Title: Pennsylvania vegetable growers' news, v. 10

Place of Publication: State College, Pa.

Copyright Date: 1940

Master Negative Storage Number: MNS# PSt SNPaAg058.11

Volume:

10

Pennsylvania

Vegetable Growers' News

Publication of the Pennsylvania Vegetable Growers' Association

Issued Quarterly at State College, Pa. Subscription Included in Annual Dues of $1.00

Vol. X. State College, Pa , March, 1940 No 1

15

Proceedings of the

Fifteenth Annual Meeting

Farm Show Building, Harrisburg, Pa.

January 16 and 17, 1940

Pennsylvania Vegetable Growers' Association

•

OFFICERS FOR 1940

President ..... R. R. Brader, Berwick
Vice-President ..... Ray Wenker, Bustleton
Secretary-Treasurer ..... W. B. Mack, State College

Directors. R. R. Comly, Bustleton; Harry Hopkins, Clarks Summit; Carl Huber, Lititz; E. J. Fleming, Andalusia; W. B. Nissley, State College; Gilbert S. Watts, Bellwood; and T. C. Rogers, Morrisville

STANDING COMMITTEES

Farm Show Committee

R. R. Brader, *Berwick; Stanley Q. Becker, R. D. 2, Bristol; Ray Wenker, Bustleton.

Exhibit Committee

C. K. Hallowell, *407 Custom House, Philadelphia; A. H. Mende, R. D. 2, Bristol; Ray Wenker, Bustleton.

Legislative Committee

Alvan C Thompson, *Morrisville; Carl D. Huber, Lititz; Gilbert S. Watts, Bellwood; Louis Orient, Bridgeville; R. B. Stutzman, R. R. 1, Vintondale.

Program Committee

Jesse M. Huffington, *State College; A. C. Thompson, Morrisville; H. S. Mills, Box 358, Bristol.

Committee on Research and Relations with the Agricultural Experiment Station

Gilbert S. Watts, *Bellwood; A. C. Thompson, Morrisville; Albert C. Roemhild, Philadelphia; Harry Hopkins, Clarks Summit; H. S. Mills, Bristol; Alan R. Warehime, Hanover.

*In each Committee, the first listed is Chairman.

Pennsylvania Vegetable Growers' Association

•

OFFICERS FOR 1940

President ..... R. R. Brader, Berwick
Vice-President ..... Ray Wenker, Bustleton
Secretary-Treasurer ..... W. B. Mack, State College

Directors. R. R. Comly, Bustleton; Harry Hopkins, Clarks Summit; Carl Huber, Lititz; E. J. Fleming, Andalusia; W. B. Nissley, State College; Gilbert S. Watts, Bellwood; and T. C. Rogers, Morrisville

STANDING COMMITTEES

Farm Show Committee

R. R. Brader, *Berwick; Stanley Q. Becker, R. D. 2, Bristol; Ray Wenker, Bustleton.

Exhibit Committee

C. K. Hallowell, *407 Custom House, Philadelphia; A. H. Mende, R. D. 2, Bristol; Ray Wenker, Bustleton.

Legislative Committee

Alvan C Thompson, *Morrisville; Carl D. Huber, Lititz; Gilbert S. Watts, Bellwood; Louis Orient, Bridgeville; R. B. Stutzman, R. R. 1, Vintondale.

Program Committee

Jesse M. Huffington, *State College; A. C. Thompson, Morrisville; H. S. Mills, Box 358, Bristol.

Committee on Research and Relations with the Agricultural Experiment Station

Gilbert S. Watts, *Bellwood; A. C. Thompson, Morrisville; Albert C. Roemhild, Philadelphia; Harry Hopkins, Clarks Summit; H. S. Mills, Bristol; Alan R. Warehime, Hanover.

*In each Committee, the first listed is Chairman.

INTENTIONAL 2ND EXPOSURE

MINUTES OF MEETING OF JANUARY 16-17, 1940

The fifteenth annual meeting of the Pennsylvania Vegetable Growers' Association was held on January 16 and 17, 1940, in the Farm Show Building, Room D, Harrisburg. The regular business session was held at 1:15 P. M. January 16, with President Alvan C. Thompson in the chair. All officers and directors were present except directors John M. Willson and W. B. Nissley.

The minutes of the meeting of January 17 and 18, 1939, and the report of the Secretary-Treasurer were read, and on motion by R. R. Brader, seconded by Hal Mills, were approved as read. The financial report of the Treasurer for the year ending January 13, 1940, was read, and on motion by Ray Wenker, seconded by C. K. Hallowell, was accepted. The report of the auditing committee, consisting of Hal Mills and C. K. Hallowell, that all accounts were in order, was accepted.

The chairman of the Resolutions Committee, Ray Wenker, presented the following two resolutions, which on motion by Hal Mills, seconded by Stanley Becker, were adopted:

1. Resolved that the Pennsylvania Vegetable Growers' Association cooperate fully with the Vegetable Growers' Association of America in its annual convention to be held in Philadelphia from August 26 to 29, and that the present President be authorized to appoint a committee to represent the Association in this cooperative effort.

2. Resolved that the Pennsylvania Vegetable Growers' Association petition the Farm Show Committee for the use of a refrigerated show case in the foyer of the Farm Show Building during the Farm Show of 1941, for an exhibit featuring Pennsylvania vegetables.

3. Resolved that the members of the Pennsylvania Vegetable Growers' Association cooperate in supplying information on vegetable crops, prices, and acreage to the Pennsylvania Federal-State Crop Reporting Service, Harrisburg, Pa.

4. Resolved that the Pennsylvania Vegetable Growers' Association oppose and condemn discriminatory and punitive taxes of all types designed to favor or penalize any selected group. Such unnecessary taxes increase cost of distribution and increase costs to consumers, thereby reducing consumption of foodstuffs, and limiting production in both agriculture and industry. We furthermore feel that undesirable distribution practices should be controlled through the proper channels and measures set up for this purpose.

The nominating committee, of which T. Herman Fleming was chairman, presented as its report the following nominations:

President—R. R. Brader
Vice-President—Ray Wenker
Secretary-Treasurer—W. B. Mack

Directors: R. R. Comly, Harry Hopkins, Carl Huber, E. J. Fleming, W. B. Nissley, G. S. Watts, and Thomas Rogers. On motion by Hal Mills, seconded by Stanley Becker, the report was accepted and the candidates were placed in nomination; nominations were closed on motion by T. H. Fleming, seconded by Hal Mills. The President instructed the Secretary to cast a ballot for the candidates, who declared them elected.

R. R. Brader reported for the representatives to the Farm Show Committee that the vegetable display had been given more space and facilities for the present show, and that efforts were being made to control dust in the Arena where the horticultural display was set up.

C. K. Hallowell, chairman, reported for the Exhibit Committee that the largest vegetable exhibit to date, now on display, included 245 entries from 13 counties, among them 21 of Easy Blanching celery, 49 of all types of celery, 18 of parsnips, and about 20 of mushrooms from Chester county. He mentioned the improved facilities provided for the exhibit, and commended the Judge, Professor Wm. T. Tapley, of the New York State Agricultural Experiment Station of Geneva, N. Y. This report was accepted by President Thompson for the Association, with commendation for the Committee.

The Legislative Committee presented no report.

The Chairman of the Program Committee, Hal Mills, also was commended by President Thompson.

The Committee on Research and Cooperation with the Pennsylvania Agricultural Experiment Station, of which Gilbert S. Watts was chairman, held a meeting at the close of the program at 4:00 P. M. on January 16, as a result of which the committee recommended the continuance of vegetable research projects now in progress at the Pennsylvania Agricultural Experiment Station, and the urging of the Dean and Director to emphasize research on vegetable insects and diseases. It was urged also that investigations in vegetable nutrition be extended, and consideration be given to studies of weed control and soil management with respect to maintenance of active organic matter.

Announcement was made of the Plant Growing Short Course to be held at State College from January 22 to 26.

A letter of Hal Mills was read, and the suggestion contained therein, that a Pennsylvania Seed Council be organized composed of representatives of large- and small-scale vegetable growers, seedsmen, canners, The Pennsylvania State College, and the Pennsylvania Department of Agriculture, with the function of considering matters relating to seed improvement and regulation, and of recommending legislation where needed, was approved on motion by Mills, seconded by Harry Hopkins. The Pennsylvania State College was named as the agency to organize the council.

R. R. Brader moved and Hal Mills seconded that the Pennsylvania Vegetable Growers' Association pay fees to the Pennsylvania State Council of Agricultural Organizations, the Northeast Vegetable and Potato Council, and the Vegetable Growers' Association of America annually unless action to the contrary be taken by an annual meeting. This resolution was carried. The same movers presented a resolution, to be transmitted to the Farm Show Committee, that all exhibits carry the name of the variety. This also was carried.

The meeting was adjourned.

THE TREASURER'S REPORT WAS AS FOLLOWS:

RECEIPTS

Balance, cash in bank Jan. 13, 1939	$ 59.92
122 Membership dues @ $1.00 each	122.00
Total	$181.92

EXPENDITURES

Jan. 28, 1939	Expenses of Charles Chupp	$ 24.72
Jan. 28, 1939	Expenses of Alton M. Porter	26.81
Jan. 30, 1939	Fee, Pa. State Council of Agr. Org.	5.00
Jan. 30, 1939	Fee, Northeastern Veg. & Potato Council	10.00
Feb. 6, 1939	Expenses of Frank App	17.35
Mar. 11, 1939	Sylvia Meeker, for typing and mailing Vol. IX, No. 1, of Pa. Veg. Gro. News	33.12
Sept. 7, 1939	Oliver-Kahse, for cup for 4-H Club Vegetable Judging Contest	18.95
Sept. 26, 1939	Ruth Shirey, for typing and mailing Vol. IX, No. 2, of Pa. Veg. Gro. News	4.63
Nov. 21, 1939	Affiliation Fee, V.G.A. of A.	25.00
Dec. 16, 1939	Sylvia Meeker, for typing and mailing Vol. IX, Nos. 3 & 4, Pa. Veg. Gro. News	6.65
	Total	$172.23
	Balance, cash in bank, Jan. 13, 1940	9.69
	Total	$181.92

The Association banquet, held at the William Penn Hotel on Tuesday evening, January 16th, was enjoyed by approximately 50 persons. R. R. Brader served as toastmaster, and Wm. R. Whitacre, of the Department of Agricultural Economics, The Pennsylvania State College, was the principal speaker.

REPORT OF THE 4-H VEGETABLE JUDGING CONTEST

CHARLES K. HALLOWELL, Philadelphia, Chairman of Committee

On August 14th, as part of the 4-H Club roundup at State College, a vegetable judging contest was conducted by a committee consisting of Charles K. Hallowell, Chairman; R. S. Clark, Huntingdon; D. R. Pheasant, Mifflintown; C. D. Morley, Beaver; R. E. Carter, Uniontown; and W. B. Nissley and J M. Huffington, State College. Six county teams of three members each, and 10 individual 4-H club members competed for team and individual prizes. A prize of a silver cup, offered by the Pennsylvania Vegetable Growers' Association to the team winning the State championship, was won jointly by the Beaver and Schuylkill County teams, who tied for first place. Other counties represented by teams were Philadelphia, Bucks, Huntingdon, and Lehigh. The ten 4-H club members who competed individually were from Cambria, Lawrence, and Washington Counties.

C. D. Morley, coach of the Beaver County team, and Ralph Fetterolf, R. D., Orwigsburg and Jean Losch, Summit Station, members of the Schuylkill County team accepted the trophy presented by Charles K. Hallowell for the Committee, for their respective teams, each of which will have possession of the cup during six months of the present year. Permanent possession of the trophy will be awarded to the county whose team first wins first place in three different annual contests.

Highest individual honors in the first contest were won by Willard Landis, Quakertown, Bucks County, with a score of 543 points; Mary Losch, Summit Station, Schuylkill County, was second with 540 points; and George Devore, Alexandria, Huntingdon County, was third with 534 points.

PRESENTATION OF PENNSYLVANIA TEN-TON TOMATO CLUB CERTIFICATES AND AWARDS

HARRY W. HUFFNAGLE, Quarrysville, Chairman of Committee, and William A. Free, York, Executive Secretary, Pennsylvania Canners' Association

The Pennsylvania Ten-Ton Tomato Club Committee of the Pennsylvania Vegetable Growers' Association, which was responsible for the award of certificates of membership, consisted of Mr. Harry W. Huffnagle, Quarryville, Chairman; Alan R. Warehime, Hanover; and Jesse H. Huffington, State College. Mr. Huffnagle on Wednesday afternoon, January 17, presented the report of the Committee, which was a list of growers who had qualified during 1939 for membership in the Pennsylvania Ten-Ton Tomato Club. He explained

that eligibility to the Club was based both on yield records or receipts showing that an average of ten tons of marketable tomatoes had been produced on at least two acres of land, and also on certain records of methods followed in producing the crop. The latter was required, in order that the Pennsylvania Ten-Ton Tomato Club might be an agency whereby the production of heavy yields of high-quality tomatoes would be stimulated, and that the experince of each successful grower might add to knowledge of methods whereby such yields could be obtained.

Mr. Huffnagle read the list of members for 1939, of which there were 78, and presented certificates of membership to those who were present.

Mr. William A. Free, Executive Secretary of the Pennsylvania Canners' Association, York, Pa., expressed the compliments of his association to the new members, and congratulated the winners of special mention for highest yield and quality. He announced the awards of cups to be presented in 1941 bv the Pennsylvania Canners' Association to the person or persons who had the greatest yield to the acre or the highest percentage of U. S. No. 1 tomatoes.

The winners of special mention for highest yield were the following:

Rank	*Name, Address, County*	*No. 1*	*No. 2*	*Culls*	*Acres*	*Yield to the Acre*
First	Amos Sheaffer, Biglerville, Adams	70	29	1	5.06	22.59
Second	J. H. Shattuck, R.5, Erie, Erie	81	18	1	2.0	16.72
Third	J. Ralph Kelly, Kelton, Chester	76	23	1	3.0	15.80
Fourth	Gilbert Marks, R.2, Gardners, Cumberland	75	24	1	7.0	15.59
Fifth	Paul R. Garber, R.2, Elizatown, Lancaster	69	28	3	5.5	15.24

Winners of special mention for highest quality were the following:

Rank	*Name, Address, County*	*No. 1*	*No. 2*	*Culls*	*Acres*	*Yield to the Acre*
First	P. O. Stauffer, R.1, Selinsgrove, Snyder	84	15	1	2.0	12.57
Second	J. Glen Manchester, R. D. North Girard, Erie	84	14	2	7.5	11.41
Third	Albert J. Bunting, R.D., Newtown, Bucks	81	18	1	10.0	12.19
Fourth	J H. Shattuck, R.5., Erie, Erie	81	18	1	2.0	16.72
Fifth	Henry Brubaker, R.2, Selinsgrove, Snyder	80	19	1	2.0	12.57

Recent Developments in Canning Crops Production in Maryland

H. A. Hunter, *Canning Crop Specialist,*
University of Maryland, College Park, Maryland

The principal crops grown for commercial canning in Maryland are tomatoes, sweet corn, peas, snap beans, and lima beans, in the order named, with smaller acreages of other crops, including asparagus, cabbage for kraut, cucumbers for pickles, spinach, and beets. Most of the recent canning crops work in the State has been with the major crops, only.

Varieties

There has been constant development in the production and use of improved varieties of canning crops for a great many years, but there have been an unusually large number of new varieties or strains of practically all of these crops developed fairly recently. The emphasis in these introductions has been more towards improvement in quality, rather than increased yields.

LIMA BEANS—Henderson Bush has been the standard lima bean used for canning, due to its ability to set pods under varying weather conditions and the fact that it matures a large percentage of its pods at one time, making it suited to machine methods of harvesting and vining. Several new varieties have now been produced which will probably cut in on at least a part of the Henderson acreage.

Illinois Baby Potato has yielded practically the same as Henderson in the tests in Maryland during the past three years. The small thick beans are of excellent quality for canning and freezing, but the variety is approximately a week later than Henderson and this may make it a little late in some seasons to use as a succession crop to canning peas.

Baby Fordhook is another small-podded, small, thick-seeded variety similar to Illinois Baby Potato, but with slightly smaller plant, pod, and bean, and it is several days earlier in maturity. In tests in 1937 and 1939 it has yielded a little heavier than Illinois Baby Potato.

Maryland Thick Seeded is a still smaller-seeded new variety of excellent quality, but it has not yielded as well as the two previously mentioned varieties, and only a very limited quantity of seed, if any, will be available for commercial trials this season.

SNAP BEANS—The varieties which have yielded best in tests and are most generally used in the canning acreage are Burpee's, Giant, and Asgrow Stringless Green Pod. The various Refugee strains have failed to give a satisfactory yield under Maryland conditions.

TOMATOES—The canning tomato acreage is largely made up of Marglobe, Rutgers, and various Baltimore types. In the last several years, Rutgers has gained in popularity and is now used about as extensively as Marglobe. Rutgers is conceded to have a better internal color than Marglobe, but there is a feeling by some canners that it does not stand up as well in the can.

SWEET CORN—Practically all of the sweet corn canning acreage is now planted with some of the hybrid types. Golden Cross Bantam is about the earliest variety that can be successfully grown under our conditions. Other varieties generally used are Country Gentleman, Evergreen, and Narrow Grain. Recent small trials of Ioana, Golden Hybrid 24 x 39, and Bloomcross 39 have proved quite satisfactory.

PEAS—Alaska is the standard canning variety used in Maryland. In the last four or five years a good number of canners have tried small acreages of some of the early sweet varieties. Tests of a large number of sweets show that some of these can be successfully grown with yields approximating those of Alaska. From the standpoint of yield and canning quality the varieties which have given best results in the tests are Mardelah, Pride, Dark Podded Thomas Laxton, Laxton's Cropper, and Canner King. The latter variety is about as late as can be recommended, particularly for the Eastern Shore area. A few of the newer developments which have not yet been thoroughly tested appear quite promising from preliminary trials.

Tomato Plant Production

Unfortunately, tomato plants can be grown in open beds in Maryland and make a fair crop in the field before frost. However, the yield is not as large as from earlier planting. Some years back, a real campaign was undertaken in the State to encourage earlier planting, either through the use of coldframe, hotbed, or southern plants. The coldframe method grew quite rapidly at first and as many as 22 million plants were produced in frames in a single year. With the growth of the southern plant industry, however, more and more tomato plants have been used from this source—probably 40 to 50 million in recent years. Hot beds have always been used in the green-wrap and early-market sections, but have never been utilized extensively by canning crops growers. Southern plants are still far from perfect, but their use has generally resulted in increased yields over open-bed plants. In keeping with the current fad of direct field seeding, trials are now in progress to compare this method with transplanted plants.

Fertilization

Canning crops in Maryland are generally grown by field-crop farmers rather than by truckers. Consequently, fertilizer practices have largely been adapted from field-crop methods and are not nec-

essarily best suited to the canning crops. The most common method of applying commercial fertilizer has been to drill this on ahead of planting. The analyses generally used for tomatoes vary from a 5-8-12 on sandy soils to a 3-12-6 on the heavier Piedmont soils. For sweet corn the analyses vary from 5-10-5 to 3-12-6; for peas, from 6-6-5 to 5-10-5; and for snap beans, from 4-8-8 to 3-12-6. Lima beans following peas are generally grown without additional fertilization. When grown as a single crop, they are fertilized the same as snap beans.

Fertilizer placement is attracting a great deal of attention at present and many growers are replacing their old equipment with planters with band placement attachments. Band placement is used extensively with snap and lima beans at the present time. Tests have indicated only slight increases with the usual band placements for tomatoes and peas over the normal methods of application. Delayed applications of fertilizers have shown to advantage for tomatoes in helping to hold the foliage later in the season. A good many growers are using fertilizer attachments on their cultivators as an easy method of applying the side-dressings. Tests with nutrient, or starter, solutions in the transplanting water have not given the increases reported from some other states, but may be advantageous on soils of low fertility or when small amounts of fertilizer are used.

With manure no longer plentiful, it has become a real problem to maintain soil organic matter. Nothing has yet been found to completely replace manure, but the turning under of heavy growths of green-manure crops certainly helps. In tests in canning crops rotations, good growths of such crops as drilled field corn turned under with moderate amounts of nitrogenous fertilizers have given almost as good results as five tons of manure per acre.

Disease and Insect Control

Spraying and dusting tomatoes to control leaf blights is being tried out quite extensively on an experimental scale. Several new insoluble copper fungicides which do not injure the plant, as does Bordeaux Mixture, seem very promising. Yellow copper oxide has given best results to date in trials in Maryland, although the increases have not been as outstanding as reported from some of the other states.

Pea root rot has been commercially controlled by long rotations in large-scale field demonstrations. The common practice in Maryland of growing peas after peas for two or more years in order to secure better inoculation, resulted in a build-up of root-rot infestation to the point where many fields would not produce a profitable crop. The use of rotations in which peas, vetch, and alfalfa do not occur more often than once in four or five years has resulted in commercial control of the disease.

The pea aphis has been a serious pest of canning peas in this area for the past four years. Prior to 1936, it was the general opinion that this insect was serious only about one year out of five, and little effort was made towards control. During the past four years, however, equipment and materials have been developed which give good commercial control. Most canners now have either sprayers or dusters especially equipped for treating peas with rotenone materials. In general, sprays have given better control than dusts, but the best control last year was secured with a micronized cube dust.

The standard control for the Mexican bean beetle is spraying or dusting with a rotenone-bearing material. Due to the ease of the operation, dusting is much more common than spraying.

The Colorado potato beetle has become a serious pest on tomatoes early in the season, particularly on the Eastern Shore. A three-quarter or one percent rotenone dust kills practically all of the soft-shells and a large proportion of the hard-shell beetles, even when dusted on with a sack or can shaker.

The Japanese beetle is causing considerable damage in several local sweet corn areas of the state. Sectional trapping demonstrations have helped to reduce the infestation, but so far the most practical measure which can be taken with the corn crop is to delay planting so that silking occurs after the major portion of the beetles have died.

Raw Product Grading

There has been a revival of interest in recent years in the purchase of canning crops on the basis of quality grades. A project has been set up at the Maryland Experiment Station to study quality factors of the different canning crops with the view of developing methods for buying on grades. Several satisfactory methods have been worked out for peas. Probably the most accurate method employs the Tenderometer, a machine which registers the pressure necessary to shear a definite quantity of peas through a standard grid. Studies are now being conducted with sweet corn in an effort to find some method which will be more acceptable than the present Federal grades for this product.

Due largely to the open market situation with tomatoes in Maryland, the use of Federal grades has not been employed as extensively as in most other tomato areas. Lima beans are generally bought on the basis of the percentage of white beans. Peas are bought according to the percentage of sieve sizes and on the basis of Texturemeter readings, as well as by use of the Tenderometer. Federal grades are used to some extent for the purchase of sweet corn on the basis of grades.

The Northeastern Vegetable Marketing Program

By WILLIAM C. OCKEY, *Senior Extension Economist*
Extension Service, U. S. D. A.
Presented by RAY WENKER, Bustleton, Pa.

Organization and Purpose of Northeastern Vegetable and Potato Council

The Northeastern Vegetable and Potato Council was organized in February 1938 at a meeting of representative vegetable growers from the States of Massachusetts, Connecticut, Rhode Island, New Hampshire, New York, Pennsylvania, and New Jersey. Its purpose, as stated in the bylaws, is to promote and encourage the advancement of the vegetable industry in the Northeastern States. Membership is set at three growers from each State, although at recent meetings of the council there have been more than this number from certain States. The members of the council represent associations or organizations of growers in their respective States. For example, these men represent State vegetable growers' associations, organizations of market gardners around principal cities, the New Jersey Auction Association, State farm bureaus, and other groups. In addition to these regular members, representatives from the State extension services, State colleges, and State departments of agriculture meet with the council at its regular monthly meetings to discuss various problems that come before it. During the first year there was an average attendance of over 20 growers and other representatives at each meeting. These representatives came from 4 to 7 States. It is to be emphasized that the Northeastern Council was not organized to replace any existing vegetable growers' organizations. Its main purpose is to enable the existing organizations to function more successfully on regional problems of importance to the vegetable industry.

A great variety of problems and topics has been discussed at the meetings of the council since its inception early in 1938. A partial list of these illustrating the wide range of discussions is as follows:

1. The development of production and marketing programs based on the needs and wants of consumers.
2. The agricultural conservation program as related to vegetable production.
3. Grading, packaging, and marking of containers.
4. Market surpluses and the development of Federal Surplus Commodities Corporation buying programs to help correct them.
5. The use of credit obtained from public and private agencies in the production of vegetables.

6. The need for additional research work relating to vegetables and potatoes and the establishment of a regional research laboratory in the Northeast.
7. Freight rates and rate differentials.
8. Improvement of terminal market facilities.
9. Advertising programs for vegetables and the use of State collected funds for such purpose.
10. Regulation of truck operators hauling vegetables in interstate commerce.
11. The Wages and Hours Act.
12. The Food Stamp Plan and its application in cities of the Northeast.

These and many other problems were discussed in the monthly meetings of the Northeastern Vegetable and Potato Council. In each instance an attempt was made to develop practical programs to correct the difficulties set forth in the discussions. In other words, outlining the problem was not considered to be sufficient. Some practical solution was sought for each problem that came before the group.

DEVELOPMENT OF MARKETING PROGRAM

The importance of marketing problems in the vegetable industry was stressed at each meeting of the council. It soon became apparent that before any practical marketing program could be developed the advice and assistance of retail and wholesale distributors of vegetables and potatoes should be obtained. Also, it was felt that to as great an extent as possible these distributors should actively participate in any program that was undertaken. Consequently, at the regular meeting of the council on April 1, 1939, the cooperation of various distributor groups was requested in formulating a marketing program for the 1939 season. Representatives of the National League of Wholesale Fresh Fruit and Vegetable Distributors, corporate chains, voluntary chains, National Association of Food Chains, and the Cooperative Food Distributors of America were present and discussed marketing problems of the northeastern vegetable industry. Representatives were appointed from their groups to meet with representatives of the Northeastern Council in drafting a tentative marketing program. This program, after considerable discussion and some changes, was formally adopted at the next regular meeting of the council.

Objectives of the Program

The program as finally decided upon had several long-time aspects as well as those points applicable specifically to the marketing of vegetables in the 1939 season. The program sought to

develop closer cooperation on the part of growers and distributors in order to obtain a more orderly and efficient merchandising procedure for vegetables produced in the Northeastern States by means of:

1. More timely and pertinent crop and market information.
2. More standardization and uniformity in quality of products and in size and kind of containers.
3. Special merchandising campaigns where needed to secure more effective distribution of peak production.
4. Publicity and advertising to stimulate increased consumer demand for local vegetables.
5. Development of machinery to move vegetables to other markets when practicable.
6. Federal Surplus Commodities Corporation purchases of burdensome market surpluses.

It can readily be seen that this 6-point program could not be accomplished in any one season but that each point in it was important to the development of more efficient marketing of vegetables produced in this area.

Means Used to Reach Objectives

The Northeastern Vegetable and Potato Council sponsored the coordinated program for the entire area. Market committees were then organized to develop a program around the principal market centers. This was done to permit greater flexibility of the program and to allow it to be adapted to local market conditions. Such market committees were organized for: (1) the New York City market, (2) the Connecticut Valley, including the cities of Waterbury, Hartford, Bridgeport, and New Haven, Connecticut, and Springfield, Massachusetts, (3) Albany, New York, (4) Syracuse, New York, (5) Buffalo, New York, (6) Philadelphia, Pennsylvania, and (7) Baltimore, Maryland. No single method of organizing these committees was followed since it was felt desirable to have them meet the wishes and needs of the local group. Therefore, in some cases the market committees were composed only of growers, while in others both growers and distributors were members. In all instances, however, distributors were asked to meet with the market committees and to cooperate on various phases of the program. Their cooperation was particularly helpful in conducting special merchandising campaigns and in discussions pertaining to grades and packages.

In addition to growers and distributors in the area, cooperation of State and Federal agencies was secured in the development and operation of the program. The State extension services, State colleges of agriculture, State departments of agriculture, and the U.S. Department of Agriculture were asked to assist in developing and

furthering the work. The Federal Extension Service provided the services of two men for six months to assist with the many details involved in initiating and coordinating the project on a regional basis. The project was considered to be experimental in character and also to provide a fine demonstration of the possibilities of this type of program. It is expected that later on the industry itself will finance this work, although the technical assistance from the various State and Federal agencies undoubtedly will be needed as the program continues.

Results Obtained

It is impossible to list all of the results obtained in this first season's activities but certain work has been outstanding and has received considerable recognition by the growers involved. Consequently, I shall indicate what has been done by referring to some of the things accomplished under each of the general headings listed in the objectives.

Crop and Market Information.—One of the most successful parts of the program was embodied in the securing of more adequate and timely information relating to market and crop conditions. In this connection growers in the area felt that a market news report from the New York City market should be made available to them at an early hour in the morning so that the information could be used as a guide to their harvesting and marketing operations that day. Consequently, the New York office of the Market News Service was asked to assist in this work, and did so by furnishing a man to secure market information relative to about 12 crops by 6:00 a. m. each morning. This information was then telephoned to Radio Station WOR at Newark, New Jersey, by 6:15 a. m., and was released on their farmers' program at 6:30 a. m. The list of vegetables for which this information was obtained was changed in accordance with the season. Also, in connection with this report, a market flash on spinach was sent over the United Press wire to Radio Station WTAR in Norfolk, Virginia, each morning to be broadcast to spinach growers in the Virginia area.

A number of other types of information of a special nature were prepared in connection wtih this general problem of securing more adequate and timely crop and market data. No further specific examples will be given at this time, although the efforts of the Agricultural Marketing Service in revising and expanding the crop reporting work for vegetables deserves mention. This will involve an additional report on crop conditions every two weeks and will be further supplemented by current releases pertaining to any unusual weather and growing conditions which quickly affect crop prospects.

Standardization.—The Northeastern Vegetable and Potato Council at its meeting in March 1939 recommended standard containers for certain vegetables, among them being the 100 lb. bag

and 15 or 10 lb. paper containers for potatoes; the 50 lb. bag for onions; the 12 qt. climax basket or 30 lb. lug for tomatoes; the 24 qt. crate for strawberries; and the round bushel basket or bushel hamper for snap beans, lima beans, and peas. These containers were recommended for use by growers in the area and every effort made to develop greater uniformity in the types of containers used and the quantity of products packed in these containers. In addition, in the various market committee meetings with representatives of the trade, the question of grades and packages was discussed at considerable length. For example, in Buffalo representative distributors offered to discuss at farmers' meetings the types of containers which could best satisfy their demands. In Albany grading and packaging demonstrations were arranged in the Menands market to take place while farmers were waiting in line with their trucks. In fact, in each of the market committee meetings both growers and the trade asked that further work be done along the lines of grades and packages and that additional meetings be arranged for the discussion of these problems. In connection with the subject of standardization, it should be mentioned that the buying of vegetables by the Federal Surplus Commodities Corporation on a graded basis has helped to bring forcefully to growers a consciousness of grades and better packages. Purchases on the farmers' markets have been conducted by the Federal Surplus Commodities Corporation for two years and in this time considerable progress along the lines of improving grades and the quality of vegetables sold on these markets has been made.

Special Merchandising Campaigns.—Special merchandising programs along the lines of "Apple Weeks," "Citrus Weeks," and the like were developed for early potatoes, cauliflower, squash, and peaches this season. In addition, similar programs were conducted for tomatoes, sweet potatoes, and melons in one or two local market areas. These programs were designed to secure the cooperation of the trade in simultaneously pushing the sale of products when it appeared that very heavy supplies at the peak of harvest time would be available on the market. The development and operation of each special merchandising program involved the following points:

1. The market committee decided when the program was needed and the crop to which it should apply.
2. The trade was then notified tentatively of the potential need for the program about three weeks in advance of the anticipated date.
3. Crop conditions were checked so as to determine as exactly as possible the time when the peak movement of supplies would occur.
4. A definite date for the program was set one week in advance so that all details could be arranged by the distributors for the sale.

5. The trade then advertised and pushed the sale of the product during the dates of the campaign. The campaigns usually lasted for one week, but in several instances, namely, for squash and cauliflower, the campaigns extended over a longer period.

In view of the heavy crop of peaches this season, growers of this product requested the assistance of the Northeastern Vegetable and Potato Council in developing a merchandising program to move peaches. Generally speaking, this program was one of the most successful undertaken by the council this season. Large supplies of peaches were moved into surrounding markets and in spite of the unusually heavy crop growers were able to find a market for their peaches.

Consumer Publicity and Information.—In order to obtain a more widespread understanding on the part of consumers of the time when locally-produced vegetables were in abundant supply and, consequently, provided a good bargain, a great amount of information was assembled by the home economics and editorial departments of the State colleges and State departments of agriculture. This information dealt with methods of preparing the different vegetables, recipes, and suggestions as to the most advantageous time to buy the various products. The seasonality of the crop was stressed as well as the quality and freshness of the local products. This information was released to the newspapers and over the radio station networks and timed to coincide with special sales efforts in the merchandising campaigns. Information concerning many products was released during the peak of harvest even though special sales efforts were not thought to be necessary Newspapers and radio stations made ready use of this material and were anxious to receive it. This type of information directed at consumers appears to be a valuable means of assisting in the distribution of large supplies of perishable products.

Federal Surplus Commodities Corporation Purchases.—For two years purchases by the Federal Surplus Commodities Corporation have been used to help prevent gluts and extremely low prices on farmers' markets in the area. There has been an exceedingly favorable reaction on the part of growers to this program. It has helped to keep markets open and has eliminated to a great extent those buyers who wait until the end of the day and then buy the remaining products for almost nothing. The Federal Surplus Commodities Corporation was ready to buy throughout the season and did purchase heavy supplies of vegetables when needed.

SUMMARY

While it has not been possible to describe all of the various things that were done in connection with the northeastern vegetable marketing program this year, I have tried to touch briefly on

some of the more important aspects. Everyone in connection with the program realizes that this year's work has been in the nature of an experiment. It is believed that the program offers a means of assisting in the more efficient marketing of vegetables in the Northeast through the cooperation of growers, distributors, and public agencies. Perhaps the fine cooperation received from all is one of the most outstanding results obtained.

The Northeastern Vegetable and Potato Council has proceeded to take up each problem that came before it and has attempted to find some practical solution to it. While in many cases it did not find the answer the first time, it was willing to keep on experimenting until it did find some solution. It is not believed that this program as adopted in the Northeast is necessarily applicable as it now stands to other areas. However, parts of the program may be applicable and perhaps the general procedure may be used by vegetable growers in other producing regions. The program does indicate what can be done when growers organize and unite their efforts on some coordinated activity which they feel will benefit them. The Northeastern Vegetable and Potato Council was built on existing organizations of vegetable growers and has merely sought to direct its efforts toward securing practical solutions to problems affecting the vegetable industry in the entire northeastern area.

Selling Tomatoes for Green-Wraps and for Canning

BY EMERSON W. KANE

CAMPBELL SOUP CO., CAMDEN, NEW JERSEY

It is a pleasure to tell you about our experiences in marketing green-wrap tomatoes and tomatoes for the canning industry.

In the Susquehanna Valley section around Washington Boro thin wrapper tobacco was grown for many years. The growth of this tobacco was made possible because of the climatic conditions in this section which are a result of a south western exposure, good moisture, temperate climate caused by the nearness to the river and a fertile sandy type of soil. Owing to the developments in other sections of the country, the market for this type of tobacco disappeared about 1925. Since the price of this land was high, a crop with a high net return had to be selected to replace the tobacco.

Certain of the growers had, for several years, been producing staked tomatoes for the local market with rather profitable returns. Each year there was a greater demand for these tomatoes. Consequently, the acreage developed rather rapidly and about 1930 there appeared a marketing difficulty among the small growers. That is, instead of picking and distributing the tomatoes uniformily during the week, there was a tendency for the growers to glut the market in one part of the week and not have sufficient to supply it at another time. Again, the larger buyers could not obtain sufficient supply without contacting several growers.

Cooperative Marketing Organization Formed

As an outgrowth of these difficulties all of the tomato growers were called together for the purpose of forming a cooperative marketing organization. This met with the approval of the great majority of growers and later in 1934 the Washington Boro Cooperative Tomato Growers Association became a reality with the necessary personnel to handle the organization selected from the growers by a popular vote.

Since it was felt that no over production had occurred, each grower was allowed the same acreage that he had produced the preceding year. On the basis of this type of organization, practically every grower cooperated wholeheartedly. A building for receiving and sales was established and the organization began to handle all of the green-wrap tomatoes.

QUALITY STANDARDS MAINTAINED

Realizing that quality was the best advertisement, standards for size and ripeness were established which are passed upon by an inspector. The growers were then permitted to deliver tomatoes in containers holding either 30 or 60 pounds with a number for identi-

fication. This was necessary because any complaint could be taken directly to the grower delivering the tomatoes. After the growers' weights and quality have been checked the sale of their tomatoes was in charge of the salesmanager who distributes them in small or large quantities as demanded by the various buyers. It was found necessary to limit the sale of tomatoes, outside of the organization, to 30 pounds per year and a fine of $25 per bushel was established to enforce this ruling.

It has been found that the small grower has as good a market as the large grower and that a great saving has been incurred by the buyers. As a result of this organization, neighboring towns have found it convenient to buy through it.

The pool closes each week on Thursday and each grower is paid on the following Monday for the tomatoes delivered. An assessment of 25c per bushel for handling has been found adequate to take care of all necessary expenses.

Growing Cannery Tomatoes in Lancaster County

The growing of tomatoes for the canning industry was established in a similar manner due to a somewhat similar cause. So, about 1930 one of the foresighted growers contacted a large canning company about the possibility of developing an acreage of tomatoes in Lancaster County. As a result of this contact one of the companies established an acreage of tomatoes. The production and quality of the crop was so satisfactory that other companies were attracted and the acreage increased rapidly.

Prior to 1936 all purchases were made on a flat rate basis of from $10 to $12 a ton, subject to the approval of the canning company. Then the system of government grading was introduced. Since 1936 this system has functioned satisfactorily, the price being based on the grade.

The acreage of tomatoes in Lancaster County in 1939 had reached the figure of about 4000 acres. The price paid averaged about $17 for U. S. No. 1 and about $9 for U. S. No. 2. From the price of tomatoes it is obvious that the canner wants No. 1 tomatoes.

Figures have been established that show that quality goes hand in hand with the quantity produced. For example, records of Campbell Soup Company for tomatoes grown in Pennsylvania show that for 53 growers delivering ten tons or more of tomatoes per acre, an average grade of 75% U. S. No. 1, 24% U. S. No. 2 and 1% culls was obtained, whereas for 55 growers delivering five tons or less, the average grade was 61% U. S. No. 1, 36% U. S. No. 2 and 3% culls. The average grade for Lancaster growers in 1939 delivered to the above mentioned company was 73.6% U. S. No. 1, 24.8% U. S. No. 2 and 1.5% culls with an average net return of $15 per ton. The highest average grade delivered for any one grower was 91% U. S. No. 1 and 9% U. S. No. 2 and his gross returns per acre for 11½ acres were $188.15. The best yield per acre delivered by any

one grower was 19.5 tons which gave him a net return of $285 per acre.

From this discussion it can be seen that tomatoes of high quality and yield can and are being grown in Lancaster County. It further indicates that much can be done to increase the yield and quality of the crop delivered by the average grower.

Modern Vegetable Production Methods

ALVAN C. THOMPSON

Production Manager—King Farms Co., Morrisville, Pa.

The necessity for lowering production costs is inevitably forcing the displacement of horses on vegetable farms. The 1939 crop of light-weight tractors was designed especially to meet the needs of the small grower and cut his costs of production. It is now possible for the small grower on the family-size farm to increase the efficiency of his labor through the use of mechanized power. Today anyone can operate a horseless farm if he desires. Manufacturers not only make special pieces of equipment designed in quick attachable units to fit the tractor, but a tractor can be chosen to suit the size of the farm being operated. Complete tillage equipment can be purchased to suit the tractor.

1. IMPROVEMENTS IN MACHINERY BENEFIT SMALL GROWER.

The small vegetable grower is now "getting a break" because manufacturers are now building specialized equipment and attachments similar to those which the larger vegetable growers, who pioneered in this mechanization, had to develop for themselves through considerable experimenting and expense. Some of these developments are: Fertilizer sidedressers, band fertilizer attachments, multiple row seeders, and plant setter attachments.

These developments increased and widened the scope and application of machinery in vegetable production. This wider application of power has also broadened the field for the manufacturers.

2. MODERN IMPROVEMENTS.

Modern tractor improvements include self-starters to eliminate hand cranking, head lamps for night operation, greater fuel economy and a wider range of speed for various classes of work. Modern tractors can operate at a speed of one mile per hour for a job such as plant setting, or ten or more miles per hour for crop dusting, to twenty miles per hour for road hauling.

Newer tractors are built to take quick-attachable units in order to make quick shifts from one job to another. Variable tread widths of wheels takes care of different width rows. The power lift saves time and effort at the ends of rows. The power take-off is useful in running machines either towed behind or mounted on the tractor. This feature permits the combining of operations to perform two or more jobs at a time. Greater efficiency in these ways means cutting the unit cost of production. One of the new tractors has an offset engine to allow clear vision for seeding and cultivation and to add weight to the land wheel where weight is needed to eliminate slippage when plowing. Removing some of the weight from the furrow wheel also means less danger of forming a plow sole or hard pan. Another improvement is steering mechanism designed for short turns at ends of fields.

Pneumatic rubber tires have played an important part in increasing the efficiency and broadening the usefulness of the farm tractor. Rubber-tired tractors perform more work on less fuel and in less time due to reduction in wheel slippage and less wasted power. They permit tractors to operate on improved highways pulling wagons loaded with crops or supplies to and from fields. Rubber tires on other implements such as plows, seed drills, and fertilizer drills increase the life of these implements by reducing shock and wear. The wheel bearings on rubber-tired plows require replacement only once every two or three seasons, whereas with steel wheels they may have to be replaced twice in one season.

3. EQUIPMENT FOR GROUND PREPARATION.

On large commercial truck farms plowing is usually done by heavy tractors pulling three or four bottom gang plows. Usually a small section of roller called a plow packer is fastened to the plow to give a preliminary ground-fitting preceding discing, which helps to conserve moisture.

Subsoil plowing to break up hard pan is usually done with a heavy chisel-tooth machine and requires lots of power to pull it. This is especially beneficial to root crops such as carrots, parsnips and potatoes.

Green-manure or cover crops are usually plowed down with a turning plow, but may also be worked into the soil with a cover-crop disc. Usually several hundred pounds per acre of a high nitrogen carrying fertilizer, such as Calcium Cyanamid, is applied to the green crop to hasten decay. An economical distributor for this material is a simple hopper which fastens on the plow and applies the fertilizer to the green crop just before it is turned under.

For most close row vegetable crops fertilizer is applied broadcast with drills after which it is harrowed in with a disc harrow.

Vegetable crops require a finely-prepared and level seed-bed and this is accomplished by using a double disc harrow and meeker combination. For most vegetable seeds planting to an accurate depth is required for proper germination.

4. STANDARDIZED MULTIPLE ROWS.

In the seeding of vegetable crops the idea is to plant the same number of rows as are going to be cultivated. The increased power of tractors over horses has permitted the building of multiple row machines which plant and cultivate more rows at a time than with horses. Row widths of various crops should be standardized as much as possible in order to simplify cultivation, and suit the wheel

tread of other equipment such as sprayers and dusters. Planter units may be either mounted on the tractor or drawn behind them.

5. BAND FERTILIZING FOR ECONOMY.

Within the past half dozen years band fertilizing of vegetable crops at the time of planting has come into quite extensive use. This method takes less fertilizer and there is less danger of injury to the crop by proper placement of it.

Plant setting of crops such as cabbage and tomatoes is usually done two or four rows at a time. Fertilizer may be applied in bands at the time of setting or applications made later when cultivating.

6. MULTIPLE ROW CULTIVATION.

Tractor power enables us to cultivate vegetables in multiple rows, usually either two, three, four, or six rows at a time. Some tractors are equipped with side-dressing attachments to apply fertilizer in bands at the time of cultivation. The walking type of garden tractor is usually used for seeding and cultivating close row crops. It is also suitable for wider rows except in crops planted on a large scale.

7. LIQUID FERTILIZER.

Liquid fertilizers have been used as plant starter solutions for the past couple years and have given marked increases in growth, especially with tomatoes. Some experimental work is also being done with them used in the seed drill furrow at the time of planting with such crops as beans and as a side application when cultivating a growing crop such as cabbage.

8. PORTABLE IRRIGATION.

Irrigation is essential for growing high quality vegetables. The new light-weight portable irrigation pipe has proven to be an economical and satisfactory method of applying water. Soluble fertilizers may be dissolved in the irrigation water and applied very economically, and get an immediate response from the growing crop.

9. CONTROL OF CROP PESTS.

Insect and disease control is another production job handled readily with tractors. A twenty-four nozzle eight-row duster can cover ten acres per hour. An eight-row sprayer can cover from three to six acres per hour. Some sprayers and dusters have been made which have booms up to forty feet in length. A new method of controlling the troublesome plant lice is called the nicotine vapofumer.

Airplane dusting and spraying is efficient and practical except on small fields. It is especially useful on crops where damage might result from ground equipment. An airplane can dust as much as fifty to seventy five acres per hour.

10. MACHINERY FOR HARVESTING VEGETABLES.

In the harvesting of vegetable crops it is more difficult to use machinery because of possible injury in handling and because of variation in maturity and because it is often necessary to select for quality. The potato digger is useful for digging such crops as carrots and parsnips. In Michigan they have developed a machine for harvesting spinach. In Arizona a large packing company is using a machine for harvesting lettuce in the field. Of course, these are not yet practical for small growers.

11. METHODS USED IN PREPARATION AND HANDLING.

A few years ago it was necessary for growers to design and build much of their own grading and washing machinery used for cleaning and packing vegetables. Now, however, much satisfactory equipment for this purpose may be purchased since manufacturers are trying to meet the needs of growers. Various types of spray washers are used for removing dirt.

The sorting and grading of vegetables is usually done over rubber or canvas belts. Workers standing alongside the belt remove the off-grade vegetables and the first quality passes over the end of the belt into the market package.

Various types of gravity rollers or belt-type conveyors are used to cut the cost of handling the vegetable packages in getting them loaded onto trucks for market.

12. MECHANIZATION BENEFITS LABOR.

The modern trend in vegetable farming is toward the increased use of mechanical power. Power equipment has enabled the vegetable grower to eliminate a great deal of his back-breaking drudgery. The use of machinery has permitted him to better systematize and organize his work, and provide more steady employment for his help. Machinery has also assisted him in reducing his peak labor requirements during rush periods. Therefore, there is less shifting of labor to and from the farm and labor has more steady employment over a longer period of time under the modern system of mechanized vegetable production.

Recent Discoveries in Vegetable Nutrition at the Pennsylvania State College

WARREN B. MACK
Department of Horticulture
The Pennsylvania State College

One hundred years ago Justus von Liebig, the father of Agricultural Chemistry, published a book, *Chemistry in its Application to Agriculture and Physiology,* which has dominated thinking and research in plant nutrition ever since. With Liebig's observations and conclusions in the main there is little room for difference of opinion: he found that plants derived the minerals required for their nutrition from the soil, and concluded that the supply of these minerals as removed by crops would have to be replaced from outside sources, if the soil was to remain productive. He thought also that the rate of growth of plants was controlled by the rate of supply of mineral nutrients from the soil, and particularly by those nutrients which were supplied by the soil in relatively the least amounts.

Since Liebig's day, chemical studies of plant nutrition have been directed toward finding, in one way or another, either by soil or plant analyses, or both, which elements required by plants are deficient—that is, present in or supplied by the soil in relatively the least amounts. Most people for many years have believed that any well-trained chemist can do this easily—a baking-powder can full of soil, a few test tubes and reagents, possibly a microscope, and within a few hours the chemist can tell what nutrients to put on the soil for a good yield of any desired crop.

Actually, this has never been possible. Twenty-four years ago W. H. Jordan, who began the Jordan Fertility Plots at The Pennsylvania State College in 1881, but who at the time mentioned was Director of the New York Agricultural Experiment Station at Geneva, New York, stated in Bulletin 427 of that Station that no chemical analyses were known by which the fertility of the soil could be estimated.

With the advent of quick soil tests, however, public confidence has been restored in the ability of the chemist to do what he has failed to do for the past century. Actually, the usefulness of quick tests has been overestimated. In general, fertilizer recommendations based on the results of quick tests have been favorable to improved yields, but, as is well known, the recommendations as made usually are based a good deal on the experience of the analyst, as well as on the results of the tests. A test of a single sample of soil of unknown type or origin could not be relied upon as a basis for recommendation of the fertilizer to apply to this soil for best yields of a particular crop.

Field-plot experiments, to find the answer to the question by trial and error methods, have had about the same outcome as had chemical analyses of soils and crops. They have shown in general which fertilizer elements are likely to improve yields, but have supplied information on only a very limited number of soil types. Lately, they have become so involved in design and interpretation, thanks to the application of statistical methods, that their number must necessarily be limited because of requirements of area, personnel, and funds.

As one elderly observer said recently, the same things are under investigation now as were being studied at the experiment stations when he was a boy. Part of the reason, of course, is that new methods and conditions require new answers for old questions; but another part is that satisfactory answers have not been found.

Recent developments in fertilizer field-plot experiments have extended their province to include the placement of fertilizer with respect to the roots of the growing plants, and the use of nutrient solutions for fertilizing crops in the field. One may surmise that the trend is toward the nutrition of crops *through* the soil, rather than by it, the soil serving simply as a medium to support the plants, through which nutrients are supplied artificially to the crop as it grows.—This statement, by the way, implies nothing regarding the desirability of such studies or the usefulness of the methods compared.—

It is a common observation that, on a given soil fertilized in a certain way, crops will often be much better in one season than in another or in one part of the field than in another. Of two neighboring farmers, both using the same kind of fertilizer and the same variety of crop, it is not unusual to find one almost uniformly obtaining yields twice as great as those of the other. It has seemed evident to one staff member of the Department of Horticulture at Penn State, Dr. Walter Thomas, that an analysis of plants should be undertaken to discover nutritional differences in the plants themselves which are associated with or responsible for such differences in growth and yield. Dr. Thomas has been studying this subject during the past thirty years, and recently has brought forth much information which promises to be of practical application in answering the question as to the fertilizer requirements of crops on particular soils.

Dr. Thomas' methods themselves are of greater interest to scientists than to farmers, but their application to practical problems can be understood better if a few general principles are presented. He has found that the chemical composition of a whole plant at the time of harvest—or at any other time—does not tell a great deal about the nutrition of the plant. It is more important to know the changes which take place during the growth of the plant. For this reason, sampling for analysis is done throughout the growing sea-

son, and the leaves, in which the important chemical processes related to growth and development occur, are the part studied. From this fact, the method is known as foliar diagnosis.

Thus far, studies have been made by this method on potatoes and corn grown in the field, and on tomatoes grown in the greenhouse. The object has been to find out in what ways the nutrition of plants with best growth and yield has differed from that of plants yielding less.

The experiments have shown that fertilizers do not have the same effect in different seasons, or at different parts of the same season; furthermore, the nutritional requirements for best growth of a plant are not the same under different climatic conditions. These facts account for the failure of analyses of soils or of plants at harvest to show the fertilizer requirements of the crops on the given soils.

Another interesting discovery is that the application to a soil of a fertilizer containing a nutrient element which is relatively low in the soil and is needed by a crop growing on the soil may not necessarily improve the yield of the crop, because the element itself or others contained in the fertilizer may interfere with the absorption of other nutrient elements required by the plant. In other words, a fertilizer may supply a needed element in available form, and yet not improve yields.

Fertilizers must improve the nutrition of the plant in order to improve yields. Furthermore, for best nutrition, nutrients must be supplied to the plant at such rates as to keep them all in proper proportion or balance throughout the growing period.

Thus far, manure has maintained such balanced nutrition throughout the season better than has any other fertilizer. It is apparent, therefore, that we must try to obtain nutrition throughout the season similar to that with manure, if we are to obtain yields from commercial fertilizers as good as those from manure. It is apparent also, from studies already carried out, that it is very difficult to do this by means of a single application of the commercial fertilizers now in use to the growing crop.

Fertilizer placement and repeated applications of fertilizer, properly placed, might be suggested as a possible way to reach this end. Such a method would approach the growing of crops with chemical nutrients in an inert medium, and more than likely would result ultimately in destruction of the soil, with an increasing number of difficulties apparently due to mineral deficiencies. More than likely, however, the way to do it is to build up the soil by a system of fertilization of cash crops and green manures and sods, so as to result in the proper nutrition of the crops *by the soil*. After all, the soil is a vast reservoir of plant nutrients, on which plants have become adjusted to grow; we should utilize as well as maintain this resource.

Studies on this procedure for bringing about proper nutrition, carried out by the method developed by Dr. Thomas, are now being contemplated. The prospects seem excellent for finding practical ways of securing balanced nutrition and best yield of vegetable crops on Pennsylvania soils by the means suggested, and, at the same time, of maintaining the soil against deterioration either by reduction of its content of chemical plant nutrients or by erosion and other physical forces.

Green-Wrap and Cannery Tomatoes Marketing, Culture and Cost Factors

HARRY S. SLOAT,
Agricultural Extension Association,
Lancaster, Pa.

In 1939, approximately 600 acres of green-wrap tomatoes were grown in Pennsylvania. The earliest coming on the market and competing directly with greenhouse-grown tomatoes are those produced along the eastern edge of the Susquehanna river in Lancaster County. There are about 50 acres grown in this area, most of which are marketed through the Washington Boro Cooperative Growers Association. The cultural practices listed briefly are used by the growers in this area.

They use the following varieties: Bonny Best, John Baer, Stokesdale, Grothen, Scarlet Dawn and Pritchard. The seed is sown under glass between January 20 and February 5. The plants are taken out of the flats from March 20 to April 1 and set 6 inches by 6 inches in coldframes under sash. These frames are usually placed in or at the edge of the field where the crop is to be grown. This hardens the plants, making them stocky, produces good root systems, and fruit buds or bloom appear as they are ready to be set in the field between April 25 and May 5, depending on the weather. The river aids the growers, in moderating the effects of late frosts.

The light sandy soil warms up quickly and aids in early maturity of the fruit. Because of the light type of soil, large amounts of fertilizer are necessary. Growers are using from 800 to 2000 pounds of 4-16-4, 4-12-5 or 5-8-7 fertilizer broadcast about a week before planting. The plants are set 18 to 24 inches in the row, and the rows 36 to 40 inches apart. Stakes are driven in before or at time of planting and each plant is tied to the stake. At weekly or ten-day intervals depending on the weather, new growth is tied to the stake, and suckers are pinched out along the stem. This is done until they start to ripen, usually about June 25. They are picked as soon as they show a little color, and are taken partly ripened in crates to the packing house. Picked at this stage of ripening they will have fewer growth cracks, will handle better in shipment to distant markets, and readily ripen on the way.

This type of tomato growing requires a lot of hand labor, intensive culture and production of a tomato of good quality for table use. If weather conditions are hot and dry, fruit is more subject to sunburn and blossom-end rot than those grown for juice or cannery purposes.

Reports from the agricultural marketing service of the United States Department of Agriculture shows that Pennsylvania ranked

18th in tomato production in the United States during the five-year period 1928-32, and rose to 13th place in 1938. The acreage rose from 4740 in 1928-32 to 17,400 in 1939. The yield rose from 19,856 tons to 128,800 in 1939. The value increased from $30,770.00 to $1,906,000.00 in 1939.

The grades, according to the report for 1938 of Mr. D. M. James of the Bureau of Markets, Pennsylvania Department of Agriculture, averaged 65% U. S. No. 1, 32% U. S. No. 2, and 3% culls. The average price paid by canners was $15.09 per ton. With the increase of tomatoes canned, the tonnage inspected and purchased on a grade basis has increased rapidly since 1935, as shown by the following figures:

1927 —	118	Tons
1930 —	747	"
1935 —	19,079	"
1936 —	28,926	"
1937 —	34,596	"
1938 —	52,282	"
1939 —	67,500	"

Records on cultural practices and costs were turned in from 15 counties. These show that most of the plants in Erie, Franklin, York, and Adams counties were locally grown; in most of the other counties more than 75% were southern grown. The varieties grown in descending order were, Rutgers, Marglobe, Baltimore, Pritchard, and Matchum. The planting distances ranged from 2½ x 4½ to 4½ x 4½ ft., or 7½ to 20¼ square feet per plant, with the average about 16 square feet per plant. The fertilizer analyses were as follows in decreasing order of the number reporting, 4-16-4, 4-12-4, 3-12-5 and 4-12-6. The application per acre averaged 829 pounds in the southeastern counties, and the lightest average application was 475 pounds in central counties. The average reported for the state was 606 pounds. Tomatoes were usually grown in a rotation, and the reports showed they followed corn more often than any other crop. The application of manure ranged from nothing to fifteen tons per acre. The larger yields in the southeastern part of the state usually had the heavier application of manure.

Cost records in Pennsylvania in 1939 on 131 farms:

Total acres—704
Average yield per acre 10.52 tons

Cost per acre:

Plants	$10.22
Interest, Depreciation, Taxes	7.16
Spray material	.05
Fertilizer	9.30
Manure	5.23
Contract planting	.42

Labor in growing	18.85
Total growing costs	$31.23
Picking	30.54
Marketing	15.82
Total harvesting	$46.36
Total cost	97.59
Cost per ton	9.27
Harvesting cost per ton	4.40

On the basis of the above figures on growing and harvesting costs per ton, and the average price received in 1939 of $14.80 per ton, 4.5 tons to the acre were required to pay production costs. Thirty percent of returns on yields above 4.5 tons were needed to pay harvesting costs.

Recommendations for growing a good quality crop of tomatoes:

1. Secure seed from high yielding strains, treat it for disease, rotate your crops to hold down disease.

2. Plant well grown, stocky, seasoned plants. Avoid exposure to wind and sun before planting. If unable to plant because of weather conditions after pulling plants, dig a trench three to four inches deep, moisten the bottom, and the roots of the plant. Spread out plants about an inch apart, covering the roots, keeping stems and leaves dry.

3. Select fertile, well drained soil, well supplied with organic matter, through application of manure or plowing under a good cover crop.

4. Use a complete fertilizer — 2-4% nitrogen, 12-16% phosphorus, 4-8% potash, at the rate of 600 to 1000 pounds per acre. Apply two to three inches deep, before or at the time of planting.

5. Cultivate shallow after the first time, and on level fields with heavy soil, ridge slightly during the last cultivation.

6. Carefully supervise pickers to pick well ripened tomatoes to obtain highest average grade and price.

7. Quality and yield go hand in hand. These are obtained through careful management and proper cultural practices in handling of plants, land, labor and crop as harvested.

Tomato Costs and Production Practices in 1939

JESSE M. HUFFINGTON, *Specialist in Vegetable Gardening Extension*
and
MONROE J. ARMES, *Specialist in Farm Management Extension*
The Pennsylvania State College

Distribution of Records:

Total for Pennsylvania, 131

County	*Ten-Ton*	*Total*	*County*	*Ten-Ton*	*Total*
Adams	7	8	Bucks	3	5
Cumberland	7	16	Snyder	5	10
Erie	2	7	Union	4	11
Franklin	22	22	Schuylkill	4	11
Chester	1	2	Lycoming	2	3
Montgomery	3	3	Philadelphia	1	1
Lackawanna	1	2			
Wyoming	0	2	Total	85	131
Lancaster	23	28			

The acreage of tomatoes grown for canning in Pennsylvania was 7,900 during the ten-year period 1928 to 1937 as compared to 18,700 acres in 1939. Tomatoes grown for local markets was 1,460 acres during the same ten-year period and increased to 2,100 acres in 1939.

This increase in acreage of another important cash crop brings with it certain problems in the adjustment of farming operations to maintain high yields with high quality at low cost per ton.

The economic solution of problems relating to the maintenance of soil fertility, soil preparation, the proper use of lime and fertilizer, sources of plants, the adjustment of equipment, and harvesting are made easier when definite records are kept. Individual records assist the grower in planning each year's operations to conform to the needs of other crop and livestock enterprises. The records and experience of a large number of growers give valuable information as to the probable success and cost of different methods he may adopt in handling the crop.

Varieties

Rutgers was used most generally for cannnig and green wraps; Baltimore strains more subject to blossom end rot; while Marglobe did not always develop the deep red color desired. On some light soils of eastern Pennsylvania, Marglobe was preferred because of its solidity. Early Rutgers, the "F" or No. 78 strain, was preferred to the regular strain in Erie County. Pritchard did well in the fertile soils of Lancaster County where early maturity was desired.

Plants

Locally grown plants were used by 63 growers. Southern plants were used by 61 growers. Eighty-three per cent of the growers

using plants from a good local source produced ten-ton crops, while only 48 per cent of those using southern grown plants produced ten tons per acre in 1939. These figures do not, of course, include all fields where southern or locally grown plants were used. However, records were taken at random or where requested. The difference does indicate that special care was used by local plant growers. Local plants may cost more but their condition can be better controlled and disease damage minimized if certain definite procedures are followed. The importance of well-grown, healthy plants, whatever the source, cannot be overemphasized.

Soil

Well-drained, medium soil, rich in organic matter was preferred and used in most cases for the ten-ton yields. Two-thirds of all growers disced and harrowed, combined, three to four times.

Manure and Commercial Fertilizer

Twenty-nine different analyses of commercial fertilizer were used in 1939 as compared to 25 in 1938. The analyses most commonly used, in the order named, were 4-16-4, 4-12-4, 3-12-6, and 4-12-6. Two growers used no nitrogen in the fertilizer.

The per cent of growers using three to four per cent nitrogen was 75, 12 to 16 per cent phosphoric acid was 78, and four to seven per cent potash was 80.

The average amount of fertilizer applied per acre was 606 pounds.

Practically all of the crops were grown on land where sod and manure were included in the rotation. Observations show that ten-ton tomato yields can be obtained consistently, year after year, only on soils well supplied with organic matter, high in fertility, well-drained, and limed sufficiently to grow clover.

Fifty-eight per cent of the crops were produced where the fertilizer was applied with a drill before planting, 25 per cent in the row, and 17 per cent used a combination of drilling broadcast and row application. The latter method is preferred where facilities are available. Plant starters, containing mostly soluble phosphoric acid, promoted earlier growth of the plants. They are added to the water applied in setting the plants.

The practice of top dressing with fertilizer needs to be tested carefully, especially when more than soluble nitrogen is used in medium or heavy loam soils.

Planting

Seventy-seven per cent of all plantings were made from May 15 to 31.

Forty-nine per cent of the growers allowed, on the average, 15 to 18 square feet per plant with the rows 46 to 50 inches apart and the

plants 36 to 48 inches apart. Space between the rows varied from 36 to 66 inches, and between the plants from 30 to 66 inches, with from 7.5 to 30¼ square feet per plant. There were a total of 36 different methods of spacing the plants.

The distance between plants should be varied according to the fertility of the soil and the variety as it influences vine growth. Wide rows may make it easier to pick the crop. A number of growers mark off the field with a corn planter, applying part of the fertilizer in this way and using the mark to check-row the crop with the transplanter. Check-rowing with cross cultivation may help to eliminate hand weeding and cut down labor requirements.

Cultivation

Four to five times is the number of times the crop was cultivated by 56 per cent of the growers, and 42.7 per cent weeded by hand once or twice. One deep cultivation followed by shallow cultivation through the entire season was practiced by most growers.

Tomato growers obtaining yields of ten or more tons per acre considered the following to be important controllable factors of production:

(1) The use of clean seed, clean plants, and clean soil.

(2) Planting only well-grown, stocky, carefully seasoned plants.

(3) Selecting only fertile, well-drained soil, well supplied with organic matter from applications of manure or the turning down of sod or green crops in the rotation.

(4) The use of complete fertilizer—0 to 4% nitrogen, 12 to 16% phosphoric acid, and 4 to 6% potash—at the rate of 600 to 1,000 pounds per acre. The method of application is preferably two to three inches deep or in the "root zone of the plant" and in solid bands unmixed with the soil, either before, at the time of, or immediately after planting. Row application—two to three inches from the plant—is preferred when only a small amount per acre (600 pounds) can be purchased. A small amount in the row (200 pounds) and a larger application broadcast (600 to 800 pounds) is another practice; while another group applied all of the fertilizer broadcast before planting, usually in larger amounts per acre.

(5) Shallow cultivation after the first time.

(6) Supervision of pickers to obtain the highest grade and rate of payment.

COST OF PRODUCING TOMATOES

Records of the cost of producing tomatoes were secured from 135 growers. One hundred thirty-one of these records are included in

the following summary. The other four records were not included because irregularities in the method of producing the crop made direct comparison impossible.

The following factors were used in calculating the cost of production:

Man labor was charged at 25 cents per hour, horse labor at 15 cents per hour, and truck and tractor at 85 cents per hour.

Manure was charged to the crop at 75 cents per ton. Commercial fertilizer was all charged to the tomato crop.

Interest was charged at 5 per cent on the investment in land and equipment. The investment in general farm machinery used was pro-rated on the basis of total crop acreage in the farm. Ten per cent depreciation was charged on the investment in equipment.

The average investments per acre were $102.01 in land and $2.92 in equipment. This does not include the value of trucks and tractors since they were charged at the hourly rate.

The following table shows the man, horse, and truck and tractor hours used in the production of an acre of tomatoes and the cost of these operations calculated from the time required to perform them:

	Man Hours	Horse Hours	Tractor Hours	Cost
Growing plants	.54	.02		$ .15
Hauling manure	6.39	8.44	1.24	3.92
Hauling fertilizer				
Plowing	3.39	5.60	1.18	2.68
Discing	1.21	.62	1.01	1.25
Harrowing	1.61	2.75	.50	1.24
Rolling	.33	.47	.09	.23
Dragging	.12	.21	.02	.08
Applying fertilizer	1.23	1.48	.14	.65
Planting	10.94	2.40	.57	3.58
Replanting	2.92			.73
Spraying, dusting	.13	.02	.03	.06
Cultivating	6.65	10.11	.62	3.71
Weeding	2.89			.72
Total growing	37.81	32.10	5.40	18.85
Picking	43.43			10.86
Hauling to market	9.14	.38	7.32	8.57
Labor of Harvesting and Marketing	52.57	.38	7.32	19.43
Total Labor	90.92	32.50	12.72	$38.43

The total labor cost is $38.43 per acre, or 39.37 per cent of the total cost per acre. Picking requires more labor than any other operation. It represents 28.26 per cent of the labor cost by the farm help on the tomato crop and, in addition, $19.68 was spent for contract and day labor per acre. Hauling to market was the next most costly operation. It represents 22.30 per cent of the total labor charged and, in addition $7.25 per acre was paid for hauling.

Cultivating and weeding accounts for 11.53 per cent of the labor cost. There was considerable variation in this cost. By cultivating at the proper time, four to five cultivations will produce the crop. Some growers found six to seven cultivations necessary and hoeing and weeding in addition.

The cost of planting and replanting was $4.73 per acre.

As will be seen from the table on the following page, the cost of harvesting and marketing is about half the total cost of producing the crop. The labor of growing is 19.3 per cent of the total cost of the crop. Cost of plants vary greatly depending on the source of the plants.

The following items were actual cash expense in producing the crop:

Cost of contract planting	$ .42
Cost of plants purchased	10.07
Cost of spray materials	.05
Cost of fertilizer	9.30
Picking hired	19.68
Hauling hired	7.25
	$46.77

Thus, 47.92 per cent of the total cost of producing the crop was actual cash expense, 38.43 per cent was labor cost, and 13.65 per cent was for overhead, manure, etc.

COST OF PRODUCING ONE ACRE OF TOMATOES IN PENNSYLVANIA—1939

The following table gives the total costs involved in producing an acre of tomatoes in various sections of the state and for the state as a whole:

	Chester Bucks Montgomery Philadelphia Counties	Lancaster County	Adams Cumberland Franklin Counties	Erie County	Lackawanna Schuylkill Wyoming Counties	Lycoming Union Snyder Counties	Penna.
Number of Records	11	28	46	7	15	24	131
Fertilizer (lbs.)	829	558	496	656	598	475	606
Manure (tons)	3.50	9.25	9.31	.48	7.84	9.15	6.99
Number of Acres	169.56	116.50	208.08	62.50	54.35	93.80	704.79
Yield (tons)	11.16	11.09	11.09	9.33	9.05	9.08	10.52
COSTS OF:							
Plants	$ 9.28	$ 7.62	$10.74	$17.15	$ 11.27	$ 8.75	$10.22
Int., Dep., Tax	8.51	9.76	5.63	6.94	6.59	5.42	7.16
Spray Materials	.09	...	.02	...	.24	...	.05
Fertilizer	12.27	8.81	7.16	11.60	8.97	8.00	9.30
Manure	2.62	6.81	7.01	.36	5.88	6.86	5.23
Contract Planting	...	...	1.41	...	...	...	.42
Labor Growing	12.59	22.02	21.04	15.98	28.49	17.72	18.85
Total Growing Costs	$45.36	$ 55.02	$53.01	$52.03	$ 61.44	$46.75	$51.23
Picking	38.42	33.89	27.79	22.65	30.31	23.66	30.54
Marketing	14.87	14.97	16.64	11.25	25.85	13.97	15.82
Total Harvesting Costs	53.29	48.86	44.43	33.90	56.16	37.63	46.36
TOTAL COSTS	$98.65	$103.88	$97.44	$85.93	$117.60	$84.38	$97.59
Cost Per Ton	8.84	9.37	8.79	9.21	12.99	9.29	9.27
			HARVESTING COSTS PER TON				
Picking	$ 3.45	$ 3.06	$ 2.50	$ 2.43	$ 3.35	$ 2.60	$ 2.90
Marketing	1.33	1.35	1.50	1.20	2.86	1.54	1.50
TOTAL	$ 4.78	$ 4.41	$ 4.00	$ 3.63	$ 6.21	$ 4.14	$ 4.40

Celery Growers Develop Unique Marketing Program

R. B. Donaldson,
Extension Specialist in Agricultural Economics,
State College, Pa.

During the past two years, celery growers of the Philadelphia and Bucks' Counties area have developed a grading and marketing program under which their celery is graded in conformity with recognized standard grades and marketed under their own brands. Definite grade specifications were established by the growers, the top grade being represented by "Sweet-Nut" brand label and the second grade by "Liberty-Bell" brand. The Philadelphia Vegetable Growers' Cooperative Association assumed the leadership in this movement and the grading and packing operations became a part of their program. Although the celery was packed cooperatively, yet each grower's pack retained its identity by the label on each crate being supplemented with the name and address of the individual grower. Sales were conducted privately, each grower retaining the privilege of selling his celery through any marketing outlet he selected. However, during the past two seasons, practically all of the celery sold under the "Sweet-Nut" brand label moved through one commission merchant on the Philadelphia market. Over 40,000 crates were graded, packed, and sold during each of the past two seasons. The results of this organized grading and marketing program indicate that celery growers in southeastern Pennsylvania have definitely accomplished the following:

(1) They have increased their net return per package.

(2) They have built up a consumer demand for their product.

(3) They have found new markets for their celery (during the past season "Sweet-Nut" brand celery was sold as far distant as the Boston market).

(4) Through this program they have been able to maintain their sales on the Philadelphia market in the face of incoming shipments of well-graded celery from other states.

The program will be carried forth during the coming year and plans are already under way to strengthen certain features of the program.

Members of the Pennsylvania Ten-Ton Tomato Club, 1939

ADAMS COUNTY

Gulden, C. I., Gardners, R. 1
Harbold, E. L., York Springs, R.D.
Reinecker, C. D., York Springs, R.2
Sheaffer, Amos, Biglerville
Showers, Ray, Biglerville

BUCKS COUNTY

Bunting, Albert J., Newton, R.D.
Luff, Clyde M., Newtown
Newbold, J. Russell, Langhorne, R.D.
Rogers, T. C., Starkey Farms Co., Morrisville

CHESTER COUNTY

Kelly, J. Ralph, Kelton

CUMBERLAND COUNTY

Davis, Ira, Gardners, R.1
Marks, Gilbert C., Gardners, R.2
McCullough, Donald, Newville
McVitty, Joseph E., Shippensburg
Weidner, Creden, Gardners, R.2
Weidner, Oscar, Gardners, R.2

ERIE COUNTY

Manchester, J. Glenn, N. Girard, R.D.
Shattuck, J. H., Erie, R.D. 5

FRANKLIN COUNTY

Benedict, Irwin P., Waynesboro, R. 1
Benedict, John A., Waynesboro, R.1
Bovey, I. M., Waynesboro, R.1
College, J. R. Chambersburg, R.6
Cramer, Oscar J., Chambersburg, R.5
Culbertson, Earl, Chambersburg, R.1
Ebersole, Sam H., Chambersburg, R.3
Fogelsanger, F. W., Greencastle, R.3
Hartman, D. Welty, Greencastle, R.3
Heckman, Glenn A., St. Thomas, R.1
Hock, Elmer D., Chambersburg, R.2
Hock, C. Walter, Shippensburg, R.3
Kline, Harvey, Waynesboro, R.1
Musser, Benj. L., Shippensburg, R.3
Musser, Sam W., Shippensburg, R.3
Picking, Harvey, Chambersburg, R.7
Shatzer, Percy, St. Thomas, R.1
Snowberger, I. F., Waynesboro, R.2
Stauffer, A. A., Waynesboro, R.1
Wenger, David H., Shippensburg, R.3
Wishard, W. H., Farm # 3, Waynesboro
Zuck, Alvin, Greencastle

LANCASTER COUNTY

Garber, Paul R., Elizabethtown, R.2
Kaylor, Roy B., Elizabethtown, R.3
Bixler, Joe, Marietta
Brubaker, Levi N., Manheim
Cutler, J. S., Drumore, R.1
Earhart, Paul, Mt. Joy, R.2
Ganty, John, Mt. Joy, R.2
Garber, Snavely, Willowstreet
Harnish, Huber, Conestoga, R.2
Herr, David S., Lancaster, R.6
Hershey, Walter, Lancaster, R.6

Hess, Amos L., Mt. Joy, R.1
Hess, H. M., Mt. Joy, R.1
Huber, Ross M., Lancaster, R.4
Millinger, H. M., Mt. Joy, R.1
Melhorn, John, Mt. Joy
Pollock, Wilbur, Quarryville, R.1
Wolgemuth, C. M., Mt. Joy, R.1
Wolgemuth, Irvin, Mt. Joy
Wolgemuth, Joseph, Mt. Joy, R.1
Zercher, A. H., Mt. Joy, R.1

Lycoming County

Dewald, Bert, Montoursville, R.2

Mountgomery County

Heebner, Curtis, Norristown, R.2
Stauffer, Wm. B., Limerick
Wentz, Harry C., Jarrettown

Philadelphia County

Morrow, W. J. & A. T, Torresdale

Schuykill County

Bensinger, Walter, Tamaqua
Heisler, Arthur, Tamaqua, R.1
Moyer, Lewis D., Andreas
Miller, Chas. M., Hegins

Snyder County

Brubaker, Henry, Selinsgrove, R.2
Brubaker, Enoch, Selinsgrove, R.2
Martin, Enos, Silinsgrove, R.2
Stauffer, P. O., Selinsgrove, R.1
Stauffer, Harry A., Selinsgrove, R.2

Union County

Barber, D. Frank, New Columbia
Dieffenbach, Geo., Lewisburg, R.2
Young, J. A., Lewisburg, R.3

The distribution of membership was as follows, by counties: Adams, 5; Bucks, 4; Chester, 1; Cumberland, 6; Erie, 2; Franklin, 22; Lancaster, 21; Lycoming, 1; Montgomery, 3; Philadelphia, 1; Schuylkill, 4; Snyder, 5; and Union, 3. Total, 78, in 13 counties.

Pennsylvania Vegetable Growers' Association Members and Subscribers in 1939 and 1940

Abbott, Charles, Espy, Pa.
Alburger, A. D., Bustleton, Pa.
Alexander, M. W., Box 53, Cochranville, Pa.
Ardrey, Howard, R. R. 2, Howard, Pa.
Arnold, Harry, R. 1, Beaver Falls, Pa.
Artley, C. LaRue, 339 Cherry St., Montoursville, Pa.

Bailey, M. V., American Cyanamid Co., Pennington, New Jersey
Baldesberger, W. P., Bridgeville, R. R. 2, Pa.
Barney, Lesko, 140 Main St., Kingston, Pa.
Bauer, Allen H., Botany Bldg., State College, Pa.
Beccari, Peter, Box 61, Hickman, Pa.
Becker, Stanley Q. Bristol, Pa.
Becker, H. Stanley, Bristol, Pa.
Bedeworth, W. L., Belle Vernon, Pa.
Book, John H., R. R. 4, Lancaster, Pa.
Brackbill, Harry G., Malvern, Pa.
Brader, R. R., Berwick, Pa.
Bretz, R. P., Mechanicsburg, R. R. 4, Pa.
Brubaker, Daniel, R. R. 1, Ephrata, Pa.
Bucher, J. B., R. R. 1, Lititz, Pa.
Burrell, J. H., D. V. Burrell Seed Growers Co., Rocky Ford, Colo.
Butterwick, Roy A., 930 Linden St., Allentown, Pa.

Clemson, Leonard G., Halifax, Pa.
Comly, Rowland R., Bustleton, Philadelphia, Pa.
Coon, F. H., R. R. 2, Clarks Summit, Pa.
Crouthamel, A. W., 315 S. Franklin St., Allentown, Pa.

Dean, J. W., Camp Hill, Pa.
Decker, Roy M., State College, Pa.
Deebel, H. E., Ringtown, Pa.
Dohler Seed Growers, Ltd., Streetsville, Ontario, Canada.
Donaldson, R. B., State College, Pa.
Douple, J. L., R. R. 3, Lititz, Pa.
Dudley, H. N., & Sons, Bustleton, Pa.
Dunlap, R. Bruce, Dept. of Welfare, Harrisburg, Pa.

Eck, James A., Montoursville, Pa.
Elwyn Training School, Elwyn, Pa.
Evans, H. J., Georgetown, New York
Eyler, Wm. N., R. R. 2, Cumberland, Md.

Fahs, D. C., R. R. 2, York, Pa.
Felins Tying Machine Co., Alfred G. Suelflow, Mgr., 2950 N. 14th St., Milwaukee, Wis.
Fisher, F. M., Wernersville, Pa.
Fleming, E. J., Andalusia, Pa.
Fleming T. Herman, Andalusia, Pa.
Flora Orchard Co., Wrightsville, Pa.
Frolio, Joseph M., 35 Henry St., Bridgeton, N. J.
Funk, A. H., Millersville, Pa.

Gifford, Clifton K., Jr., 13 South Broad St., Ridgewav, Pa.
Glick, Daniel M., Glick's Seed Farms, Smoketown, Pa.
Greenbaum, Raymond. Allentown, Pa. c/o Allentown State Hospital
Gross, Frank Jr., Box 153, Natrona Heights, Pa.

Haines, Granville E., R. R. 1, Mt. Holly, N. J.
Hallowell, Charles K., 407 Custom House, 2nd & Chestnut St., Philadelphia, Pa.
Handwerg, Theodore C.,Orange burg, N. Y.
Hanover Canning Co., Hanover, Pa.
Harris, H. E., R. R. 1, Pittston, Pa.
Hartman, M. M., R. R. 6, York, Pa.
Heebner, Curtis A., Worcester, Pa.
Heitmuller Co., W. Chas., 1310-14 Fifth St., N. E. Washington, D. C.
Heller, H. Wilbur, R. R. 1, Conestoga, Pa.
Herold, Ray, Box 164, R. R. 1, Wilkes-Barre, Pa.
Hoffman, H. A., R. R. 2, Bridgeville, Pa.
Holmes, H. L., 224 Cleveland Ave., N. W., Canton, Ohio
Hopkins, Harry W., R. R. 2, Clarks Summit, Pa.
Horn, W. D., Box 56, Star Route, Butler, Pa.
Hostettler, Lewis, R. R. 2, Johnstown, Pa.
Howden, John A., Sheffield, Mass.
Huber, Carl D., R. R. 1, Lititz, Pa.
Huffington, J. M., State College, Pa.
Huffnagle, Harry W., Quarryville, Pa.
Humphrevs. Chas. H., Somerton, Philadelphia, Pa.
Hutchison, J. D., P. O. Bldg., Wilkes-Barre. Pa.
Jaman, John, R. R. 1, Bethlehem, Pa.
Jersey Package Co., Inc., J. H. Bailey, Treas., Bridgeton, N. J.
Jones, Q. B., Blue Grass Road, Bustleton, Pa.

Kuharic, Paul C., R. 7, Butler, Pa.
Kulp, C. R., R. 1, Box 122, Pottstown, Pa.

Lachmann, Andrew, Suffern, N. Y.
Livermore, K. C., Honeoye Falls, N. Y.
Lindner, F. J., Ringtown, Pa.
Long, J. W., Cooksburg, Pa.

Mack, Warren B., State College, Pa.
Markey, R. E., R. R. 2, York, Pa.
Marvil Package Co., P. O. Box 111, Laurel, Del.
Masteller, Walter, 1614 Wyoming Ave., Forty Fort, Pa.
Masters, Arthur S., R. R. 1, Pittston, Pa.
Mende, A. H., Bristol, Pa.
Metzler, Clarence R., East Petersburg, Pa.
Meyer, Chas. L., 1519 Frick Bldg., Pittsburgh, Pa.
Millard, H. E., Annville, Pa.
Miller, Graybill, R. R. 1, Manheim Pa.
Miller, Max, Hublersburg, Centre County, Pa.
Miller, W. Clarence, R. R. 3, Bloomsburg, Pa.
Mills, Hal, Box 358, Bristol, Pa.

Mobus, Miss Mabel C., Everett, Pa.
Morinelli, Fred, 204 South 2nd St., Philadelphia, Pa.
Morley, C. D., 1008 Canal Street, Beaver, Pa.
Moyer, D. R., R. R. 3, Lancaster, Pa.
Murdock, Andrew, New City, N. Y.
Myer, D. R., R. R. 3, Lancaster, Pa.
Myers, C. E., State College, Pa.

Nesbit, C. Mac, Interlaken, N. J.
Newhard, Merle L., Conneautville, Pa.
Nissley, W. B., State College, Pa.
Nitsche, Herman A., Ivyland, Pa.
Northup, Henry W., Dalton, Pa.

Omalia, Martin, Box 16, Plainsville, Pa.
Orient, M. & Sons, R. R. 2, Box 125, Bridgeville, Pa.

Pendleton, John D., 55 E. Greenwood Ave., Oaklyn, N. J.
Penn State Seed Co., 1121 Wyoming Ave., Forty Fort, Pa.
Peterson, V. S., Agr. Bldg., State College, Pa.
Philp, Kenneth S., Ridgefield Ave., Pittsburgh (16), Pa.
Pollock, Harold, R. D., Berwick, Pa.
Poorbaugh, H. J., County Agent, Court House, Pottsville, Pa.
Preston, Samuel D., 448 West Leister St., Winchester, Va.

Rahn, E. M., State College, Pa.
Rahn, Robert, Geigertown, Pa.
Ransom, M. L., Shelter Island, N. Y.
Rasmussen, T., Folcroft, Pa.
Reed, Guy S., Summit Station, Pa.
Reichard, Robert A. & Co., Inc., Allentown, Pa.
Reynolds, A. Brinton, R. R. 6, West Chester, Pa.
Rockwell, B. A., Hershey, Pa.
Roemhild, Albert C., 122 Dock St., Philadelphia, Pa.
Rogers, T. C., R. R. 1, Morrisville, Pa.
Rohrbach, A. C., R. R. 2, Catawissa, Pa.
Rosbaugh, Andrew, Engle Road, Berea, Ohio
Royer, E. R., R. R. 3, Lancaster, Pa.
Rubinkam, N. I., Jamison, Pa.
Ruef, John, State College, Pa.

Schaak, Robert F., Box 248, Fed. —State Crop Rpt. Service, Harrisburg, Pa.
Schell, Walter S., 10th and Market Sts., Harrisburg, Pa.
Scott, Joseph C., R. R. 1, Oakdale, Pa.
Sheller, C. W., R. R. 4, West Chester, Pa.
Sherwood, Ed., 1311 Mineral Springs St., Reading, Pa.
Shisler Bros., Glenolden, Delaware County, Pa.
Smith, G. E., R. R. 4, Bethlehem, Pa.
Snyder, Victor C., Pitman, Pa.
Starkey Farm Co., Morrisville, Pa.
Storey, Chas. M., 10th and Market Sts., Harrisburg, Pa.
Strock, Clark S., Springtown, Pa.
Stutzman, Doyle, R. R. 1, Homer City, Pa.
Stutzman, R. B., R. R. 1, Vintondale, Pa.
Swartley, Arthur C., Housham, Pa.

Thomas, R. S., P. O. Box 178, Ambler, Pa.
Thompson, A. C., Morrisville, Pa.
Tucker, W. J., Court House, Bellefonte, Pa.

VanTuyle, Harold S., R. R. 1, Pittston, Pa.

Wagner, R. K., R. R. 2, New Florence, Pa.
Warner Company, Fred A. Daboll, Adv., Mgr., 219 N. Broad St., Philadelphia, Pa.
Watkins, R. G., Box 128, Wilkes-Barre, Pa.
Watts, Gilbert S., Bellwood, Pa.
Watts, R. L., State College, Pa.
Weaver, Levi A., New Holland, Pa.
Wenker, Ray W., Bustleton, Pa.
Whitenight, Harold A., R. R. 1, Bloomsburg, Pa.
Wiggins, A. W., Clarks Summit, Pa.
Willson, Andrew B., R. R. 1, Fayette City, Pa.
Willson, John M., R. R. 1, Fayette City, Pa.
Wineka, Eli F., R. R. 2, Red Lion, Pa.
Winner, G. B., American Cyanamid Co., 30 Rockefeller Plaza, New York, N. Y.
Wohleber, Stephen, 3064 Mount Troy Road, N. S. Pittsburgh, Pa.
Woleschok, John, Star Route, Butler, Pa.
Woods, E. Wilmer, R. D. 2, Connellsville, Pa.
Wright, Fred M., Harrisburger Hotel, Harrisburg, Pa.
Wright, Sidney, 517 Northampton St., Kingston, Pa.

Yeagle, Bros., R. R. 2, Bristol, Pa.
Yerger, Claude R., R. R. 3, Apollo, Pa.
Yiengst, John, R. R. 2, Lebanon, Pa.

Zimmerman, B. F., Ringtown, Pa.

End of Volume