Ditzler, Jacob W.....Lititz, R. 5  
 Enders, John F.....Columbia, R. D.  
 Fair, Frank.....Elizabethtown, R. 1  
 Felty, G. B. O.....Millersville  
 Flory, Paul B.....Pequea  
 Forry, S. E.....Ephrata, R. 1  
 Furlow, Eber.....Hopeland  
 Garber, Henry F.....Mt. Joy  
 Gise, W. H.....Lancaster, R. 5  
 Good, Martin R.....54 S. Franklin St., Lancaster  
 Hacker, E. S.....Ephrata  
 Harnish, C. H.....Leola  
 Herr, C. H.....Lancaster, R. 2  
 Herr, David S.....Lancaster, R. 7  
 Hershey, C. Maurice.....Gordonville, R. 1  
 Hershey, Hiram S.....East Petersburg  
 Hess, Francis P.....Lancaster, R. 7  
 Hostetter, Dr. J. E.....Gap, R. 1  
 Huber, L. B.....Lancaster, R. 5  
 Kauffman, A. L.....Ronks, R. 1  
 Kraybill, P. R.....Rheems  
 Kraybill, S. S.....Rheems  
 Lepole, Walter.....Akron  
 Longenecker, J. E.....Mt. Joy  
 Metzger, T. Warren.....Lancaster  
 Moore, M. A.....Lititz  
 Nolt, Harrison S.....Columbia, R. 1  
 Peris, Roy N.....Florin  
 \*Reist, John G.....Mt. Joy  
 Root, J. W.....Manheim, R. 1  
 Ruhl, H. F.....Manheim  
 Smith, Geo. K.....Akron  
 Snavelly, Henry B.....Lititz, R. 5  
 Snyder, C. B.....Ephrata, R. 1  
 Snyder, Elmer R.....Elizabethtown  
 Stauffer, T. H.....Lititz, R. 4  
 Stolfus, Isaac M.....Ronks, R. 1  
 Vogel, Elias H.....Lancaster, R. 3  
 Wenger, Monroe P.....Denver  
 Wenger, G. P.....Quarryville, R. 1  
 Wertsch, Edwin.....Lititz, R. 5  
 Widders, J. B.....Lancaster, R. 3  
 Witmer, J. B.....Lampeter  
 Zimmerman, H. S.....La Park

## LAWRENCE COUNTY FRUIT GROWERS ASSOCIATION

Organized 1914

### OFFICERS

President, J. W. CUMMINGS - - - - New Wilmington  
 Vice President, CLAN BALDWIN - - - - New Castle  
 Secy.-Treas., J. A. BOAK - - - - New Castle, R.

### MEMBERS

Bavard & Baldwin.....Newcastle  
 Bell, Russell.....West Middlesex  
 Benson, B. J.....New Castle, R. 8  
 Blair, T. W.....New Castle, R. 4  
 Boak, J. A.....New Castle, R. 4  
 Boak, J. E.....Newcastle, R. D. 4  
 Bolph, Irwin.....Newcastle  
 Bovard & Baldwin.....New Castle  
 Brown, O. P.....Newcastle, Broyles Ave.  
 Buchanan, S. W.....New Wilmington  
 Boyd, J. H.....461 E. Washington St., New Castle  
 Cox, J. W.....New Castle, R. 3  
 Cummings, J. W.....New Wilmington  
 Curry, Edward.....New Castle, R. 1  
 Drake, William.....Volant, R. 3  
 Friday, G. P.....New Castle, R. 1  
 Fullerton, A. H.....Edenburg  
 Gebhart, W. J.....New Castle, R. 8  
 Harbison, C. F.....New Castle, R. 7  
 Hartzell, Chas.....New Castle, R. 1  
 Hileman, Carl.....New Castle, R. 4  
 High Hill Fruit Farm.....Pulaski  
 Hopper, W. C.....New Castle, R. 4  
 Houk, J. B.....New Castle, R. 8  
 \*Huey, S. R.....New Castle, R. 3  
 Hunt, Norman.....New Castle, R. 4  
 Hunt, S. J.....Edenburg  
 Hunt, Lewis.....New Castle, R. 4  
 Johnston, J. B.....New Wilmington, R. 1  
 Johnston, J. H.....New Wilmington, R. 1  
 Johnston, R. S.....New Wilmington, R. 1  
 Kildoo, Samuel.....New Castle, R. 4  
 King, Howard.....New Castle, R. 7  
 Kyle, David.....New Castle, R. 8  
 Leslie, Merl.....New Castle, R. 8  
 McClure, Frank.....New Castle  
 McMillan, R. S.....916 Morton St., New Castle  
 Nass, J. B.....New Castle, R. 3  
 Nass, J. A.....New Castle, R. 5  
 Offut, N. A.....Volant, R. 1  
 Patterson, Geo. W.....East Brook  
 Reynolds, Amzi.....New Wilmington, R. 63  
 Shaner, Elmer.....Slippery Rock  
 Stone, F. B.....New Wilmington  
 Wilson, A. O.....Volant  
 Young, Fred.....Elwood City, R. 1

## THE LEBANON VALLEY COOPERATIVE FRUIT GROWERS

### OFFICERS

President, IRWIN LONGENECKER - - - - Palmyra  
 Vice President, J. R. HEILMAN - - - - Lawn  
 Secy.-Treas., H. MEYER SNAVELY - - - - Lebanon

### MEMBERS\*

\*Boltz, P. R.....Lebanon, R. 3  
 Bucher, Alvin.....Meyerstown, R. 4  
 Cassidy, John B.....Lebanon, R. 2  
 Freeman, W. C.....Cornwall  
 Heilman, Albert.....Cleona  
 Heilman, J. R.....Lawn  
 Hertzler, D. R.....Richland  
 Hoke, Arthur.....Cornwall  
 \*Horst, J. M.....Lebanon, R. 3  
 Keiser, Carl.....Cornwall  
 Krall, W. O.....Myerstown, R. 4  
 Liske, C. E.....Lebanon, R. 4  
 Longenecker, Irwin.....Palmyra  
 Meck, John.....Jonestown  
 Meyer, D. H.....Annville  
 Meyer, E. J.....Lebanon, R. 8  
 Miller, Albert D.....Lebanon, R. 3  
 Moyer, Joseph.....Lebanon  
 Rabel, Amos.....Lebanon, R. 5  
 Rank, William.....Lebanon  
 Reist, A. E.....Palmyra, R. 2  
 Snavely, H. Meyer.....Lebanon  
 Snavely, Misses.....Lebanon, R. 8  
 Suptot, A. V.....Cornwall  
 Trump, Chas.....Lebanon  
 Winters, Cyrus.....Lebanon, R. 8  
 Wolff, Paul.....Myerstown  
 Yingst, John.....Lebanon, R. 5

## LYCOMING COUNTY FRUIT GROWERS ASSOCIATION

Re-organized 1924

### OFFICERS

President, W. H. BANZHAF - - - - Muncy  
 Vice President, M. A. PERCY - - - - Montoursville  
 Sec.-Treas., W. F. MAC VEAGH - - - - Muncy, R. 3

### MEMBERS

Artley, O. R.....Linden, R. D.  
 Banzhaf, W. H.....Muncy  
 Bes, E. E.....Montgomery  
 Faries, Robert H.....250 William St., Williamsport  
 Gibson, Ralph.....331 Center St., Williamsport  
 Grittner, Harry M.....Montgomery  
 Hain, G. H.....Allenwood, R. D.  
 Harer, Roy.....Salladasburg  
 Heim, H. G.....508 Pine Street, Williamsport

Heilman, H. C.	Muncy, R. 4
Lundy, T. A.	Muncy, R. 3
Mac Veagh, W. F.	Muncy, R. 3
Miller, H. A.	35 Ross Street, Williamsport
Pearson, W. J.	Nisbet
Pearson, W. G.	DuBoistown
Percy, M. A.	Montoursville, R. 2
Rynearson, S. L.	Muncy, R. D.
Shadle, Miss Lydia	Jersey Shore, R. 4
Stryker, E. E.	Montgomery, R. D.
Theiss, Lewis Edwin	Muncy, R. 3
Welshans, M. O.	Jersey Shore, R. 4
Welshans, D. D.	Jersey Shore, R. 4
Winner, H. G.	Calvert
Winter, J. Randall	Muncy, R. 2
Williams, C. B.	Canton
Wheeler, C. S.	Montoursville, R. 2
Zellers, S. L.	Montgomery
Zellers, E. B.	Montgomery

After a period of several years of inactivity the Lycoming County Fruit Growers' Association was re-organized in February 1924 with 26 paid-up members.

The work of the year 1924 was entirely educational. Three field meetings were held. The first was a spraying demonstration on April 10. The second on September 4 was an auto tour to visit two of the large commercial orchards in the county. Prof. G. F. Miles of State College was present at this meeting and gave the growers much valuable help on fruit diseases. The third meeting was a grading and packing demonstration conducted by R. S. Snyder of State College in the orchard of one of the members.

All of these meetings were well attended and the members benefited a great deal not only from the instruction given thru the demonstrations but thru the association with other growers and the exchange of ideas.

The program for 1925 includes a demonstration orchard under the supervision of the County Agent and State College Extension Specialists.

W. F. MAC VEAGH, Secretary-Treasurer.

### LEHIGH COUNTY HORTICULTURAL SOCIETY

Organized March 16, 1923

#### OFFICERS

President, F. S. DICKENSHIED	- - - -	Zionsville
Vice President, H. A. SCHANTZ	- - - -	Allentown, Lentz Bldg.
Secretary, A. L. HACKER	- - - -	Allentown, 517 Hamilton St.

#### MEMBERS

Bender, L. J.	Allentown, R. 4
Benner, H. G.	Coopersburg
Billmeyer, H. W.	Quakertown, R. 2
Dickenshied, F. S.	Zionsville
Everett, E. B.	Orefield, R. 1
Fenstermacher, P. S.	214 N. 8th St., Allentown
Gackenbach, C. A.	Orefield, R. 1
Hacker, A. L.	Allentown, Colonial Bldg.

Hazlett, J. P.	Quakertown, R. D.
Hottenstein, Ira	141 N. 10th St., Allentown
Ihn, Harry	1147 Second St., Catasauqua
Keppinger, B. M.	Coopersburg, R. 2
Knappenberger, Thos.	Zionsville, R. 1
Kyle, Ben	Zionsville, R. 1
Lapp, H. E.	Allentown, R. 3
Linde, J. E.	Orefield, R. 1
Mill, H. S.	Allentown, 622 N. 6th St.
Monosmith, S. B.	Weisel
Mohr, Frank	Fogelsville
Oppenlander, E.	Allentown, 1648 Hamilton St.
Rappaport, N. S.	Allentown, 814 N. 7th St.
Schantz, M. P.	Allentown, 602 Hamilton St.
Schantz, Louis M.	Orefield, R. 1
Schantz, M. L.	Allentown, 1610 S. Albert St.
Schantz, M. F.	Allentown, 602 Hamilton St.
Shoemaker, C. C.	W. Catasauqua
Shoemaker, D. W.	W. Catasauqua
Schreiber, H. F.	Zionsville
Scholl, Winfield J.	Coopersburg, R. 2
Schmick, Casper	Zionsville
Smith, Wm.	Orefield, R. 1
Snyder, O. E.	Allentown, R. 3
Trexler, Harry C.	Allentown, Young Bldg.
Weaver, W. S.	Macungie
Weinberger, J. H.	Zionsville
Wolf, Joseph	Fullertown

### LUZERNE COUNTY HORTICULTURAL ASSOCIATION

Organized Feb. 16, 1923

#### OFFICERS

President, HOWARD LEWIS	- - - -	Pittston, R. D.
Vice President, ARTHUR GAY	- - - -	Dallas, R. D.
Secretary, PERCY L. YOST	- - - -	Sugarloaf, R. D.
Treasurer, ADAM STOCK	- - - -	Wyoming, R. D.

#### MEMBERS

Bronson, Marvin	Dallas, R.D.
Blackmar, C. W.	Wyoming, R. D.
Brown, Edward	Buttonwood
Coon, John	Wyoming, R. D.
Coon, H. F.	Wyoming, R. D.
Ellsworth, Oliver	Dallas, R. D.
Frantz, S. P.	Dallas, R. D.
Gay, G. E. & Son	Dallas, R. D.
Gay, Arthur	Dallas, R. D.
Hess, Fred E.	Nescopeck, R. D.
Hess, S. S., Manager	Freeland
Ide, S. C.	Sweet Valley, R. D.
Johnson, C. F.	Kis-Lyn
Kauffman, Harry	Drums
Kitchen, G. W.	Shavertown
Moore, A. C.	Kingston, 45 Eley St.
Parrish, Elmer D.	Dallas
Pierce, Harry W.	Wilkes-Barre, Lock Box 196
Rebennack, Jacob	Dallas, R. D.

Rozell, H. E.	Pittston, R. D.
Ruggles, F. L.	Dallas, R. D.
Schoonover, W. E.	Dallas, R. D.
Seely, Walter E.	Nescopeck, R. D.
Stock, Adam	Wyoming, R. D.
Wheeler, C. B.	Hunlock Creek
Williams, David	Wilkes-Barre, Box 251
Williams, John	White Haven
Winter, J. H.	Dallas
Winters, B. J.	Dallas, R. D. 3
Yost, Percy L.	Sugarloaf, R. D.

**PERRY COUNTY FRUIT GROWERS ASSOCIATION**

Reorganized in 1923

**OFFICERS**

President, DANIEL RICE	New Bloomfield
Sec.-Treas., L. F. ROTHROCK	New Bloomfield

**MEMBERS**

Adair, Frank	Landisburg
Clegg, W. S.	New Bloomfield
Jones, H. L.	Newport
Nickel, C. C.	Loysville
Rothrock, L. F.	New Bloomfield
Rhinesmith, H. B.	New Bloomfield
Ritter, Geo. H.	Loysville
Rice, Dana	New Bloomfield
Rice, Daniel	New Bloomfield
Shanor, Geo. E.	Duncannon, R. D.
Sharon, S. A.	Newport
Schuchman, Geo. W.	Shermansdale
Stewart, Geo. W.	New Bloomfield
*Stewart, John	Landisburg
Stewart, William	Landisburg
Zeigler, C. E.	Duncannon
Walker, M. C.	Newport

**WAYNE COUNTY FRUIT GROWERS ASSOCIATION**

Organized 1916

**OFFICERS**

President, BERT S. HULL	Waymart
First Vice Pres., W. H. BULLOCK	Honesdale
Second Vice Pres., HOMER BONEAR	Honesdale
Secretary, T. H. OLVER	Honesdale, R. 4
Treasurer, AMASA KEYES	Beach Lake

**MEMBERS**

Avery, Fred	Honesdale, R. 3
Bonear, Homer	Honesdale
Bullock, W. H.	Honesdale
Emery, Harvey	Waymart, R. 2
Erk, Geo.	Seelyville
Gregory, James	Narrowsburg, N. Y., R. 1

Hicks, William	Honesdale, Star Route
Hull, Bert S.	Waymart
Keyes, Amasa	Beach Lake
Kinsman, E. E.	Honesdale, R. 2
Lincoln, Geo. H.	Clarks Summit
Mohrman, Richard	Narrowsburg, N. Y., R. 1
Murray, Philip	Honesdale
Olver, T. H.	Honesdale, R. 4
Pohle, E. H.	Honesdale
Schmidt, Joseph	Hawley, R. 1
Seaman, Geo.	Honesdale
Simons, R. B.	Starling
Stephens, J. A.	Honesdale
Woodley, S. E.	Narrowsburg, N. Y., R. 1

**YORK COUNTY FRUIT GROWERS ASSOCIATION**

**OFFICERS**

President, C. P. KIBBLER	York
First Vice Pres., L. E. HARTMAN	Cly
Second Vice Pres., C. M. WERNIG	York
Secretary, J. BENTZ KAUFFMANN	York, R. D. 7
Treasurer, HOWARD ANDERSON	Stewartstown

**MEMBERS**

Allen, H. G.	New Park
Anderson, H. M.	New Park
*Anderson, H. W.	Stewartstown
Anderson, Ralph W.	Fawn Grove
Auchey, Claude	Hanover, R. 3
Bear, Arthur B.	York, R. 10
Bear, Jacob R.	York, R. D. 10
Bear, Jno. W.	York, R. D. 10
Beck, C. F.	York, R. D. 9
Beaverson, E. S.	York, R. D. 7
Boyd, Guy H.	York, R. D. 6
Boyd, Stephen G.	York, R. D. 6
Brandt, Emory W.	York, Box 666
*Brinton, H. C.	Hanover, R. D. 6
Druck, Albert	Wrightsville, R. D. 2
Flora, Wm.	Wrightsville
Gable, A. P.	York, R. D. 6
Houston, M. T.	Wrightsville, R. D. 2
Hykes, S. W.	York, 1300 N. George St.
Jacobs, David	Manchester
Kauffman, A.	York, R. D. 7
Kauffman, C.	York, R. D. 7
Kauffman, E. F.	York, R. D. 7
Kauffman, J. B.	York, R. D. 7
Kibbler, C. P.	York, 527 W. Market St.
King, Geo.	York, R. D. 2
Knisley, R. A.	Yoe
Lau, L. B.	East Berlin, R. D. 2
Lau, L. E.	East Berlin, R. D. 2
Lau, R. E.	York
Lehman, Elias	York, R. D. 5
Leiberknecht, H. F.	York, R. 3
Linn, Harry	Seven Valleys
Loose, H. H.	Menges Mills

Markey, Elmer J.....	York, R. D. 2
Markey, Melvin.....	York, R. D.
Martin, A. C.....	Muddy Creek Forks
*Miller, Amos E.....	Hanover
Moore, Edward.....	Mount Wolf, R. D. 1
Raby, J. B., Jr. ....	York, R. D. 6
Raver, Erwin C.....	York, R. D. 9
Schmidt, Mrs. Jno. C.....	900 S. George St., York
Schmidt, Henry D.....	York, Box 666
Sener, L. G.....	Hellam, R. D. 1
Sidler, A.....	York, R. D. 9
Smith, S. A.....	Yoe
Snyder, Lloyd G.....	Seven Valleys, R. 1
Stein, Geo. E.....	Wrightsville, R. D. 1
Stoner, Benjamin.....	Hellam
Stock, McClean.....	York
Stony Brook Fruit Farm.....	York, R. 7
Swartz, Samuel.....	Spring Grove
Tarbert, D. F.....	Dallastown, R. D. 1
Weaver & Leas.....	York, R. D. 9
Weber, G. G.....	York
Weaver & Leas.....	York, R. 9
Wernig, Chas. M.....	York, R. D. 9
Winter, M. L.....	Hellam, R. D. 1
Zeigler, J. A. C.....	York, 1018 W. Locust St.

**STATE HORTICULTURAL ASSOCIATION OF  
PENNSYLVANIA**

**MEMBERSHIP LIST**

Name	Post Office	County
Acme Veneer Package Co.	Orchard Park, N. Y.	
Adair, Frank	Landisburg	Perry
*Adams, W. S.	Aspers	Adams
Ackerman, S. A.	Blairsville, R. 4	Indiana
Albertson, Henry	Burlington, N. J.	
Alburger, A. D.	Bustleton	Philadelphia
Alexander, W. M. & Son	Dry Run	Franklin
Alburn, James N.	Erie, R. 3	Erie
Allen, H. G.	New Park	York
Allen, J. D.	Stockton, N. J.	
Allison, Herbert W.	Shippensburg, R. D.	Cumberland
Altman, L. A.	Blairsville	Indiana
Am. Fruit Growers, Inc.	Pittsburgh, 2100 Penn Ave.	Allegheny
Amos, W. J.	Warrington	Bucks
Anderson, H. M.	New Park	York
*Anderson, H. W.	Stewartstown	York
Anderson, Ralph W.	Fawn Grove	York
Angle, H. M.	Shippensburg	Cumberland
Angle, Robert	Shippensburg	Cumberland
Anthony, R. D.	State College	Centre
*Anwyll, Harry L.	Harrisburg	Dauphin
April Farm	Coopersburg	Lehigh
Artley, O. R.	Linden, R. 1	Lycoming
*Atkinson, D. W.	Wrightstown	Bucks
Atkinson, R. E.	Wrightstown	Bucks
Atwater, C. G.	40 Rector St., New York City	
*Atwater, Richard M.	Chadds Ford	Chester
Aument, Andrew	Safe Harbor	Lancaster
Avery, Fred	Honesville, R. 3	Wayne
Baldesberger, W. P.	Bridgeville, R. 2	Allegheny
Balthaser, G. W.	Wernersville	Berks
Baltzley, Luther	Orrtanna	Adams
*Banzhaf, W. H.	Muncy	Lycoming
Barbour, J. Beattie	Shippensburg	Cumberland
Barker, Herbert C.	West Chester	Chester
*Barlow, Thomas W.	Fort Washington	Montgomery
Barnard, C. P.	North Brook	Chester
Barnes Nursery Co.	Wallingford, Conn.	
Barr, I. C.	Greencastle, R. 2	Franklin
*Bartram, Frank M.	Kennett Square	Chester
*Bartram, G. Maurice	West Chester	Chester
*Bartram, George	West Chester	Chester
Bashoar, Dr. C. S.	Carlisle	Cumberland
*Baugher, George L.	Aspers	Adams
*Baugher, H. G.	Aspers	Adams
Bayard, E. S.	Pittsburgh Stockman & Farmer	Allegheny
Bavard & Baldwin	New Castle	Lawrence
Beam, J. D.	Chambersburg, Box 98	Franklin
Bear, Arthur B.	York, R. 10	York
Bear, Jacob R.	York, R. 10	York
Bear, Jno. W.	York, R. 10	York
Bear, Paul A.	Mt. Wolf	York
Beard, Goodwin	Forty-Fort	Luzerne

\* Life Members

Name	Post Office	County
Beaufort Farms	Harrisburg, R. 3	Dauphin
Beaver, James	Mifflinburg	Union
Beaverson, E. S.	York, R. 7	York
Beck, C. F.	York, R. 9	York
Beck & Platt	White Deer, R. 1	Union
*Bell, R. H.	State College	Centre
Bell, Russell D.	West Middlesex	Lawrence
Bender, L. J.	Allentown, R. 4	Lehigh
Benner, B. E.	Iron Springs	Adams
Benner, H. G.	Coopersburg	Lehigh
Benner, Roy	Perkasie	Bucks
*Bennett, Eugene B.	Easton, R. 3	Northampton
Berry, Dr. E. S.	Shippensburg	Cumberland
Bender, L. J.	Allentown, R. 4	Lehigh
Berky, D. W.	Sewanee, Tenn.	
Bertolett, Dr. M. L.	Mt. Penn	Berks
Best, E. E.	Montgomery	Lycoming
Betts, W. E.	Stevens, R. 2	Lancaster
Bice, John H.	Hollidaysburg	Blair
Bickley, Miss Mae	Weisel	Bucks
Bikle, Philip M.	Chambersburg	Franklin
Billmeyer, H. W.	Quakertown, R. 2	Lehigh
Bingham, A. H.	St. Thomas	Franklin
Bingham, W. O.	St. Thomas	Franklin
Bird, Anna W.	Brandywine Summit	Delaware
Bittinger, C. H.	Hanover, R. 6	Adams
Bixler, E. Stanley	Easton, 126 S. 3d St.	Northampton
Black, H. M.	Idamar, R. D.	Indiana
Black, M. C.	Allison Park	Allegheny
*Blaine, George W.	126 S. 3d St., Easton	Erie
*Blair, Charles P.	Monaca	Beaver
Blair, T. W.	New Castle, R. 4	Lawrence
*Blessing, David H.	4 N. Court St., Harrisburg	Dauphin
Blackmar, C. W.	Wyoming R. D.	Luzerne
Blackburn, W. D.	Bedford	Bedford
Boak, J. A.	New Castle, R. 4	Lawrence
Boak, J. E.	New Castle, R. 4	Lawrence
Bock, W. H.	Crafton, R. 8	Allegheny
*Boles, McClellan T.	Hanlin Station	Washington
Bolph, Irwin	New Castle, Boyles Ave.	Lawrence
*Boltz, Peter R.	Lebanon, R. 3	Lebanon
Bonear, Homer	Honesdale	Wayne
Borry, E. E.	Stevens, R. 2	Lancaster
Botscheller, A. P.	Dalton	Lackawanna
Bowman, J. H.	Lebanon, R. 3	Lebanon
Bowser, J. C.	Wolfsburg	Bedford
Boyd, Guy H.	435 Park St., York	York
Boyd, J. H.	431 E. Washington St., New Castle	Lawrence
Boyd, P. C.	Delta	York
Boyer, Elton	Biglerville	Adams
*Boyer, John F.	Middleburg	Snyder
Boyer, W. W., & Bro.	Biglerville	Adams
Brandt, Emory W.	York, Box 666	York
Brannon, J. P.	Shippensburg, R. D.	Cumberland
Brannon, H. P.	Shippensburg, R. D.	Cumberland
Bream, C. A.	Cashtown	Adams
*Breidenbaugh, H. L.	Boyertown	Berks
Brereton, O'Hara D.	Edenville	Franklin
Bricker, E. B.	Lititz	Lancaster

\* Life Members

Name	Post Office	County
Brinkerhoff, H. J.	Lees Cross Roads	Cumberland
Brinser, E. C.	Middletown	Dauphin
*Brinton, H. C.	Hanover	York
Brinton, Robert F.	West Chester	Chester
Brinton, W. H.	Parkesburg, R. 2	Chester
Brinton, Wm. H.	Parkesburg	Chester
*Brinton, William P.	Christiana	Lancaster
Broadhurst, Horace	Holicong	Bucks
Brossman, Morse W.	Mohnton, R. 2	Lancaster
Brossman, Rudy	Ephrata, R. 4	Lancaster
Bronson, Marvin	Dallas, R. D.	Luzerne
Brooke, R. G.	Schwenksville	Montgomery
Brooker, J. A.	Wexford, R. 2	Allegheny
Brown, Bert C.	Marion Center	Indiana
Brown, Edward	Buttonwood	Luzerne
Brown, H. M.	Indiana, R. 5	Indiana
Brown, Wilbur J.	Philadelphia, 2055 Wyncote Ave.	Phila.
Brown, O. P.	New Castle	Lawrence
Brown, R. A.	Homer City, R. 2	Indiana
Buchanan, S. M.	New Wilmington	Lawrence
Bucher, E. B.	Ephrata, R. 1	Lancaster
Buckman, J. Hibbs	Langhorne	Bucks
Burk, Paul H.	Riverside, N. J.	
Bullock, W. H.	Honesdale	Wayne
Buterbaugh, M. S.	Indiana, 647 Water St.	Indiana
Burkholder, A. Z.	Ephrata, R. 1	Lancaster
Butt, James	Dimock	Susquehanna
Caldwell, E. P.	Marion Center	Indiana
Caldwell, E. P.	Marion Center	Indiana
Campbell, Willard S.	Phoenixville	Chester
Campfield, W. S.	Staunton, Va.	
Carter, John T.	Wawa	Chester
Carrell, Frank B.	Neshaminy	Bucks
Cashtown Nurseries	Cashtown	Adams
*Cation, William R.	Orrtanna	Adams
Chapin, Irvin	Shickshinny	Luzerne
*Chase, Charles T.	Bala	Chester
*Chase, Howard A.	Union League, Phila.	Philadelphia
Chase, T. M.	Buckfield, Me.	
Clark, B. W.	Indiana	Indiana
Clark, Fred E.	Indiana	Indiana
Claycomb, Irvin	Ostersburg	Bedford
Clegg, Wm. S.	New Bloomfield	Perry
Conner, L. J.	Penns Run, R. D.	Indiana
Conti, J.	New Castle, R. 1	Lawrence
Coon, John W.	Wyoming, R. D.	Luzerne
*Cooper, C. A.	1000 Highland Ave., Coraopolis	Allegheny
Cope, F. R., Jr.	Dimock	Susquehanna
Cornwall Orchards	Cornwall	Lebanon
Coursen, I. H.	Wyoming, R. 3	Luzerne
Cowen, W. H.	Roaring Spring	Blair
Cox, J. W.	New Castle, R. 3	Lawrence
Craighead, E. M.	Guernsey	Adams
Crawford, J. B.	Fayetteville	Franklin
Crawford, T. H.	Fayetteville	Franklin
Creasy, Luther P.	Catawissa, R. 1	Columbia
Crilly, J. A.	Imler	Bedford
Criswell, R. T.	Chambersburg	Franklin
*Crouse, E. A.	Gettysburg	Adams

\* Life Members

Name	Post Office	County
Crowell, A and T.	Adondale	Chester
Crowell, Ralph T.	Buckingham	Bucks
Crowell, Samuel D.	Edgemont	Chester
*Cummings, J. F.	Sunbury	Northumberland
Cummings, J. W.	New Wilmington	Lawrence
Currie, W. E.	New Castle, R. 1	Lawrence
Cutler Mfg. Co.	Portland, Ore., 353 E. 10th St.	
*Davenport, Eugene	Plymouth	Luzerne
Davidson, N. H.	Chambersburg	Franklin
Davis, W. E.	York Springs	Adams
Dayton, R. S.	Dimock	Susquehanna
Decker, R. M.	Stroudsburg	Monroe
Deiner, W. S.	Boyertown, R. 2	Berks
DeLong, Cletus Y.	Mertztown, R. 2	Berks
Dennis, R. M.	Carlisle	Cumberland
Detweiler, H. B.	Kemberton	Chester
Dickenshied, F. S.	Zionsville	Lehigh
Dickey, Samuel	Oxford	Chester
*Dickson, B. M.	5711 Elgin Ave., Pittsburgh	Allegheny
Diehl, D. W. W.	Bedford, R. 4	Bedford
Diehl, Ed. B.	St. Thomas	Franklin
Diehl, E. W.	St. Thomas	Franklin
*Dill, Robert	Northeast	Erie
Diven, W. C.	Livermore	Indiana
Doan, J. L.	Chambersburg	Franklin
Dock, Miss Mira L.	Fayetteville	Adams
Dodge, Geo. P.	Swan Hotel, Dowingtown	Chester
Dohan, John T.	Darling	Chester
Doty, H. M.	Stony Creek Mills, R. D.	Berks
Doty, Richard	Stony Creek Mills, R. D.	Berks
Dougherty, Dorsey	Gettysburg	Adams
Drake, William M. C.	Volant, R. 3	Lawrence
Drenning, C. R.	Bedford, R. 4	Bedford
Drenning, H. D.	Bedford, R. 3	Bedford
Drenning, John L.	Bedford	Bedford
Druck, Albert	Wrightsville, R. 2	York
Dubbs, H. J.	Carlisle, R. 5	Cumberland
Dudley, O. P.	Bustleton	Philadelphia
Duke, D. R. & B. F.	Chambersburg	Franklin
Duncan, D. G.	Shippensburg	Cumberland
*Dunlap, James M.	Shippensburg	Cumberland
*Dunlap, R. Bruce	Hollidaysburg	Blair
Eagleman, J. G.	Geigers Mills	Berks
Eby, Henry R.	Pittsburgh, Jail Building	Allegheny
Egolf, J. W.	Schellburg	Bedford
Elbel, Geo. H.	Rossiter, R. 1	Indiana
Elder, George K.	Lewistown, Maine	
Elder, H. C.	Cumberland Valley, R. 1	Bedford
*Eldon, Robert M.	Aspers	Adams
Ellsworth, Oliver	Dallas, R. D.	Luzerne
Enck, W. K.	Biglerville	Adams
Enders, J. F.	Columbia, R. 2	Lancaster
*Engle, Enos B.	Harrisburg	Dauphin
*Engle, John G.	Marietta	Lancaster
Erk, George	Seelyville	Wayne
Eshleman, S. C.	McKnightstown	Adams
*Espe, Augustus G.	Perrysville	Allegheny
*Evans, W. H.	Plainsville	Luzerne
Everhart, G. W.	York	York

\* Life Members

Name	Post Office	County
Everett, E. B.	Orefield, R. 1	Lehigh
Everitt, Samuel	Bristol	Bucks
Fagan, F. N.	State College	Centre
Fair, Frank	Elizabethtown, R. 1	Lancaster
Faries, Robert H.	Williamsport, 250 William St.	Lycoming
		County
*Fassett, F. H.	Meshoppen	Wyoming
Fassett, Lloyd	Meshoppen	Wyoming
Felty, G. B. O.	Millersville	Lancaster
Fenstermacher, P. S.	Allentown	Lehigh
Fetterman, J. Gordon	Media	Delaware
*Filbert, R. J.	Fox Chase	Philadelphia
Fisher, E. J.	944 W. Fourth St., Williamsport	Lycoming
Fitzgerald, Chas. L.	Dowingtown	Chester
Fleming, H. K.	Moyland	Delaware
Fleming, T. H.	Andalusia	Bucks
*Fletcher, S. W.	State College	Centre
Flinchbaugh, H. H.	Loganville	York
Flora, Wm. H.	Wrightsville	York
Flory, Paul B.	Pequa	Lancaster
*Ford, A. E.	Glen Riddle	Delaware
Forry, S. E.	Ephrata, R. 1	Lancaster
*Fox, Cyrus T.	Reading	Berks
Foxcroft Farms	Glen Mills	Chester
Frable, Robert C.	Pleasant Valley	Bucks
Fraim, Merritt L.	Aspers	Adams
Frantz, S. P.	Dallas, R. D.	Luzerne
Free, W. A.	498 Linden Ave., York	York
*Freed, A. J.	Racine	Beaver
*Freed, W. A.	Racine	Beaver
Freeman, W. C.	Cornwall	Lebanon
Friday, G. P.	New Castle, R. 7	Lawrence
Friend Manufacturing Co.	Gasport, N. Y.	
Frost, S. W.	Arendtsville	Adams
Fry, Chas. S.	Reamstown	Lancaster
Fry, John L.	c-o C. K. Whitner & Co., Reading	Berks
Fullerton, A. H.	Edenburg	Lawrence
Funk, Sheldon	Boyertown	Berks
Furlow, Eber S.	Hopeland	Lancaster
Furry, E. S.	New Enterprise	Bedford
Fyock, Frank	Rochester Mills, R. 1	Indiana
Gahagan, Vernon	Loop	Indiana
Gackenbach, C. A.	Orefield, R. 1	Lehigh
Gable, A. P.	York, R. 6	York
Garrahan, C. E.	Kingston	Luzerne
Garrahan, Ralph	Kingston	Luzerne
*Garrahan, R. H.	Kingston	Luzerne
Garretson, Eli P.	Biglerville	Adams
Gates, F. S.	Shippensburg	Cumberland
Gates, G. H.	Shippensburg	Cumberland
Garber, Henry F.	Mt. Joy, R. 3	Lancaster
Gay, G. E. & Son	Dallas, R. 3	Luzerne
Gebhart, J. B.	New Castle, R. 8	Lawrence
Gerhard, Owen S.	Clayton	Berks
Gehr, Harvey J.	Waynesboro, R. 1	Franklin
Geigley, Amos W.	Orrtanna	Adams
Geigley, G. W.	Orrtanna	Adams
Gelwicks, Dr. John M.	Chambersburg	Franklin
General Chemical Co.	40 Rector St., New York	

\* Life Members

Name	Post Office	County
George, T. K.	Homer City	Indiana
Gibson, Ira	Indiana	Indiana
Gibson, Ralph	331 Center St., Williamsport	Lycoming
Gilbert, Leon H.	Bushkill	Monroe
Gillan, C. F.	St. Thomas	Franklin
Gillan, G. G.	St. Thomas	Franklin
Gillan, L. G.	137 Main St., Mt. Holly, N. J.	
Gillan, R. J.	St. Thomas	Franklin
Golden State Sales Corp.	175 Franklin St., New York	
Goldsborough, H. B.	Shepherdstown, W. Va.	
*Good, C. W.	Waynesboro	Franklin
Good, Martin R.	54 S. Franklin St., Lancaster	Lancaster
Goodling, Geo.	York, R. 9	York
Goshorn, Taylor L.	Quincy, Box 47	Franklin
Grabert, O. P.	Allison Park, R. 2	Allegheny
Greening Nursery Co.	Monroe, Mich.	
*Greist, C. A.	Guernsey	Adams
Greist, Frederick E.	Flora Dale	Adams
Grimes, Eugene	Lima	Delaware
Grittner, Harry M.	Montgomery	Lycoming
Groff A. P.	Chalford	Bucks
Gross, H. S.	Mt. Wolf, R. D. 1	York
*Grove, W. E.	York Springs	Adams
Grubbs, N. S.	Mt. Holly, N. J.	
Guyton, Thomas L.	Harrisburg, Dept. of Ag.	Dauphin
Hacker, A. L.	Colonial Bldg., Allentown	Lehigh
Hadley, C. H.	Bu. Plant Industry, Harrisburg	Dauphin
*Haddock, John C.	Wilkes-Barre	Luzerne
Hagerstown Spray Ma- terial Co.	Hagerstown, Md.	
Haines, G. H.	Allenwood, R. D.	Lycoming
Haines, Dr. W. A.	Bristol	Bucks
*Hall, L. C.	Fairview	Erie
Hamilton, R. W.	Home	Indiana
Harbison, C. F.	New Castle, R. 7	Lawrence
Lau, L. E.	East Berlin, R. 2	York
Hardt, C. W.	2245 N. 2d St., Harrisburg	Dauphin
Harer, Roy	Salladus	Lycoming
Haring, S. A.	901 N. 11th St., Reading	Berks
Harmon, C. B.	Shippensburg	Cumberland
Harnest, James B.	Leola	Lancaster
Harnish, C. H.	Sinking Springs	Berks
*Hartman, D. L.	Little River, Florida	
*Hartman, William	Etters	York
*Hartman, L. E.	Cly	York
Hartzell, Chas.	New Castle, R. 7	Lawrence
Hauser, Clarence L.	York, R. 7	York
*Haverstick, Paul E.	Lancaster	Lancaster
*Hawkins, Charles A.	Delta	York
Hawkins, E. B.	Delta	York
Hayes, H. Samuel	214 N. Beaver St., York	York
Hayman, Guy L.	Northbrook	Chester
Hazlett, J. P.	Coopersburg	Lehigh
Heacock, F. J.	Bedford	Bedford
Heberling, Herbert	Newburg	Cumberland
Heilman, Albert	Cleona	Lebanon
Heilman, H. C.	Muncy, R. 4	Lycoming
Heilman, J. R.	Lawn	Lebanon
Heim, H. G.	508 Pine St., Williamsport	Lycoming

\* Life Members

Name	Post Office	County
Heisey, S. A. & Bro.	Greencastle, R. 4	Franklin
Herr, C. H.	Lancaster, R. 2	Lancaster
Hershey, C. Maurice	Gordonville, R. 1	Lancaster
*Hershey, H. F.	Hamburg	Berks
Hershey, H. S.	East Petersburg	Lancaster
Hess, Francis P.	Lancaster, R. 7	Lancaster
Hess, Fred E.	Nescopeck, R. D.	Luzerne
Hess, Paul C.	Mt. Alto, R. 1	Franklin
Hess, Ralph C.	Waynesboro	Franklin
Hess, Ray B.	Mt. Alto, R. 1	Franklin
Hess, Willis A.	Waynesboro, R. 4	Franklin
Hicks, William	Honesdale, Star Route	Wayne
Hildebrand, John	Dallas, R. D.	Luzerne
Hile, Anthony	Curwensville	Clearfield
*Hill, William D.	Northeast	Erie
Hilles, Edith	Glen Mills	Delaware
Hilles, Elizabeth M.	Malvern	Chester
Hinkle, Jacob E.	Oley, R. 1	Berks
Hinkley, H. O.	Elysburg	Northumberland
Hodil, Emory E.	Glenshaw, R. 1	Allegheny
Hodil, J. W.	Glenshaw, R. 1	Allegheny
Hoffacker, G. T.	Hanover, R. 2	York
Hoffman, H. L.	Butler	Butler
Hochberg, Wm. H.	Verona, R. 1	Allegheny
Hopper, W. C.	New Castle, R. 4	Lawrence
Horn, W. H.	Chambersburg, R. 10	Franklin
*Horst, J. Morris	Lebanon, R. 3	Lebanon
Horst, Miles	Lebanon, R. 1	Lebanon
*Hostetler, Abram	Johnstown	Cambria
Hostetter, J. E.	Gap, R. 1	Lancaster
Houk, J. B.	New Castle, R. 8	Lawrence
Houston, M. T.	Wrightsville, R. 2	York
Howe, Homer B.	Benton	Columbia
Hood, T. C.	Saltsburg, R. D.	Indiana
Hoopes, Wilmer W.	West Chester	Chester
Horsfall, J. L.	Bustleton	Philadelphia
Hottenstein, Ira	141 N. 10th St., Allentown	Lehigh
Houser, J. C.	Bedford, R. 3	Bedford
Howard, T. H.	1301 Poplar St., York	York
Huber, Chas. H.	Gettysburg	Adams
Huber, Levi B.	Neffsville	Lancaster
*Huey, S. R.	New Castle, R. 3	Lawrence
*Huff, Burrel R.	Greensburg	Westmoreland
*Huff, L. B.	Greensburg	Westmoreland
Hull, Bert S.	Waymart	Wayne
Hunt, Norman	New Castle, R. 4	Lawrence
Hunt, S. J.	New Castle, R. 4	Lawrence
Hunt, V. C.	Bedford, R. 4	Bedford
Hyde, A. A.	Manns Choice	Bedford
Hyde, Clarence	Manns Choice	Bedford
Hykes, S. W.	1300 N. Geo. St., York	York
Ide, S. C.	Sweet Valley, R. D.	Luzerne
Ihn, Harry	1147 Second St., Catasauqua	Lehigh
Irvin, S. D.	Punxsutawney, R. 1	Jefferson
Ivins, William A.	Media	Delaware
Jacobs, David	Manchester	York
Jennings, C. H.	Hummelstown	Dauphin
Jennings, L. H.	Schellburg	Bedford
Johnson, C. S.	Orrtanna	Adams

\* Life Members

Name	Post Office	County
Johnson, Dr. E. E. S.	Hereford	Berks
Johnson, Mrs. Evelyn B.	New Hope	Bucks
Johnson, Geo. W.	Jermyn	Lackawanna
Johnston, Mrs. F. C.	Dallas	Luzerne
Johnston, J. B.	New Wilmington, R. 1	Lawrence
Johnston, J. H.	New Wilmington, R. 1	Lawrence
Johnston, R. S.	New Wilmington, R. 1	Lawrence
Jones, Howard L.	Newport	Perry
*Jones, J. F.	Lancaster	Lancaster
*Jones, S. Morris	West Grove	Chester
Karns, J. H.	Chambersburg	Franklin
Kauffman, A. L.	Ronks, R. 1	York
Kauffman, C.	York, R. 7	York
Kauffman, E. B.	York, R. 7	York
Kauffman, J. B.	York	York
Keech, M.H.	West Chester	Chester
Keefer, L. C.	Sunbury, R. D.	Northumberland
Keith, C. W.	Barnesboro	Indiana
*Keiser, Carl	Cornwall	Lebanon
Keller, Clarence	Orrtanna, R. 1	Adams
*Keller, Paul J.	Gettysburg, R. 5	Adams
Kemery, C. H.	West Chester	Chester
*Kessler, George W.	Tyrone	Blair
Keyes, Amasa	Beach Lake	Wayne
Kibbler, C. P.	572 W. Market St., York	York
Kildoo, Samuel	New Castle, R. 4	Lawrence
King, Geo.	York, R. 2	York
King, Howard	New Castle, R. 1	Lawrence
King, M. G.	Mt. Wolf, R. 1	York
Kinsman, E. E.	Honesdale, R. 2	Wayne
Kitchen, G. W.	Shavertown	Luzerne
Klauser, W. J.	430 W. King St., York	York
Kleppinger, B. M.	Coopersburg, R. 2	Lehigh
Knappenberger, Theo.	Vinesville, R. 1	Lehigh
Knaper, John	Dallastown	York
Knisley, R. A.	Yoe	York
Knisely, Samuel	Bedford, R. 4	Bedford
Knobel, E. M.	Sunbury, R. 1	Northumberland
Knutsen, Wm. J.	Mt. Wolf	York
Koch, C. H.	McKeansburg	Schuylkill
*Koehler, Paulus E.	Monaca	Beaver
Koenig, Paul L.	State Dept. Agr., Harrisburg	Dauphin
Krause, J. W.	Barnesville	Schuylkill
Kraybill, P. R.	Rheems	Lancaster
Kraybill, S. S.	Rheems	Lancaster
Krepps, Harry B.	Mercersburg	Franklin
Kruppinbach, Harry H.	Robesonia	Berks
Kuhn, C. E.	Cashtown	Adams
Kunkel, N. J.	Orwigsburg	Schuylkill
Kyle, David F.	New Castle, R. 8	Lawrence
Lachman, John	4100 Brownsville Road, Pittsburgh	Alle'gy
Landis, D. L., Jr.	Chambersburg, R. 1	Franklin
*Landis, D. M.	Lancaster, R. 7	Lancaster
Landis, Grayville G.	Lancaster, R. 3	Lancaster
*Landis, Israel	Lancaster	Lancaster
Landis, Israel	Lancaster	Lancaster
Langel, Paul H.	Pine Grove	Schuylkill
Lapp, H. E.	Allentown, R. 3	Lehigh
Lassen, H. G.	Lansing, Mich., Bean Sprayer Co.	

\* Life Members

Name	Post Office	County
Latshaw, J. E.	Marion	Franklin
Latterman, Robert	York, R. 5	York
Lau, Rev. I. M.	Catawissa	Columbia
Lau, L. B.	East Berlin, R. 2	York
*Brinton, S. L.	West Chester	Chester
Lau, R. E.	York	York
*Lawrence, Schuyler	109 Main St., Towanda	Bradford
Lehman, Arthur	York, R. 5	York
Lehman, Elias	York, R. 5	York
Lehman, G. E.	Wrightsville R. 2	York
Lenhart, Richard L.	Kline, Eppiheimer & Co., Reading	Berks
Leonard, G. F.	1012 Columbia Bldg, Louisville, Ky.	
Lepole, Walter	Akron	Lancaster
Lesh, H. V.	Northumberland	Northumberland
Leslie, Merl	New Castle, R. 8	Lawrence
Lewis, A. G.	Stony Creek Mills	Berks
Lewis, H. G.	Pittston, R. 1	Luzerne
Lewis, R. D.	Wyoming, R. D.	Luzerne
Lienhard, Edward	Lehigh, R. 2	Carbon
Lightner, E. S.	York, R. 10	York
*Lightner, William A.	Landisburg	Perry
Lincoln, Geo. H.	Clarks Summit	Lackawanna
Linde, J. Eric	Orefield	Lehigh
Linn, Harry	Seven Valleys	York
Linville, Arthur S.	Media, R. 2	Delaware
Lippincott, B. A.	Downingtown	Chester
Livingood, W. W.	Robesonia	Berks
Long, D. Edward	213 Trust Bldg., Chambersburg	Franklin
Long, W. G.	Fayetteville	Franklin
Longenecker, Irwin	Palmyra	Lebanon
Longenecker, J. E.	Mount Joy	Lancaster
*Loop, A. I.	North East	Erie
Loose, H. H.	Menges Mills	York
*Lord, John	Wyoming, R. 1	Luzerne
Lovett, R. P.	Fallsington	Bucks
Loy, W. G.	Newport	Perry
Luberknecht, H. F.	Hellam	York
Luigard, Geo. W.	Lenhartsville	Berks
Lundy, T. A.	Muncy R. 3	Lycoming
Lupton,	Winchester, Va.	Indiana
Lydic, J. M.	Blairsville, R. 1	Dauphin
Lynn, W. C.	Bureau of Markets, Harrisburg	Luzerne
*Macneal, William H.	Parkesburg	Luzerne
McAllen, R. W.	Fannettsburg	Franklin
McCabe, H. Dallas	Reynoldsdale	Bedford
*McClelland, J. B.	Cannonsburg	Washington
*McCormick, James	Harrisburg	Dauphin
McClure, Frank	New Castle, R. 3	Lawrence
McCree, F. C.	Blairsville, R. 4	Indiana
McCree, W. P.	Blairsville, R. 4	Indiana
McCubbin, W. A.	State Dept. Agr., Harrisburg	Dauphin
McDonough, F. L.	Middleport, N. Y.	
*McFarland, J. Horace	Harrisburg	Dauphin
*McGeorge, Katherine L.	Orrtanna	Adams
McGinnes, C. R.	Reading	Bucks
McHenry, Clarence	Indiana	Indiana
McIlvaine, J. S.	Fayetteville, R. 1	Franklin
*McKee, J. M.	State Dept. Agr., Harrisburg	Dauphin
*McLanahan, J. King	Hollidaysburg	Blair
McMillen, Ray	Miten St., New Castle	Lawrence

\* Life Members

Name	Post Office	County
McMullen & Patterson	19 Dundaff St., Carbondale	Lackawanna
MacVeagh, W. F.	Muncy	Lycoming
*Maffet, Miss M. A.	264 S. Franklin St., Wilkes-Barre	Luzerne
Malone, Mary S.	Brandywine Summit	Chester
Marble, L. M.	Canton	Bradford
Markey, Daniel	York, R. 9	York
Markey, Elmer J.	York, R. 2	York
Markey, Melvin	York, R. D.	York
Markeley, N. S.	Shanesville	Berks
Marter, R. A.	Bradford	Allegheny
Martin, A. C.	Muddy Creek Forks	York
*Martin, J. O.	Mercersburg	Franklin
Mason, A. Freeman	Agr. Exp. Sta., New Brunswick, N. J.	Bedford
Mason, John C.	Hyndman	Bedford
Mason Drug & Chem. Co.	Hancock, Maryland	Lancaster
*Mayer, Guy S.	Willow Street	Lebanon
Meck, John W.	Jonestown	Lebanon
Mechling, E. A.	Moorestown, N. J.	Philadelphia
*Meehan, S. Mendelson	Germantown	Berks
Melcher, Bennett A.	Bally	Berks
Melcher, George W.	Bally	Berks
*Mendenhall, J. Howard	Glen Mills	Delaware
Merkel, Floyd	Hamburg	Berks
Mesta Brothers	Finleyville, R. 1	Washington
*Metzger, Dr. A. H.	LaFayette	McKean
Meyer, Charles L.	1519 Frick Bldg., Pittsburgh	Allegheny
Meyer, M. A.	Annville	Lebanon
Meyer, E. J.	Lebanon, R. 3	Lebanon
Meyer, Henry T.	Lewisburg	Union
Meyer, Robert W.	Rebersburg	Centre
Meyers, H. C.	Lancaster	Lancaster
Mickle, J. Warren	New Paris	Bedford
Miller, Albert D.	Lebanon, R. 3	Lebanon
*Miller, Amos	Hanover, R. 4	York
Miller, A. D.	Lebanon, R. 3	Lebanon
Miller, C. Clayton	Marion	Franklin
Miller, Chas. E.	Smithfield	Fayette
Miller, D. L.	Waynesboro	Franklin
Miller, H. A.	35 Ross St., Williamsport	Lycoming
Miller, Harvey	Loganville	York
Miller, C. M.	Newville	Cumberland
Miller, I. A.	Fishertown	Bedford
Miller, L. P.	Paw Paw, W. Va.	Columbia
Miller, W. C.	Catawissa, R. 1	Lehigh
Mill, H. S.	622 N. 6th St., Allentown	Northumberland
Minnich, C. S.	Elysburg	Franklin
Mish & Croft	St. Thomas	Luzerne
Mitchell, A. J.	Pittston, R. 1	York
Mohr, Edward	Mt. Wolf, R. 1	Lehigh
Mohr, Frank J.	Fogelsville	Chester
Morris, Mary W.	West Chester	Bedford
Mollenauer, L. R.	Bedford	Allegheny
Morrow, Harry S.	Wilkesburg, R. 1	Lancaster
Moore, N. A.	Lititz	Lancaster
Mohler, David G.	Ephrata	Lancaster
Mohrman, Henry	Narrowsburg, N. Y., R. 1	Bucks
Monosmith, S. B.	Weisel	Montgomery
Morgan & Wilson	Norristown, R. 2	Bucks
*Moon, Henry T.	Morrisville	Bucks
Moon, R. Barclay	Morrisville	Bucks

\* Life Members

Name	Post Office	County
Moore, Warren	Media	Delaware
Mowery, H. F.	Shippensburg	Cumberland
Mowery, N. E.	Shippensburg	Cumberland
Mowery, L. O.	Newville	Cumberland
Moyer, Joseph	Lebanon	Lebanon
Moyer, Leir G.	Chalfonte	Bucks
Moyer, Samuel	Hershey	Dauphin
*Muller, Adolph	Norristown	Montgomery
Murray, Philip	Honesdale	Wayne
Murray, Edward A.	Punxsutawney	Jefferson
Musselman, C. H.	Biglerville	Adams
Musselman, Ivan Z.	Orrtanna	Adams
Musselman, John	Orrtanna	Adams
Muttart, B. F.	Schwenksville	Montgomery
Musser, W. E.	New Bethlehem	Clarion
Myers, C. E.	State College	Centre
*Myers, Levi M.	Siddonsburg	York
Nass, J. B.	New Castle, R. 3	Lawrence
Nelson, D. H.	Chambersburg	Franklin
Newcomer, Aaron	Smithburg, Md.	Lawrence
Newman, Harry	New Castle, R. 4	Indiana
Nibert, Wm.	Indiana	Indiana
Nickle, C. C.	Loysville	Perry
Nissley, W. B.	State College	Centre
Nissley, W. I.	Hummelstown	Dauphin
Nolan, John V.	Malvern	Chester
Nolt, Harrison S.	Columbia, R. 1	Lancaster
Northrup, A. M.	Danville	Northumberland
Northup, H. J.	Dalton	Luzerne
*O'Conner, Haldeman	13 N. Front St., Harrisburg	Dauphin
Offut, N. A.	Volant, R. 1	Lawrence
Olver, T. H.	Honesdale, R. 4	Wayne
Omwake Brothers	Greencastle	Franklin
Opdyke, F. A.	Homer City	Indiana
Oppenlander, E.	1648 Hamilton St., Allentown	Lehigh
Orr, B. G.	Chambersburg	Franklin
Overdorff, H. W.	Blairsville, R. 6	Indiana
*Page, C. M.	Etters	York
Page, J. A.	Beverly, N. J.	Luzerne
Parrish, E. R.	Dallas, R. D.	Lebanon
Patteridge, C. N.	Richland	Bucks
Paxson, Ed. W.	Lumberville	Bucks
Paxson, Samuel L.	Lumberville	Bucks
*Pannebaker, William M.	Virgilina, Virginia	Chester
Parker, Caroline R.	West Chester	Delaware
Passmore, N. S.	Chester Heights	Lawrence
Patterson, Geo. W.	New Castle, R. 9	York
Patterson, James A.	Stewartstown	York
Pearson, W. G.	DuBoistown, R. D.	Lycoming
Pearson, W. J.	Nesbit	Lycoming
Pease, Walter	1811 South Ave., Rochester, N. Y.	Lancaster
Peris, Roy N.	Florin	Chester
Perrigo, A. H.	West Chester	Chester
Pa. Frt. Pkg. & Sales Co.	Collegeville	Montgomery
Pennsylv, A. S.	Wolfsburg, R. D.	Bedford
Pennsylv, Bert	Wolfsburg	Bedford
Pennock, Geo. L.	165 W. Essex Ave., Lansdowne	Delaware
Pershing, Theodore	Pineville	Bucks
Percy, M. A.	Montoursville, R. 2	Lycoming
Peters, John B.	Gardners	Adams

\* Life Members

Name	Post Office	County
Philip, Geo.	South Hills, Pittsburgh	Allegheny
*Pierce, H. W.	235 Market St., Kingston	Luzerne
Pierce, E. F.	Kennet Square	Chester
*Pratt, B. G.	50 Church St., New York, N. Y.	Berks
Preston, J. Albert	Wernersville	Wayne
Pohle, Edw.	Honesdale	York
Poorbaugh, J. A.	York, R. 3	York
Powers, R. A.	Glenshaw	Allegheny
Pollock, G. B.	Wyoming, R. 3	Luzerne
Potteiger, C. M.	Richmond	Lebanon
Purnell, D. N.	Doylestown	Bucks
Pusey, Fred C.	624 Widener Bldg., Phila.	Philadelphia
Raby, J. B., Jr.	York, R. D. 6	York
Raffensperger, Chas. E.	Arendtsville	Adams
*Rankin, Charles C.	West Chester	Chester
Rappoport, M. S.	814 N. 7th St., Allentown	Lehigh
Raver, Edwin C.	York, R. 9	York
Ray, J. E. S.	West Chester	Chester
Read, F. A.	47 Jay St., New York, N. Y.	Franklin
Rearick, J. W.	Chambersburg	Luzerne
Rebennack, Jacob	Dallas, R. D.	Franklin
Reed, Fred B.	Chambersburg	Franklin
Reichard, Chas. W.	Waynesboro	Franklin
Reif, Jacob L.	Camp Hill	Cumberland
Reiner, Enoch	Bangor	Northampton
Reasner, J. E.	Shippensburg	Cumberland
Reist, A. E.	Palmyra, R. 2	Lebanon
*Reist, John G.	Mount Joy	Lancaster
Reiter, G. F.	Mars	Butler
Resh, Noah	Hanover, R. 2	York
Reynolds, Amzi	New Wilmington, R. D.	Lawrence
Rhinesmith, H. B.	New Bloomfield	Perry
Rice, A. E.	Biglerville	Adams
Rice, O. C.	Biglerville	Adams
Rice, Daniel	New Bloomfield	Perry
Rice, C. L.	New Bloomfield	Perry
*Rick, John	430 Oley St., Reading	Berks
Riddlemoser, H. E.	McKnightstown	Adams
Rife, Jacob R.	Camp Hill	Cumberland
*Rinehart, E. S.	Mercersburg	Franklin
Risser, H. N.	Marietta	Lancaster
Richards, A. C.	New Paris	Bedford
Richards, Neff	Schellburg	Bedford
Ritter, Geo. H.	Loysville	Perry
Ritchey, Maurice	Chambersburg	Franklin
Rittenhouse, Dr. J. S.	Lorane	Berks
Rittenhouse, S. B.	Lorane	Berks
Roberts, A. J.	Moorestown, N. J.	
Roberts, B. T.	Marlton, N. J.	
*Roberts, Horace	Moorestown, N. J.	
*Robinson, A. Blaine	North East	Erie
Rochester Rex Co.	172 Monroe Ave., Rochester, N. Y.	
*Rohde, William	Johnstown	Cambria
Rogers, A. L.	Chambersburg	Franklin
Rogers, G. W.	Alum Bank	Bedford
Roher, Geo. H.	Mertztown	Berks
Rohlfing, F. F.	Hummelstown	Dauphin
Romig Brothers	Downingtown	Chester
Rose, E. A.	Bedford, R. 3	Bedford
Rose Valley Sanitarium	Media	Delaware

\* Life Members

Name	Post Office	County
Rosensteel, L. C.	Edri	Indiana
Rozelle, H. E.	Pittston, R. D.	Luzerne
Ruhl, Dr. H. F.	Manheim	Lancaster
*Runk, J. A.	Huntingdon	Huntingdon
*Rush, Perry M.	Sycamore, R. 1	Greene
Ruth, B. F.	Reading	Berks
Saeger, Oscar J.	N. First St., Lehighon	Carbon
Sargent, Geo., Jr.	Downington	Chester
*Satterthwaite, Fredk. G.	Yardley	Bucks
Satterthwaite, Lewis P.	Newtown	Bucks
Sanville, Florence	Brandywine Summit	Chester
Schmidt, Mrs. J. C.	900 S. George St., York	York
Schantz, M. P.	602 Hamilton St., Allentown	Lehigh
Schantz, H. A.	602 Hamilton St., Allentown	Lehigh
Schantz, L. M.	1610 S. Albert St., Allentown	Lehigh
Schieferstein, Wm.	Leesport	Berks
Schwinderman, H. P.	Wexford	Allegheny
Schnick, Casper C.	Zionsville, R. 1	Lehigh
Schmick, Wilson E.	Hamburg	Berks
Schoemaker, C. C.	Catasauqua	Lehigh
Schoemaker, D. W.	Catasauqua	Lehigh
Schoonover, W. E.	Dallas, R. D.	Luzerne
*Schuyler, Lawrence	109 Main St., Towanda	Bradford
Scholl, Winfield J.	Coopersburg, R. 2	Lehigh
Schreiber, H. F.	Zionsville	Lehigh
Schrope, John H.	Hegins	Schuylkill
Schuchman, Geo. W.	Shermansdale	Perry
Schultz, Adam S.	Hereford	Berks
Schuyler, Lawrence	Towanda	Bradford
*Searle, Alonza T.	Honesdale	Wayne
Sener, L. G.	Hellam, R. 1	York
*Settlemyer, C. T.	Wilmore	Cambria
Shatzer, H. C.	Edenville	Franklin
Sharon, S. A.	Newport	Perry
Shaner, Geo. E.	Duncannon, R. D.	Perry
Shaffer, R. E.	Schellburg	Bedford
Shockey, Luther P.	Chambersburg, R. 9	Franklin
*Shallcross, Frank R.	Frankford	Philadelphia
*Shank, H. L.	Conestoga Stage, Lancaster	Lancaster
*Sharpe, Miss E. M.	Accotink, Virginia	
Sheadle, Lydia	Jersey Shore, R. 4	Lycoming
Shearer, Walter J.	Vinemont	Berks
Shenot, C. P.	Wexford	Allegheny
Shenot, E. N.	Wexford	Allegheny
Sheble, Earle	Hamburg	Berks
Sheller, Charles W.	West Chester	Chester
Sheppard, C. W.	Pittston, R. 1	Luzerne
Shermeyer, Harry A.	York, R. 3	York
Shoemaker, C. C.	121 First Ave., Catasauqua	Lehigh
Shoener, John	Orwigsburg	Schuylkill
Schutz, Robert H.	Mechanicsburg	Cumberland
Sidler, A.	York, R. 9	York
Simons, R. B.	Starlight	Wayne
Simmons, S. L.	Mt. Olive, R. 6, Pittsburgh	Allegheny
Simpson, J. A.	Indiana, R. 5	Indiana
Skinner, H. W.	Chambersburg	Franklin
Slamp, H. S.	Dept. Public Inst'n, Harrisburg	Dauphin
Slick, J. T.	New Paris	Bedford
*Smedley, Samuel L.	Newton Square	Delaware
Smedley, S. L., Jr.	Newton Square	Delaware

\* Life Members

Name	Post Office	County
Smedley, Walter	Media	Delaware
Smith, Clayton	Bedford, R. 4	Bedford
Smith, Geo. K.	Akron	Lancaster
Smith, C. M.	Lewistown	Mifflin
Smith, Edwin	Royersford, R. D.	Montgomery
Smith, G. E.	Bethlehem, R. 4	Lehigh
Smith, James E.	Newport	Perry
Smith, Wm.	Orefield, R. 1	Lehigh
Smith, J. H.	Carlisle	Cumberland
Smith, Leonard R.	Burlington, N. J.	
Smith, Noah	Lewistown	Mifflin
Smith, S. A.	Yoe	York
Snavely, Henry B.	Lititz, R. 5	Lancaster
*Snavely, H. H.	Willow St., Lancaster	Lancaster
Snavely, H. Meyer	Lebanon, R. 8	Lebanon
Snavely, The Misses	Lebanon, R. 8	Lebanon
Snider, J. E.	Medina, N. Y.	
Snyder, C. B.	Ephrata, R. 1	Lancaster
Snyder, F. H.	Dallas, R. 3	Luzerne
Snyder, Fred	Avonmore, R. 1	Indiana
Snyder, Lloyd G.	Seven Valleys, R. 1	York
Snyder, E. Bane	Hagerstown, Md.	
Snyder, Elmer R.	Masonic Homes, Elizabethtown	Lancaster
Snyder, S. S.	Coopersburg	Lehigh
Snyder, T. S.	Brodbecks	York
Starkey, S. H.	Bustleton	Philadelphia
Stauffer, T. H.	Lititz, R. 4	Lancaster
*Stear, J. R.	Chambersburg	Franklin
Stahlman, Dr. T. M.	1111 Westinghouse Bldg., Pgh.	Allegheny
Staub, A. C.	E. Berlin	Adams
Stauffer, W. G.	Quakertown, R. 2	Lehigh
Stein, Geo. E.	Wrightsville, R. 1	York
*Stem, Dr. J. C.	Lemoyne	Cumberland
Steininger, S. I.	White Deer	Union
Stephens, J. A.	Honesdale	Wayne
Stephens, A. Woodward	Mooresburg	Montour
Stephens, Ben.	Clymer, R. 2	Indiana
Stephens, Zenos	Clymer	Indiana
Sterringer, Chas. B.	Coopersburg	Bucks
Stewart, William	Landisburg	Perry
Stewart, Geo. W.	New Bloomfield	Perry
Stitzer, C. E.	Mifflinburg, R. 1	Union
Stock, Adam	Wyoming, R. D.	Luzerne
Stock, G. M.	Idaville	Adams
Stock, McClain	Security Bldg., York	York
Stoner, Benjamin	Hellam	York
Stonebreaker, H. W.	Indiana, R. 7	Indiana
Stoner, E. N.	Wilkinsburg, R. 1	Allegheny
Stoner, H. S.	Orrtanna	Adams
Stough, Mulford	Shippensburg	Cumberland
Stockwell, Rev. G. E.	Wyoming, R. D.	Luzerne
Stonybrook Fruit Farm	York, R. 7	York
Storm, Dr. Katherine	Perkasie	Bucks
Stover, Jacob E.	Springwood Farms, York	York
Strohnster, Herman A.	Gouglersville	Berks
*Strasbaugh, E. F.	Orrtanna	Adams
Strode, A. Darlington	West Chester	Chester
Strode, Marshall	West Chester	Chester
Strong, T. M.	Blairsville, R. 1	Indiana
Stryker, E. E.	Montgomery, R. D.	Lycoming

\* Life Members

Name	Post Office	County
Styer, Darlington	Woodbourne	Bucks
Styer, Walter, Jr.	Woodbourne	Bucks
Sunni-Glow Gardens, Inc.	Boiling Springs	Cumberland
*Swank, Luke H.	Johnstown	Cambria
Swartz, Samuel	Spring Grove	York
Syder, Fred	Avonmore	Westmoreland
Surface, H. A.	Selinsgrove	Snyder
Tarbert, D. F.	Dallastown, R. 1	York
Taylor, H. E.	Chicora	Butler
*Taylor, Ralph S.	325 N. Matlack, Ave., W. Chester	Chester
Thayer, Paul	State College	Centre
Theiss, Lewis E.	Muncy, R. 3	Lycoming
Thomas, Charles E.	Wayne, R. 1	Delaware
*Thomas, Charles L.	King-of-Prussia	Montgomery
*Thomas, Edwin W.	King-of-Prussia	Montgomery
Thompson, J. H.	Wernersville	Berks
Tice, L. L.	Annaville	Lebanon
Torr, W. H.	Mechanicsburg	Cumberland
Transue, R. E.	Timberville	Bucks
*Trexler, Harry C.	Allentown	Lehigh
Trostle, Francis C.	Gardners	Adams
Trump, Chas.	Lebanon, R. 5	Lebanon
Tuscano, A. H.	Milford	Pike
*Tyson, Chester J.	Flora Dale	Adams
*Tyson, Edwin C.	Flora Dale	Adams
*Tyson, William C.	Flora Dale	Adams
Uibel, Geo. D.	Reading	Berks
Uncle Peter's Fruit Farm	Inc., Mt. Carmel	Northumberland
Updegraff, P. H.	Valley View	Schuylkill
Van Gundia, G. K.	Chambersburg	Franklin
Vogel, E. H.	Lancaster, R. 3	Lancaster
Wagner, A. H.	New Cumberland, R. 1	York
Wagner, Chas. E.	McClure	Snyder
Walker, James F.	Westtown	Chester
Walker, M. C.	Newport	Perry
Walton, R. C.	Arendtsville	Adams
*Walton, Robert J.	Hummelstown	Dauphin
Watts, Gilbert S.	Bellwood	Blair
Watts, R. L.	State College	Centre
*Weaver, Abram	Windber	Somerset
Weaver, Elmer J.	Ronk	Lancaster
Weaver, Wm. S.	Macungie	Lehigh
Weaver & Leas	York, R. 9	York
Weber, G. G.	York	York
*Weigel, H. M.	Harrisburg	Dauphin
Weinberger, J. H.	Zionsville	Lehigh
*Weimer, E. A.	Lebanon	Lebanon
Weinschenk, W. H.	New Castle	Lawrence
Welsh, Geo. A.	Media	Chester
Welshans, D. D.	Jersey Shore, R. 4	Lycoming
Welshans, M. O. & Sons	Jersey Shore, Box 60	Lycoming
Wenger, G. P.	Quarryville, R. 1	Lancaster
Wenger, M. P.	Denver	Lancaster
Wernig, Chas. M.	York, R. 2	York
Wertsch, Edwin	Lititz, R. 5	Lancaster
Weaner, W. C.	Bendersville	Adams
Wertz, E. P.	Broad Branch Road, Washington, D. C.	
*Wertz, D. Maurice	Waynesboro	Franklin
*Wertz, Geo. M.	Johnstown	Cambria
Wertz, J. N.	Bedford	Bedford

\* Life Members

Name	Post Office	County
Wertz, S. H.	Leesport	Berks
Wehmer, Wm. H.	Allison Park, R. 2	Allegheny
Wetzel, Wm. S.	Marion Center	Indiana
Weidner, H. E.	Gardners	Adams
Wempler, Wm. G.	Bustleton	Philadelphia
*Westrick, F. A.	Patton, R. 2	Cambria
Wheeler, C. B.	Hunlock Creek, R. D.	Luzerne
Wheeler, C. F.	Montoursville, R. 2	Lycoming
Wherley, Clarence B.	740 W. Poplar St., York	York
*Whisler, Edgar	Etters, R. 1	York
*White, Arthur H.	Pulaski	Lawrence
White, Theo. F.	Darling	Chester
Williams, C. B.	Canton	Bradford
Williams, F. W.	Indiana, R. 4	Indiana
Williams, H. P.	Schellburg	Bedford
*Williams, Irvin C.	Royersford	Montgomery
Williams, John J.	Media	Delaware
Williams, R. G.	400 N. Michigan Ave., Chicago, Ill.	
Wilson, A. O.	Volant	Lawrence
Wilson, G. E. & Sons	Wilkesburg, R. 1	Allegheny
Wilson Bros.	Aspers	Adams
Wilson, Harry C.	Richboro	Bucks
Widders, J. B.	Lancaster, R. 3	Lancaster
Winner, H. G.	Calvert	Lycoming
Winter, H. Randall	Muncy, R. 2	Lycoming
Winter, M. L.	Hellam, R. 1	York
Winters, B. J.	1440 Wyoming Ave., Kingston	Luzerne
Winters, Cyrus	Sunnyside	Lebanon
Wise, Harvey	Comodore, R. D.	Indiana
*Wister, John C.	Germantown	Philadelphia
*Witherow, R. T.	Punxsutawney	Jefferson
Witman, John	Reading	Berks
Witmer, John B.	Lampeter	Lancaster
Wohleber, Stephen	3064 Mt. Troy Rd., Pittsburgh	Allegheny
*Wolfe, Charles A.	Aspers	Adams
Wolf, John	York, R. 6	York
Wolff, F. B.	Lima	Delaware
Wolper, D. L.	Norristown, R. 3	Montgomery
*Woods, Edward A.	Frick Bldg., Pittsburgh	Allegheny
Worthington, Russell	West Chester	Chester
Wright, Allen	Spring City	Chester
Wright, A. L.	Spring Hope	Bedford
Wright, C. E.	Spring Hope	Bedford
Yahner, A. J.	Patton	Cambria
Yanulewicz, John	Wapwallopen, R. 1	Luzerne
Young, A. F.	North East	Erie
Yoder, Chauncey L.	Royertown, R. 1	Berks
York Chemical Works	York	York
Young, Fred	Ellwood City, R. 1	Lawrence
*Youngs, L. G.	North East	Erie
Zeigler, J. A. C.	1018 W. Locust St., York	York
Zeigler, C. E.	Duncannon	Perry
Zellers, E. B.	Montgomery	Lycoming
Zellers, R. J.	Sinking Springs	Berks
Zellers, S. L.	Montgomery	Lycoming
Zimmerman, B. F.	Ringtown	Schuylkill
Zimmerman, H. S.	La Park	Lancaster
Zimmerman, W. H.	3441 York Rd., Philadelphia	Philadelphia
Zook, I. F.	Curryville	Blair

\* Life Members

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