VIRGINIA

HORTICULTURE — ANNUAL REPORT — 1934

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ANNUAL REPORT
1934

Project No. Va - - - - - - - Extension Division

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Horticultural Department, V. P. I.

Virginia Agricultural & Mechanical College & Polytechnic Institute

Blacksburg, Va.

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Blacksburg, Virginia
December 1, 1934

Mr. John R. Hutcheson, Director
Extension Division
Blacksburg, Virginia

Dear Sir:

I am submitting herewith the thirteenth annual report of the work in Vegetable Extension, Department of Horticulture, for the period beginning December 1, 1933 and ending November 30, 1934.

PERSONNEL

The personnel for this period consisted of L. B. Dietrick, Vegetable Specialist, employed two-thirds time; and L. C. Benner, Assistant Vegetable Specialist, employed full time.

GENERAL DISCUSSION

In December 1933 the annual conference of the staff in Vegetable Extension was held to summarize the accomplishments in the various projects and to outline the work for the coming year. Since all major projects are on a long-time basis, drastic changes any one year are unnecessary. Several minor changes are made yearly, however, to keep the various projects definitely in line with cultural and economic trends of the vegetable industry in the state.

At the conference it was decided to continue to emphasize four main projects. Three of these, the Potato, Sweet Potato, and Tomato Projects, deal with crops of considerable monetary value to the agriculture of the state. The fourth, or Home Garden Project, deals with a phase of agriculture which is of even greater importance to the health and often to the income of the farm family.

Although efforts were confined chiefly to the projects mentioned, considerable aid was given along other lines. Several institutions were aided in their production problems. The usual amount

of judging at fairs also had to be handled. Correspondence in addition dealt with practically every vegetable crop grown in the state. The minor projects as well as the four major projects will be discussed separately in the body of this report.

Means and Agencies

The extension set-up within the counties continued to be the main agency through which Vegetable Extension information was carried to the farmers of the state. The success or failure of any project depends primarily upon the intelligent understanding of that project by the agent and secondly upon the energy expended by him in pushing the project in his county. For that reason, projects were stressed primarily in those counties in which the agents were completely sold on the project under consideration. At the same time, efforts were continued to sell the work to agents in other counties where such work is needed.

Through the agents, the aid of various other organizations was enlisted in Vegetable Extension work. Among these might be mentioned marketing organizations, growers' organizations, civic leagues, farmers' clubs, garden clubs, etc.

Demonstrations were used to a great extent in putting over the program in Vegetable Extension. By this means, a far greater total number of people were reached than would otherwise have been possible. Communities have been served rather than individuals. The demonstrations given have covered the range of vegetable production, including demonstrations on the construction of plant growing structures, the use of good seed, seed treatment, seeding, thinning, fertilization, liming, cultivation, pest control, harvesting, grading storage and storage house construction, selecting exhibits, judging, etc.

Wherever possible, meetings or tours were held at result demonstrations to fix definitely such results in the growers' minds. Likewise, it has been our aim, in so far as possible, to make all other meetings demonstrations. For example, actual grading demonstrations were given at all meetings held to discuss grading; through the use of a blackboard, definite gardens were actually planned at meetings held to discuss garden planning, etc. It is felt that such demonstrations have added considerably to the effectiveness of the meeting as an extension agency. Publicity articles, radio talks, and circular letters have also been used to a great extent both in putting over subject matter and results.

For subject matter, the specialists have from time to time called upon the United States Department of Agriculture and various state experiment stations. The cooperation of the Virginia Truck Experiment Station has been of particular value in this respect.

Increased Demand for Aid

Before discussing the several projects in detail, a brief statement might well be made relative to the Vegetable Situation in general. The average value per acre of commercial truck crops for the country as a whole, although estimated to be larger than during the 1933 season, maintained the low level that has existed since 1931. The average gross return to growers for these commercial truck crops was approximately $106 per harvested acre in 1934, compared with less than $101 in 1933 and $96 in 1932, the low point in recent years. Net returns to growers in 1934 were probably less than in 1933 due to increased production and marketing costs.

The level of prices to growers of canning crops in 1934 may average 75 to 80 per cent of the 1924-29 level compared with 70 per cent in 1933, 66 per cent in 1932, 84 per cent in 1931 and 89 per cent in 1930. Net returns for this group were likewise reduced by increased costs of production and marketing.

Virginia truckers were relatively in a worse position than the country as a whole. Total acreage increased while gross return per acre decreased. Variation has been great between crops. Irish potato growers lost heavily. Sweet potato and tomato growers fared somewhat better than in 1933. Growers of snap beans, beets, early and late cabbage, and onions received only approximately half the unit price of 1933. The late fall or winter crop of cabbage, lima beans, and peas sold for better than twice the unit price of 1933. Cucumbers, kale, lettuce, spinach and watermelons all showed price improvement over 1933. As a whole, however, the lot of the Virginia trucker has been thorny for several years. Depressed conditions over a period of years have resulted in the survival of the fittest with the standard of fitness becoming higher each year. In general in 1934 only the best growers made a profit. Good growers broke even or lost a little. Inefficient growers lost heavily as usual. A premium has thus been placed on efficiency of the highest type. As a result, the service rendered by this department has become increasingly important. Seventy-four per cent of the specialists' time was devoted to field work. The nature and extent of this service are partially revealed by the following statistics:

Type of Service	Data
Days in field	400
Days in office	138
Mileage	28,319
Counties visited	46
Visits to agents	181
Visits unassisted by agents	28
Meetings	244
Attendance	10,186
4-H clubs met	39
Attendance	2,196
Method demonstrations	276

Attendance	5,735
Letters written	8,615
Circular letters written	28
Circular letters sent out	197,080
Press articles and radio talks prepared	28
Bulletins sent out	3,049

The number of miles traveled, the days in the field or office, the number of letters written, or even the meetings held and demonstrations given, are not necessarily a true criterion of the work accomplished, yet taken all together they serve as an index to achievement. Viewed in this light, the above figures are indicative of the service rendered by this department.

POTATO PROJECT

The Irish potato is the most important truck crop in Virginia. For the five-year period 1930-1934, the state acreage in Irish potatoes has averaged 104,800 acres with an average production of 12,041,000 bushels valued at $8,034,800.

The yield per acre, however, is far from satisfactory. The average yield per acre in 1934 was only 133 bushels. The five-year average 1930-1934 was still lower, only 114 bushels per acre. Such yields are far too low and must be increased for economical production.

The low average yield for the state is due primarily to the use of poor and diseased seed, low fertilization, lack of cultivation, little or no pest control measures, etc. The potato project is designed to increase the production per acre at a low unit cost of production. Work was carried on in this project in ten counties.

Early Irish Potato Production

Early Irish potato producers followed their age-old practice of increasing acreage following a year of high prices. Total acreage of commercial early potatoes was 304,100 acres compared with 240,600 acres in 1933, an increase of 63,400 acres or over 20%. Production likewise increased from 30,731,000 bushels in 1933 to 41,819,000 bushels in 1934, an increase of 11,088,000 bushels or over 36%.

Virginia growers followed the bell wether and increased their acreage approximately 19% from 38,000 acres in 1933 to 53,000 acres in 1934. Due to increased acreage and higher yields Virginia production increased from 5,681,000 bushels in 1933 to 10,018,000 bushels in 1934, an increase of nearly 75%. This increase in acreage occurred in spite of the fact that outlook meetings were held throughout Virginia at which any acreage increase was discouraged and in spite of the fact that all financing agencies signed an agreement not to finance any acreage over that financed in 1934.

Due to the increased acreage and production the price per bushel received by the growers in the 19 early states fell from $1.08 in 1933 to 87 cents in 1934, a decrease of over 44%. Virginia growers suffered still worse, the price declining from $1.21 in 1933 to 44 cents in 1934, or a decline of nearly 64%. Eastern Shore growers averaged 44 cents per bushel in comparison with 47 cents for the Norfolk area and 40 cents for other early producing sections of the state. This is strikingly illustrated the importance of acreage control, voluntary or otherwise. One is tempted to surmise how long the Virginia grower will require to learn this lesson. Virginia growers as a group in 1934 received in total 62% less money for 76% more potatoes than in 1933. Based on cost of production studies conducted on 90 farms, Virginia growers lost $21.74 for each acre of potatoes produced or a total of $1,869,280 for the state.

Various efforts were made throughout the marketing season to stabilize marketing conditions. Efforts on the part of growers and shippers secured the purchase of approximately 2,500 carloads of Irish potatoes by the Federal Emergency Relief Administration in order to remove the surplus from the market. Although the price dropped to $1.00 the Government paid $1.90 per barrel for the potatoes purchased for relief purposes. The removal of these potatoes undoubtedly kept the price from dropping still lower.

As a further effort to stabilize market conditions, the Potato Marketing Agreement went into effect at 12:01 a.m., Friday, July 13. It apparently, however, had little stabilizing influence on the price. It should be realized that the agreement did not go into effect until after half the crop had been marketed. A further difficulty was that marketing agencies did not play ball and as a rule requested allotments far above their shipping requirements with the idea that even after accepting a cut their final allotment would be sufficient.

Both in acreage and total production Virginia continued to rank first among the early states. Yield for her early crop has gradually been declining, however, over a period of years until the past season, declining from 188 bushels per acre in 1927 to 161 bushels in 1928, to 174 bushels in 1929, to 130 bushels in 1930, to 136 bushels in 1931, to 127 bushels in 1932, to 108 bushels in 1933 and rising to 118 bushels in 1934. Such a trend must be reversed if Virginia is to hold per place as an early potato producing state. The salvation of the state and particularly of the individual potato grower lies not in increased total production, but in increased production per acre at minimum costs. Considerable effort has been expended, therefore, in influencing growers to adopt improved cultural practices and thus increase their individual production per acre. The use of land suitable for potato production, green manure crops, good seed, proper fertilization, and the judicious use of lime have been particularly stressed.

Various phases of the early potato project work are discussed in detail in the following pages.

Outlook Information. This department cooperated with the Interstate Early Potato Committee in bringing outlook information to the attention of the growers. The Early Potato Committee conducted 25 outlook meetings in Virginia with a total attendance of 1,000. Mr. A. E. Mercker, Chairman of the Committee, had charge of the meetings and deserves considerable credit for his presentation of the facts to the growers. Dr. B. H. Rosenberger, Director of the Virginia Truck Experiment Station, was drafted for the outlook meetings and made some very valuable suggestions on cultural practices. As Acting Chairman of the Virginia Committee on Advance Market Information and Acreage Stabilization, the writer secured valuable information from time to time from Mr. Mercker, government Intentions-to-Plant Reports, Crop Reports, etc., which was passed on to agents and growers.

In view of the increased acreage and production one might be inclined to discount the value of such meetings. Admittedly, it is exceedingly difficult to measure the results of outlook information. Many factors enter into the reaction of the grower. It is felt, however, that encouraging results are being secured. Facts have been presented to this group for the past several years and regardless of the cause, certain growers have reacted along the lines indicated as advisable regardless of the reaction of the group as a whole. The intelligent grower, armed with the facts of the case, is certainly better able to plan his production program than he who gropes in darkness. And many of them, in increasing numbers, are profiting from such information.

The 1934 Potato Outlook Report, prepared by this department, will be found in the back of this report as a part of Exhibit A.

(Source-of-Seed Demonstrations.) Four source-of-seed demonstration plots were conducted on the Eastern Shore. Twenty-one known sources of Cobblers were compared, ranging from strains of known inferiority to decidedly superior strains.

The plots were handled as nearly as possible according to farm practice. Cultural practices for all the seed in any one plot were identical. One variation from common practice was thought advisable. In an effort to improve the stand, the stem end of the potato was discarded when cut.

The seed was inspected just previous to planting. Records were kept on the size and maturity of each source, firmness, length of sprout, type of storage, etc. Such data serve as an index later for the interpretation of field records, particularly where discrepancies occur which might not be expected.

The performance of the various sources was observed

carefully throughout the season. Germination, disease and yield records were kept on each. Individually and collectively, the plots served as excellent "Good Seed vs. Poor Seed" demonstrations. Accumulated records over a 12-year period also serve as valuable aids in recommendations to growers. One year's results are questionable; twelve years' consistent performance insures dependability to a high degree.

The first field record taken was a germination count. Missing hills were dug up to determine, if possible, the cause for non-germination. Among the contributing causes were rot, dead eye, no eye and loss. Loss was attributed to cultivation, rodents and more particularly complete rot. The averaged germination counts for the four plots are included in this report as a part of Exhibit B.

Germination ranged from 79.6% to 99.2% with an average germination of 95.0%. The distribution of the causes for missing hills was: Rot 3.30%, loss 0.67%, no eye 0.00%, dead eye 0.02%.

The second field record taken was a Disease Count. Each hill was carefully checked and disease symptoms noted. Acknowledgment is made to Mr. H. T. Cook, of the Virginia Truck Experiment Station, for his assistance in taking the disease record. The averaged disease counts of the four plots are also included in this report as a part of Exhibit B.

The per cent disease ranged from 0% to 8.72% with an average of 1.18%, composed of 0.04% spindle tuber, 0.37% mosaic, 0.19% leaf roll, and 0.02% black leg. The ten highest yielding strains showed an average of only 0.36% diseases; the ten lowest producing strains averaged 1.69% disease.

The third field record taken was the yield record. The averaged yields of the four plots on Eastern Shore have been computed in bushels per acre and are given below. The number in parentheses directly after the name of each strain denotes the number of plots in which that particular strain occurred.

Average of All Plots

Source of Seed		Yield - Bushels Per Acre		
		Prime	Seconds	Total
Mr.-Prescott #1	(4)	263.6	51.1	314.7
Mr.-Prescott #2	(4)	267.3	46.1	313.4
Vt.-Joslyn	(4)	259.3	36.7	296.0
S.D.-Fletcher	(4)	228.4	41.7	270.1
N.Y.-Porter & Penny	(4)	226.7	43.8	270.5

Minn.-Lindy	(4)	224.3	36.2	258.5
N.D.-Hoosley	(4)	221.1	42.3	263.4
Nova Scotia	(4)	218.4	37.1	255.5
P.E.I.	(4)	216.7	40.8	257.5
Me.-Hussey	(4)	203.4	36.8	240.2
N.Y.-Cottrell	(4)	208.0	30.7	238.7
S.D.-Rathke	(4)	198.0	33.4	231.0
N.D.-Home Grown	(4)	191.9	38.3	230.2
S.D.-Letnes	(3)	190.4	32.8**	223.2
Me.-Home Grown	(4)	189.8	28.1	217.9
P.E.I.-Home Grown	(4)	184.5	37.2	222.5
Nova Scotia #47	(4)	167.8	36.7	204.5
N.D.-Douglass	(2)	161.9	32.8**	194.6
S.D.-Thompson	(3)	167.1	32.1**	199.2
N.D.-Whitmack	(3)	151.6	46.4**	198.0
N.D.-Canada	(4)	148.6	32.0	180.6
Average		201.5	42.8	244.3

* Records on 3 plots only ** Records on 2 plots only

Yields ranged from 148.6 to 265.5 bushels of prime per acre, a difference of 116.9 bushels between the best and poorest strains. The average yield for all strains included in the plots was 201.5 bushels of prime per acre. Yields varied from 42.8 bushels below the average to 63.1 bushels above the average. This variation can be charged largely to source of seed.

The plots again emphasized the superiority of certified seed over home-grown seed, as illustrated by the following table:

Source of Seed	Yield - Bushels Per Acre		
	Prime	Seconds	Total
Maine-(Av. of 5 strains)	230.1	31.3	260.4
Maine-Home-Grown	189.8	28.1	217.9
P.E.I.	216.7	40.8	257.5
P.E.I.-Home-Grown	184.5	37.2	222.5
N.Dak.-Hoosley	221.1	42.3	263.4
N.Dak.-Home-Grown	191.9	38.3	230.2
Average - Certified	224.5	44.8	270.1
Average - Home-Grown	169.0	34.5	225.6

Only two strains of North Dakota certified seed occurred in all four plots. ~~The Dakota strain was not included in the above average since it had been discarding bills.~~ The difference in yield in favor of certified seed averaged 30.3 bushels of prime per acre, due largely to the later maturity of home-grown seed and to the greater prevalence of disease in home-grown seed. That this superiority of certified seed is not due just to factors operating this year is clearly demonstrated by the fact that over a period of nine years Maine certified has averaged 214.8 bushels of prime per acre as compared to 177.0 bushels for Maine Home-Grown, or an increase of 37.3 bushels of prime per acre.

The data recorded from the plots are utilized in many ways. Mimeographed copies are distributed to growers, seedsmen, fertilizer dealers and others. Copies are sent to the seed growers in the several states whose seed is represented in the plots. Both the grower and the user of the seed can then study its performance in comparison with other strains. Such a comparison should exercise a healthy influence both upon the seed producer and the user. A copy of the complete plot records, distributed this year, is contained in the back of this report as Exhibit B.

In addition, the information is used as a basis for publicity articles and recommendations to growers. To emphasize the peculiar value of the plot records as a basis for recommendations, it need only be pointed out that the leading strain in the plots yielded 263.6 bushels of prime per acre, 104.6 bushels over the Eastern Shore average of 159 bushels, or an increase of over 66%. The five leading strains showed an increase of over 61%. The ten leading strains showed an increase of over 44%. Eighteen of the twenty-one strains yielded as well or better than the Eastern Shore average, with an average increase of 31%, while three strains showed a decrease in yield below the Eastern Shore average. Such comparisons are all the more significant when it is remembered that several known inferior strains were included in the plots.

New Varieties. Chippewa, Katahdin, Cobden and other new varieties were included in some of the source-of-seed plots. In two plots Chippewa averaged 188.8 bushels of prime per acre and Katahdin 108.8 bushels per acre. ~~Katahdin in one plot yielded 102.9 bushels~~ of prime per acre.

Stem Ends. A planting of stem ends was included in each of the four source-of-seed plots. For the four plots the average yield was 124.0 bushels of prime and 47.6 bushels of seconds per acre.

Cultural Practices. Economic conditions have led to increased emphasis being placed upon cultural practices. Proper fertilization, the judicious use of lime and green manure crops, have been particularly stressed.

Potato Tour. The twelfth annual Eastern Shore Potato Tour was held on June 19, 1934, in conjunction with the Worcester County, Maryland, Tour held the following day.

Growers, fertilizer and package salesmen, seed dealers, marketing representatives and others toured the various demonstration plots, comparing seed-source, pest control measures, stand and plantings, twin row planting, liming, etc. After inspecting the plots, the crowd gathered at the Eastern Shore Experiment Station at Onley, to inspect the several experiments conducted at that station, to observe spraying, dusting, washing and packaging demonstrations, and to listen to a prepared program.

Approximately 325 people attended the tour. A partial check-up showed representatives from Virginia, Florida, Maryland, Michigan, New Jersey, North Dakota, North Carolina, Idaho, Delaware, Ohio, Pennsylvania, New York, Maine, and Ontario, Canada. Thirteen states and Canada were thus represented.

Several Virginia representatives also attended the Maryland tour on the day following the Virginia tour. Such tours afford an excellent opportunity for interchange between growers, officials, and others vitally interested in the potato industry from several states. Such associations must of necessity react to the benefit of the Virginia potato industry. A program of the tour is included in the back of this report as a part of Exhibit B.

The Production of Potatoes in Other Parts of the State

Virginia late potato growers decreased their acreage 8% from 40,000 acres in 1933 to 36,800 acres in 1934. Due to increased yields per acre, however, producing increased nearly 22% from 2,832,000 bushels in 1933 to 3,451,000 bushels in 1934. Yields averaged 90.5 bushels per acre compared with 70.8 bushels in 1933. The price received by the grower will average around 50 to 55 cents per bushel compared to $1.05 in 1933. The late potato grower, therefore, in 1934 will receive in total dollars only 64% as much for a crop 22% larger than he received in 1933.

Late potato growers face practically the same problems as the producer of early potatoes. Similar aid was given, therefore, to growers in various sections as was given in the early producing area.

Demonstrations. Numerous demonstrations were given in the various phases of potato production including the use of good seed, seed treatment, recognition of pests, pest control, regueing, grading, storage, etc.

Meetings. Forty-nine meetings, including the Oxblook Meetings were held or attended in the Potato Project as a whole with

a total attendance of 5,122. Average attendance was 105.

Exhibits. Certified Irish and sweet potato exhibits were featured by this department at the Corn and Grain Show. Six out-of-state and 24 state exhibits comprised the Irish potato exhibit.

A potato exhibit was also put on at the Keller Fair which featured "More Money from Fewer Potatoes". Practically all growers lost heavily on this year's crop. While it is true that disorderly marketing was responsible for some of this loss, nevertheless, the large increase in acreage and production was responsible to a great extent for this loss. The grower has the human tendency to blame all other agencies rather than himself. For that reason the exhibit stressed the point over which the grower himself exercises control.

Certified Seed Production. Considerable work was done with 7 growers of Green Mountain, Rural New Yorker and Irish Cobbler varieties for certification. Excellent cooperation was secured from all growers. A total of 49 acres were grown consisting of 36 acres of Rural New Yorker, 8 acres acres of Green Mountain and five acres of Irish Cobbler. The potatoes will not be bin inspected until January. The 1933 crop, however, bin inspected in January 1934, totaled 880 bushels of which 710 bushels were certified. Assistance was given these growers on storage problems as well as along cultural lines.

4-H Club Work. Considerable work was done with sixty-three 4-H club members in Alleghany County. The majority of the projects actually served as result demonstrations and also presented an opportunity for work with the parents as well as with the children. As a part of the demonstration, individual projects were well fertilized and sprayed with Bordeaux mixture.

The club members secured an average yield of 125 bushels per acre, an increase of 36 bushels or 40% over the state average for late potatoes. Average gross returns were $120.38 per acre. Total cost per acre was $68.78, leaving a net profit per acre of $51.60. In addition, the club members received a total of $27.65 in prizes at fairs and potato shows.

Storage House Construction. Two storage houses with a total capacity of 5,000 bushels were erected under the supervision of this office; one is located on the Huff farm at Glade Spring, and the other at the State Epileptic Colony, at Colony, Virginia

Summary of Accomplishments - Potato Project

Cooperated with Interstate Early Potato Committee in preparing and disseminating outlook material. Twenty-five outlook meetings were held in Virginia with a total attendance of 1,066.

Fifty-six and one-half days in field devoted to Potato Project work in 10 counties.

Forty-nine meetings held with a total attendance of 4,122; average attendance 106.

Ninety demonstrations conducted on source-of-seed, certified seed, liming, ringing, spraying dusting, grading, storing, etc.; attendance at 26 method demonstrations, 958.

Source-of-seed plots ranged from 148.6 to 328.8 bushels of prime per acre, thus emphasizing the importance of seed source.

Certified seed yielded 38.5 bushels of prime per acre more than home grown seed; the nine-year average is 47 bushels per acre increase.

Five leading strains in source-of-seed plots yielded 8% over Eastern Shore average. Ten of the 21 strains average 46% over Eastern Shore average; 10 averaged 31% over Eastern Shore average while 6 strains showed a decrease in yield.

Three hundred and twenty-five growers, seedsmen, fertilizer dealers, certification officials, and others attended potato tour.

Twenty-four state and 8 out-of-state Irish potato exhibits featured at Corn and Grain Show.

Forty-seven acres of Irish potatoes grown for certification. Seven hundred and ten bushels certified from 16½ acres grown in 1938.

Two storage houses constructed under supervision of this office with a total capacity of 9,000 bushels.

Sixty-three 4-H Potato Club members secured average yield of 188 bushels per acre, an increase of 38 bushels or 43% over the state average for late potatoes.

Average gross returns per acre for 4-H Club members, $180.38; total cost per acre, $66.78; net profit per acre, $81.68; cash prizes, $27.82.

[redacted]

Source-of-Seed Plot

Interested Group of Growers at Source of Seed Plot

Explaining Potato Demonstrations at 1934 Potato Tour

Dr. Zimmerly Addressing Group at Potato Tour

Dinner-Time-Potato Tour

Magnesium Deficiency

Potato Tour - Note Fertiliser Bins

Growers Inspecting Individual Plants in Source of Seed Plot

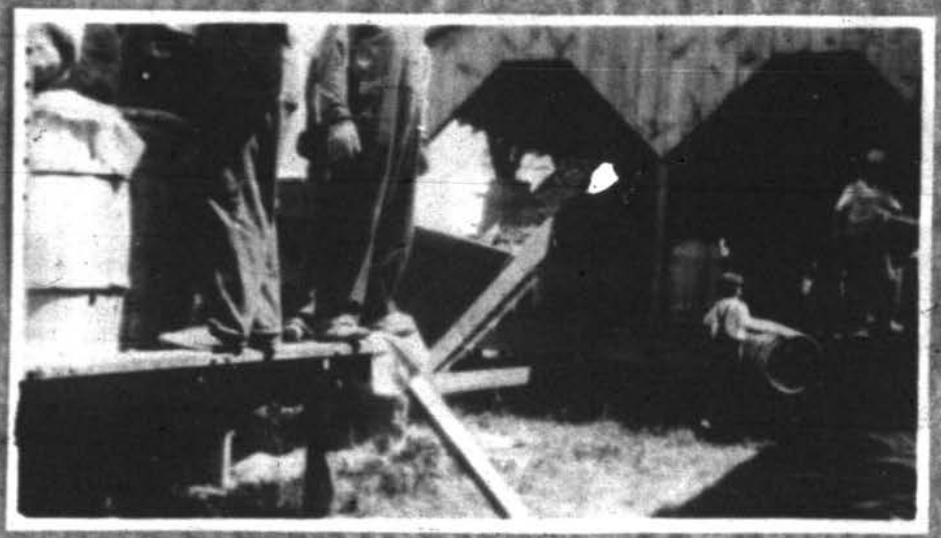
Twin-Row Planting

Potatoes Harvested at Proper Stage for Growth of Corn

Potatoes Injuring Corn - Unharvested because of Low Price

Harvesting Potatoes on Eastern Shore

80 Bbl. Yield of Irish Potatoes - Eastern Shore

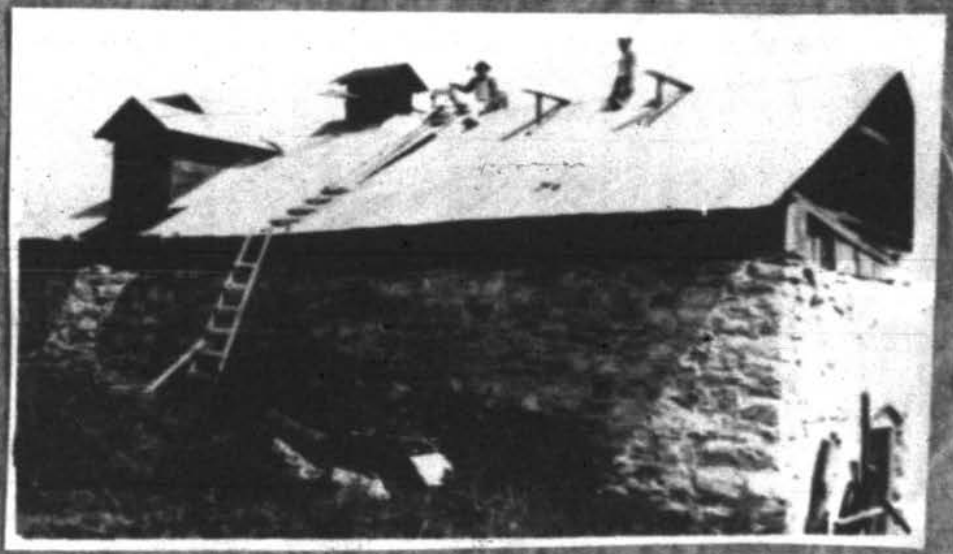


One of Many Grading Stations on Shore

Irish Potato Exhibit - Keller Fair

Harvesting Potatoes with Digger in Mountain Section

Potato Storage House Under Construction



Same House on Completion

SWEET POTATO PROJECT

Sweet potato acreage for the United States in 1934 is estimated at 762,000 acres, an increase of 3,000 acres or less than 4/10 of 1% over 1933, while production increased slightly over 3% from 66,134,000 bushels in 1933 to 67,450,000 bushels in 1934. Yield per acre was 88 bushels in 1934 compared to 89 bushels in 1933. The price level improved from 58 cents per bushel in 1933 to 64 cents per bushel in 1934.

Virginia growers decreased their acreage from 34,000 acres in 1933 to 34,000 acres in 1934, a reduction of 8.8%. Total production increased less than 1% from 5,886,000 bushels in 1933 to 5,910,000 bushels in 1934. Price to the grower is estimated at 58 cents per bushel the same as in 1933. Many growers, however, averaged much higher. Eastern Shore prices per bushel were $1.30 on August 15, 78 cents on September 15, 89 cents on October 15, 61 cents on November 15, and 60 cents on December 15.

Although the total value of the sweet potato crop in 1934 in Virginia was $2,130,000, the yield per acre is far from satisfactory. Yield per acre in 1934 was only 116 bushels, an increase of 4 bushels over 1933; her five-year average, 1930-1934, was only 105 bushels. Proper cultural practices can increase this yield tremendously. Factors contributing to the low average yield are the use of poor land, poor seed, improper fertilization, disease, careless harvesting and poor storage.

Certified Seed Production, Crop Production, and Storage House Construction, were emphasized in the Sweet Potato Project. Project work was carried on in 17 counties.

Certified Seed Production

Good seed is fundamental to high production per acre. The certified seed project has been of untold value in making a supply of such seed available and thus directly increasing the yield per acre.

During the past twelve years a total of 132,814 bushels of sweet potatoes have been certified, or an average of 11,068 bushels annually. The seed has been marketed both within and without the state. At a conservative estimate of only $1.50 per bushel, certification of sweet potatoes has returned to the growers of the state over $199,220. And this figure does not take into consideration the benefits of increased production per acre secured by growers using the seed, nor does it take into account the cash return from the sale of plants. A further bright side of the picture is that there is still need for a considerable expansion of the project. Even if all the seed certified were sold in Virginia, less than 7% of the state's bedding requirements would have been supplied. In addition,

there is a continued demand from without the State. Seed or draws from Virginia have already found markets in approximately 20 States.

<u>Rules and Regulations Governing Certification.</u> The rules and regulations governing certification of sweet potatoes were prepared by this department and are included in the Crop Improvement Association Manual.

<u>Inspections.</u> Three separate inspections were given; namely, Seed Bed, Field, and Bin. The seed beds were inspected primarily for black rot, soft rots and general condition of the plants. The fields were inspected for varietal mixture, black rot, blue stem, freedom from weeds, general condition, etc. The potatoes were inspected in the bin for black rot and storage rots.

<u>Scope of Work.</u> In 1934, certification work was done with 61 growers-four counties - Isle of Wight, Northampton, Southampton and Caroline.

One hundred forty-two and three-quarters acres were grown for inspection, consisting of 105 acres from draws and 38-3/4 acres from vine cuttings. The distribution of acreage according to varieties was as follows:

Variety	Acreage
Nancy Hall	93-11/12
Big Stem Jersey	38
Porto Rico	5
Little Stem Jersey	1
Priestly	1/4
Golden Sweet	1/4
Haymans	1/8
Spanish	1/8

All crops were produced from certified seed or plants. Over 1,828 bushels of sweet potatoes were treated and bedded by growers of certified seed under direction from this office.

Nine thousand three hundred and seventy-two bushels of sweet potatoes were eligible for inspection and of this number 2,047 were certified. This figure is for the 1933 crop as this year's crop will not be certified until late in January. These potatoes were disturbuted according to varieties as follows:

Variety	Bushels
Big Stem Jersey	7,625
Nancy Hall	1,016
Little Stem Jersey	371
Priestly	100
Haymans	58

Value of Certification Project. The certification project affords an opportunity to evaluate concretely one phase of the vegetable extension program. The primary value of the project naturally lies in the increased production per acre for users of the seed. Aside from increased production per acre, however, there are two items or sources of income open to the grower - that derived from the sale of slip seed and that derived from the sale of drums. In 1934 growers received certification on 9,047 bushels of sweet potatoes produced in 1933 which, even at the very low estimate of $1.00 per bushel would total $9,047. Incomplete reports also show returns of $2,145.50 from the sale of plants, bringing the total income from certified seed and plants to approximately $11,192.50.

Of even greater importance, however, is the fact that the growers bedded 1,836 bushels of certified seed and used over 2,500,000 plants for their own plantings. The use of such improved seed by the certified growers themselves, together with the sale of such seed to their neighbors, cannot help but improve the yields in Virginia.

Crop Production

The same type of cultural information was given to the commercial growers as to the producers of certified seed. Outlook information, pest control, grading and storing were particularly stressed.

Outlook Information. The state outlook report on sweet potatoes was prepared by this office and is included in this report as a part of Exhibit A. This information was used effectively at sweet potato meetings.

Demonstrations. Seventy-five demonstrations were given in the Sweet Potato Project with a total attendance of 515. The demonstrations dealt with seed selection and treatment, disease identification, rogueing, fertilization, harvesting, grading, storing, and storage house construction.

Meetings. Six meetings were held in the Sweet Potato Project with a total attendance of 237, or an average attendance of 40.

Corn and Grain Show. Sweet potatoes were again featured at the Corn and Grain Show. The exhibit consisted of 33 entries in the open and certified classes.

Circular Letters. Two circular letters on sweet potato production were distributed with a total distribution of 2,500. (See exhibits C and D).

Storage House Construction

This project is a cooperative one between this department and the Agricultural Engineering Department. Messrs. L. C. Bowyer and H. H. Gordon are to be congratulated on the progress in this phase of the Sweet Potato Project.

Nineteen houses were constructed during the past year, 16 of wood and 3 of cinder block construction. Of the 16 wood houses, 13 were new and 3 were old buildings remodeled into storage houses. The wide distribution of the houses should be noted.

County	No. of Houses
Caroline	7
Princess Anne	6
Prince George	2
Southampton	1
Cumberland	1
Amherst	1
Campbell	1

The total capacity of the 19 houses is 38,150 bushels or an average capacity of slightly over 2,000 bushels. Provided 50% of this capacity is being utilized the premium value over field marketed stock should total over $19,000.

The 19 houses constructed this year bring the total to 106 houses constructed during the last 10 years. These houses are located in 24 counties and have a total capacity of approximately 227,650 bushels or an average capacity of slightly over 2,150 bushels. During the same period, several houses have been constructed in addition to the above from plans furnished by this office.

House cured sweet potatoes usually sell at a premium of at least 50 cents per bushel above the average price paid in the field. If all houses were filled to capacity the premium value of the potatoes so stored would total $113,825. Even though only 50% of this capacity were utilized the premium value would still amount to over $56,900.

Storage House Check-Up. A check-up was made on 70 of these houses and instructions given to the owners on storage house management. Approximately 60% of the storage capacity of those houses was being utilized.

Summary of Accomplishments - Sweet Potato Project

Outlook information prepared for growers.

Thirty-two and one-half days in field devoted to Sweet Potato Project work in 17 counties.

Six meetings held with a total attendance of 257; average attendance, 40.

Seventy-five demonstrations given with a total attendance of 515.

Certification work done in 4 counties with 41 growers.

One hundred forty-two and three-fourths acres of sweet potatoes grown for certification. Eight varieties entered.

One thousand eight hundred thirty-nine bushels of seed bedded by growers of certified seed under direction of this office.

Nine thousand forty-seven bushels of seed certified, approximately 5% of state's requirement for bedding.

One hundred thirty-two thousand eight hundred fourteen bushels of seed certified in twelve years, an average of 11,068 bushels annually.

Returns to certified growers from sale of seed and draft approximately $11,182.80.

Two million/three hundred thousand plants used by growers for own planting.

Sweet potatoes featured in exhibit at Corn and Grain Show.

Nineteen storage houses constructed or remodeled during past year with total capacity of 38,250 bushels; average capacity slightly over 2,000 bushels; provided only 80% of capacity is utilized for storage, premium value along would total over $10,000.

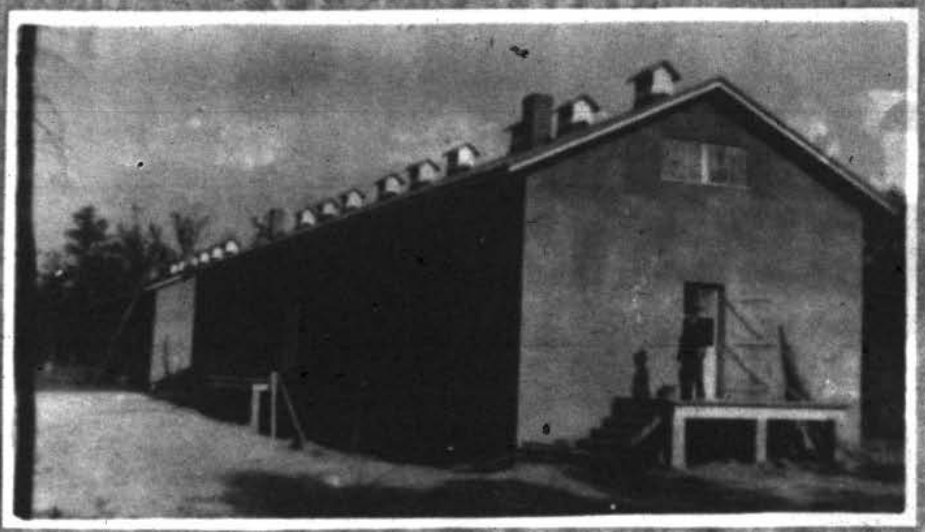
One hundred and five houses constructed in 24 counties since project started; total capacity 227,850 bushels; average capacity slightly over 2,160 bushels.

Seventy storage houses visited and instructions given to insure on storage house management; houses filled to approximately 2/3 capacity.

Sweet Potato Plant Beds

Sweet Potatoes Ready for Market

8000 bu. House Constructed 1934 - Caroline County



7,500 bu. Storage House added to 8,000 bu. House - Caroline County

17c

Storing Potatoes in Caroline County - House Constructed in 1934

1000 bu. House Constructed in 1934 - Princess Anne County

Small Remodelled House - 500 bu. Capacity - Princess Anne County

17E

800 Bu. House Under Construction in Princess Anne County

TOMATO PROJECT

Tomatoes rank as one of the leading vegetable crops of the state. For the five-year period, 1930-1934, the total value of the crop has averaged $783,600 . This figure, however, is but a small part of the potential value of the crop with improved yield per acre.

Project work was carried on in 16 counties. The Tomato Project naturally subdivides itself into two phases - the production of canning tomatoes and the production of the early or market crop. Each of these sub-projects will be discussed separately.

The Production of Canning Tomatoes

United States acreage in canning tomatoes increased nearly 26% from 880,130 acres in 1933 to 982,130 acres in 1934. Production likewise increased from 1,081,200 tons in 1933 to 1,369,600 tons in 1934, an increase of nearly 27%. Yield per acre was exceedingly low, 3.95 tons compared with 3.86 tons in 1933 and closely approximating the 3.90 tons in 1930 which was the lowest yield in the past 16 years. The total pack is estimated at 12,912,741 cases of No. 3's, compared to 11,986,000 cases in 1933.

Due to the exceedingly low yield and also to the light pack in 1933, the average price paid to the growers increased approximately 7% from $11.36 per ton in 1933 to $12.15 in 1934. For that reason the stage is already set for a tremendous over-production in 1935. Such over-production would result in disastrous losses to the canner in 1935 and consequent poor prices to the grower in 1936.

Virginia growers followed the general trend, increasing their acreage 21% from 16,800 acres in 1933 to 20,000 acres in 1934. Yields for Virginia, however, were exceedingly low averaging only 2.8 tons (65.3 bushels) per acre or a decrease of over 10% from the low yield of 3.8 tons (93.3 bushels) in 1933. Due to the low average yield total production was increased only 8% from 46,200 tons in 1933 to 50,000 tons in 1934. Prices improved somewhat and will probably average around 40 cents per bushel as compared to 36 cents in 1933.

Regardless of price, however, Virginia growers must increase their yield per acre for economical production. As factors influencing yield, the Tomato Project has stressed good seed, good plants, good land, early planting, proper fertilization, cultivation and pest control.

Outlook Information. This department prepared the outlook report on canning tomatoes which will be found in the back of this report as a part of Exhibit A. This information was passed on to growers through the agents, meetings and publicity articles.

In addition to the outlook report, additional outlook information on acreage, production, etc., was sent regularly to the county agents. Both growers and canners, particularly the latter, are more and more requesting this type of information.

Demonstrations. Three hundred and fifty-six demonstrations were conducted on plant bed selection, land preparation, good seed, seeding, thinning, mulching, dusting, disease identification, fertilization, cultivation, grading, packing, account keeping, etc. 338 method demonstrations are included in the above with a total attendance of 1,048. The nature of some of the result demonstrations will be discussed separately.

Tomato Plant Bed Demonstrations. Twenty-eight tomato plant bed demonstrations were conducted in 1934. All beds were properly fertilized and were dusted to control insect and disease pests. Information and demonstrations were given the plant bed grower in selecting a site, land preparation, fertilization, seeding, mulching, cultivation, thinning, pest control, pulling and planting.

Results of such work are accumulative. Some of the outstanding benefits are listed below:

1. Demonstrational value of beds. The plant beds actually demonstrate. Scores of growers are now following the practices demonstrated in such beds.

2. Increased spraying and dusting. The beds have strikingly emphasized the value of pest control in the production of good plants and high yields. When extension work began in the Northern Belt, no dusting was practiced. Now, it is the common practice. This one change in practice has meant thousands of dollars to the tomato growers in the Northern Belt.

3. Available supply of good plants increased. Records show a direct correlation between good plants and yield. A total of over 881,000 plants were used from the 28 beds, sufficient to set 121 acres.

Introduction of Good Seed. Specific information has been given both growers and canners as to sources of reliable tomato seed. The seed source plots have effectively stimulated this work. Hundreds of pounds of seed have been purchased from sources recommended by this office.

One hundred and sixty-six ounce packages of high grade seed were distributed to individual tomato growers in several counties. The growers were asked to keep a record on the performance of this seed in comparison with their own crops. Many of the fields were visited by a Vegetable Specialist and the superiority of the seed noted. In addition, several letters have been received from the growers highly commending the seed.

In some instances seed saving has been stressed where the growers started with a high producing strain.

Source-of-Seed Demonstrations. Closely allied to the introduction of good seed has been the source-of-seed plots. The majority of the cost account demonstrations in 1934 used seed from firms whose seed showed a high record of performance in the source-of-seed tests. The advantage of these tests was also brought out in another way. One concern which has consistently sold inferior tomato seed in the Northern Neck area put out seed the last two years which was much better than any sold by this concern in this section in the past. It is only logical to assume that the seed trials have influenced this concern in this matter. One thousand copies of the source-of-seed plot records were distributed to growers, seedsmen, and canners, a copy of which is included in this report as a part of Exhibit E.

Five source-of-seed plots were conducted this year in cooperation with the Virginia Truck Experiment Station as a part of the better seed program. Since the plots were all located in the wilt area, only the Marglobe variety was used in this work. Marglobe seed from 14 different sources was all planted on the same date in the same plant bed and treated in the same manner. Plants were set in the plots on the same date and received the same field treatment. Records were made on trueness-to-type, resistance to wilt, and yield. The summarized record on four plots follows:

SUMMARY TOMATO SEED SOURCE PLOTS - 1934

Seedsmen	Type and Wilt Studies			
	No. Plants Studied	% Plants OFF-Type	% Wilt	% Dull Plants
Brown-Dynamo Strain	160	0.0	0.0	0.0
Francis C. Stokes	162	2.2	0.0	3.7
Stokes-Exeter Marglobe	167	0.0	0.0	0.0
Brown-Chase Strain	148	0.0	0.0	1.4
Ferry-Morse	170	0.0	0.0	0.6
Geo. Tait & Sons	189	6.3	0.0	2.8
R. O. Dunn	170	0.6	0.0	1.8
Southern States Cooperative	169	2.4	0.6	4.1
Tri-State Packers	168	0.0	0.0	4.2
Thos. E. Brown	168	0.0	0.0	1.2
J. E. Cockrell	136	0.7	0.0	3.7
Woodruff & Sons	170	18.8	2.9	0.0
T. W. Wood & Sons	168	3.0	0.0	0.6
Griffith & Turner	300	4.5	0.0	6.7
Greater Baltimore	94	0.0	1.1	4.5
Average		2.8	0.3½	2.3

* Not included in average

Per cent off-type ranged from as low as 0% to as high as 19.6% with an average of 3.3%. The type of seed sold in the Northern Neck has improved considerably in the last few years. Bull plants developed in the plots to some extent this year due probably to weather conditions. Such plants were no more numerous in the plots, however, than in the field.

Unfortunately, none of the plants were located on land badly infested with wilt. Only three strains developed any wilt at all and the average for these three strains was only 1.5%. The average for all strains was 1/4 of 1%. Heavily infested land has been secured for next year's plots.

Yield records were kept on two plots. Yields ranged from 2.14 tons to 6.02 tons per acre for the Marglobe strains with an average yield of 4.24 tons per acre. The yields for all strains are given in the following table.

Seedsmen	Yield-Tons Per Acre
Woodruff & Sons	6.02
Stokes-Exeter Marglobe	6.01
R. O. Dean	5.98
Tri-State Packers	5.96
Ferry-Morse	5.87
Brown-Dyneen Strain	5.86
Brown-Chase Strain	5.85
Southern States Cooperative	5.53
Geo. Tait and Sons	5.31
Thos. M. Brown	4.80
Francis C. Stokes	4.62
T. W. Wood & Sons	4.59
J. B. Coubrell	3.39
Griffith & Turner*	2.14
Average	5.25
Greater Baltimore*	3.48

* One plot only.

Tomato Tour. In order to bring the various tomato demonstrations to the attention of growers, canners, and seedsmen, a tour of Lancaster and Westmoreland Counties was conducted. The program of the tour is included in this report as Exhibit B. Representatives of the following seed concerns attended:

Francis C. Stokes Seed Co., Philadelphia, Pa.
Ferry-Morse Seed Co., Detroit, Mich.
R. O. Dean, Federalsburg, Md.
Griffith and Turner, Baltimore, Md.
Tri-State Packers Association, Easton, Md.
T. W. Wood and Sons, Richmond, Va.
Geo. Tait and Sons, Norfolk, Va.

In addition, Professors Holden and Hunter, Canning Crops Specialists of the University of Maryland, also attended. This tour has focused the attention of the seedsmen selling tomato seed in this area and has done a great deal to stimulate interest in better seed both on the part of the seedsmen themselves and also with growers and canners.

Thinning Demonstrations. Thinning demonstrations were limited largely to plant bed growers as a part of the production of better plants program.

Pest Control Demonstrations. Each of the 89 plant beds served as a demonstration on pest control. All beds were dusted to control pests. Their peculiar value in this respect is explained under "Tomato Plant Bed Demonstrations".

Wilt is one of the most destructive diseases of the tomato area. Emphasis has been placed upon the use of the wilt-resistant variety, Marglobe. All the seed introduced in the good seed work has been of this variety.

Tomato Survey Records. Survey records were made of the 249 tomato farms whose owners cooperated in keeping cost accounts. Each survey secured information on factors pertinent to tomato production on the particular farm in question (see Exhibit F). These records will be summarized and the results presented to growers' meetings in 1934. They should be of particular value in conjunction with the cost account records kept on the same farms in interpreting causes of variations in returns from the tomato crop.

Cost Account Records. One of the most important phases of the tomato project is the cost account work. Definite information on the cost of tomato production in Virginia is sorely needed and such records will supply this information. 249 cost account record books were started with tomato growers in Lancaster, Westmoreland, Essex, Bedford, Spotsylvania, Shenandoah and Page Counties, in cooperation with the Economics Department. The account books completed have not been summarized as yet, but will be in time to present to meetings of tomato growers in January and February.

The data from 156 records kept in 1933 were presented in meetings early this year very effectively. A brief summarization follows:

Costs and Returns Per Acre on Tomatoes

	(156 farms)	
	Amount	Value
Use of land		$3.70
Manure		2.19
Fertilizer	499 lbs.	5.07

Lime		.08
Seed		.91
Plants		.08
Spray and Dust		.06
Man Labor	76.1 hrs.	2.18
Horse Work	60.3 hrs.	3.94
Truck Use		.08
Tractor Use		.20
Equipment Use		.47
Contract Picking		2.31
Contract Hauling		1.66
Interest		.30
Total Cost		30.34
Tomatoes Sold	223.2 bkts.	37.82
Profit Per Acre		7.48
Acres Per Farm	5.89	
Yield Per A. (Bkts)	223.2	
Cost Per Bushel		13.6¢
Value Per Bushel		17.0¢
Profit Per Bushel		3.4¢

(For a complete summary, see Exhibit G.)

Meetings. Twenty-eight meetings were held in the Tomato Project, as a whole, with a total attendance of 1,048; average attendance was 38.

Three special phases of tomato production were taken up at these meetings. The first was the outlook information. All the available data were presented to the growers and canners for their consideration. The second phase discussed was the source-of-seed work stressing the necessity for good seed. The third matter presented was cost of production studies described previously. The reason why some growers secured a high profit per acre while others made a low profit or suffered a net loss was pointed out. In Lancaster County, for example, 41 growers averaged $7.74 net profit per acre. The five best growers, however, made a net profit of $26.64 per acre; the five medium growers made a profit of $2.38 per acre; while the five poorest growers suffered a net loss of $11.88 per acre. The same comparative figures held true for Westmoreland, Essex, Botetourt, Bedford, Shenandoah and Page Counties. There was considerable interest manifested in the studies, particularly since many of the cost accounts demonstrators attended the meetings.

The writer also addressed the Virginia Canners Association in their annual meeting at Luray, Virginia.

The Production of Market Tomatoes

Virginia acreage in market tomatoes increased 9% from 4,000 acres in 1933 to 5,180 acres in 1934. Yields averaged 180 bushels per acre as compared to 104 bushels in 1933. Total production is estimated at 570,000 bushels, an increase of 80% over 1933 production. The price per bushel received by the grower was 70 cents or an increase of 5 cents over the 1933 price. The total value of the crop was $399,000 compared with $197,000 in 1933.

Extent of Work. Work with growers of market tomatoes was limited to Caroline County and to areas adjacent to cities.

Summary of Accomplishments - Tomato Project

Outlook information prepared and disseminated to growers and canners throughout the year.

Eighty-three days in field devoted to Tomato Project work in 16 counties.

Twenty-eight meetings held with a total attendance of 1,082; average attendance, 34.

Three hundred and sixty-six demonstrations conducted on plant bed selection, land preparation, good seed, seeding, thinning, mulching, dusting, disease identification, fertilization, cultivation, grading, packing, account keeping, etc. Attendance at 322 method demonstrations, 1,049.

Twenty-eight plant bed demonstrations emphasize value of good plants. Over 821,000 plants produced in beds, sufficient to set 321 acres.

Use of good seed greatly increased through good seed project. One hundred and sixty-six ounce lots distributed to individual growers in tomato counties.

Five seed-refused demonstrations conducted comparing seed from 14 sources. Trueness to type ranged from as high as 100% to as low as 81.2%. Value of seed source strikingly emphasized.

Two hundred and forty-nine tomato cost account record books started to secure information on production and marketing costs. Survey on cultural practices made on same farms.

Cost account records kept on 154 farms in 1933 (summarized and presented to meetings in 1934) show the average gross return per acre as $37.82; cost per acre $30.34; profit per acre $7.48.

HOME GARDEN PROJECT

In times past the average Virginia farmer, and more particularly the one-crop farmer, has failed to realize the importance of the home garden in the farm program. At an estimated value of $150 per garden, the total potential value of the farm garden in Virginia reaches the impressive figure of $21,000,000 annually. A twenty-one million dollar industry is worthy of most serious consideration.

During the last few years, the interest in this phase of farm life has grown by leaps and bounds. Emergency relief garden programs have added impetus to this interest. The writer was loaned to the Virginia Emergency Relief Administration to help initiate the garden relief program for Virginia which is discussed later in this report. Although the relief work naturally cut heavily into the time devoted to the regular extension garden program, nevertheless, it is felt that the results accomplished more than justify this robbery of Peter to pay Paul. The regular Extension Garden Program and the Relief Program will be discussed separately in this report.

Calls upon this department for garden aid have necessitated the robbing of the other projects to afford time to meet even a portion of the need. During the past year, 127 days in the field were devoted to garden work. Double the amount of time could easily have been used in constructive garden work. A full-time man could not possible handle all the garden work requested and yet only 1-2/3 man's time is available for all four major projects. Sixty-five visits were made to counties on definite garden work. In addition, an opportunity to present garden information was often presented when visiting counties primarily for other projects. Various phases of the project will be discussed in the following pages.

Meetings. Meetings continued to be the chief agency for disseminating garden information. One hundred and twenty-three meetings were held with a total attendance of 5,545 or an average attendance of 46. The average attendance per meeting in 1934 increased over 2½ above 1933 attendance. Eight of the above meetings in March with a total attendance of 607 were handled by M. M. Parker of the Virginia Truck Experiment Station at the request of this office since the writer was called to Richmond on the V.E.R.A. subsistence garden program.

Garden work was presented to 37 4-H Garden Clubs with a total attendance of 1,008, or an average attendance of 27.

Thirty-two adult garden clubs were met with a total attendance of 860; or an average attendance of 27.

Garden work was also presented at the Cape Henry, Jamestown and State Short Courses.

Leader Trainer Work. Six leader-trainer groups were met with a total attendance of 81 or an average attendance of 13. In such groups, the specialist is given an opportunity to present definite, timely garden information to a representative from each of the various clubs within a county. Such information is in turn carried back by the leader to her particular club. It is thus possible to influence a far greater number of people than would be possible by attempting to meet the individual clubs. Average attendance at the adult garden clubs met was 27. Provided each of the 81 leaders, who attended the leader-trainer meetings, justified her selection as a leader, the leader-trainer work succeeded in reaching 2,187 people in clubs throughout the counties in which leader-trainer work was conducted.

Demonstrations. One hundred and twenty-six method demonstrations were given in the garden project with a total attendance of 1,260 or an average attendance of over 10.

Contests. Several canning contests were conducted throughout the state by the Home Economics Department in cooperation with commercial concerns. Considerable aid was given contestants along garden lines. Such contests serve to stimulate interest in gardening and afford this department an opportunity for service to the many contestants.

Aid was also given in scoring gardens in 4-H club contests. Work of this type has been restricted as much as possible, however, for economic reasons and as it is felt that the county extension agents are capable of handling the scoring themselves.

Bulletins. Practically every county in the state benefited from garden information in the form of bulletins and letters. Wholesale distribution of bulletins is not encouraged, but rightly used they constitute an effective extension agency.

Approximately 10,000 copies of Circular B-265, Vegetable Garden Suggestions for Virginia Farmers, were distributed through the county extension agents, bringing the total distribution to date to 70,000. The garden plan included in this circular was also reprinted in the Norfolk and Western Market Bulletin and received distribution to all their mailing list. A copy of the Market Bulletin is included in the report as Exhibit H.

The office also cooperated with the State Chamber of Commerce in preparing a garden graph based on the plan in the circular. Several thousand copies of the graph were distributed by the State Chamber of Commerce.

Circular Letters. Nineteen circular letters were prepared for the entire garden project and 189,130 copies were distributed. The subjects treated in the letters were seasonal and

timely. Many favorable comments have been received from various sources, both as to the content of the letters themselves and as to their effectiveness. Some of the subjects treated in the letters were as follows:

Planning the Garden
Suggested Garden Plan for a Family of Five
March Suggestions for Garden Club Leaders and Gardeners
April Suggestions for Garden Club Leaders and Gardeners
May Suggestions for Garden Club Leaders and Gardeners
Pest Control
June Suggestions for Garden Club Leaders and Gardeners
July Suggestions for Garden Club Leaders and Gardeners
August Suggestions for Garden Club Leaders and Gardeners
October Suggestions for Garden Club Leaders and Gardeners
Farm Storage for Fruits and Vegetables

All letters were sent out under the signature of the agent to give the information a more personal touch. Samples of the garden letters are included in the appendix of this report as Exhibits 1 to 8 inclusive. Many agents, in addition to distributing the letters, used them as press articles in county papers.

Press Articles. Nine press articles on the home garden were prepared and published in the Extension Division News, Virginia Fruit, the Tobacco Grower, county papers, etc. Six radio talks on the home garden were also broadcast over Station WRNL.

GARDEN RELIEF WORK

The subsistence or relief garden program has developed along much the same line in all states undertaking such work. In the majority of the states the gardens have been largely of the following five more or less definite types.

1. Home or backyard gardens
2. Vacant lot gardens
3. Community gardens (not divided into individual gardens
4. Industrial gardens
5. Municipal gardens (large tracts divided into individual gardens

A word of explanation should be given about each of these types.

Home and vacant lot gardens are very similar except that the home gardens are located close to the house while vacant lot gardens may be located anywhere in the city. The chief advantage of home or backyard gardens is that they are convenient to the worker and should receive more care and attention while the vacant lot garden at some distance may be neglected. The chief problem offered by each type is supervision. Where adequate supervision and sufficient

land is available the home or backyard garden ranks high in efficiency.

In the community gardens, large tracts of land are secured and planted to vegetable crops. The tract is now, however, divided into individual gardens. The products from the plot are usually distributed to families on relief or divided among those who work the tract. Community gardens provide work for the unemployed or partially employed and help to sustain morale. There is lacking, however, the personal pride which a man would have in a garden of his own.

Industrial gardens are gardens provided, and sometimes supervised by corporations to provide relief for their own unemployed or part-time workers.

Municipal gardens are gardens sponsored by various state, county, city or town organizations. A tract of land is obtained and divided into individual gardens. Each gardener receives the produce grown in his own garden. Such a plan acts as an incentive to the individual gardener, stimulates interest and initative and in the opinion of many, is the best form of relief garden work for congested areas.

History of Movement in Virginia. Previous to 1933 little had been attempted with publicly financed subsistence or relief gardens in Virginia and practically no supervision had been given. It is true, of course, that home or backyard gardens have received more attention in the past few years than ever before. The Live-at-Home program of the State Agricultural College has stressed the importance of the rural home garden for years. Such gardens were financed by the individual, however, and not by state or federal funds. A few corporations throughout the state had furnished industrial gardens to their employees and cooperated with the Virginia Agricultural Extension Service for supervision. A few cities had likewise developed a community or municipal garden plan and cooperated with the Extension Service for cultural information.

In 1933 the first statewide effort in Virginia was initiated along the line of subsistence or relief gardens. In that year by far the greater amount of garden relief work in Virginia was made possible through E.F.C. funds. The work was headed up by the Commissioner of Public Welfare in Richmond. Each county in which E.F.C. funds were being expended had a local Welfare Board which could order and distribute garden seed if they so desired. A large number of counties availed themselves of this opportunity. In these counties any man working on E.F.C. projects could secure garden seed. In many counties the seed was given outright to the men. In other counties they were required either to pay for the seed at cost or to work a sufficient time to pay for the seed in part or in whole. The

Extension Service, through the county agricultural agents, cooperated with the welfare committees by furnishing information upon balanced gardens, varieties, planting, fertilization, cultivation, pest control, food preservation and storage, etc. In the majority of the counties the extension agents held several meetings with the R.F.C. men receiving seed, and wherever possible, followed up the work throughout the entire season. Their actual supervision was limited, however, by the heavy demands of the A.A.A. program and the regular extension program. (For a complete report on the R.F.C. Garden Work, see the Vegetable Extension Report for 1933).

State-Wide Supervised Program Developed

In 1934 a state-wide supervised subsistence or relief garden program was undertaken. The program was inaugurated as a cooperative project between the Virginia Emergency Relief Administration, the Virginia Agricultural Extension Service, the Virginia Agricultural and Home Economics teachers and all other forces which could be enlisted in furtherance of a state-wide garden relief program. The program was to include both urban and rural areas. It will be noted that the early development of the subsistence garden idea was concerned primarily with cities and city workers. The Virginia program dealt equally with both rural and urban peoples. As a matter of fact, approximately 60% of the subsistence gardens in 1934 were located in rural areas.

The aim of the program was threefold: first, to supply an abundance of fresh, canned and stored vegetables throughout every month in the year to as many relief or marginal families in Virginia as possible; second, to supply adequate supervision in gardening and food preservation to all such as were included in the program; and, third, to help sustain the morale and self respect of the state's needy and unemployed. The program as developed was essentially educational as well as relief in nature. (See Exhibit 7 for a complete discussion of the aims and set-up of the project).

From the start the cooperation of the various agencies concerned was excellent. The project was sponsored and financed by the Virginia Emergency Relief Administration without which funds, the work could not have been undertaken. And a major part of the credit for the success of the project is due to the wholehearted cooperation received by the local Relief and Garden Directors from farm agents, agricultural instructors, home economics teachers and other public spirited citizens.

Organization

The first step in the organization of the work was the setting up of a State Garden Advisory Committee consisting of key men and women directly interested in the program. Attention was then given to necessary state, county, and city personnel to supervise the project.

State Personnel. The state personal consisted of a State Director, a State Garden Specialist, a State Food Preservation Specialist and such office force as was necessary to prosecute the program efficiently.

L. B. Mistrick, Vegetable Specialist at V.P.I., was loaned to the Virginia Emergency Relief Administration as State Director to initiate the program. M. M. Parker, Horticulturist, was loaned by the Virginia Truck Experiment Station, as State Garden Specialist. Mrs. Sarah Porter Ellis was secured as State Food Preservation Specialist.

On June 7, L. B. Mistrick returned to his regular extension activities and M. M. Parker took over the position of Director. W. A. Mathews, a former graduate of this institution, was secured at the same time to take over the work of State Garden Specialist. On July 1, Mrs. Sarah Porter Ellis resigned to accept the position of State Home Demonstration Agent at Ames, Iowa. Her position was taken by Mrs. L. C. Deaner, a former Virginia Home Demonstration Agent, of many years' experience.

Later in July, M. M. Parker returned to his work at the Virginia Truck Experiment Station, and V. L. Myers, formerly with the N. Y. Potash Association, was made Director.

Field Personnel. The paid field personnel consisted of a County or City Garden Director in each county or city organized for relief. At the request of Mr. William A. Smith, State R.E.A. administrator, Miss Maude M. Wallace, State Home Demonstration Agent, and her four District Home Demonstration Agents, accepted the responsibility of interviewing prospects and recommending suitable persons for the Garden Directors. Miss Wallace's force willingly donated their services for this work as they felt that the subsistence garden program was closely allied to their regular extension program. In this manner it was possible to secure Garden Directors who, on the whole, were experienced and well qualified to handle the work. Many had been home demonstration club leaders for years.

The first duty of the County Garden Director was to organize her county. The County Organization was headed up by the Garden Director who was chairman of the County Garden Committee, composed of the County Garden Director, the County Relief Director, Farm Agent, Home Demonstration Agent, an Agricultural teacher, Home Economics teacher and the Chairman of each Magisterial District Garden Committee. In counties having negro extension agents or teachers, they were included in the County Garden Committee. In other counties without such representatives but having a large negro population, a negro representative was included on the County Garden Committee and in many instances a negro assistant Garden Director was included in the paid personnel.

An outstanding person from each Magisterial District in the County, suggested by the Home or Farm Agent, Relief Director, Agricultural or Home Economics Teacher, served as chairman of the

Magisterial District Garden Committee. This committee, in addition to the Chairman, was composed of the Chairmen of each Local or Community Garden Committee. The membership of this committee was selected by the Magisterial District Chairman with the aid of the County Committee.

The local or Community Garden Committee Chairman selected four or five additional persons in each community to serve on her committee.

All committee members served on a voluntary basis without pay with the exception that mileage was paid for food preservation assistants during the food preservation phase of the program. Naturally all committees did not function perfectly, but it is felt that the Garden Directors would have been faced with an impossible task without the assistance of such committees. The complete organization setup is shown graphically in Exhibits U and V. City organization differed to some extent, but was along similar lines. (A complete discussion of the duties of the county and city garden directors will be found in Exhibits U and V).

Selection of Gardeners

Since the garden program got under way rather late it was necessary to make the allotments of gardens to counties and cities soon after the program started. Several factors were considered in making these allotments, among which were

1. Total population
2. Rural population
3. Area
4. Number of farm gardens per county
5. Number of relief gardens in 1932
6. Old Quota of C.W.A. jobs
7. Approved relief load

All factors listed were used in determining the final quota or allotment of gardens. Factors 5, 6, and 7 in particular, were used as adjustment factors in obtaining the final figure. In the majority of instances it was impossible, due to limited funds and the problem of supervision, to allot the total number of gardens which the relief load might indicate as justified.

Since all relief families could not receive gardens, the careful selection of the individuals who were to receive gardens had a direct bearing on the success or failure of the project. A list of these families on relief by magisterial districts or wards was furnished by the Relief Office. This was broken up into community lists by the Garden Director. The local or community garden committee selected from these lists those who were eligible to receive gardens. Three essential requirements had to be met before a family could be selected. First, since the program was a relief

program the family chosen either had to be on relief or be a marginal family which might come on relief if such assistance was not given. Second, the family must have sufficient land suitable for a garden or be able to obtain such land. Finally, and of especial importance, the family had to be capable, in the opinion of the committee, of following garden and food preservation instructions. Ultimate selection was left with the members of the local committees; that is, with neighbors who knew them best. Since sufficient funds were not available for distribution to all relief families, the initial selection undoubtedly reacted to the good of the garden program.

Individual Seed, Seed Potato and Fertiliser Quotas

Seed Collections. Two collections of garden seed were ordered. Each collection contained the same assortment of seventeen vegetables and differed only in the amount of seed. The vegetables included were:

String Beans	Cucumber	Pumpkin
Lima Beans	Kale	Squash
Beets	Lettuce	Tendergreen
Cabbage	Onions	Tomatoes
Carrots	Parsnips	Turnips
Corn	Peas	

With the addition of potatoes or sweet potatoes, or both, the collections were designed to meet the requirements of a well balanced diet. Seed was supplied in sufficient quantities to supply an abundance of fresh, canned and stored vegetables throughout the year.

Approximately 1/3 of the total number of collections were the smaller collection designed to meet the needs of a family of two, three, or even four where the children were small. The balance of the collections were the larger collection designed to meet the needs of larger families. In a limited number of cases, more particularly in cities, collections were split and some of each seed given to two families because of lack of ground.

Irish and Sweet Potato Allotments. In the sweet potato growing area of the state each family was given 1/2 bushel of potato seed which was later supplemented with approximately 300 sweet potato plants. In other areas one bushel of potato seed was allotted each family. The amount for the cities varied but in general was from a peck to 1/2 bushel per family.

Fertiliser Allotments. An average of 150 pounds of fertiliser was allotted per garden. The amount given to the individual gardener varied, depending upon the size of the garden, the seed collection received, etc. In the case of cities the average allotment per garden was considerably decreased due to the small average size of the gardens.

Distribution of Supplies

In all a total of 28,083 seed collections, 18,803 bushels of seed potatoes and over 1,900 tons of fertilizer were distributed in the 55 counties and 19 cities or towns in which the program was prosecuted. Distribution actually was made to 29,535 families due to split collections. Such distribution entailed many problems. A remarkable feature was the comparative efficiency with which the distribution was accomplished. Supplies were shipped direct to the local Relief Directors. The relief office made arrangements for temporary storage facilities and transportation to one point in each magisterial district or ward. From that point on the distribution became the duty of the garden director and her committees. In spite of the fact that the state garden program did not get under way until the middle of March, distribution was practically completed in April except in those counties which did not organize for relief until a later date.

Distribution of supplies, however, did not end in April. In June approximately 1,650,000 sweet potato plants were distributed in certain counties to supplement the half bushel of Irish potato seed at the average rate of two hundred plants to a gardener.

In July and August, 201,916 complete jars, 331,104 jar tops, 510,080 jar rubbers and 26,300 tin cans were distributed. These figures do not include jars that were donated by churches, civic organizations and interested individuals in a number of counties.

The actual distribution of all these supplies would have been impossible without the active cooperation of committees and others interested in the work.

Supervision and Progress

Supervision was given through the Garden Directors and their committees. April, May and June were largely devoted to instructions in the practical phases of gardening, such as planting, fertilization, cultivation, pest control, etc. Information was given the gardeners both individually by personal visits and at meetings called for that purpose. Mimeographed instructions were distributed from time to time. (See Exhibits W, X, and Y).

In July the food preservation phase of the program got into full swing and continued through August and September. Volunteer assistants were secured in each county or city to give canning and food preservation demonstrations. These assistants gave their services freely, receiving only mileage for the actual use of their cars. Reports from the Garden Directors list 2,085 such demonstrations with a total attendance of 24,292 gardeners and 7,535 visitors. As previously mentioned a limited number of jars and jar tops were distributed to help conserve this surplus. In addition all available

jars owned by the gardeners and donated by committee or interested persons were utilized.

Canning centers were set up at various places and some excellent work was done at them. By far the bulk of the canning, however, was done in the individual homes with simple equipment under conditions which will have to be faced by the individuals in later years when no relief program is being prosecuted. In addition the gardeners were taught to dry a number of vegetables, particularly where sufficient cans were not available for canning all the surplus. (See Exhibits 3, A[1] and B[1] for samples of materials distributed in the canning phase of the program).

From July through October information was also furnished on the planting and care of the fall garden, canning, storage, etc.

A few statistics summarized by the State Garden Director from the monthly reports of the Garden Directors are indicative of the scope and progress of the project.

1. Ten thousand six hundred and four days were spent in the field which is equivalent to over 29 years continuous work by one person; 6,668 days were spent in the office holding personal conferences with gardeners, preparing garden materials etc.

2. Five thousand one hundred and twenty-two meetings were held during the same period with a total attendance of 44,851.

3. Twenty-two thousand five hundred and thirty-eight conferences were held by Garden Directors with their committee chairmen or members.

4. Actual contacts with gardeners numbered 109,877 of which 76,674 were actual garden visits while 33,203 were office conferences.

5. One thousand four hundred and two news articles were prepared and published by the Garden Directors. Some advertised their program over the radio. This publicity undoubtedly helped to secure a favorable public reaction toward the project. Editorial comments on the program and its accomplishments have been very favorable, several stating that they considered the garden program one of the best forms of relief yet attempted.

Two press comments on the program which are typical of the press comment throughout the state follow:

"The FERA subsistence garden campaign, which has just come to a close in Hanover County, appears from the report to be one of the most successful of the Administration's efforts to relieve the needy by helping them to help themselves.

Some 226 gardens were planted in Hanover County, nearly

all of them carried through to harvest. Besides the subsistence provided during the summer more than $5,700 in canned goods were put up from the crops. This does not include great amounts of potatoes, turnips, beets, etc., grown but not yet harvested. Nor can any statistical report include the benefits to mind and body which many of the unemployed gained from their summer of pleasant and profitable work.

Of all the government projects, this seems most likely to be of immediate assistance to the needy and of the most lasting benefit. It has not been many years since few farmers took the trouble to raise their own gardens. Strangely enough home vegetable gardens have been more frequent in the cities than in the country.

The FERA subsistence plan will bring farming back to where it started; teach the rural home and land-owner that on his own acres he may find nearly everything he needs for subsistence. After all, it is just as profitable to save money by raising your own as to make it." (Ashland Herald).

"Of the several projects inaugurated by the present Administration, whose ultimate aim is to aid in the restoration of prosperity, the subsistence gardens program stands in the fore as one of the most promising, if statistics of the work done in Norfolk County is indicative of the good that the program is doing in other counties of Virginia and the country as a whole.

In Norfolk County alone the value of the work is practically inestimable. Actual figures, however, show that nearly 14,000 jars of vegetables and fruits have been preserved for winter use by subsistence gardens families in three small districts of the county. It is, therefore, obvious that this method of indirect, or work relief, is one project which should be continued by the government." (Portsmouth Star).

Accomplishments

The first question which the observer along the sidelines will ask, and rightly so, is "Did the program pay its own way or was it a drain upon the public treasury?"

The total cost of the project was $269,649.56 distributed as follows according to the report of W. L. Myers, State Director of Subsistence Gardens.

Total Cost of Garden Program - (8 Months)

Administration	$18,081.66
Seeds and plants	75,655.76
Fertilizer	88,462.00
Supervision of gardens	71,995.72
Tin cans for canning centers	1,046.60

Glass jars and accessories	20,760.77
Transportation and storage of garden and canning supplies	1,160.91
Canning schools	7,000.00
Regional meetings	848.58
	$249,949.56

In the same report the total value of the program is estimated at $1,595,448.64, which figure is arrived at as follows:

Value of canned goods	$344,660.04
Value of oven and sun dried portion	24,557.24
Value of dried on vine and cob	29,716.71
Eaten fresh	811,734.63
Stored raw	384,980.02
	$1,595,448.64

Quoting from the same report "the average cost per garden was $8.47 and the average yield is valued at $57.58. On this basis the return per dollar expended was $6.79."

The above returns, however, contain certain figures which are purely estimates. In the opinion of the writer a more reliable picture would be presented by a comparison of the total cost of the project and the total value of the canned and dried products upon which definite figures are available. The following table taken from the report of Mrs. L. C. Beamer shows the distribution and total value of the canned and dried products, the total value being $368,997.28.

Total Canned and Dried Products

Total No. of Gardeners Canning, 22,831 ~~Total No. People Fed, 165,703~~

Vegetables	Total Quarts	Value Per Qt.	Total Value
Beets	131,410.80	$0.15	$ 19,711.62
Carrots	8,261.75	.15	1,239.26
Kraut or Cabbage	169,371.06	.15	25,405.66
Corn	174,535.50	.20	34,907.10
Greens	30,504.00	.20	6,100.80
Lima Beans	50,406.50	.20	10,081.30
Squash or Pumpkin	24,943.50	.15	3,741.53
Peas	20,691.00	.25	5,172.75
Snaps	425,476.65	.20	85,095.33
Sweet Potatoes	4,834.00	.15	725.10
Soup Mixture	133,307.00	.20	26,661.40
Tomatoes	559,056.00	.15	83,858.40
Others	209,489.15	.20	41,897.83
Total	1,942,716.86		$344,660.04

	Total Pounds	Value Per Pound	Total Value
Dried Vegetables	89,684.75	.35	$24,887.24

Demon. Given by Garden Directors	2,730	Demon. Given by Others - 1,225	Total Demon. 3,955

Note: 451 gardens from Petersburg not reporting
75 gardens from Radford not reporting

Using the figure of $565,997.28 the garden project returned in canned and dried food along $1.48 for each dollar expended in the entire program. Relief programs as a rule are a drain on the public treasury. When a program not only pays for itself, but returns 48 cents additional on each dollar invested, the results are eminently satisfactory.

This return does not include the value of any vegetables such as cabbage, potatoes, carrots, onions, parsnips, etc., stored in their fresh state, nor does it include any estimate as to the value of the vegetables consumed during the summer months. Hundreds of gardeners were removed in part or in whole from the relief rolls through the garden program. And in addition thousands were enabled to maintain their self-respect by helping themselves. This is particularly true since wherever possible the gardeners worked in payment for the materials furnished them. The ultimate aim of all true relief—to assist in such a way as will make further relief unnecessary—was the aim and to a considerable extent, the accomplishment of the garden program. Experience in gardening and food preservation has been acquired by thousands which will serve them well in years to come.

Summary of Accomplishments - Home Garden Project

One hundred and thirty-seven days in field devoted to Garden Project, in 35 counties.

Sixty-five visits to counties on definite garden work.

One hundred and twenty-three meetings held, with a total attendance of 5,646; average attendance 46.

Thirty-seven 4-H garden clubs met with a total attendance of 2,098; average attendance 57.

Thirty-two adult garden clubs met with a total attendance of 880; average attendance, 27.

Six leader trainer groups met with a total attendance of 81; average attendance, 13. Information carried back by leaders to over 2,168 people.

One hundred and twenty-six method demonstrations given with a total attendance of 1,236; average attendance 10.

Several counties aided in garden contests.

Garden instruction given at Cape Henry, Jamestown and State Short Courses.

Approximately 10,000 copies of Circular B-263, Vegetable Garden Suggestions for Virginia Farmers distributed; 70,000 copies distributed to date.

Nineteen circular letters written in the home garden project with a total distribution of 189,150 copies; average distribution, 9,956.

Nine press articles prepared and published on various phases of the garden project.

Six garden radio talks broadcast over Station WRNJ.

Summary of Accomplishments - Garden Relief Work

Garden relief program conducted in 95 counties and 19 cities or towns of the state.

Twenty-eight thousand and thirty-three seed collections, 18,608 bushels of Irish potatoes, 1,938,000 sweet potato plants, 1,900 tons of fertilizer, 201,916 complete jars, 381,104 jar tops, 910,000 jar rubbers, and 28,800 tin cans distributed to gardeners.

Seventeen vegetables included in garden collections; Irish potatoes in addition given to all gardeners and sweet potatoes in eastern section of the state.

Twenty-nine thousand five hundred and thirty-three families benefited from program; 163,769 people fed from subsistence gardens.

A total of sixty-two percent of subsistence gardeners white; 38% colored.

One hundred and seven white Garden Directors, 1 white assistant garden director and 11 negro assistant Garden Directors appointed.

Garden Directors spent 10,804 days in field, equivalent to over 29 years continuous work by one person; 6,686 days spent in office holding personal conferences with gardeners, preparing garden material, etc.

Five thousand one hundred and twenty-two meetings held by Garden Directors with total attendance of 46,651.

Twenty-two thousand five hundred and thirty-eight conferences held by Garden Directors with their committee chairmen and members.

Actual contact with gardeners numbered 108,877; of which 76,674 were actual garden visits while 33,203 were office conferences.

One thousand four hundred and two news articles prepared and published by Garden Directors.

Three thousand nine hundred and fifty-five canning demonstrations held with a total attendance of 32,130.

Ten community canning centers established; 79,449 containers filled at these canning centers.

One million, nine hundred and forty-two thousand seven hundred and sixteen quarts of vegetables canned and 69,554 pounds of dried vegetables conserved by subsistence gardeners.

Total value of canned and dried products, $368,997.28; total cost of project $269,440.56.

Return in canned and dried products alone $1.45 for each dollar invested in program.

#14,995

Detailed Costs and Returns on Canning Tomatoes, 154 Virginia Farms, 599.7 Acres, Crop Season 1933

	Average Costs and Returns per acre in dollars					
	A	B	C	D	E	F
Use of Land	3.70	3.32	3.26	3.03	4.58	4.08
Manure	2.19	2.63	3.25	2.70	1.36	.84
Fertilizer	5.07	7.76	4.75	6.88	3.02	3.41
Lime	.05	.11	.04	.06	-	.01
Seed	.91	.87	1.43	.67	.71	.60
Plants	.09	.06	.11	.16	.12	.02
Spray and Dust	.06	.05	.11	.04	.04	-
Man Labor	9.12	6.14	6.98	6.92	12.68	12.97
Horse Work	3.94	3.05	4.20	3.34	3.71	5.43
Truck Use	.08	.01	.05	.53	-	.12
Tractor Use	.20	.55	.11	.08	.08	.02
Equipment Use	.47	.43	.50	.52	.45	.51
Contract Picking	2.51	2.96	2.41	2.52	2.34	2.22
Contract Hauling	1.65	2.79	1.98	1.81	.39	1.12
Interest	.30	.29	.27	.30	.34	.33
Total Cost	30.34	31.02	29.45	29.56	29.82	31.68
Tomatoes sold	37.82	38.76	38.97	27.32	32.07	47.39
Profit	7.48	7.74	9.52	- 2.24	2.25	15.71
Yield (Baskets) Per Acre 1/	223.2	167.1	210.6	207.0	209.0	290.2
Cost per basket	.136	.150	.140	.143	.143	.109
Value per basket	.170	.187	.185	.132	.153	.163
Profit or loss per basket	.034	.037	.045	-.011	.010	.054
Returns per hour of man labor	.218	.230	.241	.069	.165	.303

County	Number of farms keeping records	Total acres in tomatoes	Average acres in tomatoes per farm	Average Per Acre: Pounds fertilizer used	Hours Man Labor	Hours Horse Work
A - State	154	599.7	3.89	499	76.1	50.3
B - Lancaster	41	151.95	3.71	713	60.9	39.7
C - Westmoreland	40	152.0	3.80	536	68.3	56.4
D - Essex	17	53.25	3.13	594	67.8	45.3
E - Shenandoah & Page	27	135.5	5.02	314	90.4	48.0
F - Bedford & Botetourt	29	107.0	3.69	331	94.6	61.9

1/ Yield per acre is given in terms of 5/8 baskets - except where tomatoes were sold by weight 30# was considered a basket.

[illegible] OF GARDEN PROJECT

Garden Instruction - State Short Course

State Short Course Garden Group

Garden Inspection - State Short Course

4-H Garden Club Day - Fulton County

Group of 4-H Garden Club Members - Cape Henry Short Course

4-H Club Garden and Club Boy - First Prize - Fairfax County

Canning Exhibit from Relief Gardens - Keller Fair

Negro Subsistence Gardeners - Amelia County

Prize Garden - Tangier Island

Work with Negro Garden Group - Amelia County

MINOR PROJECTS

An attempt was made to confine our efforts insofar as possible to the four major projects. Naturally, however, considerable aid had to be given along other lines. Seventy-five days were spent in the field on miscellaneous projects in 1934 in 34 counties. Approximately 19% of the time in the field was, therefore, devoted to work other than the major projects. While the increased demand for aid aside from the major projects is gratifying, yet it serves to emphasize the keen need for additional personnel.

At the Farmers' Institute, this department presented a vegetable crop program. In addition to the staff, we were fortunate in securing Drs. H. H. Zimmerley, Harold T. Cook, Jackson B. Hester, and Harry G. Walker, of the Virginia Truck Experiment Station, as speakers. Mimeographed information on seed treatment prepared by Dr. Cook, was distributed at this meeting, and later through this office. (See Exhibit C-). Attendance at this meeting was 88.

Cabbage Production

The outlook report on cabbage was prepared by this department and is included in this report as a part of Exhibit A. Several samples of yellows resistant cabbage seed were distributed in the yellows territory. Cultural information was given to several growers.

Cucumber Production

Considerable aid was given cucumber growers in Caroline, Essex and Rockingham counties, along cultural lines. Three meetings were held with a total attendance of 71.

Spinach Production

One meeting of spinach growers was held at Norfolk, Virginia, to discuss a compulsory state grading law. Approximately 40 growers attended the meeting. Nothing definite developed in this direction, however.

Market Gardening

Considerable aid has been given to individual market gardeners around Charlottesville, Lynchburg, Danville, Roanoke, Richmond, Washington and Norfolk. Such assistance has been in the nature of advisory visits with county agents, cultural information, etc.

Two truck crop institutes were held in Fairfax and Patrick Counties with a total attendance of 132.

Seed Distribution

Several samples of wilt resistant corn, mildew resistant cantaloupes and new varieties of watermelon were distributed to truckers and market gardeners.

Subsistence Homesteads

One week was spent in making a survey of industrial conditions in Eastern Virginia relative to the establishment of subsistence homesteads. The trip was made with Mr. Edmund Richardson, Field Assistant of the Subsistence Homesteads Division, Department of Interior, Washington, D. C. Projects have been submitted to Washington by interested persons in the Richmond-Hopewell area, the Petersburg area, and the Newport News area.

Rural Rehabilitation

Several conferences on rural rehabilitation have been attended by the writer, with particular reference to the garden phase of the program. The regional conference at Atlanta was also attended on the request and at the expense of V.E.R.A.

Fairs

The following fairs or shows were attended during the past year and products were judged at all of them:

Chesterfield County Fair	Chesterfield
Rural Retreat Community Fair	Rural Retreat
Alleghany County Fair	Covington
Keller Fair	Keller
Bottomley Community Fair	Blackstone
Princess Anne 4-H Club Achievement Day	Cosoma
Virginia Corn and Grain Show	Lynchburg
Virginia State Fair	Richmond
Roanoke County Fair	Roanoke

This department featured Irish and sweet potato exhibits at the State Corn and Grain Show at Lynchburg, Virginia.

Institutional Work

The following institutions were given definite aid in their production problems:

Central State Hospital	Petersburg
Hampton Institute	Hampton
State Industrial School for Boys	Waldens
State Farm	State Farm
State Epileptic Colony	Colony
McAllister Silk Mills	Covington
Alleghany Tanning Company	Covington
Bottomley Transient Camp	Blackstone
Montgomery Transient Camp	Yellow Sulphur

Radio and Publicity

Six radio talks were made over Station WRVA. Twenty-one press articles were prepared throughout the year and published in the Extension Division News, agricultural papers, newspapers, etc.

Correspondence

A considerable portion of office time was required to answer correspondence. A total of 8,618 letters were written which represent an increase of over 30% over the previous year due largely to V.I.S.A. work. Including both the regular extension program and the time spent on the V.I.S.A. program, an average of 45 letters were written for every day spent in the office.

Study

The demand for field work seriously limits the time which can be devoted to study. The specialists, however, strive to keep well up on the study of subject matter.

Summary of Accomplishments - Minor Projects

Seventy-five days in field devoted to minor projects in 24 counties; 60 visits to counties made.

Fourteen method demonstrations given; total attendance, 188.

Constructive aid given to growers of cabbage, cucumbers, and watermelons, and to market gardeners.

Nine fairs or shows judged.

Definite aid given to 9 institutions.

Six radio talks prepared.

Eight thousand six hundred and thirteen letters written.

Twenty press articles prepared and published.

Cabbage Unharvested - Splitting - Low Prices

Cucumber Brining Factory

OUTLOOK FOR 1935

The vegetable work in 1935 will be continued along the same general lines as in 1934. No drastic changes should be necessary. Minor changes will be made to fit the requirements of the work as conditions arise making such changes necessary. Emergency and relief work will very probably increase and cause a shifting of the time devoted to the various projects. Increased emphasis will be placed upon outlook information for all vegetable crops and upon high acre production at a low unit cost of production. Additional personnel is urgently needed to handle adequately the increased service requested from this department.

In the Potato Project, close cooperation with the Interstate Early Potato Committee will be maintained. The value of outlook information will be impressed upon the growers. In an effort to increase production per acre, the use of good land, cover crops, good seed, proper fertilization, and the judicious use of lime will be stressed.

In the Sweet Potato Project, outlook information, seed certification, efficient crop production, and storage house construction will be emphasized.

In the Tomato Project, outlook information demonstration plant beds, source-of-seed demonstrations, high grade seed of the proper varieties, fertilization, grading and the saving of seed will be stressed as factors in an economic production program. At least 150 tomato surveys and cost account records will be taken.

In the Home Garden Project, an effort will be made to increase the number of all-year-round gardens and to aid gardeners in solving their problems. The demand for garden work is such as to utilize efficiently a full-time man.

The Minor Projects will be given as much consideration as time will permit.

The work will be carried on as in the past mainly through the county extension agents. Aid will be required from the United States Department of Agriculture in the form of

1. Intentions-to-Plant Reports, Acreage and Production Forecasts, Crop Reports, Market Reports, etc.

2. Publications and other literature.

3. Information as to successful extension methods.

STATISTICAL DATA

The following statistics are summarized from the monthly reports. The data are given for the personnel of the Vegetable Extension collectively:

Days in field	400
Days in office	130
Days annual leave	41
Counties visited	61
Visits to county agents	118
Visits to county home demonstration agents	83
Visits to counties unassisted by agents	48
Meetings attended	244
Total attendance	18,106
Average attendance	78
4-H Clubs visited	28
Total attendance	2,196
Average attendance	84
Adult clubs visited	32
Total attendance	860
Average attendance	27
Letters written	3,613
Circular letters prepared	21
Distribution of circular letters	197,080
Average Distribution	9,861
Bulletins sent out	3,049
Method demonstrations	570
Total attendance	3,735
Miles traveled by auto	20,677
Miles traveled by rail	11,648
Miles traveled by other means	894
Total mileage	33,219

Potato Project

Days in field	89½
Counties visited	10
Visits to agents	17
Visits unassisted by agents	13
Meetings	49
Total attendance	5,122
Average attendance	105

Method demonstrations	26
Total attendance	598
Average attendance	23
Acres grown for certification	67
Bushels certified (1935 crop)	710
Storage cellars constructed or remodeled	2
Tours attended	2
Attendance at Virginia Potato Tour	325
Exhibits staged	7

Sweet Potato Project

Days in field	33½
Counties visited	17
Visits to agents	18
Visits unassisted by agents	13
Meetings	6
Attendance	237
Average attendance	40
Method demonstrations	75
Total attendance	313
Number of certified seed growers	61
Bushels bedded by certified growers	1,535
Number draws used by certified growers	2,300,000
Acres grown for certification	142-3/4
Bushels submitted for inspection	9,372
Bushels certified	9,047
Total bushels certified since project began	132,814
Average number of bushels certified per year	11,068
Storage houses constructed	19
Average capacity	2,000
Storage houses constructed since project began	106
Average capacity	2,150
Exhibits staged	1

Tomato Project

Days in field	53
Counties visited	16
Visits to agents	47
Visits unassisted by agents	2
Meetings	28
Total attendance	1,061
Average attendance	38
Method demonstrations	333
Total attendance	1,049
Plant bed demonstrations	23

Plants sold or used from beds	851,000
Number source-of-seed demonstrations	6
Canna samples of seed furnished to growers	166
Surveys made and cost account records started	249

Home Garden Project

Days in field	137
Counties visited	15
Visits to agents	20
Visits to home demonstration agents	35
Visits unassisted by agents	12
Meetings	123
Total attendance	5,645
Average attendance	46
4-H Clubs met	37
Attendance	2,089
Average attendance	57
Adult clubs met	32
Attendance	860
Average attendance	27
Leader-trainer groups met	6
Attendance	81
Method demonstrations	126
Attendance	1,268
Average attendance	10
Circular letters written	12
Distribution of circular letters	189,130
Average distribution	9,956
Press articles and radio talks	18

Relief Garden Project

Counties participating	28
Cities participating	19
Number white Garden Directors (1 assistant)	108
Number negro assistant Garden Directors	11
Per cent white gardeners	62
Per cent negro gardeners	38
Seed collections distributed	28,033
Bushels Irish potatoes distributed	18,900
Sweet potato plants distributed	1,880,000
Tons fertilizer distributed	1,900
Complete jars distributed	201,916
Jar tops distributed	391,104
Jar rubbers distributed	910,080
Tin cans distributed	28,800

Families benefited	29,855
People fed	103,749
Days in field (Garden Directors)	10,804
Days in office	6,686
Conferences with committee chairmen	22,886
Garden visits	76,676
Office conferences with gardeners	33,308
Meetings held	5,122
Attendance	44,851
News articles published	1,482
Canning demonstrations held	3,955
Attendance	32,130
Community canning centers	10
Containers filled at centers	79,449
Quarts of vegetables canned	1,942,716
Pounds dried vegetables	69,834
Value canned and dried products alone	$365,887.28
Total cost of project	$249,549.91
Return on canned and dried products alone for each dollar invested	1.48

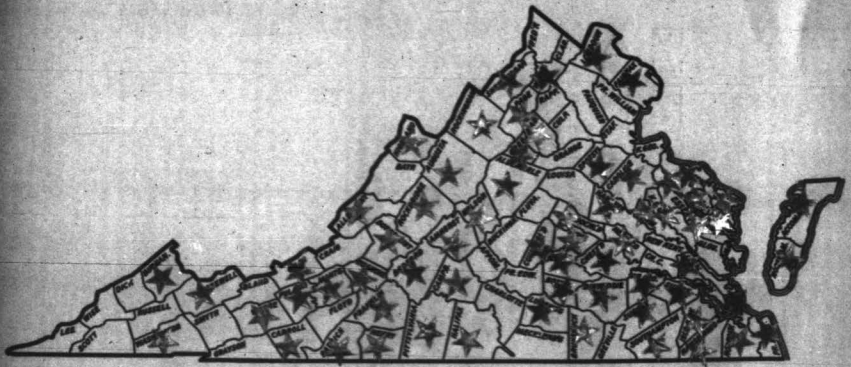
Minor Projects

Days in field	75
Counties visited	24
Visits to agents	33
Visits unassisted by agents	27
Meetings attended	29
Attendance	6,145
Average attendance	212
Method demonstrations	14
Attendance	135
Institutions aided	9
Radio talks	6
Fairs judged	8
Publicity articles	20

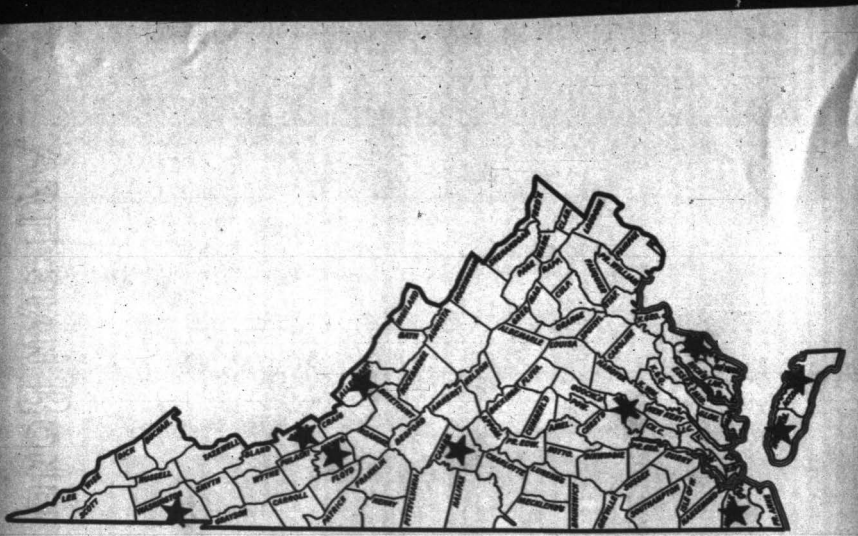
Respectfully submitted,

L. B. Dietrick
In Charge of Vegetable Extension

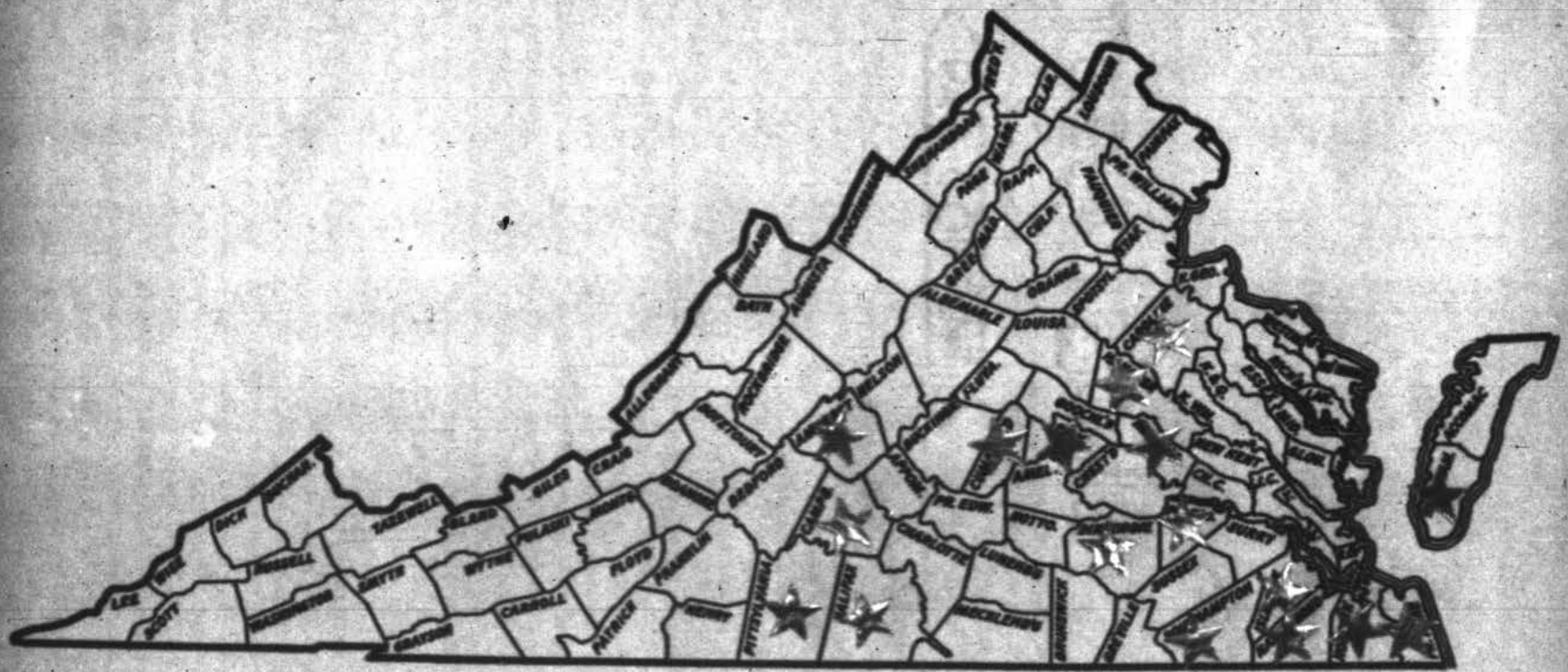
LBD:MPH



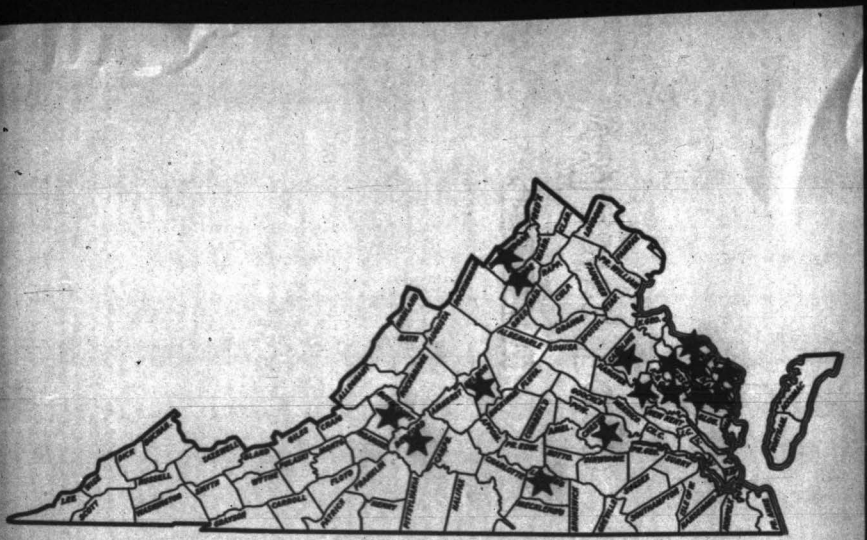
Counties Visited in 1954



Counties Visited in Potato Project

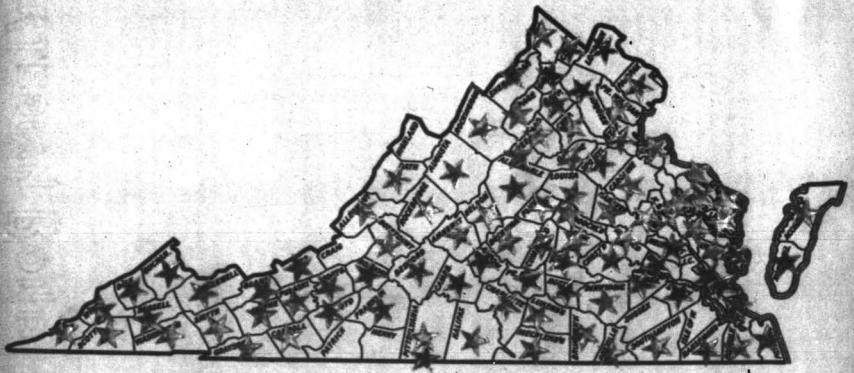


Counties Visited in Sweet Potato Project

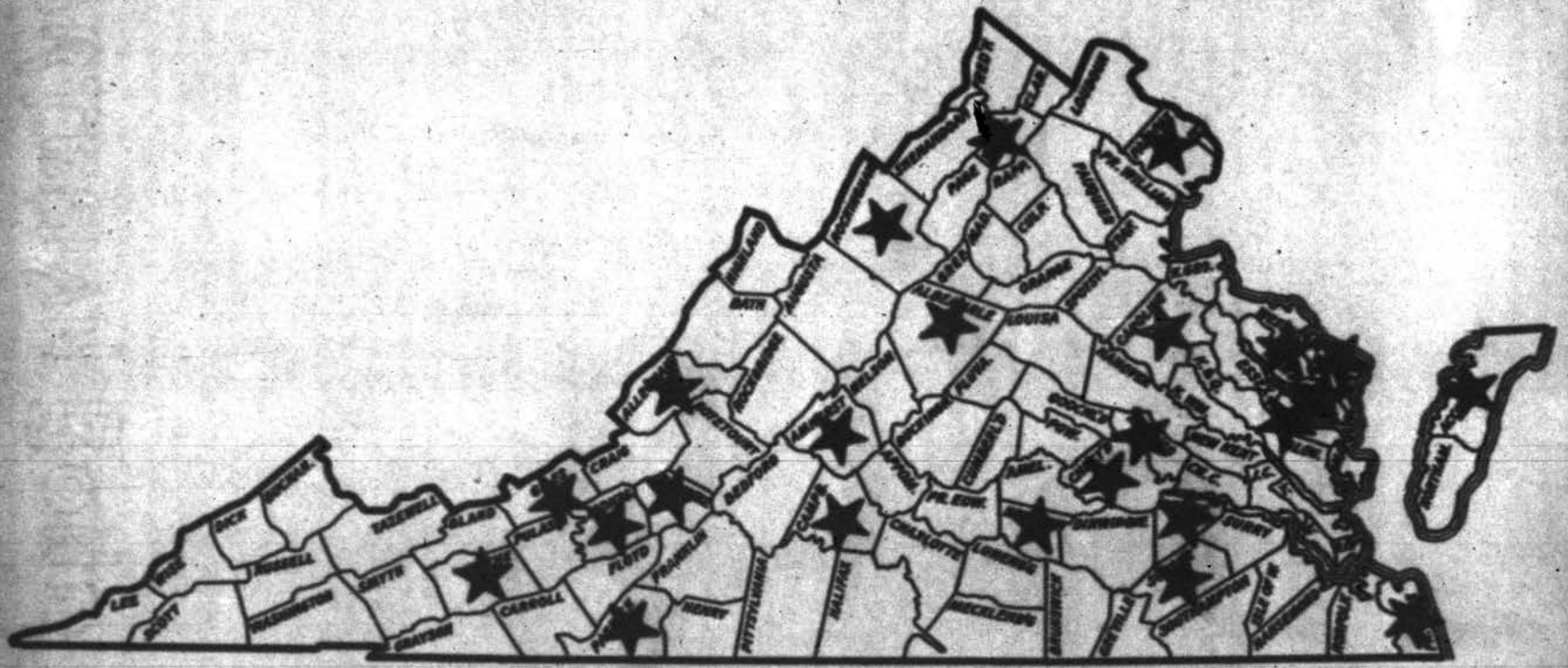


Counties Visited in Tomato Project

Counties Visited in Home Garden Project



Counties in Which V.E.R.A. Subsistence Garden Work Was Conducted



Counties Visited in Minor Projects

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE AND U. S. DEPARTMENT OF AGRICULTURE, COOPERATING
EXTENSION DIVISION, JNO. R. HUTCHESON, DIRECTOR, BLACKSBURG, VIRGINIA

Extension Division News

ISSUED MONTHLY BY THE EXTENSION DIVISION, VIRGINIA POLYTECHNIC INSTITUTE

THE EXTENSION DIVISION NEWS is issued monthly and copies will be sent free to anyone desiring them. Send your name and address to the Director of the Extension Division, Blacksburg, Va., and you will be put on the regular mailing list to receive this and other publications of the Extension Division.

VOL. XVI FEBRUARY, 1934 NUMBER 4

THE AGRICULTURAL OUTLOOK FOR 1934

SUGGESTIONS TO VIRGINIA FARMERS

John R. Hutcheson, Director

The outlook for crop farmers in Virginia in 1934 is distinctly more encouraging than it was in 1933. Virginia farmers are now receiving prices for wheat, cotton, flue tobacco and peanuts which are from 50 to 100 percent higher than they received for these commodities a year ago. These better prices are largely due to production control programs and marketing agreements worked out with the aid of the Agricultural Adjustment Administration. Such programs and agreements are based upon promises of farmers to fit production to market demands. Unless farmers in Virginia and other states where these commodities are grown not only comply with these promises, but use their moral influence to see that other farmers comply, we may expect lower prices next year. Therefore the most important step for farmers and other business men to take in working out cooperative plans for 1934 is to see that the crop production control agreements are honestly and intelligently put into effect.

The outlook for livestock producers is not so bright. The successful carrying out of the corn-hog program should mean better prices for hogs, but there is little hope that prices for beef cattle, sheep, poultry and dairy products will rise rapidly. The supply of such products is still large and the demand low. It would, therefore, seem to be the part of wisdom for the producers of livestock products to wholeheartedly cooperate with the government in working out plans for fitting production to market demands. While such plans are being developed, livestock producers should keep their stocks and herds rigidly and do everything possible to lower production costs.

In order that readers of the Extension Division News may have the best possible information on which to base their production plans for 1934, the various departments of the agricultural college have secured supply and demand information from all parts of the world and are presenting it briefly herewith, together with a few practical recommendations. It will pay every Virginia farmer to study this material carefully. Those desiring more detailed information will be sent a copy of the complete printed outlook report for 1934 upon request.

FLUE CURED TOBACCO

The present world supply of United States flue cured tobacco is estimated at 1,880,000,000 pounds, which is about 4 percent larger than the supply last year, and also above normal, as it is three times the estimated 1933-34 domestic and foreign consumption. Carry-over next July is expected to be 100,000,000 pounds larger than that of July 1933.

Domestic consumption of flue cured tobacco was about the same in the 1932-33 season as a year earlier. Domestic consumption is not expected to increase greatly during the 1933-34 season.

Foreign consumption of United States flue cured tobacco, which has recently equalled about 60 percent of total consumption, continues to decline. Foreign production in 1933 is the largest on record, while exports from the United States in 1932-33 of 270,000,000 pounds were below the small exports of 1931-32 and the smallest since 1924-1925. Prices have been considerably better during 1933 than they were in 1932. The improved prices, however, are the direct result of the Administration's acreage reduction program and agreement with domestic buyers and should not, under any circumstances, be attributed to an improved supply and demand situation.

Production must be decreased in 1934 if a normal balance between supply and consumption is to be restored and maintained. If production in 1934 is limited to 500,000,000 pounds as proposed by the Agricultural Adjustment Administration, the total world supply of flue cured tobacco will be only 4 percent smaller than that of the present year. A crop as large as that of 1933 would be ruinous to the tobacco grower.

Recommendations. In view of the above facts, it is recommended that Virginia flue cured tobacco growers reduce the acreage planted in 1934 to flue cured tobacco, 30 percent below the average acreage planted in the years 1931-32 and 1933, as called for in the Agricultural Adjustment Administration's acreage reduction program. A reduction is imperative. It is further recommended that flue cured tobacco be planted only on soils suited to the production of quality tobacco, and that approved methods of cultivation, fertilization and handling be used. Do not plant flue cured tobacco on the heavy type soils with red subsoils.

BURLEY TOBACCO

The estimated total supply of 1,160,000,000 pounds of burley tobacco for the 1933-34 season is about 15 percent above the record supply of last year, and is more than 50 percent above the five-year (1926-30) average supply. The present supply is equivalent to about four years consumption at present rates, whereas a normal supply is equivalent to about 2½ years of consumption.

Stocks on October 1, 1933, were about 5 percent greater than the record stocks a year earlier, and are sufficient for about 3½ years of consumption requirements. In addition, 1933 production exceeded consumption by 100,000,000 pounds, which will give a carry-over in 1934-35 of a three-year supply at present rates of consumption.

The 1933 production of 424,000,000 pounds is the second largest crop of burley ever produced, and is 35 percent larger than last year's crop, and 50 percent larger than the five-year (1926-30) average production. This

(Continued on page 2)

SUGGESTIONS FOR THE FARM FAMILY

Mary B. Settle

Farm families in most sections of Virginia are looking forward to further advances in the level of farm prices in 1934, and to a somewhat higher income for family living. Such increases for a large proportion of our people, however, will still be insufficient to provide more than bare necessities. Debts, taxes, store bills, and other obligations will absorb much of the increased income. The ability to pay off such obligations should relieve financial strain, however, and put these families in better position to live more satisfactorily.

Higher prices for goods and services which the farmer buys for family living may be expected during the coming months, offsetting to some extent increases in the farm income. There will probably be few people leaving the farm in the next year. Some labor released from the production of cash crops or otherwise unemployed will be available for increased home production.

The farm income should be supplemented whenever possible by retail sale of food and other home products. The housekeepers' cooperative markets, of which there are fourteen operating successfully in Virginia, will continue to be very valuable aids to this end. Real income may be increased also by bartering or exchanging products and services with neighbors. Cooperative buying of certain commodities for family use may provide another means of increasing the real income.

In making adjustments to meet existing conditions, farm families should continue a strong living-at-home program. Since there will still be little cash for living expenses, it is wise to re-emphasize the importance of producing a maximum amount of food for family use. Many families have learned the advantages of using carefully planned yearly food budgets as the basis for their home food production. Such planned production should recommend itself to every Virginia farm family. With food products on which a processing tax is charged, viz. wheat, pork, and corn, it will be especially advantageous to produce home consumption needs. There should be more home curing and canning of pork products, since in many cases it will be more profitable to keep meat for the family use than to sell it.

As to clothing for the family, home sewing, remodelling, and cleaning will continue important activities of the homemaker and her helpers. While more of this was done in 1933 than in previous years, it will be necessary to continue such home activities. Supplies of clothing much depleted should be replenished as cash available will permit.

Available labor should be used in fixing up the house, repairing furniture and improving the home grounds. Aside from the financial value of keeping the home in good condition, one cannot disregard its strong

effect on morale, social well-being, and outlook on life.

The home production of supplies for cleaning such as laundry soap, bedding, rugs, etc. will continue valuable means of supplying needs at low cost. Indications point to a revival of effort in various types of home improvement in Virginia in 1934, based chiefly upon better use of materials and resources on hand.

The work of keeping down cash expenditures and adjusting home production activities to incomes has resulted in increasing the farm woman's load over previous years. This is true in many cases in spite of assistance she has received from the men and older boys and girls of the family. It has become increasingly important, therefore, that labor and time saving methods and equipment be thoughtfully considered and used in every farm home. The women of farm families who bear the brunt of work resulting from the financial depression should not be allowed to pay a penalty in lasting physical impairment.

The needs of the family as to health and education, and community welfare should be met before investing in new service equipment. House furnishing should be replenished if further cash is available.

There is a slowly increasing amount of information being made available to the consumer which will aid in wise buying. The home buyer should seek and demand more facts for use in purchasing commodities, while making use of information provided by the Consumers' Guide, published bi-weekly by Consumers' Counsel of the A. A.A. and other sources.

Farm and household accounts should be kept and analyzed as a guide toward farm family security. While there has recently been a large increase in effort along this line, it should be much more widely adopted as a valuable aid to satisfactory home management.

Home and community recreation, in which all share, should be stressed again and again. More home talent should be developed in singing, playing and acting in group participation for their recreative and spiritual values.

While we look forward to the next year with hope and encouragement, a live-at-home program of emergency proportions will still be required. Until incomes are greatly increased, heavy home production of every possible sort is essential.

SUGGESTIONS TO VIRGINIA FARMERS

(Continued from page 1)

is the fourth consecutive year production has exceeded consumption, which was approximately 290,000,000 pounds per year. Production must be decreased to restore a normal balance between supply and consumption.

Recommendations. In view of the large supply of burley tobacco on hand and increased carry-over next year, it is recommended that Virginia burley tobacco growers reduce the 1934 acreage planted to burley tobacco 50 percent below that planted in 1933. A drastic reduction in production is essential if a normal balance between supply and consumption is to be restored. Quality, rather than quantity production, should be the slogan of every grower in 1934.

DARK FIRE CURED TOBACCO

The fire cured tobacco situation is characterized by a further curtailment in world consumption, heavy world supplies, and a continued increase of competition from foreign tobacco. World supplies for 1933-34 are estimated to be about 500,000,000 pounds, of which 428,000,000 pounds is the Kentucky-Tennessee types and 72,000,000 pounds the Virginia type. This is approximately the supply as of a year ago. However, the estimated 1932-33 world consumption of 135,000,000 pounds is 10 percent below that of a year earlier and 30 percent below world consumption of four years ago.

The 1933 production is forecast at 134,000,000 pounds, which is 8,000,000 pounds larger than the 1932 production. This increase is due to Virginia production. The Virginia crop is 8,000,000 pounds larger than in 1932, while Kentucky and Tennessee show practically no change.

Domestic consumption of fire cured tobacco, representing only 30 percent of world consumption, has shown only minor fluctuations and was about 15 percent below the ten-year average in 1932-33.

Prior to 1923 nearly 90 percent of all the United States fire cured tobacco was consumed in foreign countries. Since then foreign consumption of these types has declined approximately 50 percent and exports have declined even more, due to withdrawal of foreign stocks for consumption without replacements. Exports for the crop year ending September 30, 1933, were the lowest on record, being 20 percent below the previous year. Consumption of competing foreign tobacco in Europe increased from 192,000,000 pounds to 297,000,000 pounds during the period 1924 to 1932.

Recommendations. Due to decreased exports of fire cured tobacco, increased competition from competing foreign tobaccos and heavy supplies, the situation looks none too good. It is, therefore, recommended that Virginia fire cured tobacco growers reduce their production in 1934 twenty-five percent as recommended by the Agricultural Adjustment Administration.

PEANUTS

The preliminary estimated production of peanuts for 1933 is 890,000,000 pounds, which is 112,000,000 pounds under the 1932 crop, and 11,000,000 pounds below the average for the preceding five years.

Virginia, North Carolina and Tennessee, which produce principally the Virginia type nuts, have an acreage 23 percent below that of 1932, and an indicated production of 24 percent less than the 1932 crop. The carry-over of farmers' stocks in this area is only 50 percent as large as a year ago, and the supply for the 1933-34 season will be about 30 percent smaller than for the previous season.

For the entire belt the acreage is about 13 percent below the record acreage of 1932, but 11 percent above the five-year (1927-31) average. Production, due to the low yield per acre, is forecast at 11,000,000 pounds below the five-year average.

October prices were considerably better than those a year ago. The improved prices are very largely due to the activities of the Agricultural Adjustment Administration and should not be considered as justifing increased production. An increased production in 1934 is very likely to suppress prices below those prevailing in 1933.

Recommendations. Due to the trend of Virginia type peanuts toward shelled goods, and increased competition from the Spanish and Southeastern summer types, it is recommended that Virginia farmers *do not* increase the 1934 acreage over that of 1933. This reduced acreage will materially help in improving the price of the Virginia type peanuts and give them a better relative position in competition with Southeastern and Southwestern peanuts.

Plant peanuts only on land suited to quality production, and use methods and practices which result in efficient production.

COTTON

The world supply of all cotton for the 1933-34 season will exceed the supply in either of the previous years when the total supplies were equivalent to 41,000,000 bales.

The present indications are that the world supply of American cotton for the 1933-34 season will be about 24,500,000 bales. This is a decrease of 1,500,000 bales from the extremely large supplies of the two previous seasons, but is offset by an increase in foreign production of 1,500,000 bales. The present supply is still 6,000,000 bales larger than the ten years (1921-31) average supply of 18,500,000 bales. Without the adjustment program which took out of production about 4,200,000 bales, the present supply of American cotton would be 28,700,000 bales.

The supply of foreign cotton is estimated to exceed 16,500,000 bales, which is 1,950,000 bales larger than in 1932-33 and 1,000,000 bales larger than the preceding five-year average.

The world mill consumption of all cottons for the 1932-33 season was reported at 24,332,000 running bales. This was an increase of 2,013,000 bales, or 9 percent over that of 1931-32, and slightly above the average for the last ten years.

World consumption of American cotton was placed at 14,167,000 bales for the 1932-33 season, which is an increase of 3,259,000 bales, or 30 percent above the low level of 1930-31. Seventy percent of this increase is accounted for by the increased use in the United States and 30 percent in foreign use.

Despite the increased consumption and reduction program during the last season, we are still faced with a burdensome supply of cotton, which calls for further reduction in production.

Recommendations. Due to the still burdensome supply of cotton available for consumption, and the necessity of balancing supply and consumption; it is recommended that Virginia cotton growers reduce the 1934 acreage planted to cotton 40 percent below the acreage planted in 1933. It is further recommended that only land suited to the production of high yields be planted to cotton, and that approved cultural and fertilization practices be used to assure efficient production.

IRISH POTATOES

The 1933 acreage of commercial early potatoes was 248,200 acres compared with 275,400 acres in 1932, or a reduction of approximately 10 percent. Production likewise decreased 9.7 percent. Virginia growers reduced their acreage 8.6 percent from 58,000 acres in 1932 to 53,000 acres in 1933, while production decreased 20.8 percent from 7,364,000 bushels in 1932 to 5,831,000 bushels in 1933.

The price per bushel received by the growers in the 19 early states increased 65 percent; from 59 cents in 1932 to 99 cents in 1933. The increase received by Virginia growers was even greater, advancing from 58 cents per bushel in 1932 to $1.21 in 1933, an advance of 108.6 percent. As a result of the short crop, Virginia growers as a group received $2,800,000 more for the 1933 crop than for the 1932 crop, although the production was nearly 21 percent less.

Three factors will largely determine the price which Virginia growers will receive in 1934, the carry over of old potatoes, the supply of new potatoes, and consumer purchasing power.

In the 30 late states which will largely influence the supplies of old potatoes on hand next spring, the production is estimated at 259,969,000 bushels, or a reduction of approximately 11.1 percent from 1932. Shipments of potatoes from the late states started unusually early this season as a result of high market prices. These heavier fall marketings, an increase of 46.4 percent over last year; together with the smaller production in the late states, indicate that the supply of old potatoes for the late winter and spring markets will be short. The

carry over, therefore, should not seriously hamper the marketing of early potatoes in 1934. Virginia growers should realize, however, that the carry over affects their price only to a slight extent and in years of an unusual light carry over probably not at all. By the time North Carolina markets, much of the direct effect of the carry over has been dissipated.

Competition at the time Virginia potatoes come on the market will be greater in 1934 than in 1933. Growers in the early and intermediate states reported about October 1 that they intend to increase their 1934 commercial acreage to 294,500 acres or about 19 percent over that harvested in 1933. In most of these states the tendency is to return to an acreage equal to the acreage planted prior to 1932.

Assuming that the acreage now planned is actually planted in 1934 and that average yields are obtained, the production of commercial early, second early and intermediate potatoes will total about 40,000,000 bushels compared with 30,112,000 bushels in 1933 and 33,350,000 in 1932. The increased production in the early and second early states can probably be marketed at reasonably profitable prices, since the spring carry over of old potatoes will be unusually small. Prices for the intermediate group, however, may be a great deal lower, since prices in the intermediate states depend almost entirely on the production in those states.

Virginia growers market with the intermediate states and in determining their acreage for 1934, should carefully consider the probability of lower prices. Yields in the intermediate states in 1933 were low, only 107 bushels per acre. Total production for the group in 1933 was only 8,870,000 bushels; in 1932 it was 12,501,000 bushels. With no increase in acreage, normal yields could easily result in a crop as large or larger than in 1932. This group, however, plans to increase its acreage 16 percent in 1934 which, with normal yields, would still further materially increase its production.

On the demand side there are many factors which appear uncertain. It is expected that business conditions next spring will be improved over those of 1933. The total consumer purchasing power should also be higher in 1934 than in 1933. The extent of the improvement, however, is problematical.

Recommendations. In view of the slight effect of the small carry over on Virginia prices, the increased competition during the period in which Virginia markets her potatoes, and the uncertainty of consumer purchasing power, Virginia growers are urged to increase their yield per acre rather than to increase their acreage. Maximum yields per acre at a low unit cost of production should be the aim of every grower. To that end the following recommendations are made:

1. Plant only such land to potatoes as will normally produce 50 barrels or more of No. 1 potatoes per acre.
2. Wherever possible, turn under a green manure crop. Experiments at the Virginia Truck Experiment Station show increased yields ranging from 44 percent to 61 percent as a result of this practice.
3. Use only good seed. The production of certified seed potatoes in 1933 is indicated to be about 35 percent larger than in 1932. Sufficient quantities of certified seed should be available, therefore, to supply the demand.
4. Lime where necessary. Experiments conducted by the Virginia Truck Experiment Station indicate that the soil reaction should be kept between a pH of 4.8 and a pH of 5.3.
5. Fertilize adequately and properly. Consult your county agent for specific recommendations on fertilization and other cultural practices.

SWEET POTATOES

Due to the unusually low prices received for sweet potatoes during the 1932 season, and to the increased plantings of cotton in the spring of 1933, the acreage of sweet potatoes in 1933 was materially decreased below that of 1932. Total acreage is estimated at 813,000 acres, a decrease of about 12 percent from the 1932 acreage of 926,000 acres. Production is estimated at 69,743,000 bushels, a decrease of 11.1 percent from the 1932 production of 78,384,000 bushels. Virginia growers decreased their acreage 2.6 percent, from 38,000 acres in 1932 to 37,000 acres in 1933; while production increased from 3,610,000 bushels in 1932 to 4,255,000 bushels in 1933.

Due to the 11 percent reduction in the supply of sweet potatoes, and to the shortage of late Irish potatoes, sweet potato growers this year experienced a reversal of the price trend after 4 years of declining prices. Virginia growers will probably average around 55 cents per bushel in 1933 compared with 30 cents in 1932, an increase of 83.3 percent.

Several factors will determine the price which Virginia growers will receive for their 1934 crop. Chief of these will be the acreage and production of sweet potatoes in 1934, the increased competition from Irish potatoes, and consumer purchasing power.

The improvement in prices of sweet potatoes in 1933 is likely to encourage farmers to increase their acreage substantially in 1934, particularly in commercial areas. However, on the Eastern Shore of Virginia where sweet potatoes are commonly grown on the same farm with Irish potatoes, the acreage of the former may be reduced because of the increased plantings of the latter.

Growers from the 19 early potato producing sections report intentions to increase their 1934 commercial acreage about 19 percent over that harvested in 1933. This greatly increased production will compete to some extent with the marketing of sweet potatoes in 1934.

Business conditions in 1934 are expected to improve over last year. Such improvement should tend to be reflected in the prices of all commodities.

Recommendations. In view of the probable increased production of sweet potatoes in 1934, and of the expected increase in competition from Irish potatoes, Virginia growers are urged to produce their crop on a practical and economical basis. Maximum production per acre at a minimum unit cost of production should be secured. Growers are particularly urged:

1. To plant only land to sweet potatoes suited for the crop.
2. To bed only good, disease-free seed of the proper varieties.
3. To practice seed treatment for the control of disease.
4. To fertilize adequately and properly.
5. To harvest carefully to prevent injury.
6. To sell only a well graded product.

Outlook for Storage Potatoes. It is believed that the present may be a good time for the construction of home storage houses by growers favorably located in the sweet potato area of the state. The capacity of such houses should range from 500 to 2500 bushels. This belief is based upon the general price level of properly cured sweet potatoes in the past. Due to the limited quantity stored, such stock has usually commanded a premium over the field stock marketed in the fall, and over bank-stored stock.

For the crop now in storage the growers should make an effort to supervise the storage house carefully. Indications now point to a considerable improvement in the market demand for sweet potatoes during the remainder of the present marketing season.

MARKET TOMATOES

Virginia growers of market tomatoes face their greatest competition from the second-early and intermediate states. Prices in the second-early states in 1933 averaged $1.52 per bushel, or somewhat higher than in 1932. These higher prices are likely to cause growers to increase the second-early acreage in 1934. Since yields last season were unusually low, and the acreage was above the recent five-year average, only a moderate increase in the 1934 acreage will be sufficient to produce a second-early crop large enough to supply the demand at reasonable prices. A substantial increase would result in lower prices.

The 1933 production in the intermediate states (Arkansas, Maryland, Missouri, New Jersey, North Carolina, Tennessee, Virginia, parts of California, Ohio and Illinois) was reduced to 4,990,000 bushels from the large crop of 5,780,000 bushels in 1932. Virginia's acreage remained at 3,000, while production decreased from 480,000 bushels to 465,000 bushels. Prices of intermediate tomatoes averaged 83 cents per bushel, or substantially higher than in 1932. The greater returns this year are likely to result in some increase in acreage in 1934, but in view of the low yields of last season coupled with the prospective acreage increase in the second-early states, this should be limited to only a moderate increase.

Recommendations. Virginia growers of market tomatoes are urged to aim for increased production through higher yields per acre rather than through substantially increasing their acreage.

CANNING TOMATOES

Production of tomatoes for manufacture in 1933, according to October 1 indication, was expected to be smaller than any crop in the last 11 years. Total production indicated on October 1 was 957,000 tons, or 20 percent less than the 1932 production of 1,199,000 tons, and slightly smaller than the light crop of 1931. Compared with the peak production of 1,757,600 tons in 1930, the 1933 crop shows a reduction of about 46 percent. Virginia growers increased their acreage 12.9 percent, from 13,900 in 1932 to 15,700 in 1933. Production decreased 11.3 percent however, from 38,900 tons in 1932 to 34,500 tons in 1933; due to the exceptionally low yield of only 2.2 tons per acre.

No definite information is yet available on the average price paid to growers for canning tomatoes in 1933. It is expected, however, that the price will be somewhat higher than the relatively low prices of 1931 and 1932. Virginia growers will probably average around $10.40 per ton (31¼ cents per bushel) as compared to $9.20 per ton (27½ cents per bushel) in 1932.

Improved prices for canned tomatoes depends to a considerable extent on improvement in consumer purchasing power. The price of canned tomatoes in September 1933 was about 20 percent below the September average for the 5-year period, 1926-30. If employment were at a higher level, the relatively light supply of tomatoes expected in 1933 would be a more significant factor in determining the level of prices of canned tomatoes during the next three months and of contract prices for the 1934 crop.

The light production of tomatoes for manufacture in 1933 will probably mean a pack of about 10,000,000 cases of 24 No. 3 cans of canned tomatoes. In 1932 the estimated pack of canned tomatoes appears to have been around 12,000,000 cases of No. 3 cans. In 1931 the pack was 9,573,000 cases; in 1930 it had reached 16,998,000 cases.

It appears that the total supply of canned tomatoes for the 1933-34 season will not greatly exceed 10,000,000 cases of No. 3 cans compared with a supply of 14,560,000 cases for the 1932-33 season and an average of

EXTENSION DIVISION NEWS

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Farmers are not spectacular performers, do not furnish sensations for the country, work in and out of season, but they are recognized as the backbone of the country, the real army that preserves us as a nation. If the farmer can find something helpful in the suggestions given in this paper every month it will have fulfilled its mission.

THE EXTENSION DIVISION NEWS will be mailed free of charge to any one who asks it. The newspapers of the State are invited to use the material in its columns at any time and need give no credit for same.

Entered at the post office at Blacksburg, Virginia, as second class matter.

Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917, authorized March 1, 1920.

Acceptance for mailing at special rate of postage provided for in section 1103. Act of October, 1917, authorized October 22, 1923.

16,000,000 cases for the last five years. The supplies for 1933-34 will apparently be at least 2,000,000 cases less than the average domestic utilization.

Recommendations. Under average growing conditions an acreage somewhat larger than that grown in 1933, or somewhere near the 1927-31 average of 313,000 acres, would be required to fill consumption requirements of domestic canned tomatoes for the 1934-35 season. Such an acreage represents an increase of approximately 14 percent over the 1933 acreage. The advisability of any increase, however, will depend upon the increase in consumer purchasing power, which in turn would be reflected in the canner's prices to the growers. Substantially better prices to the canner rest primarily upon improved economic conditions.

Of far more importance to the Virginia grower than any increase in acreage is his production per acre. Efforts should be confined to securing a higher yield per acre at a low unit cost of production. The following suggestions are offered to aid in accomplishing this result.

1. Plant only such land in tomatoes as will normally yield at least 150 bushels per acre.
2. Fertilize properly and adequately.
3. Use high grade seed of the proper varieties.
4. Practice a thorough program of pest control in the plant bed.
5. Get the plants in the field before June 1; later plantings usually do not pay expenses.
6. Cultivate thoroughly, particularly early in the season.
7. Consult your county agent relative to recommended practices on tomato production.

CABBAGE

Eastern Virginia Outlook. In the early states (California, Florida, Louisiana, and Texas) it is likely that acreage planted for the 1934 spring market will be increased over the 1933 harvested acreage. Although prices to growers in 1933 were about 50 percent below 1932 prices, the prospective small carry over of late cabbage is likely to encourage growers in these early states to increase plantings. In the second early states (Alabama, Georgia, Mississippi, North Carolina, South Carolina and Eastern Virginia) the prospects are for some increase in acreage in 1934 largely because of the likelihood that the carry over of late Danish cabbage will be small. However, the low prices received for the second-early crop in 1933 may cause growers to increase acreage only moderately. In 1933 the acreage of cabbage in these states was increased 25 percent over that of 1932. A total of 67,200 tons was produced in these states in 1933 compared with 48,300 in 1932 and 83,500 tons, the 1927-31 average. With consumer purchasing power at a low level and with a heavy carry over of late Danish cabbage, prices of the second-early crop in 1933 averaged only $25.60 per ton to the grower compared with $42.25 in 1932.

Eastern Virginia growers increased their acreage approximately 30 percent; from 3,550 acres in 1932 to 4,600 acres in 1933. Production in eastern Virginia increased 109 percent; from 8,800 tons in 1932 to 18,400 tons in 1933.

Southwestern Virginia Outlook. For the intermediate group as a whole, which includes Southwestern Virginia, the low prices secured for the crop in 1932 caused growers to reduce their cabbage acreage slightly in 1933. The smaller acreage and slightly lower yields resulted in a crop of only 115,500 tons of cabbage against 127,100 tons in 1932. Prices of the intermediate crop averaged about $27.30 per ton compared with $15.41 in 1932. The improved prices of 1933 are likely to cause some increase in acreage in these states in 1934. Growers should bear in mind, however, that lower-than-average yields were produced during the last two years and any appreciable expansion of acreage, with average yields, would increase production considerably.

Southwestern Virginia growers decreased their acreage from 2,650 acres in 1932 to 2,500 acres in 1933, a decrease of approximately 6 percent. Prices received by the growers in southwestern Virginia averaged about double those of 1932.

Recommendations. Growers in both sections of Virginia are urged to consider carefully all factors before increasing appreciably their acreage. High production per acre should be secured at a low unit cost through:

1. Use of only such land as will give a high production per acre.
2. Use of good seed and proper varieties.
3. Proper fertilization and cultivation.
4. Thorough pest control measures.

APPLES

The number of apple trees in the United States continues to decrease. Removals, because of drought conditions and lack of care, have exceeded the number of trees planted. The shift from the farm to commercial orchards is still taking place. However, present plantings contain more trees of the popular and better paying varieties. In spite of orchard neglect and tree removals, production has not declined materially during the 1929-1933 period. Growers can still expect large crops to be produced in years when growing conditions are favorable, and keen competition as a result of the increasing supplies of competing fruits.

The commercial apple crops of the United States and Virginia for 1932 and 1933 were both below the five-year average of 1926-1930. This decrease was due to a large extent to unfavorable weather conditions during the blooming and growing season. The commercial crop in all sections was not up to the normal standard of previous years. In Virginia the 1933 crop was one of the poorest on record as a result of a severe outbreak of rosy aphis and codling moth and a severe epidemic of scab. As a result, stocks of U. S. No. 1 fruit are very much smaller than usual.

Prices have averaged higher this season than those for the same period in 1932, due to the smaller commercial supplies of the higher grades and the somewhat improved demand.

It appears that the 1933-1934 export season will be better than last season because of the smaller exportable supplies and the stronger demand conditions both at home and abroad. The export situation has been further strengthened by the improved foreign exchange position. Virginia apple growers may expect more competition from foreign supplies in the chief export markets. Foreign countries are modernizing their apple industries. They are giving more attention to improving the quality and pack of their apples. Besides greater competition, Virginia growers may expect increased restrictions in the foreign markets.

Recommendations. Because of unfavorable weather conditions at blooming time, certain varieties did not set a large crop in 1933. Therefore, the prospects are that these trees will set a larger crop in 1934. Fruit buds seem to be plentiful, although rather weak in many orchards. The purchasing power of the consumer has not increased sufficiently for growers to believe that a large crop can be disposed of at high prices. This means that a large crop in 1934 is very apt to move at lower prices. Labor and other costs may be higher, therefore, Virginia growers should put forth greater effort to increase the quality of their fruit.

The pruning may be somewhat heavier; not the cutting of large limbs but the thinning out of small branches; removing the weak fruiting wood in order to open up the trees to light and spray materials; thorough spraying to secure better scab and worm control; thinning to increase the percentage of quality fruit; removal of weak and nonprofitable trees to reduce costs and the amount of low grade and inferior fruit; cultural practices to increase organic matter.

Extensive plantings are not advisable at this time. New plantings when made should be of the better quality and better paying varieties.

PEACHES

Peach acreage continues its downward trend for the United States as a whole. Especially is this true of the South.

Peach production is also on the decline. The peach crop for the United States for 1933 is placed at 45,300,000 bushels. This is 7 percent larger than the 1932 crop, but 40 percent smaller than the large crop of 1931. The short crop of 1933 was due to a period of warm weather that had advanced the trees, followed by a late freeze. In many states the crop was almost a complete failure. Neglect and failure to put on the dormant spray helped to reduce the crop. Virginia was one of the fourteen states in the entire country to report more than half of a normal crop.

Virginia's 1933 peach crop of 990,000 bushels was one of the best on record from the standpoint of size, color and quality. Prices were also substantially higher than those obtained in 1932. This was due to lower growing costs and because the harvesting season of the peach producing sections to the south were almost over before the picking started in Virginia. The season price in 1933 for Virginia peaches will be about $1.10 per bushel.

Peach tree plantings in the South have been light since 1930. New plantings in Georgia and other southern peach states have not been sufficient to replace the trees that have been going out of production. This is also true of Virginia where the plantings have been largely replacements of trees that have died. In southern Georgia the Hiley variety is being planted mostly with some Early Rose and relatively few Elberta. In central Georgia, the change is also more from Elberta to the early maturing varieties. Similar changes in varieties are taking place in North and South Carolina.

Recommendations. The higher returns in 1933 have already put new life into many peach growers and indications are that there will be some increase in tree plantings. Many growers are giving their trees better care.

Moderate plantings sufficient to maintain the present commercial orchards seem advisable, but heavy plantings at any one time should be avoided in order to guard against over-production in the future. Georgia and

other peach states that compete with Virginia growers in the markets are planting more trees of the early varieties and reducing the number of Elberta trees. It would seem advisable, therefore, for Virginia growers to include a large percent of Elberta in their new plantings. If early varieties are planted, the higher quality yellow fleshed, freestone sorts should be selected. Avoid planting varieties that mature later than Elberta because of the carryover of oriental peach moth. Above all, do not make plantings on sites with poor air drainage and sorts that will not produce high yields. A larger crop may be expected in 1934. Costs should be kept to a minimum.

STRAWBERRIES

Present estimates indicate that the total commercial strawberry acreage of the United States will be about 264,560 acres in 1934. This almost equals the 1932 acreage of 1928. There is an increase of 3 percent over the 1932 acreage in the second-early states, which include Virginia. It is expected that Virginia growers will pick 7,600 acres in 1934, which is larger than the 1932 acreage.

Virginia strawberries are harvested during the heaviest crop movement period and greatest competition. Further, the percentage of first year beds is smaller in Virginia and the second-early states than in the early and intermediate states. As a rule, first year beds produce better fruit, both in size and quality, than older beds. This means that Virginia strawberries will meet with stronger competition in the markets this year.

In 1933 total commercial strawberry production was 306,960,000 quarts, with a farm value of $21,017,000 as compared to the 1932 total commercial production of 325,776,000 quarts and a farm value of $24,432,000.

Virginia's 1933 commercial production was 14,280,000 quarts with a farm value of $864,000. In 1932 the commercial production was 9,912,000 quarts with a farm value of $677,000.

The per acre yield in Virginia for 1933 was above that of 1932. Although, the 1933 crop was below the one of 1932, prices on the average to growers were the lowest on record. Virginia strawberry growers received on an average 12 cents a quart for their fruit in 1931; 6.8 cents per quart in 1932; and only 4.8 cents per quart in 1933. The price to Virginia growers in 1933 was more than 21 percent less than the average for the second-early states and more than 30 percent less than the average for the United States. These low prices were due to poor quality; small and sandy fruit was a result of poor care and lack of plant food.

Recommendations. With a record commercial strawberry acreage in sight for next year, it can be reasonably expected that with normal weather conditions the 1934 harvest will equal or exceed the large crop of 1928. Storm damage in August 1933 will probably decrease production to some extent in the states in the storm area. There is some indication that certain production costs may be increased. It seems, therefore, advisable that Virginia growers take better care of the present beds in order to increase yields and improve the size and quality of the fruit instead of increasing their expenditures by increasing their acreage. It is also recommended that more matting of beds be done in order to produce cleaner and brighter fruit. New plantings should be confined to replacing old beds and those in poor condition instead of expanding the acreage.

HORSES AND MULES

January 1, 1933 horses on farms numbered 12,163,000 which is only 57 percent of the number January 1, 1918. The number of mules has declined less rapidly.

Developments during the last two years indicate the beginning of a shortage in the supply of work stock. The time when the shortage will be greatest will depend somewhat on the programs of reduced acreage. The possibility of overbreeding is present even with the program in effect. The need for stock to replace an increasing proportion of old animals should be reflected in a growing demand for good animals for several years, even though there is some increase in the use of mechanical power.

Recommendations. It appears that good breeding mares, used both as a source of farm power and to raise horse or mule colts, will prove profitable during the next few years. The purchase of good draft stallions or jacks by individuals or groups of individuals could well be made in some communities.

BEEF CATTLE

The upswing in cattle and calf slaughter which got under way early in 1933 is expected to continue for several years. Slaughter supplies in 1934, however, will probably include fewer of the better finished kinds and more of the lower grades. Cattle numbers have been increasing since 1928 and are expected to continue to increase through 1934.

The outlook for cattle producers during the next two years is relatively unfavorable, but the cattle feeders during the next twelve months is more promising. Market prices for grass cattle of all kinds, cattle for slaughter, stockers and feeders, are now at the lowest point reached since prices turned downward in 1929, and for some kinds the lowest on record. Transportation and marketing costs relative to cattle prices are the highest on record, which makes the returns to producers even lower than market prices indicate.

The spread between prices of the lower and higher grades of slaughter cattle at the end of October was much smaller than that of a year earlier. In view of the probable marked decrease in the proportion of the better grades of cattle in the slaughter supplies during most of 1934, the margin between the prices of these grades and the prices of the lower grades is expected to widen materially, and will probably reach a maximum in the late summer of 1934.

In view of the relatively unfavorable position cattle now occupy, it is well for Virginia producers to seriously consider ways of helping themselves through means of saving on marketing costs and reducing supplies of low grade cattle that compete with good beef.

Recommendations. 1. Sell all poorly bred, nondescript calves as veals. The fact that fifteen calves can be shipped with each deck of lambs will aid this movement.

2. Increase cow herds where the feed supply justifies the practice.

3. Breed the type of cattle the markets demand.

4. Develop the Lancaster feeding section as an outlet for the stockers and feeders.

5. Support local and terminal cooperative marketing organizations in order to lower marketing costs.

HOGS

The 1933 spring pig crop for the United States was estimated at 51,030,000 head, which represents an increase of 3 percent over the 1932 spring pig crop. The June pig survey indicated an 8 percent increase in the number of sows to farrow in the fall of 1933. However, widespread drought in the corn belt, which curtailed the corn crop and created an unfavorable relationship between corn and hog prices during June, July and August, along with other developments, probably resulted in little, if any, increase over 1932 and possibly a decrease. The number of hogs in Virginia has decreased as a result of the short corn crop of 1932 and the low prices prevailing.

In late August the Department of Agriculture put into effect the emergency program designed to reduce market supplies during the 1933-1934 marketing year. Under this program 6,141,000 pigs weighing less than 100 pounds and about 221,000 sows weighing over 240 pounds that would farrow in the fall were purchased for slaughter and did not enter regular channels of distribution. It seems probable that without these purchases, hog supplies for the 1933-1934 marketing year would have shown an increase over the previous year. However, indications now point to a decrease of around 12 percent.

Federally inspected slaughter during the marketing year ending September 30 was the largest since 1928-1929. From May to September it was the second largest on record and storage accumulations during this period were the largest. However, light receipts of hogs, along with a processing tax imposed upon pork in storage, have encouraged processors to reduce stocks as much as possible before November 1.

The maintenance of present levels of employment and payrolls in 1934 should result in some improvement in demand for pork in 1934. Substantial improvement will depend upon further increases in buying power. Exports of pork products increased slightly over the previous year, but were still at low levels. The outlook for pork products in foreign markets continues unfavorable.

Curtailed slaughter supplies of hogs during the period October 1, 1933 to May 1, 1934 is expected to result in an advance in prices, the extent and time of the advance will depend upon the distribution of market supplies, demand and other factors.

Slaughter supplies of hogs for the 1934-1935 marketing year will depend largely on the corn-hog adjustment program. Some reduction was to be expected due to the short corn crop and the unfavorable relationship between corn and hog prices. Additional reduction will depend upon the cooperation of hog producers in the reduction plan, announced by the Department of Agriculture.

Recommendations. 1. Farmers should carefully study the corn-hog reduction program in order that they may know the benefits that may be derived and the effect it may have on their farming operations.

2. All farmers should produce sufficient hogs for home use. Methods of curing and canning should be emphasized which will provide an adequate supply of pork products throughout the year.

3. Hog producers should make maximum use of by-products of the farm, pasture and home-grown grains; use proper control measures for parasites and diseases; and market to best advantage.

SHEEP

Sheep numbers in the United States are now on the downward side of the production cycle. The peak in numbers was reached in 1931, following a period of nine years in which they increased more than 45 percent. The 1933 lamb crop was 2.5 percent smaller than the 1932 crop and the smallest since 1929. The decrease took place in the western area and was accounted for both by a reduced number of ewes and a lower percentage lamb crop.

In the western sheep states the length and the extent of the downward movement in sheep numbers will be determined largely by the number of ewe lambs for replacements during the next few years. Such replacements have been small during the past two years and the number of old ewes relatively large. Range and feed conditions and difficulties in financing have probably prevented normal replacements being made in 1933. No material change in sheep num-

bers in the native lamb area seems likely during the next few years.

The supply of lambs for slaughter during the remainder of the marketing year (up to May 1, 1934) is expected to be below that of the previous year.

Lamb prices advanced during May and have continued above the previous year throughout the season. The average price of good to choice Virginia graded lambs on the Jersey City market was $7.37 in 1932 and $8.65 in 1933.

World wool production has been large in recent years, but was smaller in 1933 than in 1932. Domestic mill activity has been at high levels since March and conditions in Europe have improved. Domestic wool prices have advanced more rapidly than foreign prices, resulting in an increase in imports of wool. Domestic wool prices during the remainder of 1933 and early in 1934 will depend largely on foreign wool prices and the relationship of the dollar to currencies in the principal exporting countries.

Lambs and wool offered one of the best sources of incomes for Virginia farmers during 1933 and appear to be in a favorable position during 1934.

Recommendations. 1. Increase the percentage of lambs grading good to choice by: (a) Docking and castrating all market lambs.

(b) Using only good purebred mutton type rams.

(c) Systematic treatment of the ewe flock and late lambs for stomach worms.

(d) Creep feeding early lambs.

(e) Adequate feeding of the ewes.

2. Market lambs and wool cooperatively.

3. Grade shipments of lambs.

DAIRY PRODUCTS

Dairying has been in a comparatively more favorable position than other agricultural pursuits during the last few years. The dairy markets were more stable; prices were relatively better; and production conditions were more conducive to profit. But this dairy situation is likely to be less favorable to dairy producers during the next two years. Today there are record stocks of dairy products in storage; consumer demand is low; production continues at a surplus building rate and more cows are being milked than ever before.

What strength exists in dairy market prices is due to the price-supporting measures being applied by the Agricultural Adjustment Administration. The further effectiveness of these influences, however, depends upon how much consumer purchasing power is improved. There is no immediate prospect of a sustained rise in dairy product prices. There are some indications, however, that improvement in dairy prices will lag behind the improvement in other farm product prices.

It is probable that the margin between the cost of dairy feeds and the price of dairy products will be relatively narrow during 1934. The acreage reduction, processing taxes, and other features of the AAA. will tend to keep feed prices relatively high.

These influences may cause a shift towards the milking of more cows, a lower production per cow on pasture, and an increased production in the summer over the winter months.

No pressure of foreign dairy supplies on our markets is contemplated this winter; neither is there much prospect of profitable foreign outlets for American dairy surpluses. Existing trade barriers and tariffs must be adjusted before American surpluses will flow more freely to foreign markets.

The supply of feed grains for the 1933-34 season is less than for any year since 1901. Allowing for farm stocks carried over from previous years, the total feed grain supply is 9 percent below the five-year average. With an increase in farm livestock numbers since 1930, there is now about 6 percent less feed per animal than in 1930. The supply of by-product feeds is less than last year and the average prices of all concentrates are about 50 percent higher than a year ago. Hay supplies are short in some areas, but an acute shortage is not anticipated, excepting possibly in those areas most seriously affected by drouth. Pastures were poorer in 1933 than in 1932, particularly in southern Virginia, and a more extensive pasture acreage is expected in the future as more contracted acres are taken out of crop production under the AAA.

The number of milk cows on dairy farms has increased 14 percent since 1926. With dairying relatively more profitable than other types of farming, it is likely that the number of milking cows will continue relatively large for the next year or two, unless measures are taken to help farmers dispose of unprofitable surplus cows.

Considered on a milk equivalent basis, there was a net decline of 2.7 percent in the consumption of butter, cheese, and condensed milk, taken in the aggregate, during the first nine months of 1933. This decrease is attributed to unemployment and low wages current among consumers. It is probable that the activities of the NRA and other recovery agencies, along with marketing codes under the AAA, will cause milk prices to be favorably adjusted and maintained, and consumption increased among the general public.

Recommendations. 1. The present unfavorable dairy situation is directly attributable to burdensome dairy surpluses in the country. Therefore, farmers are likely to find it to their ultimate advantage to reduce production to a practical minimum for their herds.

2. Under present conditions it will pay to feed grain only to those exceptionally high producing cows that will take grain at current market prices and convert it into additional profit in terms of milk and butterfat. It will not pay generally to feed grain to low producing cows.

3. Any adjustments made in the feeding, breeding or general management of the herd should be made in accordance with definite business records kept over a long period. Membership in the Dairy Herd Improvement Association should prove a good investment to those who must now make adjustments in their dairy operations.

4. With feed prices high and milk prices low, dairymen will realize a saving from a program of stringent culling in which the unprofitable low producing cows are removed from the herd.

5. Dairymen will find it profitable to feed grain according to production only to exceptionally high producing cows. Cows that cannot convert grain into milk and butterfat profitably, and that cannot be disposed of profitably, should be kept and fed on a lower cost ration of good hay and silage.

6. Under present conditions cream producers and some fluid milk producers find it advantageous to keep most of their farms in permanent grass and legumes, feeding very little, if any, grain to their herds and thus obtaining a lower but more profitable production from their herds from roughage rations.

7. It will not pay to raise calves from low producing cows. The dairyman will benefit by raising his own herd replacements only from his best cows and by the best purebred bulls.

8. With the narrow margin that exists between feed and milk prices, every dairyman should keep his cron production costs low and the productive efficiency of his herd high. Forage crops, grains and pasture produced at excessive cost are not likely to return much profit, no matter how efficient the herd may be.

9. Considering market conditions and the record storage holdings of all dairy products, there is little room for newcomers in the field of fluid milk production. Established fluid milk producers are now encountering extreme competition from all sections and new producers are likely to experience difficulty in becoming established in fluid milk markets under present conditions.

10. Cream production holds some promise of profit for dairymen who last year had an average production of 7,360 pounds of milk and 360 pounds of butterfat annually per cow; raise all the good roughage and most of the concentrates his herd requires; keep enough cows to justify cream deliveries at least twice each week; maintain high quality in the cream; and finally, keep enough hogs and poultry to consume all the skim milk profitably on the farm.

POULTRY PRODUCTS

The number of laying birds in farm flocks throughout the United States is about 1 percent greater than a year ago, and the number of pullets yet to come into production is about 5 percent greater. The number of layers will probably exceed 1933 during the late winter and early spring as the hatched pullets come into production. The number of birds on commercial poultry farms is probably about the same as last year.

Egg production during the winter is likely to be somewhat less than the number of birds would indicate because of higher feed prices. Production per bird should increase during the spring months, thereby, making the total egg production about the same as last year. Unless egg prices during late winter and early spring are higher than now seems probable, the number of chicks hatched next spring will be less than in 1933. The prospect is for a smaller number of pullets to come into production next fall.

In Virginia the number of laying birds in farm flocks is about 1 per cent less than a year ago. Commercial flocks are about the same as last year. Even with these reduced numbers of layers, Virginia poultrymen will meet strenuous competition from other sections of the country, particularly from the Pacific Coast.

The supply of poultry, other than broilers, for marketing during the first six months of 1934 will be about the same as a year ago. This is the result of more old hens and chickens on hand. With the level of the low prices offered for poultry, farmers will likely hold their birds for laying unless egg prices become low.

Because of high feed costs and lower prices being paid for broilers, there will likely be fewer broilers raised during the winter and early spring than in 1933.

Storage holdings of eggs are about 50 percent above a year ago and slightly above the five-year average. These stocks will influence the market during the winter months. With the low prices for refrigerator eggs, there is little or no profit in their sale and this will have an adverse effect upon the demand for eggs for storage during the spring.

Total holdings of frozen poultry are about 40 percent over last year and 8 percent over the five-year average. Holdings of broilers are about the same as a year ago. Holdings of fryers, however, are considerably above last year and holdings of fowl are nearly double what they were in 1932.

The consumption of eggs and poultry during 1933 was adversely affected by the reduced purchasing power of the mass of consumers. Even though consumption was fairly large, prices have been below the normal relationship to the supply on account of this reduced purchasing power. The curtailed ability of consumers to buy poul-

try products will probably continue during the forepart of 1934. The pay rolls of wage earners are about two-thirds of the average amount for 1923-25.

The prospect of any material improvement in consumer demand during the winter is not bright. Consumer purchasing power will improve as business conditions improve, and this should have a beneficial effect upon prices of eggs and poultry.

The returns available from the poultry flocks in this state are at present favorable in relation to most other farm enterprises. This situation will probably continue for a time and should be a stimulus to better feeding.

While the relation of the price of eggs and chickens to the price of feed is fairly favorable to production in this state, it is more favorable for other regions. The competition from these other regions, particularly the Middle West, will probably be of increasing intensity. Such competition will be greater for those producers in Virginia who are producing low grade poultry products and who do not have special outlets for their products.

Recommendations. From a study of these facts, the following conclusions are drawn:

1. Present conditions and the immediate outlook do not justify the development of new or the expansion of present enterprises in the state.

2. Present equipment may safely be used to its normal capacity.

3. The efficiency of the poultry flocks must be strengthened through better breeding, more timely hatching, and better methods of growing the poultry.

4. More attention must be given to the production of quality products.

5. Future development of the poultry industry in Virginia depends to a large extent upon the development of a marketing program which will give to Virginia poultry products a favorable position on the Eastern markets.

FARM LAND UTILIZATION

An editorial in The Weekly Kansas City Star (October 11) says: ". . . . The plan to take 40 million acres of land out of production of standard crops makes it necessary for farmers who cooperate in this venture to revise their methods of land utilization . . . . It is quite possible that the reduction in acreage of cultivated crops may result in the abandonment of continuous production of corn, wheat or cotton and establish a system of crop rotation. If resting the land or seeding it to soil-building crops demonstrates its advantage to farm operators who have not followed such practices, the experiment in controlling production will not be without benefit. The acute situation which has developed may justify methods that cannot be followed as a permanent practice. There is, however, a real need for a nation-wide plan in land utilization which ultimately will make it possible to grow forests on land not adaptable to grazing or crop production, grass on lands that will deteriorate if cultivated, and wheat, cotton, corn and tobacco on lands which are peculiarly adapted to those particular crops. This must be preceded by a survey which will indicate the most profitable use to which various areas can be put and followed by an intensive educational campaign which will result in land owners or operators making use of the salient features of such a survey."

After emptying a jar of canned fruits or vegetables, wash and dry the jar, put the top on, and set the jar on a shelf reserved for the purpose. When canning season arrives next year, much time and trouble in gathering and matching jars and covers will be saved.

ONE USE OF SPARE TIME

Assuming that America may not be feeding the World again for some time to come, assuming that some day before long profits *will* be divided more equitably, and that therefore we'll not have to work so long and hard and fruitlessly, what then? After we get out of this pickle, how will we putter away the promised *otium cum dignitate!*

Many uses of leisure have been mentioned. We've all read the list, from reading literature to roller-coasting; and perchance we can't make up our minds just what we would do if given the opportunity. So I have in mind emphasizing one thing in particular, one thing which in itself will take you far afield in books and mental travel and bring you returns innumerable and immeasurable, one thing which Virginia needs badly.

I speak of improving the home grounds.

I envy old countries. (Not to be taken too literally.) On every hand we hear the cry, "Save the American farmer from peasantry." But if what I read and hear and see in pictures is true, a Virginia road or rural village is wretched in comparison with peasant life in Europe or country life in England. I may be wrong. This much, however, is self-evident, regardless of old-country conditions: Virginia is afflicted with a multitude of pitiful homesteads.

Does this condition exist because the home owners are poor? No, I don't think so. I believe it is because they have lost sight of the beauty of Nature and orderliness, and the economy of proper construction and upkeep. This world has been money-mad long enough. It is time to face in a new direction. If farm life is drudgery, we have made it so ourselves by not bringing into it the magnificent and wholesome relief of art and beauty.

Allen Eaton, who spoke at the Country Life meetings here last summer, expresses the idea this way: "Of course, it is true that a certain economic return is essential to the support of any population, rural or urban; but America doesn't know yet what either the amount or the nature of that return should be. That is one of the things which is troubling all of us. This struggle for readjustment is not, as a lot of us seem to think, a purely economic one; it is quite as much — and I think more — a struggle to discover and to readjust ourselves to new social and cultural values . . . . We ought to know that values in country life cannot be truly measured by the economic yard stick only. Agriculture broadly speaking is not merely a way of making a living but largely a way of building a life . . . . Sooner or later the value of beauty comes in, beauty either created or enjoyed."

Where can beauty flourish to better advantage than outside under the sun along a Virginia roadside? It doesn't take a mansion or money. A will to make the most of what we have is all that is needed. But yet, one cannot drive for ten minutes along any road in Virginia without seeing some home grounds that could be vastly and inexpensively improved. Tall weeds cover the lawn. An ugly, irregular path leads to a lopsided porch. A scythe, a load of flat stone obtainable from a neighboring stream, and a few hours of work would remedy this slovenly condition.

Trees are cluttered with dead branches, and the shrub border, if there ever was one, with dead plants. Houses in warmer sections stand up from the ground, a shelter for brick-bats, clods and trash, while two rods away there is a wood crowded with shrubs which would serve admirably for screening these places.

Unsightly buildings stand bare to view while the countryside holds generous supplies of pines and poplars, honeysuckle and creepers. Gates are rickety, serving little purpose except to cause more work in their opening. Chickens swarm over the doorsteps. The vegetable garden seems poorly cared for. And an occasional border of flowers is the only expression which reaches above a meager existence.

Perhaps I do not know of what I speak. Perhaps the farmer gets enough of growing things. His days under the sun and surrounded by nature alone give him enough of her. The contrast offered by the home grounds may therefore be pleasing. Or perhaps he or any other member of the family just doesn't have time for "frills." I wonder. I wonder a lot. And I think of the homes of European peasants: Neat, clean, vine covered, surrounded by flowers and shrubs — a home, not just four walls and a roof.

Next year we will not have so much wheat, tobacco, cotton, corn and hogs to raise. There will be more opportunity for home grounds improvement. Nor do we lack equipment and material for a little landscaping. What do we lack, then? You answer that question. I am only advocating a slight addition to a program of living in exchange to a hard-fisted, grasping program of dying.

But we do not have to wait until next year. Winter months are comparatively idle ones, and much can be done about the home grounds from now until spring planting time, especially in warmer sections. Of course, it is too late to plant grass. This job really should be reserved for next fall, for spring planting is not recommended. However, farm buildings, the outside of the house, fences and gates can be repaired. In most parts of the state trees and shrubs can be transplanted any time during the dormant period without injury, if the work is done carefully. Cutting out dead limbs of trees and cleaning up in general furnish enough activity so that cool winds should not keep us from working out of doors.

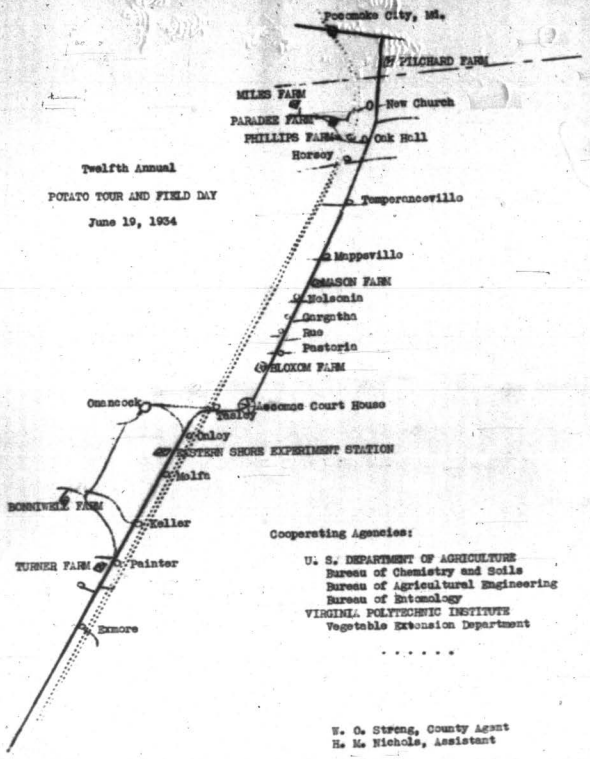
There are hundreds of things that can be done and ought to be done. When one really gets interested in work of this kind, it is usually difficult to find a good place to stop. One improvement leads to another; and in the end, we can still improve on the improvements.

One feels the need of some guidance even in landscape work on the smallest scale, though our forefathers who developed in the Old Doominion some of the finest examples of gardening, probably depended largely on their own imaginations and resources. Of course there are landscape architects and nurserymen qualified to help, but they hardly come into the picture when we speak of improvements at no cost. However, if you should be one to consider more elaborate improvements, it is well not to overlook expert advice. A nursery catalog, incidentally, contains a lot of valuable suggestions and information, especially for one who has undertaken a study of plants preparatory to any improvement activities. It will pay to get one. Sometime you may find an opportunity to add to your native collection some purchased nursery stock.

Transplanting, pruning, lawn care, flower and vegetable gardening and other elements of home grounds improvement all require a good deal of planning and forethought. The United States Department of Agriculture has anticipated this and has published bulletins on nearly every phase of home gardening and landscaping problems. These publications are available at state extension headquarters in Blacksburg.

—R. D. M.

When a country woman was asked if *one* should say a hen sits or a hen sets, she said: "That does not interest me in the least; the one thing that worries me is when my hens cackle. I don't know whether they have 'laid' or 'lied.'"



Cooperating Agencies:

U. S. DEPARTMENT OF AGRICULTURE
Bureau of Chemistry and Soils
Bureau of Agricultural Engineering
Bureau of Entomology
VIRGINIA POLYTECHNIC INSTITUTE
Vegetable Extension Department

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W. O. Streng, County Agent
H. M. Nichols, Assistant

COBBLER SEED SOURCE DEMONSTRATION

ACCOMACK COUNTY, VIRGINIA

TWELFTH ANNUAL POTATO TOUR AND FIELD DAY

June 19, 1934

Seed Plots Located On The Following Farms:

R. F. Mason, Mappsville, Va.
J. L. Turner, Painter, Va.
G. C. Bonniwell, Harborton, Va.
Eastern Shore Experiment Station,
Onley, Va.

* *

W. O. Strong, County Agent
H. M. Nichols, Assistant

INTRODUCTION

Cobbler Seed Source Demonstration

There are four seed source demonstration plots located in Accomack County as shown by reports on the following pages. In these plots are included Cobbler seed from the principal commercial seed-growing districts.

None of the seed were treated before planting as this is not customary with local growers. It was thought desirable to handle this work as nearly like average farm practice as possible. However, in an effort to improve the stand, the stem end eye of the potato was discarded when cut.

The disease counts were made on June 12 and 13, by Dr. Harold T. Cook, Plant Pathologist of the Virginia Truck Experiment Station. No spindle tuber counts are recorded; however, strains showing a large number of spindle tuber type plants are indicated in the individual plots.

A study of the enclosed data shows conclusively how good certified seed, intelligent use of fertilizer, and careful cultural practices influence stand and yield, thus lowering the cost per unit of production - the first step in successful marketing.

Potato Insect Control

Since potato insects, particularly flea beetles, have been doing so much damage in the upper part of Accomack County and appear to be migrating southward, a very intensive experiment is being conducted in an effort to test various available materials and new materials which may become of commercial importance. Time of application and number of applications of these materials, both in dust and spray form, are being studied. The plots are replicated three times on two farms on a small scale. The most promising materials are being tested this year on a commercial scale with traction dusters and sprayers.

Bean Beetle Control

As beans are fast becoming one of the chief cash crops on the Eastern Shore and bean beetle control is a very important factor in bean production, a large experiment is being conducted at the Eastern Shore Branch of the Virginia Truck Experiment Station in cooperation with the U. S. Department of Agriculture, Bureau of Entomology, to determine the most effective means of control.

Fertilizer Application

During the past two or three years it has been noted that certain methods of applying fertilizer decidedly improve the yield. Therefore, the Bureaus of Chemistry and Soils and Agricultural Engineering of the U. S. Department of Agriculture are cooperating with the Virginia Truck Experiment Station in an intensive study at the Eastern Shore Branch along this line.

STRAINS AND SOURCES OF SEED USED IN TEST PLATS - 1934

Strain	Grower or Source
1. Stem Eyes	
2. P. E. I.	Prince Edward Island; furnished through courtesy of E. S. of Va. Produce Exchange
3. P. E. I., Home Grown	C. M. Wise, Onancock, Va.
4. Maine	C. E. Hussey and Son, Presque Isle, Me.
5. Maine, #1	John Prescott, Island Falls, Maine
6. Maine, #2	John Prescott, Island Falls, Maine
7. Maine, Ho. Gr.	G. F. Johnson, Onancock, Va.
8. South Dakota	John Raitke, Watertown, South Dakota
9. South Dakota	E. A. Fletcher, Garden City, South Dakota
10. North Dakota	A. B. Thompson, Grafton, North Dakota
11. North Dakota	R. L. Douglas, Park River, North Dakota
12. North Dakota	Jens Letnes, Hillsboro, North Dakota
13. North Dakota	L. Aafedt, Fordville, North Dakota
14. North Dakota	J. L. Whitnack, Moorhead, Minnesota
15. North Dakota	H. A. Hoesley, Crystal, North Dakota
16. North Dakota, Ho. Gr.	C. D. Hutchinson, Onley, Va.
17. Minnesota	C. E. Leedy, St. Paul, Minnesota
18. Vermont	H. A. Joslyn, East Hardwick, Vermont
19. Nova Scotia, #47	Agricultural Experiment Station, Truro, N.S.
20. Nova Scotia	W. A. Fleming, Truro, N. S.
21. New York	Porter and Rooney, Elba, New York
22. New York	B. Cottrall, Homer, New York
23. Katahdin, Chippewa, Golden, and Numbered Varieties	U. S. Department of Agriculture

Note: South Dakota samples and a number of North Dakota samples furnished through courtesy of Seaboard Produce Distributors, Inc., Onley, Va.

P. E. I. and Nova Scotia samples furnished through courtesy of E. S. of Virginia Produce Exchange.

DESCRIPTION OF SEED JUST BEFORE PLANTING

March 25, 1934

Strain	Size	Sprout Length (8ths)	Mature	Immature	Firm	Extra	Medium	Air Crack	Date Recd	Place Stored
1. Stem Eyes										
2. P. E. I.	M-L	1	x	-	x	-	-	-	3-15	P. E. I.
3. P.E.I.,Ho.Gr.,C.M.Wise	S-M	-	-	x	x	-	-	-	3-17	Onancock, Va.
4. Me., Hussey and Son	S-L	2	x	-	x	-	-	tr	3-18	Presque Isle, Me.
5. Me., Prescott #1	M-L	1	x	-	x	-	-	tr	3-8	Island Falls, Me.
6. Me., Prescott #2	S	1	x	-	x	-	-	tr	3-8	Island Falls, Me.
7. Me., Ho.Gr.,Johnson	S-M	1	-	x	x	-	-	-	3-18	Onancock, Va.
8. S.Dak., J. Radtke	M-L	3	x	-	x	-	-	tr	3-10	Eastville, Va.
9. S.Dak., E.A.Fletcher	M	3	x	-	-	-	x	tr	3-18	Garden City, S. Dak.
10. N.Dak., A.B.Thompson	M-L	2	x	-	x	-	-	tr	3-10	Eastville, Va.
11. N.Dak., R.L.Douglas	L	2	x	-	x	-	-	tr	3-10	Eastville, Va.
12. N.Dak., Jens Letnes	S-M	1	x	-	-	x	-	tr	3-17	Hillsboro, N.Dak.
13. N.Dak., L. Aafedt	S-M	1	x	-	-	-	x	tr	3-10	Eastville, Va.
14. N.Dak., J. L.Whitmack	S-M	1	x	-	x	-	-	tr	3-17	Moorhead, Minn.
15. N.Dak., H. A. Hoesley	M-L	1	x	-	x	-	-	tr	3-17	Crystal, N. Dak.
16. N.Dak., Ho.Gr.,Hutchinson	S-M	1	-	x	x	-	-	-	3-17	Onley, Va.
17. Minn., C. E. Leedy	S-M	tr	x	-	-	x	-	tr	3-15	St.Paul, Minn.
18. Vt., H. A. Joslyn	M	2	x	-	x	-	-	tr	3-8	East Hardwick, Vt.
19. Nova Scotia, #47	M	2	x	-	x	-	-	tr	3-15	Truro, Nova Scotia
20. Nova Scotia	M	2	x	-	x	-	-	tr	3-15	Truro, Nova Scotia
21. N.Y.,Porter and Bonney	S-L	1	x	-	-	x	-	tr	3-16	Elba, N. Y.
22. N.Y., B. Cottrell	S-M	1	x	-	x	-	-	tr	3-16	Homer, N. Y.

R. Finney Mason, Mappsville, Va.
Planted with New Iron Age Planter With Spacer Attachment - 4/18/34
Rows 95' Long, 30" Apart, Seed 14" in Row.

Source Of Seed	Missing Hills: Total	Rot	Dead Eye	No Eye	Weak	Lost	Br. Stem	Diseased Hills: Total	Mosaic	Leaf Roll	Sp. T. T.	B. L.	Rhiz.	Weak	Injury
1. Stem Eyes	5	4	-	1	-	-	-	1	-	1	*	-	-	6	-
2. Check	2	2	-	-	-	-	-	0	-	-	*	-	-	-	-
3. P. E. I.	1	1	-	-	-	-	-	0	-	-	-	-	-	-	-
4. P.E.I.,Ho.Gr.,C.M.Wise	4	3	-	1	-	-	-	0	-	-	-	-	-	-	-
5. Me., #1, J. Prescott	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
6. Me., #2, J. Prescott	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
7. Me.,Ho.Gr.,G.T.Johnson	4	4	-	-	-	-	-	0	-	-	-	-	-	-	-
8. Check	4	4	-	-	-	-	-	1	-	1	-	-	-	2	-
9. S.Dak., J. Radtke	21	21	-	-	-	-	-	0	-	-	*	-	-	-	3
10. S.Dak., E. A. Fletcher	3	3	-	-	-	-	-	0	-	-	-	-	-	-	-
11.					-	-	-								
12. N.Dak., R. L. Douglass	9	[illegible]	-	-	-	-	-	0	-	-	-	-	-	-	-
13.															
14. N.Dak., L. Aafedt	6	6	-	-	-	-	-	0	-	-	-	-	-	-	-
15.															
(16. N.Dak., H. A. Hoesley	6	6	-	-	-	-	-	0	-	-	-	-	-	1	-
(* Stone Marker															
17. N.Dak., Ho.Gr.,Hutchinson	3	3	-	-	-	-	-	3	3	-	-	-	-	-	-
18. Check	2	2	-	-	-	-	-	0	-	-	-	-	-	1	-
19. Minn., C. E. Leedy	1	1	-	-	-	-	-	0	-	-	-	-	-	-	-
20. Vt., H. A. Joslyn	1	1	-	-	-	-	-	0	-	-	-	-	-	-	-
21. Nova Scotia, #47	13	13	-	-	-	-	-	0	-	-	-	-	-	3	-
22. Nova Scotia	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
23. N.Y., Porter and Bonney	4	4	-	-	-	-	-	0	-	-	-	-	-	-	-
24. N.Y., B. Cottrell	4	4	-	-	-	-	-	0	-	-	-	-	-	-	-
25. Check	1	1	-	-	-	-	-	2	-	-	-	-	-	-	-
26. Chippewa															
27. Katahdin															
28. Golden															
29. 366															
30. 41914															
31. 45075															
32. 45656															
33. 44073															
34. 366, 44639 (12 pc.), 44605															
7 rows Spalding Rose	Florida, 1934, Dug 12 days before planting														
1 row Vermont															
3 rows Nova Scotia															

*Many spindle tuber type hills

Check - Maine, Hussey and Son

Eastern Shore Experiment Station - Onley, Va.
Planted and Fertilized with New Iron Age Planter With Spacer Attachment
Planted 3/31/34; Rows 30" Apart, Seed 15" in Row
Rows 106' long

Source Of Seed	Missing Hills: Total	Rot	Dead Eyo	No Eye	Weak Sp.	Lost	Br. St.	Diseased Hills: Total	Mosaic	Leaf Roll	Sp. T. T.	B. L.	Rhiz.	Weak	Injury
1. Stem Eyes	16	16	-	-	-	-	-	0	-	-	-	-	-	-	-
2. Ck., Me., Hussey & Son	10	10	-	-	-	-	-	1	-	-	-	1	-	-	-
3. P. E. I.	12	12	-	-	-	-	-	0	-	-	-	-	-	-	-
4. P.E.I., Ho.Gr., C.M.Wise	3	3	-	-	-	-	-	0	-	-	-	-	-	-	-
5. Me., #1, J. Prescott	3	3	-	-	-	-	-	0	-	-	-	-	-	1	-
6. Me., #2, J. Prescott	2	2	-	-	-	-	-	0	-	-	-	-	-	-	-
7. Me., Ho.Gr., G.F.Johnson	2	2	-	-	-	-	-	4	-	4	-	-	-	-	-
8. Check	5	5	-	-	-	-	-	1	-	-	-	1	-	-	-
9. S.Dak., J. Radtke	1	1	-	-	-	-	-	0	-	-	-	-	-	1	-
10. S.Dak., E.A.Fletcher	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
11. N.Dak., A.B.Thompson	7	7	-	-	-	-	-	1	1	-	-	-	-	-	-
12. N.Dak., R.L.Douglass	9	9	-	-	-	-	-	0	-	-	-	-	-	2	-
13. N.Dak., Jens Letnes	4	4	-	-	-	-	-	1	1	-	-	-	-	-	-
14. N.Dak., L. Aafedt (Far North)	4	4	-	-	-	-	-	0	-	-	-	-	-	-	-
15. N.Dak., J. L. Whitneck	4	4	-	-	-	-	-			-	-	-	-	-	-
16. N.Dak., H. A. Hoesley	2	2	-	-	-	-	-	0	-	-	-	-	-	-	-
17. N.Dak., Ho.Gr., Hutchinson	5	5	-	-	-	-	-	1	1	-	-	-	-	-	-
18. Check	2	2	-	-	-	-	-	1	-	-	-	1	-	-	-
19. Minn., C. E. Leedy	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
20. Vt., H. A. Joslyn	1	1	-	-	-	-	-	3	-	3	-	-	-	-	-
21. Nova Scotia, #47	2	2	-	-	-	-	-	0	-	-	-	-	-	-	-
22. Nova Scotia	4	4	-	-	-	-	-	0	-	-	-	-	-	-	-
23. N.Y., Porter & Bonney	2	2	-	-	-	-	-	1	-	-	-	-	-	1	-
24. N.Y., B. Cottrell	7	7	-	-	-	-	-	[illegible]	-	-	-	-	-	2	-
25. Check	13	13	-	-	-	-	-	3	-	2	-	1	-	-	-
26. S 44605															
27. Katahdin, 42667															
28. S 41914															
29. 44639															
30. 45656															
31. 366															
32. Chippewa, 42672															
33. Golden, 44428															
34. 44073															
35. 45075															
36. 46335A, 45685, 45694, 45697, 46243, 46244, 46251, 46255, 46271, 46272, 46288C, 46331, 46332 (2pc.), 46376, 46385, 46413, 46431 46466															

Check - C. E. Hussey and Son, Maine

G. C. Bonniwell, Harborton, Va.
Planted By Hand - 3/31/34
Rows 30" Apart, Seed 18" in Row, Rows 100'

Source Of Seed	Missing Hills: Total	Rot	Dead Eye	No Eye	Weak Sp.	Lost	Br. Stem	Diseased Hills: Total	Mosaic	Leaf Roll	Sp. T. T.	B. L.	Rhiz.	Weak	Injury
1. Stem Eyes	9	9	-	-	-	-	-	0	-	-	-	-	-	-	-
2. Check	2	-	2	-	-	-	-	0	-	-	-	-	-	-	-
3. P. E. I.	1	-	1	-	-	-	-	1	1	-	-	-	-	1	-
4. P.E.I., HoGr., C.M.Wise	1	1	-	-	-	-	-	0	-	-	-	-	-	1	-
5. Me., #2, J. Prescott	1	1	-	-	-	-	-	0	-	-	-	-	-	-	-
6. Me., #1, J. Prescott	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
7. Me., Ho.Gr., G.T.Johnson	2	2	-	-	-	-	-	1	-	1	-	-	-	2	-
8. Check	2	2	-	-	-	-	-	0	-	-	-	-	-	-	-
9. S.Dak., J. Radtke	1	1	-	-	-	-	-	0	-	-	-	-	-	-	-
10. S.Dak., E.A.Fletcher	2	2	-	-	-	-	-	0	-	-	-	-	-	-	-
11. N.Dak., A. B. Thompson	16	16	-	-	-	-	-	0	-	-	-	-	-	2	-
12.															
13. N.Dak., Jens Letnes	9	9	-	-	-	-	-	0	-	-	-	-	-	-	-
14. N.Dak., L. Aafedt (Far North)	22	22	-	-	-	-	-	0	-	-	-	-	-	-	-
15. N.Dak., J. L. Whitnack	0	-	-	-	-	-	-	1	1	-	-	-	-	1	-
16. N.Dak., H. A. Hoesley	0	-	-	-	-	-	-	3	-	3	-	-	-	-	-
17. N.Dak., Ho.Gr., Hutchinson	1	1	-	-	-	-	-	2	2	-	-	-	-	-	-
18. Check	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
19. Minn., C. E. Loody	2	2	-	-	-	-	-	0	-	-	-	-	-	-	-
20. Vt., H. A. Joslyn	1	1	-	-	-	-	-	0	-	-	-	-	-	-	-
21. Nova Scotia, #47	7	7	-	-	-	-	-	0	-	-	-	-	-	1	-
22. Nova Scotia	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
23. N.Y., Porter and Bonney	0	-	-	-	-	-	-	0	-	-	-	-	-	1	-
24. N.Y., B. Cottrell	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
25. Check	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-

Check - Maine, C. E. Hussey and Son

J. L. Turner, Painter, Va.
Planter, New Iron Age - Fertilizer, Royster
Rows 212' long, 31" apart, Seed 15 in. in Row, 50 lbs. Fertz. per Row
Planted 4/3/34

STATE ROAD → Source of Seed	Missing Hills: Total	Rot	Dead Eye	No Eye	Weak Sp.	Lost	Br. Stem	Diseased Hills: Total	Mosaic	Leaf Roll	Sp. T.	B. L.	Rhiz.	Weak	Injury
1. Ck., Me., Hussey & Son	7	-	-	1	-	6	-	0	-	-	-	-	-	-	-
2. P. E. I.	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
3. P.E.I., Ho.Gr.-C.M.Wise	1	-	-	-	-	1	-	1	-	1	-	-	-	-	-
4. Me., #1, J. Prescott	1	-	-	-	-	1	-	5	5	-	-	-	-	-	-
5. Me., #2, J. Prescott	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
6. Me., Ho.Gr.-G.T.Johnson	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
7. Check	5	1	-	4	-	-	-	0	-	-	-	-	-	-	-
8. S.Dak., J. Radtke	8	2	-	-	-	6	-	1	1	-	-	-	-	-	-
9. S.Dak., E.A.Fletcher	2	-	-	-	-	2	-	0	-	-	-	-	-	-	-
10. N.Dak., A.B.Thompson	6	5	-	1	-	-	-	1	-	-	-	1	-	-	-
11.															
12. N.Dak., Jens Lotnes	6	4	-	2	-	-	-	3	3	-	-	-	-	-	-
~~13. N.Dak., L. Aafedt (PerNth)~~	~~50~~	~~45~~	~~-~~	~~-~~	~~-~~	~~5~~	~~-~~	~~1~~	~~-~~	~~1~~	~~-~~	~~-~~	~~-~~	~~6~~	~~-~~
14. N.Dak., J.L.Whitnack	6	4	-	-	-	2	-	0	-	-	-	-	-	1	-
15. N.Dak., H.A.Hoesley	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
16. N.Dak., Ho.Gr., Hutchinson	1	-	-	-	-	1	-	1	1	-	-	-	-	-	-
17. Check	3	-	-	-	-	3	-	0	-	-	-	-	-	2	-
18. Minn., C. E. Leedy	1	1	-	-	-	-	-	1	1	-	-	-	-	-	-
19. Vt., H. A. Joslyn	0	-	-	-	-	-	-	0	-	-	-	-	-	-	-
20. Nova Scotia, #47	4	-	-	-	-	4	-	0	-	-	-	-	-	-	-
21. Nova Scotia	4	1	-	1	-	2	-	0	-	-	-	-	-	-	-
22. N.Y., Porter and Bonney	3	-	-	-	-	3	-	0	-	-	-	-	-	-	-
23. N.Y., B. Cottrell	1	-	-	1	-	-	-	0	-	-	-	-	-	-	-
24. Check	6	1	-	-	-	5	-	1	-	1	-	-	-	-	-

Check - Maine, Hussey and Son

GERMINATION COUNTS

1934

Source of Seed	Total No. Hills	% Miss. Hills	Causes of Missing Hills			
			% Rot	% Dead Eye	% No Eye	% Lost
1. Stem Eyes	233	12.87	12.44	0.00	0.43	0.00
2. Check, Mo., Hussey & Son	1612	3.97	2.67	0.12	0.31	0.87
3. P. E. I.	403	3.47	3.22	0.25	0.00	0.00
4. P. E. I., Mo.Gr., Wise	403	2.24	1.74	0.00	0.25	0.25
5. Mo., #1, J. Prescott	403	0.99	0.74	0.00	0.00	0.25
6. Mo., #2, J. Prescott	403	0.74	0.74	0.00	0.00	0.00
7. Mo., Mo.Gr., Johnson	403	1.99	1.99	0.00	0.00	0.00
8. S.Dak., J. Radtke	403	7.69	6.21	0.00	0.00	1.48
9. S.Dak., E. A. Fletcher	403	1.73	1.24	0.00	0.00	0.49
10. N.Dak., A. B. Thompson	322	9.00	8.69	0.00	0.31	0.00
11. N.Dak., R. L. Douglass	166	10.85	10.85	0.00	0.00	0.00
12. N.Dak., Jens Letnes	322	5.90	5.28	0.00	0.62	0.00
13. N.Dak., L. Anfedt (Fairforth)	403	20.35	19.11	0.00	0.00	1.24
14. N.Dak., J. L. Whitnack	322	3.15	2.49	0.00	0.00	0.62
15. N.Dak., H. A. Moseley	403	1.99	1.99	0.00	0.00	0.00
16. N.Dak., Mo.Gr., Hutchinson	403	2.48	2.23	0.00	0.00	0.25
17. Minn., C. E. Leedy	403	0.99	0.99	0.00	0.00	0.00
18. Vt., H. A. Joslyn	403	0.74	0.74	0.00	0.00	0.00
19. Nova Scotia, #47	403	6.45	5.46	0.00	0.00	0.99
20. Nova Scotia	403	1.99	1.24	0.00	0.25	0.50
21. N. Y., Porter and Bonney	403	2.22	1.48	0.00	0.00	0.74
22. N. Y., B. Cottrell	403	2.98	2.73	0.00	0.25	0.00

DISEASE COUNTS

1934

Source Of Seed	Total Plants	%Diseased Plants	% Various Diseases: Mosaic	Leaf Roll	Sp. Tuber	Black Leg	% Weak Plants
1. Stem Eyes	233	5.58	0.00	0.43	5.15	0.00	2.58
2. Sk., Me., Hussey and Son	1612	1.11	0.13	0.13	0.60	0.25	0.31
3. P. E. I.	403	0.50	0.25	0.00	0.25	0.00	0.25
4. P. E. I., Ho.Gr., Wise	403	0.74	0.00	0.25	0.49	0.00	0.25
5. Me., #1, J. Prescott	403	1.49	1.24	0.00	0.25	0.00	0.25
6. Me., #2, J. Prescott	403	0.49	0.00	0.00	0.44	0.00	0.00
7. Me., Ho.Gr., Johnson	403	3.47	0.00	1.24	2.23	0.00	0.49
8. S.Dak., J. Radtke	403	3.72	0.25	0.00	3.47	0.00	0.25
9. S.Dak., E. A. Fletcher	403	0.49	0.00	0.00	0.49	0.00	0.00
10. N.Dak., A.B.Thompson	322	1.24	0.31	0.00	0.62	0.31	0.62
11. N.Dak., R. L. Douglass	166	0.00	0.00	0.00	0.00	0.00	1.20
12. N.Dak., Jens Letnes	322	1.55	1.24	0.00	0.31	0.00	0.00
13. N.Dak., L. Aafedt	403	0.99	0.00	0.99	0.00	0.00	1.48
14. N.Dak., J.L.Whitnack	322	1.24	0.31	0.00	0.93	0.00	0.62
15. N.Dak., H. A. Hoesley	403	0.74	0.00	0.74	0.00	0.00	0.25
16. N.Dak., Ho.Gr., Hutchinson	403	3.22	1.74	0.00	1.48	0.00	0.00
17. Minn., C. E. Leedy	403	0.25	0.25	0.00	0.00	0.00	0.00
18. Vt., H. A. Joslyn	403	0.99	0.00	0.74	0.25	0.00	0.00
19. Nova Scotia, #47	403	0.74	0.00	0.00	0.74	0.00	0.99
20. Nova Scotia	403	0.25	0.00	0.00	0.25	0.00	0.00
21. N.Y., Porter & Bonney	403	0.25	0.00	0.00	0.25	0.00	0.49
22. N.Y., B. Cottrell	403	0.00	0.00	0.00	0.49	0.00	0.49

1933 YIELDS - CORELER SEED SOURCE DEMONSTRATION

The average yield of the five source-of-seed plots in 1933 is given below. The number in parentheses directly after the name of each strain denotes the number of plots in which that particular strain occurred.

Average of All Plots

Source of Seed		Yield - Bushels Per Acre		
		Primes	Seconds	Total
1. N.Y., Porter and Bonney	(2)	139.0	34.3	171.3
2. S.Dak., Stein	(5)	132.4	38.0	170.4
3. Mo., Prescott	(5)	128.4	42.3	170.7
4. S.Dak., Radtke	(5)	126.6	31.4	158.0
5. Mo., Prescott #2	(5)	123.6	38.8	162.4
6. Mo., Corliss	(5)	123.1	32.3	155.4
7. Mo., Hussey	(5)	121.7	34.5	156.2
8. S.Dak., Parker	(5)	121.6	36.9	158.5
9. N.Dak., Thompson (A. B.)	(5)	120.3	33.4	153.7
10. N.Dak., Thompson (J.)	(5)	117.3	30.9	148.2
11. Wis., Miller	(5)	114.2	32.1	146.3
12. N. Y., Cottrell	(5)	108.6	42.3	150.9
13. S.Dak., Kornmann	(5)	109.2	24.6	133.8
14. Wis., Zeloski	(5)	108.0	35.4	143.4
15. Mich.,	(5)	105.7	41.2	146.9
16. N.Dak., Douglass	(5)	105.7	31.7	137.4
17. Mo., Home Grown	(5)	104.4	25.9	130.3
18. S.Dak., Rodlin	(5)	97.2	33.7	130.9
19. S.Dak., Home Grown	(5)	95.8	20.5	116.3
20. N.Y., Hollenbeck	(5)	94.7	27.5	122.2
21. P. E. I., Home Grown	(5)	95.3	18.7	114.0
22. Md., Dukes	(5)	90.7	18.3	109.0
23. N.Y., Rogers	(5)	75.0	37.5	112.5
24. N.Y., Wilson	(4)	53.4	25.1	78.5
Average		108.7	32.0	140.7

Yields ranged from 53.4 to 137.0 bushels of primes per acre, a difference of 83.6 bushels between the best and poorest strains. The average yield for all strains included in the plots was 108.7 bushels of primes per acre. Yields varied from 55.3 bushels below the average to 28.3 bushels above the average. This variation can be charged largely to source of seed.

1933 YIELD - COMPARISON OF CERTIFIED AND HOME-GROWN SEED

The plots again emphasized the superiority of certified seed over home-grown seed, as illustrated by the following table:

Source of Seed	Yield - Bushels Per Acre Primes	Seconds	Total
Maine (Av. of 4 strains)	124.8	37.0	161.8
Maine, Home Grown	104.4	25.9	130.3
S.Dak.,(Av.of 5 strains)	117.4	32.9	150.3
S.Dak.,Home Grown	95.8	20.5	116.3
Average - Certified	120.8	34.9	155.7
Average - Home Grown	100.1	23.2	123.3

The difference in yield in favor of certified seed averaged 20.7 bushels of primes per acre, due largely to the later maturity of home-grown seed and to the greater prevalence of disease in home-grown seed. That this superiority of certified seed is not due just to factors operating this year is clearly demonstrated by the records of the past eight years, summarized in the following table:

Source of Seed	Yield Bushels Primes Per Acre
Maine, Certified	212
Maine, Home Grown	176
S.Dak., Certified	230
S.Dak., Home Grown	190
Average - Certified	221
Average - Home Grown	183

It will be noted from the above that the difference in yield in favor of certified seed over home-grown seed has averaged 38 bushels of primes per acre over an eight-year period.

FLEA BEETLE CONTROL EXPERIMENT

Conducted On
The B. P. Paradee and David Miles Farms, near Mlona, Va.
By L. D. Anderson, Assistant Entomologist
Virginia Truck Experiment Station

INSECTICIDES USED

Sprays

1. Calcium arsenate - Bordeaux	*2-2-3-50
2. Calcium arsenate - Bordeaux	2-4-6-50
3. Calcium arsenate - Bordeaux	2-6-9-50
4. Calcium arsenate - Bordeaux - Zinc sulphate	2-2-2-5-50
5. Lead arsenate - Bordeaux	2-4-6-50
6. Zinc arsenate - Bordeaux	2-4-6-50
7. Lead arsenate - Calcium arsenate - Bordeaux	1-1-4-6-50
8. Bordeaux	4-6-50
9. Calcium arsenate - Zinc sulphate - Lime	2-4-4-50
10. Calcium arsenate	2-50
11. Lead arsenate	2-50
12. Calcium arsenate - Basic Copper Sulphate	2-2-50
13. Pyrox - Calcium arsenate	8-2-50

*2 lbs. calcium arsenate, 2 lbs. copper sulphate, 3 lbs. lime, 50 gals. water

Dusts

14. Lead arsenate - Lime	1-1
15. Calcium arsenate - Lime	1-1
16. Calcium arsenate - Zinc sulphate - Lime	1-1-1
17. Dutox - Lime	1-3
18. Calcium arsenate - Copper - Lime	1-1-3
19. Sulphur - Pyrethrum	3-1
20. Check	

Time and Number of Applications

A Bordeaux-Calcium Arsenate spray is being tried in a series of combinations of time of application and number of applications to determine, if possible, the best time and number of times to treat.

Treatments with Traction Equipment

In order to test the efficiency of sprays and dusts on a commercial scale in controlling flea beetles, Kopotox and Lead Arsenate and Lime dusts, as well as Calcium Arsenate and Bordeaux spray, are being used. The equipment is a Niagara one-horse, 6-nozzle Traction Duster, and a "Red Jacket" 4-row, 3-nozzle-per-row Traction Sprayer.

Seed Treatment

A seed treatment test is being made to determine whether this has any effect on the amount of flea beetle larval injury to the tubers. Corrosive Sublimate (4 oz. to 30 gals.), Formaldehyde (1 pt. to 30 gals.), Semesan Bel (1 lb. to 2-1/2 gals.), were the materials used. Previous seasons' work indicates that seed treatment decreases larval injury, but results for this season will not be available until time of harvest.

Past experience indicates that mixtures containing copper, lime, and a stomach poison greatly improve the crop.

TWELFTH ANNUAL EASTERN SHORE OF VIRGINIA POTATO FIELD DAY, JUNE 19, 1934

Purpose: To bring about a better understanding among seed producers, dealers, farmers who grow table stock and seed, and others interested in the potato industry; and to observe and study potato and other demonstrations and experiments.

SCHEDULE

9.30 a. m. Assemble at the B. P. Paradee Farm, 3 miles west of New Church, Va.
10.45 a. m. Observe potatoes planted in Twin Rows, E. R. Phillips Farm, New Church, Va.
11.15 a. m. Stop at Seed Source Plot, R. Finney Mason Farm, Mappsville, Va.
(Those south of Painter attending the Field Day should observe J. L. Turner's Plot, at Painter, and G. C. Bonniwell's Plot, Pungoteague, Va.)
11.45 a. m. Arrive at Eastern Shore Experiment Station, Onley, Va.
12.00 Noon Lunch, served by ladies of the Onley Community Organization.
1.30 p. m. Program of Speeches:
Address of Welcome - Hon. B. T. Gunter, President of the Governing Board, Va. Truck Experiment Station
Discussion of Experimental Work - Director H. H. Zimmerley, Virginia Truck Experiment Station
Agricultural Credit - Captain C. R. Arnold, Farm Credit Adm'n.
A. A. A. Program - J. H. Quisenberry, Dist. Agrl. Agent
Machine Placement of Fertilizers - G. A. Cumings, U. S. D. A., Bureau of Agricultural Engineering
3.30 p. m. Machinery demonstrations and observation of Experiment Station Plats

EXPERIMENTS

(1) Lime Bean Fertilizer Placement Experiment
(2) Source of Nitrogen and Neutral vs Acid Reacting Fertilizers Experiment
(3) Lime Experiment (6 forms of lime used)
(4) Fertilizer Placement Experiment (U. S. D. A. Cooperating)
Methods of Placement:
Fertz. Key No.
6-8-6 : 15-12-10

(A)	(B)	
1	9	In mark, lightly mixed with soil
2	10	In mark, mixed well with soil
3	11	On each side in narrow bands, 2" away from seed piece, on same level
4	12	On each side, 2" away and 2" below level of seed piece
5	13	On each side, 4" away, on level with seed piece
6	14	On each side, 1" away, on level with seed piece
7	15	Underneath, 4" band, covered with 1" of soil
8	16	Local method - applied in furrow, 15" band, cultivated and planted as separate operation
	17	Check - No fertilizer

EXPERIMENTS

(Cont'd.)

(5) Sweet Potato Experiments:
  (a) Plant Spacing Test
  (b) Triangulation Fertilizer Experiment With Porto Ricos
  (c) Sprout Treatment Experiment
(6) Nitrogen and Potash Study (U. S. D. A. Cooperating)
(7) 6-6-5 Brands Test (Each brand is represented by a single row 87' long, replicated 6 times)
(8) Strawberry Variety Test
(9) Bean Beetle Control Experiment (U. S. D. A., Bureau of Entomology Cooperating) 152 Plats
(10) Twin-Row Method of Planting Potatoes
(11) Source-of-Seed Test Plot
(12) Nutritional Experiment (Fertilizer reinforced with magnesium, copper, zinc, manganese, etc.)

DEMONSTRATIONS

(1) Spraying and Dusting (2) Soil Testing (3) Grading

EXHIBITS

(1) Specimens of Irish Cobbler Seed Used In Source-of-Seed Demonstration Plats
(2) Economic Insect Exhibit With Special Reference to the Mexican Bean Beetle and Japanese Beetle
(3) Potato Machinery Exhibit, Including Planters, Fertilizer Distributors, Sprayers, Dusters, Graders, Etc.

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Other Important Meetings:

(1) Worcester County, Maryland, Potato Tour and Field Day, Pilchard Farm, Pocomoke, Md. June 20

(2) Meeting of Northeastern Section of American Society of Agronomy, New Brunswick, New Jersey June 21-22
(This meeting will include a tour of the potato-growing district)

MAKE YOURSELF AT HOME ASK QUESTIONS

COME AGAIN

FARMERS' FIELD DAY - JUNE 19, 1934

Eastern Shore Experiment Station - Painter, Virginia

I. LIMA BEAN FERTILIZER PLACEMENT EXPERIMENT

Plat No.	
1	1000 lbs. per acre broadcast nine days before planting
2	Same as No. 1, immediately before planting
3	500 lbs. per acre broadcast nine days before planting
4	500 lbs. per acre broadcast immediately before planting
5	1000 lbs. of side-dressing after plants were up
6	1000 lbs. in row, cultivated in
7	500 lbs. in row, cultivated in
8	1000 lbs. on surface above seed after planting
9	1000 lbs. in band 3-1/2 in. wide, 1 in. below seed
10	1000 lbs. in band 3-1/2 in. wide, 2 in. below seed
11	1000 lbs. in band 3-1/2 in. wide, 3 in. below seed
12	1000 lbs. in band 2 in. to each side, 1 in. below level of seed
13	1000 lbs. in band 2 in. to each side, 2 in. below level of seed
14	1000 lbs. in band 3 in. to each side, 1 in. below level of seed
15	1000 lbs. in band 3 in. to each side, 2 in. below level of seed
16	500 lbs. in band 3-1/2 in. wide, 2 in. below seed
17	500 lbs. in band 2 in. to each side, 2 in. below level of seed
18	500 lbs. in band 3 in. to each side, 2 in. below level of seed
19	Check - no fertilizer

Note: Beans planted 6/5/34. 4-10-6 fertilizer, 25% organic and 75% inorganic nitrogen, used throughout experiment. All treatments repeated five times. Plats consist of one 30-inch row, 100.5 ft. in length (.0068 of an acre), except for treatments 1 to 4 inclusive, which consist of 3 rows each.

II. SOURCE OF NITROGEN AND ACID vs NEUTRAL FERTILIZERS EXPERIMENT - POTATOES (In Cooperation with U. S. D. A., Bureau of Chemistry and Soils)

Row No.	Fish & Tankage	$NaNO_3$	$(NH_4)_2SO_4$	Urea	Soluble MgO Lbs. Per Ton	Dolomite Lbs. Per Ton	Equiv. Acidity Lbs. Per Ton	Org.& Inorg. Content	Reaction
1	80	10	70	0	0	0	446	20-80	Acid
2	80	10	70	0	40	0	446	20-80	Acid
3	80	10	70	0	0	446	0	20-80	Neutral
4	80	10	70	0	40	446	0	20-80	Neutral
5	80	10	50	10	40	361	0	40-60	Neutral
6	0	10	50	40	40	386	0	40-60	Neutral
7	30	10	60	0	40	391	0	30-70	Neutral
8	40	10	50	0	40	0	335	40-60	Acid
9	40	10	50	0	40	335	0	40-60	Neutral
10	50	10	40	0	40	280	0	50-50	Neutral
11	0	10	90	0	40	0	556	0-100	Acid
12	0	10	90	0	40	556	0	0-100	Neutral

Note: Planted 4/7/34. Maine and Nova Scotia seed mixed. Replicated 3 times. Fertilizer analysis 6-6-6.

III. LIME EXPERIMENT - POTATOES

A. Forms of Lime Used

(a) Hydrated Calcium Lime
(b) Hydrated Dolomitic Lime
(c) Lime Marl
(d) Oyster Shell Flour Lime
(e) Dolomitic Limestone - 100 mesh
(f) Calcium Limestone - 100 mesh

IV. FERTILIZER PLACEMENT EXPERIMENT - POTATOES (U. S. D. A. Cooperating)

A. Methods of Fertilizer Placement

Parts. Key No. 6-6-6 12-12-12		
(A)	(B)	
1	9	In mark, lightly mixed with soil
2	10	In mark, mixed well with soil
3	11	On each side in narrow bands, 2" away from seed piece, on same level
4	12	On each side, 2" away and 2" below level of seed piece
5	13	On each side, 4" away, on level with seed piece
6	14	On each side, 1" away, on level with seed piece
7	15	Underneath, 4" band, covered with 1" of soil
8	16	Local method - applied in furrow, 15" band, cultivated and planted as separate operation
	17	Check - No fertilizer

V. SWEET POTATO EXPERIMENTS

A. Plant Spacing Test

(a) 12-14-16-20-24 inches
(b) 4 rows at each distance - 110 ft. long
(c) Replicated 5 times

B. Triangulation Fertilizer Experiment with Porto Ricos

C. Sprout Treatment

Fresh Pulled Sprouts	Sprouts Pulled Several Days Before
1. Bordeaux mixture (20-20-50)	8. Bordeaux mixture (20-20-50)
2. Semesan Bel (125 grams per qt.)	9. Semesan Bel (125 grams per qt.)
3. Copper - lime dust (20-80)	10. Copper - lime dust (20-80)
4. Sulphur dust	11. Sulphur dust
5. Red oxide and sulphur (5%)	12. Red oxide and sulphur (5%)
6. Black oxide and sulphur (11%)	13. Black oxide and sulphur (11%)
7. Check	14. Check

VI. NITROGEN AND POTASH STUDIES - POTATOES (U. S. D. A. Cooperating)

A. Nitrogen Studies

Plot No.	Source of Nitrogen			
1-7	0%	organic -	100%	inorganic
8-8	25%	" -	75%	"
3-6-9-12	50%	" -	50%	"
4-10	75%	" -	25%	"
5-11	100%	" -	0%	"
Check	0%	" -	0%	" (Check)

Fertilizer analysis 6-6-6. Inorganic nitrogen derived equally from sodium nitrate and ammonium sulphate; organic nitrogen derived equally from fish and tankage; P_2O_5 derived from superphosphate; K_2O derived from potassium sulphate; 1500 lbs fertilizer per acre - 3 rows to a plot.

B. Potash Studies

Plot No.	Fertilizer Analysis	Source of K_2O
1	6-8-4	KCL
2	6-8-0	-
3	6-8-6	KCL
4	6-8-8	KCL
5	6-8-0	-
6	6-8-10	KCL
7	6-8-4	K_2SO_4
8	6-8-0	-
9	6-8-6	K_2SO_4
10	6-8-8	K_2SO_4
11	6-8-0	-
12	6-8-10	K_2SO_4
Check	0-0-0	-

Sources of nitrogen and phosphorus same as in nitrogen studies shown above. Rate of application 1800 lbs. per acre. 3 rows to a plot. Plots duplicated.

VII. 6-6-5 BRANDS TEST (Each brand is represented by a single row 87' long, replicated 6 times)

VIII. STRAWBERRY VARIETY TEST

IX. BEAN BEETLE CONTROL EXPERIMENT (U. S. D. A., Bureau of Entomology Cooperating) 152 Plots

X. TWIN-ROW METHOD OF PLANTING POTATOES

XI. SOURCE-OF-SEED TEST PLOT

XII. NUTRITIONAL EXPERIMENT (Fertilizer reinforced with magnesium, copper, zinc, manganese, etc.)

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Exhibit C

14,844 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly.Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

Dear Sweet Potato Grower:

The acreage of sweet potatoes will probably be substantially increased in 1934. What are you going to do? Before definitely planning your production program, it would be well to consider carefully several factors which will help to determine your profit and loss in 1934.

Supply. The improvement in prices of sweet potatoes in 1933 is likely to encourage growers to increase acreage in 1934. Farm prices September 15 averaged 76 cents per bushel compared with 55 cents a year ago, an increase of over 38%. Virginia growers averaged around 55 cents per bushel in 1933, compared with 30 cents in 1932, an increase of over 83%. Such substantial price increases are bound to increase both acreage and production in 1934. Yields in 1933 were low. Normal yields in 1934 could very easily result in a surplus of sweet potatoes.

Increased Competition from Irish Potatoes. Growers from the 19 early potato producing sections report intentions to increase their 1934 commercial acreage about 19% over that harvested in 1933. With normal yields from such an acreage, total production in these states would reach 40,000,000 bushels, nearly 10,000,000 bushels over the 1933 production. This greatly increased production would compete to some extent with the marketing of sweet potatoes in 1934.

Consumer Purchasing Power. Business conditions in 1934 are expected to improve over last year. This should improve prices of all commodities.

All these factors should be given careful consideration. Regardless of total acreage and production, however, the grower securing the highest yield per acre at the lowest production cost per bushel will net the greatest return. In view of that fact these recommendations are made:

1. Plant only land that is suited to the crop; avoid heavy or poorly drained soils.
2. Use either new beds or new soil to grow plants.
3. Bed only disease-free seed of the proper varieties.
4. Treat seed to control disease.
5. Fertilize adequately and properly.
6. Harvest carefully to prevent injury.
7. Sell only a well graded product.

For definite information on seed treatment, fertilization, etc., either write me or call at my office.

Yours very truly,

County Agent

Exhibit B

15 310 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly.Inst. & U.S.D.A.Cooperating
EXTENSION SERVICE

Dear Sweet Potato Grower:

Great losses occur annually as a result of sweet potato diseases which affect the potato in the seed bed, field, or storage house. These diseases can be controlled and the loss practically eliminated if these suggestions are carried out:

1. The seed stock to be used should be carefully selected.
2. For bedding purposes, select medium sized roots, clean in appearance and typical of the variety tobe used. Care should be taken NOT to use any sweet potatoes which have shriveled ends or black spots. These characteristics indicate presence of diseases. Seed treatment will not cure any disease already established in the sweet potato, but will only destroy the spores on the surface of sound roots which may be there as a result of rubbing against diseased specimens.
3. The seed potatoes should be disinfected before bedding by dipping them for ten minutes in a solution of corrosive sublimate made according to these directions:

4 ounces of corrosive sublimate
32 gallons of water

Make up the solution in a wooden container, as this chemical eats into metal. Place the sweet potatoes in a split basket or cotton bag, and dip them in the solution. They should be treated on a warm, sunny day so that they will not become chilled. Eight gallons of solution will treat two and one-half bushels of sweet potatoes.

4. Immediately upon removal from the solution, the sweet potatoes should be placed in the seed bed. They should be bedded in clean sand or soil in which no sweet potatoes have been bedded before. If the plantbed frame has been used for this purpose previously, it should be disinfected thoroughly with a solution of corrosive sublimate of dipping strength before putting in new bedding soil.
5. If manure is to be used to supply heat for the beds, the grower should be sure that it does not come from stock which has been feeding on sweet potatoes or sweet potato vines.
6. Care should be exercised in covering the roots in the seedbed. If too little sand or soil is placed over them, the bed dries out quickly and the roots fail to sprout. On the other hand, if they are covered too deeply, many of the sprouts fail to reach the surface. It is recommended that they be covered with sand to a depth of 2 to 3 inches above the upper surface.
7. The bed should be thoroughly drained by digging surface ditches on all sides.
8. It is necessary to keep the bed moist at all times for best results.
9. All growing plants need air. Ventilate the beds every day if the weather will permit.
10. A three or four year crop rotation should be planned with every sweet potato grower to further aid in the control of the field diseases of sweet potatoes.

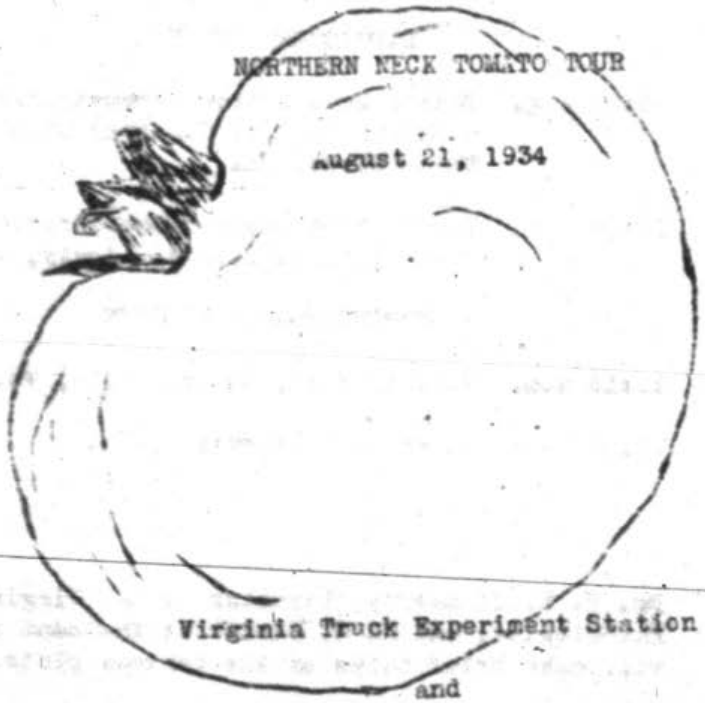
Agent.

EXHIBIT E

PROGRAM

NORTHERN NECK TOMATO TOUR

August 21, 1934



Virginia Truck Experiment Station

and

Virginia Agricultural Extension Service Cooperating

NORTHERN NECK TOMATO TOUR

Tuesday - August 21, 1934

LANCASTER COUNTY

9:00 a.m. Tomato Seed Source Demonstration, located on farm of C.Carter Chase, White Stone, Va.

10:00 a.m. Tomato Seed Source Demonstration on farm of R. H. Hainis, Lively, Va.

NORTHUMBERLAND COUNTY

11:15 a.m. Variety Test, Edwardsville, Va.

12:00 noon Lunch at Heathsville, Va.

WESTMORELAND COUNTY

2:15 p.m. Tomato Seed Source Demonstration, located on farm of R. D. Dameron, Tuckers Hill, Va.

3:15 p.m. Tomato Seed Source Demonstration, on farm of E. B. Hutt Neenah, Va.

4:30 p.m. Seed Source Demonstration on farm of T. A. Hynson, Leedstown, Va.

Dr. H. H. Zimmerley, Director of the Virginia Truck Experiment Station, Norfolk, Va., Dr. H. T. Cook, Plant Pathologist, and M. M. Parker of the same station, L. B. Dietrick, Vegetable Extension Service, and others, will make brief talks at the various plots.

HOTEL ACCOMMODATION: Guests attending the tour can secure accommodations for Monday night, August 20, at Kilmarnock and Irvington at reasonable prices.

WRITE COUNTY AGENTS C. CARTER CHASE, WHITESTONE, C. M. HUBBARD, HEATHSVILLE, OR S. J. DAWSON, MONTROSS, FOR HOTEL ACCOMMODATIONS, INFORMATION, ETC.

Tomato Seed Source Demonstration - C. C. Chase - White Stone, Va.

Read

	No. Plants	Off Types	Wilt		Nulls
			Dead	Infected	
No. 1 Brown-Hynson	48	0	2	0	0
" 2 Stokes Standard	48	0	6	0	0
" 3 Stokes Master	48	0	0	0	4
" 4 Brown- Chase	48	0	0	2	1
" 5 Perry Mazac	48	0	0	0	1
" 6 Geo. Tait & Sons	48	2	0	0	2
" 7 B. O. Dunn	47	5	0	0	4
" 8 So. States Coop.	48	0	0	0	3
" 9 Tri-State Packers	48	0	0	0	2
" 10 Thos. W. Brown	48	4	0	0	3
" 11 J. E. Cockrell	48	6	1	0	0
" 12 Woodruff & Son	48	1	0	0	0
" 13 T. V. Wood	48				

Tomatoes

Plants grown by C. Carter Chase on own farm

a All vines off type. Does not appear to be Marglobe variety

Tomato Strain Test - R. H. Mayhis - Lively, Va.

Tomato Field

	No. Plants	Off Type	Wilt Dead	Wilt Infected	Bulls	
U. 599	22	15	0	6	0	
No. 15	F. W. Wood 21	6	1	0	0	
" 13	Thos. M. Brown 22	0	0	0	0	
" 12	Woodruff & Sons 22	9	0	1	0	
" 9	Tri-State Packers 22	0	0	0	0	
" 8	So. States Coop 22	8	0	0	0	
" 7	R. O. Dunn 22	0	0	8	0	
" 6	Geo. Ehit & Son 22	0	0	0	0	
" 5	Terry Moran 22	0	0	0	0	
" 3	Stokes Prater 21	0	0	0	0	
" 1	Stokes Standard 22	1	0	0	0	
" 2	Brown-Hynson 21	0	0	2	0	
Tomatoes						
Tomatoes - 3 rows not in plot						

Garden

Plants obtained from C. W. Stuart Farm through S. S. Dawson County Agent

22 plants to row
Plants set 6/7/34

1 All plants rather immature; type may change slightly with maturity.

Tomato Seed Source Demonstration
R. D. Dameron, Tucker Hill, Va.

South - Tomatoes

East

	No. Plants	Off Type	Wilt: Dead	Wilt: Infected	Bulls
15 Greater Balto.	22	0	0	0	4
" "	23	0	0	1	0
14 T. W. Wood	25	0	0	0	0
" " "	25	0	0	0	0
13 Thos. M. Brown	25	0	0	0	0
" " "	24	0	0	0	0
12 Woodruff & Son	25	3	1	0	0
" "	25	0	1	0	0
11 J. B. Cockrell	21	0	0	0	0
" " "	21	0	0	0	2
10 Griffith & Turner	20	0	0	0	2
" "	20	1	0	0	1
9 Tri-State Packers	24	0	0	0	2
" " "	25	0	0	0	0
8 So. States Coop.	25	0	0	0	1
" " "	24	0	0	0	2
7 R. O. Dean	25	0	0	0	0
" " "	25	0	0	0	0
6 Geo. Tait & Son	23	3	0	0	2
" " "	24	2	0	0	2
5 Ferry Morse	25	0	0	0	0
" "	25	0	0	0	0
4 Brown-Chase	24	0	0	0	0
" "	24	0	0	0	0
3 Stokes Master	24	0	0	0	0
" "	25	0	0	0	0
2 Stokes Standard	22	2	0	0	0
" "	20	0	0	0	2
1 Brown Hynson	20	0	0	0	0
" "	23	0	0	0	0

West Tomatoes

South - Road and wire fence

Plants rather immature on August 16.

Tomato Seed Source Demonstration
T. B. Hutt, Neenah, Va.

Road

		No. Plants	Off Type	Wilt		Bulls
				Dead	Infected	
	0 T5992	40	0	0	0	0
	0 U5991	49	4	0	0	0
	1 Brown-Hynson	48	0	0	0	0
	2 Stokes Standard	50	4	0	0	0
	3 Stokes Master	49	0	0	0	0
	4 Brown- Chase	49	0	0	0	0
	5 Ferry Morse	50	0	0	0	0
C	6 Geo. Tait & Son	50	3	0	0	1
o	7 R. O. Dean	50	1	0	0	1
r	8 So. States Coop.	50	1	0	0	0
n	9 Tri State Packers	49	0	0	0	0
	10 Griffith & Turner	49	3	0	0	3
	11 J. B. Cockrell	46	0	0	0	0
	12 Woodruff & Sons	50	14	0	1	0
	13 Thos. M. Brown	49	0	0	0	0
	14 T. W. Wood	49	3	0	0	1
	15 Greater Baltimore	49	0	0	0	0

Tomatoes

Plants set 5/29/34

#14,847

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly.Inst. & U.S.D.A.Cooperating
EXTENSION SERVICE

1933 Tomato Seed Source Demonstrations

Six source-of-seed plots were conducted in the Northern Neck of Virginia in 1933 in cooperation with the Virginia Truck Experiment Station as a part of the better seed program. Since the plots were located in the wilt area, only the Marglobe variety was used. Marglobe seed from thirteen different sources was planted on the same date in the same plant-bed and treated in the same manner. All plants in any one plot were set on the same day and received the same field treatment. Records were made on trueness to type, resistance to disease, and yield of four plots. The summarized record on type follows:

SUMMARY TOMATO SEED SOURCE PLOTS - 1933 - TYPE STUDIES

Seedsmen	No. Plants Studied	Type Studies: % Fruit On-Type	% Fruit Off-Type	Rank
R. O. Dean	174	97.1	2.9	5
Landreth Seed Co.	200	94.0	6.0	8
Thos. M. Brown	204	97.5	2.5	4
T. W. Wood & Sons	203	67.5	32.5	13
Stokes Master Marglobe	200	97.5	2.5	4
Griffith & Turner	201	86.1	13.9	12
Brown-Chase Strain	202	99.5	0.5	1
Francis C. Stokes	140	90.7	9.3	9
Ferry-Morse	143	96.4	3.6	7
Associated Seed Growers				
Strain A	143	83.2	16.8	13
Strain B	93	90.3	9.7	10
Geo. Tait & Sons	137	89.1	10.9	11
Brown-Hynson Strain	193	97.9	2.1	3
Southern States Coop.	182	69.2	30.8	14
Tri-State Packers	54	96.3	3.7	4
R. O. Dean Direct	54	98.1	1.9	2
Average		90.7	9.3	

Trueness to type ranged from as high as 99.5% to as low as 67.5% with an average of 90.7%. Such a difference means dollars and cents to the grower selling on grade. The percent off-type directly limits the percent of the fruit which would grade U.S.No.1 at the factory.

Wilt was particularly bad this year as evidenced by a study of the following table. The total percent wilt for the Marglobe strains ranged from 8.6% to 68.4% while for the check, Greater Baltimore, it was 68.8%. The total percent wilt, however, does not give a true picture of the wilt situation. It was thought best, therefore, to differentiate between plants completely killed by wilt and plants infected by wilt but producing fruit. Some strains, for example, showed no plants killed by wilt while others had as high as 27.3% dead from wilt. Dead plants were given a value of 2 while infested plants producing fruit were given a value of 1. The two were then added together and divided by the total number of plants to secure

the "Wilt Index". The wilt index ranged from 8.6 to 92.2 with an average of 27.2 for the Marglobe strains and 114.2 for the non-wilt resistant check, Greater Baltimore.

SUMMARY TOMATO SEED SOURCE PLOTS - 1933 - WILT STUDIES
(Average of 3 plots)

Seedsmen	No. Plants Studied	Wilt Studies: % Dead From Wilt	% Infected, but Producing Fruit	% Total Wilt	Wilt Index
H. O. Dean	189	2.5	25.0	27.5	30.0
Landreth Seed Co.	146	2.1	19.9	22.0	24.0
Thos. M. Brown	150	0.0	24.0	24.0	24.0
T. W. Wood & Sons	149	11.4	20.1	31.5	43.0
Stokes Master Marglobe	146	2.1	17.1	19.2	21.2
Griffith & Turner	147	5.4	15.0	20.4	25.8
Brown-Chase Selection	148	0.0	14.2	14.2	14.2
Francis C. Stokes	140	1.4	12.9	14.3	15.7
Ferry-Morse	143	1.4	14.7	16.1	17.5
Associated Seed Growers					
Strain A	143	0.7	17.5	18.2	18.9
Strain B	93	0.0	8.6	8.6	8.6
Geo. Tait & Sons	137	0.7	18.3	19.0	19.7
Brown-Hynson Selection	139	1.4	18.0	19.4	20.9
Southern States Coop.	128	27.3	37.5	68.4	92.2
Average		4.0	18.9	23.0	27.0
Greater Baltimore	141	48.4	23.4	68.8	114.2

The storm of August 23 all but ruined the plots from a yield standpoint. The following table gives the yields from two plots for the eleven strains that were included in both plots. The yield record is included to complete the report, but the yields should not be considered as more than possibly indicative due to the storm mentioned.

Seedsmen	Yield--Tons Per Acre
H. O. Dean	5.28
Stokes Master Marglobe	4.73
Brown-Chase Selection	4.63
Griffith and Turner	4.58
Thos. M. Brown	4.31
Landreth Seed Co.	4.26
Geo. Tait & Sons	4.21
Brown-Hynson Strain	3.99
T. W. Wood & Sons	3.98
Southern States Cooperative	3.17
Average	4.29

#14,847

For the purpose of comparison, the following table is given, showing the performance of various strains in 1932: (six plots):

SUMMARY TOMATO SEED SOURCE PLOTS 1932 - TYPE, WILT & YIELD STUDIES

Seedsmen	No. of Plants Studied	Type Studies: % Fruit On-Type	% Fruit Off-Type	% Wilt **	Yield Tons Per Acre
Tait*	270	86.3	13.7	6	6.42
Griffith & Turner	299	56.9	43.1	33	6.97
J. Manns Co.	297	80.2	19.8	8	7.51
Virginia Seed Service	302	84.4	15.6	8	8.37
T. W. Wood & Sons	293	82.9	17.1	7	8.11
Ferry Morse, No. 1	294	87.4	12.6	1	7.84
" " No. 2	281	89.3	10.7	3	8.33
Campbell Soup Co.	277	80.5	19.5	1	7.01
Edgar Hurff	279	79.9	20.1	3	7.78
Stokes - Marglobe	268	77.2	22.8	18	7.52
" - Master Marglobe	386	81.3	18.7	4	8.73
Tri-State Packers	284	82.7	17.3	4	7.58
Wood's Special**	31	83.9	16.1	x	6.04
Thos. M. Brown***	243	89.3	10.7	x	8.79
Dean	46	91.3	8.7	x	
Average		83.3	17.7	7.8	7.64

x - Did not occur in this plot
* - Yield influenced by position in plot - outside row
** - Record on one plot only
*** - Occurred in only three plots

13,124 Exhibit F

TOMATO CROP RECORD - 1933

Grower_____ Post Office_____ Acreage_____

Variety_____

Source of Seed_____ Cost_____

Seed Bed Management

Date of Seeding_____ Method: Hand_____ Seeder_____ Stand_____

Fertilization: Material_____ How Applied_____ When Applied_____

Manure: Kind_____ Amount_____ When Applied_____

Cultivation: Hand_____ Cultivator_____ No. of Times_____

Pest Control: Sprayed_____ Dusted_____ No. of Times_____

Materials_____ Thinned: Yes_____ No_____

Field Management

Type of Soil_____ When Plowed_____ Replowed_____

Soil Preparation: Times Harrowed: Disc_____ Spike_____ Spring_____ 5 Tooth_____

Manure: Kind_____ Amount_____ When Applied_____ How Applied_____

Cover Crop: Kind_____ Growth: Poor_____ Medium_____ Good_____

Disced before Turning: Yes_____ No_____

Crop Rotation: 1930_____ 1931_____ 1932_____ 1933_____

Fertilization: Materials_____ Amt. per Acre_____ When Applied_____

How Applied: Hand_____ Drill_____ In Row_____ Broadcast_____

Single Application_____ Split Applications_____

Sidedressing: Material_____ State of Growth Applied_____

Planting: Date_____ Hand_____ Machine_____

Replants: Times_____ Dates_____ Per Cent_____ Final Stand_____

Cultivation: Level_____ Ridge_____ Sided Off: Yes_____ No_____

Times_____ Method_____ Deep_____ Shallow_____

Pest Control:_____

Harvesting: Date Started_____ Date Completed_____

Yield (5/8 basket): Total_____ Per Acre_____

Distribution: U.S.No.1_____ U.S.No.2_____ Culls_____

Marketing: On Grade_____ Contract_____ Price_____

Remarks:_____

#14,995

Detailed Costs and Returns on Canning Tomatoes, 154 Virginia Farms, 599.7 Acres, Crop Season 1933

	Average Costs and Returns per acre in dollars					
	A	B	C	D	E	F
Use of Land	3.70	3.32	3.26	3.03	4.58	4.08
Manure	2.19	2.63	3.25	2.70	1.36	.94
Fertilizer	5.07	7.76	4.75	6.88	3.02	3.41
Lime	.05	.11	.04	.06	-	.01
Seed	.91	.87	1.43	.67	.71	.60
Plants	.09	.06	.11	.16	.12	.02
Spray and Dust	.06	.05	.11	.04	.04	-
Man Labor	9.12	6.14	6.98	6.92	12.68	12.97
Horse Work	3.94	3.05	4.20	3.34	3.71	5.43
Truck Use	.08	.01	.05	.53	-	.12
Tractor Use	.20	.55	.11	.08	.08	.02
Equipment Use	.47	.43	.50	.52	.45	.51
Contract Picking	2.51	2.96	2.41	2.52	2.34	2.22
Contract Hauling	1.65	2.79	1.98	1.81	.39	1.12
Interest	.30	.29	.27	.30	.34	.33
Total Cost	30.34	31.02	29.45	29.56	29.82	31.68
Tomatoes sold	37.82	38.76	38.97	27.32	32.07	47.39
Profit	7.48	7.74	9.52	- 2.24	2.25	15.71
Yield (Baskets) Per Acre 1/	223.2	167.1	210.6	207.0	209.0	290.2
Cost per basket	.136	.150	.140	.143	.143	.109
Value per basket	.170	.187	.185	.132	.153	.163
Profit or loss per basket	.034	.037	.045	-.011	.010	.054
Returns per hour of man labor	.218	.230	.241	.069	.165	.302

County	Number of farms keeping records	Total acres in tomatoes	Average acres in tomatoes per farm	Average Per Acre: Pounds fertiliser used	Hours Man Labor	Hours Horse Work
A - State	154	599.7	3.89	499	76.1	50.3
B - Lancaster	41	151.95	3.71	713	60.9	39.7
C - Westmoreland	40	152.0	3.80	536	68.3	56.4
D - Essex	17	53.25	3.13	594	67.8	45.3
E - Shenandoah & Page	27	135.5	5.02	314	90.4	48.0
F - Bedford & Botetourt	29	107.0	3.69	331	94.6	61.9

1/ Yield per acre is given in terms of 5/8 baskets - except where tomatoes were sold by weight 30# was considered a basket.

COSTS AND RETURNS PER ACRE ON TOMATOES - CROP SEASON 1933

	Area 1/ 98 Farms		Lancaster County 41 Farms		Lancaster County 5 High Farms		Lancaster County 5 Middle Farms		Lancaster County 5 Low Farms	
	Amount	Value	Amount	Value	Amount	Value	Amount	Value	Amount	Value
Use of land		$ 3.25		$ 3.32		$ 3.56		$ 4.23		$ 2.69
Manure		2.91		2.63		3.80		4.39		.69
Fertiliser	620#	6.36	713#	7.76	893#	8.92	660#	7.28	488#	7.12
Lime		.07		.11		-		-		-
Seed		1.08		.87		.81		.84		.84
Plants		.10		.06		.17		.07		.09
Spray & Dust		.09		.05		-		-		-
Man labor	65.1 Hrs.	6.61	60.9 Hrs.	6.14	58.6 Hrs.	5.56	67.2 Hrs.	5.09	74.2 Hrs.	7.42
Horse work	47.7 "	5.58	59.7 "	3.05	40.4 "	3.03	38.0 "	2.07	53.9 "	4.35
Truck use		.10		.01		-		-		-
Tractor use		.29		.55		-		-		-
Equipment use		.47		.43		.80		.49		.49
Contract picking		2.65		2.96		7.23		3.24		.69
Contract hauling		2.30		2.79		6.32		1.28		.26
Interest		.29		.29		.31		.27		.30
TOTAL COST		33.14		31.02		40.64		30.25		24.84
Tomatoes sold	208.4 Bskts.	37.14	167.1 Bskts.	38.76	405.0 Bskts.	74.28	210.4 Bskts.	39.63	71.1 Bskts.	13.19
Profit or Loss		7.00		7.74		33.64		9.38		-11.65
Acres per farm	4.06		3.71		2.5		3.2		2.9	
Yield(Bskts)Per A. 2/	208.4 Bskts.		167.1 Bskts.		405.0 Bskts.		210.4 Bskts.		71.1 Bskts.	
Cost per basket		.144		.150		.10		.144		.348
Value per basket		.178		.187		.183		.186		.186
Profit per basket		.034		.037		.083		.04+		-.162
R. P. H. M. L. 3/		.209		.23		.67		.284		-.063

Note: 1/ The figures in the above table were secured from records kept by 41 Lancaster, 40 Westmoreland, and 17 Essex county farmers in 1933.
2/ Yield per acre is given in terms of 5/8 baskets -- where tomtoes were sold by weight 30# was considered a basket.
3/ R. P. H. M. L. = Returns Per Hour Man Labor.

DETAILED COSTS AND RETURNS PER ACRE ON CANNING TOMATOES
CROP SEASON 1933

Item	Area 1/ 96 Farms		Westmoreland Co. 40 Farms		Westmoreland Co. 5 High Farms		Westmoreland Co. 5 Middle Farms		Westmoreland Co. 5 Low Farms	
	Amount	Value	Amount	Value	Amount	Value	Amount	Value	Amount	Value
Use of Land		$ 3.25		$ 3.26		$ 4.65		$ 2.55		$ 3.44
Manure		2.91		3.25		8.15		1.55		2.22
Fertilizer	620#	6.35	536#	4.75	760#	6.77	431#	4.67	518#	4.68
Lime		.07		.04		.31		-		-
Seed		1.08		1.43		2.56		1.00		.90
Plants		.10		.11		.54		-		-
Spray and Dust		.09		.11		.27		.07		.05
Man Labor	65.1 Hrs.	6.61	68.3 Hrs.	6.98	143.2 Hrs.	14.32	79.6 Hrs.	7.96	56.7 Hrs.	5.67
Horse Work	47.7 "	3.56	56.4 "	4.20	90.5 "	6.39	54.8 "	4.11	53.3 "	4.00
Truck Use		.10		.05		-		-		-
Tractor Use		.29		.11		-		-		-
Equipment Use		.47		.50		.50		.50		.50
Contract Picking		2.65		2.41		2.20		.84		1.70
Contract Hauling		2.30		1.96		1.74		2.54		.59
Interest		.29		.27		.50		.28		.22
Total Cost		30.14		29.45		48.90		25.87		23.97
Tomatoes Sold 2/	208.4 B.	37.14	210.6 B.	38.97	507.6 Bskts.	82.15	234.4 Bskts.	39.69	66.6 Bskts.	12.17
Profit		7.00		9.52		33.25		13.82		-11.80
Acres Per Farm	4.06		3.8		1.65		1.95		6.01	
Cost Per Basket		.144		.14		.096		.11		.36
Value Per Basket		.179		.185		.162		.163		.163
Profit Per Basket		.034		.045		.066		.059		-.177
R. P. H. M. L. 3/		.209		.241		.322		.274		-.106

Notes: 1/ The figures in the above table were secured from records kept by 40 Westmoreland, 41 Lancaster and 17 Essex County farmers in 1933.
2/ Yield per acre is given in terms of 5/8 bushels - where tomatoes were sold by weight 30# was considered a basket.
3/ R. P. H. M. L. = Returns Per Hour Man Labor.

DETAILED COSTS AND RETURNS PER ACRE On CANNING TOMATOES - CROP SEASON 1933

Item	Area 1/ 98 Farms Amount	Area 1/ 98 Farms Value	Essex County 17 Farms Amount	Essex County 17 Farms Value	Essex County 5 High Farms Amount	Essex County 5 High Farms Value	Essex County 5 Middle Farms Amount	Essex County 5 Middle Farms Value	Essex County 5 Low Farms Amount	Essex County 5 Low Farms Value
Use of land		$ 3.25		$ 3.03		$ 3.23		$ 2.62		$ 3.08
Manure		2.91		2.70		1.72		4.90		2.74
Fertilizer	620#	6.35	594#	6.68	353#	8.48	489#	6.76	542#	6.20
Lime		.07		.06		-		.22		-
Seed		1.06		.67		.62		.92		.54
Plants		.10		.16		.58		.07		-
Spray & Dust		.09		.04		.10		.01		.04
Man Labor	65.1 Hrs.	6.81	67.8 Hrs.	6.82	67.8 Hrs.	7.97	75.7 Hrs.	6.18	59.8 Hrs.	6.53
Horse work	47.7 "	5.58	45.5 "	3.54	58.2 "	4.56	43.7 "	3.27	32.7 "	3.18
Truck use		.10		.52		.60		.60		-
Tractor use		.29		.08		-		.09		.17
Equipment use		.47		.53		.52		.50		.59
Contract picking		2.65		2.62		4.72		2.16		1.61
Contract hauling		2.30		1.81		2.49		1.85		2.05
Interest		.29		.30		.36		.28		.27
TOTAL COST		30.14		29.56		36.75		30.25		26.99
Tomatoes sold 2/	208.4 Bskts.	37.14	207 Bskts.	27.32	561.4 Bskts.	44.00	202.7 Bskts.	26.92	97.6 Bskts.	11.52
Profit		7.00		-2.24		8.25		-3.33		-15.47
Acres per farm	4.06		3.13		2.6		2.7		2.8	
Cost per basket		.144		.143		.099		.149		.277
Value per basket		.178		.132		.122		.133		.118
Profit per basket		.034		-.011		.023		-.016		-.159
R. P. H. M. L. 3/		.209		.089		.236		.048		-.137

Note: 1/ The figures in the above table were secured from records kept by 40 Westmoreland, 41 Lancaster and 17 Essex county farmers in 1933.
2/ Yield per acre is given in terms of 5/8 baskets - where tomatoes were sold by weight 30# was considered a basket.
3/ R. P. H. M. L. = Returns Per Hour Man Labor.

DETAILED COSTS AND RETURNS PER ACRE OF CANNING TOMATOES
CROP SEASON 1933

Item	State 1/ 154 Farms Amount	Value	Bedford & Botetourt 29 Farms Amount	Value	Bedford & Botetourt 5 High Farms Amount	Value	Bedford & Botetourt 5 Middle Farms Amount	Value	Bedford & Botetourt 5 Low Farms Amount	Value
Use of Land		$ 3.70		$ 4.08		$ 4.46		$ 3.27		$ 3.46
Manure		2.19		.84		1.39		.35		.41
Fertilizer	499#	5.07	331#	3.41	384#	3.97	342#	2.77	376#	4.20
Lime		.05		.01		.07		-		-
Seed		.91		.60		.57		.69		.70
Plants		.09		.02		-		-		.12
Spray and Dust		.06		-		-		-		-
Man Labor	76.1 Hrs.	9.12	94.6 Hrs.	12.97	132.1 Hrs.	18.16	67.7 Hrs.	8.77	81.6 Hrs.	9.62
Horse Work	50.3 "	3.94	61.9 "	5.43	86.4 "	7.32	50.0 "	4.42	59.1 "	4.73
Truck Use		.08		.12		-		.01		-
Tractor Use		.20		.02		-		-		-
Equipment Use		.47		.51		.64		.47		.50
Contract Picking		2.51		2.22		3.99		4.61		-
Contract Hauling		1.65		1.12		2.60		.51		.78
Interest		.30		.33		.45		.24		.32
Total Cost		30.34		31.68		43.62		26.11		24.86
Tomtoes Sold 2/	223.2 Bskts.	37.82	230.2 Bskts.	47.39	537.0 Bskts.	87.15	242.3 Bskts.	37.00	127.2 Bskts.	18.02
Profit		7.48		15.71		43.53		10.89		-6.84
Acres per farm	3.89		3.69		3.7		3.4		2.9	
Cost per basket		.136		.109		.081		.108		.195
Value per basket		.170		.163		.162		.153		.142
Profit per basket		.034		.054		.081		.046		-.053
R. P. H. H. L. 3/		.218		.303		.467		.290		.034

Notes 1/ The figures in the State column of the above table were secured from records kept by 29 Bedford and Botetourt, 27 Shenandoah and Page, 40 Westmoreland, 41 Lancaster and 17 Essex county farmers in 1933.

2/ Yield per acre is given in terms of 5/8 baskets - where tomatoes were sold by weight 30# was considered a basket.

3/ R. P. H. H. L. = Returns per hour of man labor.

DETAILED COSTS AND RETURNS PER ACRE OF CANNING TOMATOES
CROP SEASON 1933

Item	State 1/ 154 Farms		Shenandoah & Page 27 Farms		Shenandoah & Page 5 High Farms		Shenandoah & Page 5 Middle Farms		Shenandoah & Page 5 Low Farms	
	Amount	Value	Amount	Value	Amount	Value	Amount	Value	Amount	Value
Use of Land		$ 3.70		$ 4.58		$ 4.51		$ 4.52		$ 4.53
Manure		2.19		1.36		1.48		1.36		.70
Fertilizer	499#	5.07	314#	3.02	442#	4.74	236#	1.95	445#	3.85
Lime		.05		-		-		-		-
Seed		.91		.71		1.44		.16		.29
Plants		.09		.12		-		-		.64
Spray and Dust		.06		.04		.08		.03		-
Man Labor	76.1 Hrs.	9.12	90.4 Hrs.	12.68	66.1 Hrs.	9.07	102.5 Hrs.	15.25	71.3 Hrs.	8.37
Horse Work	50.3 "	3.94	48.0 "	3.71	45.0 "	3.38	52.7 "	3.95	41.8 "	3.15
Truck Use		.08		-		-		-		-
Tractor Use		.20		.08		-		-		.13
Equipment Use		.47		.45		.50		.50		.50
Contract Picking		2.51		2.34		5.21		1.18		.94
Contract Hauling		1.65		.29		-		.59		.29
Interest		.30		.34		.30		.35		.26
Total Cost		30.34		29.82		30.71		29.86		23.65
Tomatoes Sold 2/	223.2 Bskts.	37.82	209.0 Bskts.	32.07	340.0 Bskts.	51.60	154.3 Bskts.	24.05	58.0 Bskts.	8.82
Profit		7.48		2.25		20.89		-5.81		-14.83
Acres per farm	3.89		5.02		9.35		4.4		4.45	
Cost per basket		.136		.143		.090		.194		.408
Value per basket		.170		.153		.152		.156		.152
Profit per basket		.034		.010		.062		-.038		-.256
R. P. H. M. L. 3/		.218		.165		.453		.092		-.091

Note: 1/ The figures in the State column of the above table were secured from records kept by 27 Shenandoah and Page, 29 Bedford and Botetourt, 40 Westmoreland, 41 Lancaster and 17 Essex county farmers in 1933.
2/ Yield per acre is given in terms of 5/8 baskets - where tomatoes were sold by weight 30# was considered a basket.
3/ R. P. H. M. L. = Returns per hour of man labor.

Exhibit H
See back page

NORFOLK AND WESTERN RAILWAY COMPANY

INDUSTRIAL AND AGRICULTURAL DEPARTMENT

ROANOKE, Va., MARCH 1st, 1924.

MARKET BULLETIN

Your attention is called to the following products for which producers wish to find markets. If interested, kindly communicate with parties direct.

The object of this Bulletin is to assist the seller and buyer in getting together and effecting their own transaction. This Department assumes no responsibility in any transaction that may result from information furnished through this Bulletin.

FOR SALE

PRODUCT	QUANTITY AND VARIETY	SHIPPER	ADDRESS
APPLES:-			
Albemarle Pippin	5077 barrels	Dr. S. J. Gill	Roanoke, Va.
	15 baskets	Jno. A. Rayner	Washington, Va. (Shipping point, Front Royal, Va.)
Ben Davis	1000 baskets	Chesapeake Orchard Co.	Chesapeake, O. (Shipping point, Ironton, O.)
	60 baskets	Union Apple Co.	Waynesboro, Va.
Delicious - Golden ...	75 baskets	Jno. A. Rayner	Washington, Va.
Gano	2000 baskets	Chesapeake Orchard Co.	Chesapeake, O.
	60 baskets	Union Apple Co.	Waynesboro, Va.
Grimes	95 baskets	Jno. A. Rayner	Washington, Va.
Lowry	60 baskets	Union Apple Co.	Waynesboro, Va.
Winesap	2000 baskets	H. T. Patterson	Bedford, Va., Rt. 2.
	7 barrels	Union Apple Co.	Waynesboro, Va.
York Imperial	2000 boxes	E. L. Denham	Chilhowie, Va.
	600 baskets	Jno. A. Rayner	Washington, Va.
ANTICHOKES:-	Limited quantity	Jno. Clark, Jr.	Halifax, Va.
BABY CHICKS:-			
Anconn - S. C.	4250 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Australorp	500 per week	South Boston Hatchery	South Boston, Va.
Jersey Black Giant ...	Limited number	Bristol Chick Hatchery, Inc...	Bristol, Va.
	1440 per week	Teele Suburban Poultry Farm ..	Columbus, O., 306-308 E. 8th Ave.
	1440 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
Jersey White Giant ..	Limited number	Bristol Chick Hatchery, Inc...	Bristol, Va.
	1440 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	1000 per week	Brown Co. Hatchery	Cardinia, O.
Leghorn-S. C. Brown .	1440 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	5000 per week	Quality Hatchery Co.	Lynchburg, Va., Box 668.
	Any number	The James Hatchery	Petersburg, Va.
	2150 per week	Birchett's Hatchery	Petersburg, Va.
	1000 per week	Brown Co. Hatchery	Cardinia, O.
	500 per week	South Boston Hatchery	South Boston, Va.
	4250 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Leghorn -S. C. Buff .	4250 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Leghorn-S. C. White..	5000 per week	Bristol Chick Hatchery, Inc...	Bristol, Va.
	1440 per week	Southern Ohio Hatchery	Circleville, O., 140 W. Water St.
	1440 per week	Teele Suburban Poultry Farm ..	Columbus, O., 306-308 E. 8th Ave.
	600 per week	Produce Exchange Corp.	Galax, Va.
	5000 per week	Riverside Poultry Farm	Grottoes, Va.
	1440 per week	Fred Beery's Accredited Hatchery	Hillsboro, Va.
	900 per week	Jason Peterson	Lovingston, Va.
	600 per week	Shenandoah Valley Turkey Ranch	Luray, Va.
	5000 per week	Quality Hatchery Co.	Lynchburg, Va., Box 668.
	1000 per week	Bruce Anderson	Lynchburg, Va., 18 Ninth St.
	400 per week	T. S. Stevens	Nace, Va.
	2250 per week	Wright Hatcheries	Peebles, O.
	600 per week	Sunnyfield Poultry Farm	Petersburg, Va., P.O.Box 668.

PRODUCT	QUANTITY AND VARIETY	SHIPPER	ADDRESS
BABY CHICKS:- (Con.)			
Leghorn -S.C.White (Con.)	2330 per week	Petersburg Farm Hatchery	Petersburg, Va., Madison St.
	2130 per week	Birchett's Hatchery	Petersburg, Va.
	Any number	Southside Produce Exchange, Inc.	Petersburg, Va.
	Any number	The Jones Hatchery	Petersburg, Va.
	3330 per week	Wright Hatcheries	Portsmouth, O.
	1000 per week	Magic City Hatchery	Roanoke, Va., 517 Twelfth St., S. W.
	3300 per week	Densmore Poultry Farm	Roanoke, Va., P.O.Box 267.
	1000 per week	High Point Poultry Farm	Rural Retreat, Va.
	1800 per week	Bluemont Leghorn Farm	Rustburg, Va.
	750 per week	Salem Hatchery	Salem, Va.
	9000 per week	Brown Co. Hatchery	Sardinia, O.
	2000 per week	South Boston Hatchery	South Boston, Va.
	4250 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
	5000 per week	Suffolk Chick Hatchery	Suffolk, Va.
	Any number	Troutville Poultry Farm, Inc.	Troutville, Va.
	660 per week	J. E. Trevathan	Walnut Cove, N. C.
Minorca - S.C.Black	2130 per week	Birchett's Hatchery	Petersburg, Va.
	4250 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Orpington - S.C.Buff	800 per week	Produce Exchange Corp.	Galax, Va.
	3330 per week	Wright Hatcheries	Peebles, O.
	2130 per week	Birchett's Hatchery	Petersburg, Va.
	Any number	The Jones Hatchery	Petersburg, Va.
	3330 per week	Wright Hatcheries	Portsmouth, O.
	200 per week	South Boston Hatchery	South Boston, Va.
Plymouth Rock-Barred	3330 per week	Bristol Chick Hatchery, Inc.	Bristol, Va.
	1660 per week	Southern Ohio Hatchery	Circleville, O., 120 W. Water St.
	1400 per week	Teele Suburban Poultry Farm	Columbus, O., 306-308 E. 5th Ave.
	600 per week	Produce Exchange Corp.	Galax, Va.
	2500 per week	Riverside Poultry Farm	Grottoes, Va.
	1600 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	800 per week	Shenandoah Valley Turkey Ranch	Luray, Va.
	3000 per week	Quality Hatchery Co.	Lynchburg, Va., Box 652.
	1000 per week	Bruce Anderson	Lynchburg, Va., 12 Ninth St.
	3000 per week	Wright Hatcheries	Peebles, O.
	2500 per week	Petersburg Farm Hatchery	Petersburg, Va., Madison St.
	Any number	The Jones Hatchery	Petersburg, Va.
	2000 per week	Birchett's Hatchery	Petersburg, Va.
	Any number	Southside Produce Exchange, Inc.	Petersburg, Va.
	3000 per week	Wright Hatcheries	Portsmouth, O.
	1000 per week	Magic City Hatchery	Roanoke, Va.
	3000 per week	Densmore Poultry Farm	Roanoke, Va., P.O.Box 267.
	750 per week	Salem Hatchery	Salem, Va.
	7500 per week	Brown Co. Hatchery	Sardinia, O.
	2000 per week	South Boston Hatchery	South Boston, Va.
	4000 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
	5000 per week	Suffolk Chick Hatchery	Suffolk, Va.
	Any number	Troutville Poultry Farm, Inc.	Troutville, Va.
	600 per week	J. E. Trevathan	Walnut Cove, N. C.
Plymouth Rock-Buff	1600 per week	Southern Ohio Hatchery	Circleville, O.
	1400 per week	Teele Suburban Poultry Farm	Columbus, O.
	1600 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	500 per week	Brown Co. Hatchery	Sardinia, O.
Plymouth Rock-White	1600 per week	Southern Ohio Hatchery	Circleville, O.
	1400 per week	Teele Suburban Poultry Farm	Columbus, O.
	1600 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	3000 per week	Wright Hatcheries	Peebles, O.
	Any number	The Jones Hatchery	Petersburg, Va.
	3000 per week	Wright Hatcheries	Portsmouth, O.
	750 per week	Salem Hatchery	Salem, Va.
	6000 per week	Brown Co. Hatchery	Sardinia, O.
Rhode Island Red-S.C.	3000 per week	Bristol Chick Hatchery, Inc.	Bristol, Va.
	1600 per week	Southern Ohio Hatchery	Circleville, O.
	1400 per week	Teele Suburban Poultry Farm	Columbus, O.
	800 per week	Produce Exchange Corp.	Galax, Va.
	2500 per week	Riverside Poultry Farm	Grottoes, Va.
	1600 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	500 per week	Jason Peterson	Lewcho, O.
	3000 per week	Quality Hatchery Co.	Lynchburg, Va., Box 652.
	1000 per week	Bruce Anderson	Lynchburg, Va., 12 Ninth St.

PRODUCT	QUANTITY AND VARIETY	SHIPPER	ADDRESS
EGGS:-(For Hatching)			
Rhode Island Red -S.C. (Com.)	1000 per week	Jason Peterson	Lovuka, O.
	3700 per week	Quality Hatchery Co.	Lynchburg, Va., Box 652.
	4000 per week	Wright Hatcheries	Peebles, O.
	4800 per week	Birchett's Hatchery	Petersburg, Va.
	4000 per week	Wright Hatcheries	Portsmouth, O.
	1300 per week	Magic City Hatchery	Roanoke, Va.
	350 per week	High Point Poultry Farm	Rural Retreat, Va.
	1200 per week	Salem Hatchery	Salem, Va.
	27000 per week	Brown Co. Hatchery	Sardinia, O.
	6000 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
	500 per week	E. M. Spivey	Winston-Salem, N. C.
Wyandotte - Silver Laced	Limited quantity	Bristol Chick Hatchery, Inc.	Bristol, Va.
	4200 per week	Birchett's Hatchery	Petersburg, Va.
	1000 per week	Brown Co. Hatchery	Sardinia, O.
Wyandotte - White	4800 per week	Teole Suburban Poultry Farm	Columbus, O.
	5000 per week	Riverside Poultry Farm	Grottoes, Va.
	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	4100 per week	Wright Hatcheries	Peebles, O.
	4100 per week	Wright Hatcheries	Portsmouth, O.
	3600 per week	Brown Co. Hatchery	Sardinia, O.
	6200 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
DUCK EGGS:- White Pekin	Any quantity	The Mottoony Game Farms	Crows, Va.
PHEASANT, QUAIL AND WILD TURKEY EGGS:-	Any quantity	The Mottoony Game Farms	Crows, Va.
HAY:-	10 tons - Timothy - baled	Geo. S. Davis	Atkins, Va.
HONEY:-	Any quantity - Sourwood	Maxwell Bros.	Pamplin, Va.
LESPEDEZA:- Serioea - Seed	400 pounds	W. T. Oakes	Gladys, Va.
	Limited quantity	O. C. Frazier	Marion, Va.
PEAS:-	Limited quantity-Mixed	E. W. Jones, Jr.	Woodlawn, Va.
POTATOES:- Irish - Seed	Limited quantity	Walter Jones	Woodlawn, Va.
	Limited quantity - Improved McCormick	E. W. Jones, Jr.	Woodlawn, Va.
STRAW:- Barley and Oat	5 tons - baled	Geo. S. Davis	Atkins, Va.

LIME PLANTS ALONG THE NORFOLK AND WESTERN RAILWAY

The Bertha Mineral Co.	Austinville, Va.	Ground Agricultural Limestone
James River Hydrate & Supply Co.	Buchanan, Va.	Hydrated & Crushed Limestone
Alba Marl Lime Co.	Charles Town, W. Va.	Marl
Natural Lime Marl Co.	Charles Town, W. Va.	Precipitated Lime
Green Bay Cement Co.	Exmore, N. Va.	Ground Limestone & Hydrated Lime
Limeton Lime Co.	Limeton, Va.	Burnt, Hydrated & Agricultural Lime
Lone Jack Limestone Co., Inc.	Lynchburg, Va.	Crushed Limestone
W. F. Culbert & Sons	Marion, Va.	Crushed & Agricultural Limestone
Blue Ozone Lime Co.	Maxwell, Va.	Burnt, Ground & Hydrated Lime
Visiwarp & Co.	Norfolk, Va.	Burnt & Raw Shell Lime
A. S. Lee & Sons Co., Inc.	Norfolk, Va.	Burnt Oyster Shell Lime
Chas. T. Priddy & Co., Inc.	Norfolk, Va.	Burnt & Raw Shell Lime
Smith-Douglass Co., Inc.	Norfolk, Va.	Burnt Oyster Shell Lime
Peery Lime Co.	North Tazewell, Va.	Burnt & Hydrated Lime, Crushed & Flaxing Stone
O. S. Boggess Co.	Oakvale, W. Va.	Agricultural Lime
Pembroke Limestone Corp.	Pembroke, Va.	Crushed Limestone
Pounding Mill Quarry Corp.	Pounding Mill, Va.	Ground Limestone
Limestone Dust Corp.	Pounding Mill, Va.	Pulverized Limestone
R. H. Horton	Richlands, Va.	Burnt Lime
Ripplemead Lime Co.	Ripplemead, Va.	Burnt Lime
Virginia Limestone Corp.	Ripplemead, Va.	Crushed Limestone
Farmers Marl Lime Co.	Riverside, Va.	Marl
Riverton Lime Co.	Riverton, Va.	Chemical, Burnt & Hydrated Lime
Blue Ridge Stone Corp.	Roanoke, Va.	Ground Limestone
Vacuum Stone Co., Inc.	Roanoke, Va.	Ground Limestone
Carlyrock Lime Co.	Roanoke, Va.	Precipitated Lime
Hamilton Lime Co., Inc.	Shawsville, Va.	Chemical, Burnt, Hydrated & Spray Lime
Five Oaks Lime & Stone Co.	Tazewell, Va.	Chemical, Burnt & Hydrated Lime

PRODUCT	QUANTITY AND VARIETY	SHIPPER	ADDRESS
EGGS:-[For Hatching]			
Leghorn - S.C.Brown ..	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	3700 per week	Quality Hatchery Co.	Lynchburg, Va., Box 652.
	4200 per week	Birchett's Hatchery	Petersburg, Va.
	2400 per week	Brown Co. Hatchery	Sardinia, O.
	6200 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Leghorn - S.C.Buff..	4200 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Leghorn - S.C.White.	Limited quantity	Bristol Chick Hatchery, Inc...	Bristol, Va.
	4200 per week	Teele Suburban Poultry Farm	Columbus, O., 306-309 E. 5th Ave.
	Limited quantity	Ralph R. Taylor	East Bedford, Va., Box 295.
	1000 per week	Produce Exchange Corp.	Galax, Va.
	5000 per week	Riverside Poultry Farm	Grottoes, Va.
	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	1000 per week	James Peterson	Lambe, O.
	1150 per week	Shenandoah Valley Turkey Ranch.	Luray, Va.
	3700 per week	Quality Hatchery Co.	Lynchburg, Va., Box 652.
	500 per week	T. S. Stevens	Mars, Va.
	4000 per week	Wright Hatcheries	Peebles, O.
	4000 per week	Birchett's Hatchery	Petersburg, Va.
	600 per week	Sunnyfield Poultry Farm	Petersburg, Va., P.O.Box 406
	6000 per week	Wright Hatcheries	Portsmouth, O.
	Any quantity	Mountain Home Farm	Pulaski, Va.
	1800 per week	Magic City Hatchery	Roanoke, Va., 617 Twelfth St., S. W.
	250 per week	High Point Poultry Farm	Rural Retreat, Va.
	2000 per week	Rhumont Leghorn Farm	Rustburg, Va.
	1800 per week	Salem Hatchery	Salem, Va.
	87000 per week	Brown Co. Hatchery	Sardinia, O.
	6200 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Minorca -S.C.Black..	4200 per week	Birchett's Hatchery	Petersburg, Va.
	6200 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
Minorca -S.C.Buff ..	Limited quantity	Mrs. C. C. Tucker	Independence, Va.
Orpington-S.C.Buff..	1000 per week	Produce Exchange Corp.	Galax, Va.
	4000 per week	Wright Hatcheries	Peebles, O.
	4200 per week	Birchett's Hatchery	Petersburg, Va.
	4000 per week	Wright Hatcheries	Portsmouth, O.
Plymouth Rock-Barred	Limited quantity	Bristol Chick Hatchery, Inc...	Bristol, Va.
	4200 per week	Teele Suburban Poultry Farm	Columbus, O.
	Limited quantity	E. H. Amos	Pamplin, Va.
	1000 per week	Produce Exchange Corp.	Galax, Va.
	5000 per week	Riverside Poultry Farm	Grottoes, Va.
	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	1000 per week	Shenandoah Valley Turkey Ranch.	Luray, Va.
	3700 per week	Quality Hatchery Co.	Lynchburg, Va., Box 652.
	4000 per week	Wright Hatcheries	Peebles, O.
	4000 per week	Birchett's Hatchery	Petersburg, Va.
	4000 per week	Wright Hatcheries	Portsmouth, O.
	1800 per week	Magic City Hatchery	Roanoke, Va.
	250 per week	High Point Poultry Farm	Rural Retreat, Va.
	1800 per week	Salem Hatchery	Salem, Va.
	18000 per week	Brown Co. Hatchery	Sardinia, O.
	6200 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
	840 per week	Miss Wilhelmena Cogner	Waynesboro, Va.
Plymouth Rock-Buff..	4200 per week	Teele Suburban Poultry Farm	Columbus, O.
	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	1800 per week	Brown Co. Hatchery	Sardinia, O.
Plymouth Rock-White.	4200 per week	Teele Suburban Poultry Farm	Columbus, O.
	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	4000 per week	Wright Hatcheries	Peebles, O.
	4000 per week	Wright Hatcheries	Portsmouth, O.
	1800 per week	Salem Hatchery	Salem, Va.
	18000 per week	Brown Co. Hatchery	Sardinia, O.
Rhode Island Red-S.C.	Limited quantity	Bristol Chick Hatchery, Inc...	Bristol, Va.
	Any quantity	Cloverdale Red Farm	Cloverdale, Va.
	4200 per week	Teele Suburban Poultry Farm	Columbus, O.
	1000 per week	Produce Exchange Corp.	Galax, Va.
	5000 per week	Riverside Poultry Farm	Grottoes, Va.
	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.

PRODUCT	QUANTITY AND VARIETY	SHIPPER	ADDRESS
BABY CHICKS:- (Con.)			
Rhode Island Red-S.C. (Con.)	2000 per week	Wright Hatcheries	Pueblo, C.
	2500 per week	Petersburg Farm Hatchery	Petersburg, Va., Madison St.
	Any number	The Jones Hatchery	Petersburg, Va.
	2000 per week	Birchett's Hatchery	Petersburg, Va.
	Any number	Southside Produce Exchange, Inc.	Petersburg, Va.
	2000 per week	Wright Hatcheries	Portsmouth, O.
	1000 per week	Magic City Hatchery	Roanoke, Va., 517 Twelfth St., S. W.
	2000 per week	Densmore Poultry Farm	Roanoke, Va., P.O.Box 867.
	1000 per week	High Point Poultry Farm	Rural Retreat, Va.
	750 per week	Salem Hatchery	Salem, Va.
	7500 per week	Brown Co. Hatchery	Sardinia, O.
	500 per week	South Boston Hatchery	South Boston, Va.
	4000 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
	5000 per week	Suffolk Chick Hatchery	Suffolk, Va.
	Any number	Troutville Poultry Farm, Inc.	Troutville, Va.
	600 per week	J. E. Trevathan	Walnut Cove, N. C.
	Limited number	R. M. Spivey	Winston-Salem, N. C., 1816 Elizabeth Ave.
Wyandotte - Silver Laced	Limited number	Bristol Chick Hatchery, Inc.	Bristol, Va.
	2000 per week	Birchett's Hatchery	Petersburg, Va.
	500 per week	Brown Co. Hatchery	Sardinia, O.
Wyandotte - White	1500 per week	Southern Ohio Hatchery	Circleville, O.
	2500 per week	Riverside Poultry Farm	Gretlees, Va.
	1000 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	3000 per week	Wright Hatcheries	Pueblo, O.
	Any number	The Jones Hatchery	Petersburg, Va.
	2000 per week	Wright Hatcheries	Portsmouth, O.
	1000 per week	Brown Co. Hatchery	Sardinia, O.
	4000 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
	Any number	Troutville Poultry Farm, Inc.	Troutville, Va.
DUCKLINGS:- White Pekin	Any number	The Jones Hatchery	Petersburg, Va.
BUCKWHEAT:- Japanese	100 bushels - Seed	R. W. Jones, Jr.	Woodlawn, Va.
CANNED GOODS:- Tomatoes	2400 cases No. 2	C. C. Reaburn	Roanoke, Va., Colonial Nat'l Bank Bldg.
CORN:- Seed	100 bushels - Boone County White	G. W. Garst	Newport, Va.
	Limited quantity - Country Gentleman	G. W. Garst	Newport, Va.
	Limited quantity - Va. Tolley Dent	G. W. Garst	Newport, Va.
	Limited quantity -White	Walter Jones	Woodlawn, Va.
	Limited quantity-Tolley.	Walter Jones	Woodlawn, Va.
	Limited quantity - Country Gentleman	R. W. Jones, Jr.	Woodlawn, Va.
EGGS:-(For Hatching) Ancona - S. C.	6000 per week	Weaver Farm Chickeries	Stuarts Draft, Va.
	Limited quantity	Woodside Stock & Poultry Farm	Summit Point, W. Va.(Shipping point, Berryville, Va.)
Bantam	Limited quantity	Walter Jones	Woodlawn, Va.
Hamburg - Silver Spangled	Limited quantity	Miss Mary Bonham	Chilhowie, Va.
	Limited quantity	Walter Jones	Woodlawn, Va.
Jersey Black Giant	Limited quantity	Bristol Chick Hatchery, Inc.	Bristol, Va.
	4800 per week	Teele Suburban Poultry Farm	Columbus, O., 906-926 E. 6th Ave.
	2500 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	Limited quantity	R. W. Jones, Jr.	Woodlawn, Va.
	Limited quantity	Walter Jones	Woodlawn, Va.
ey White Giant	Limited quantity	Bristol Chick Hatchery, Inc.	Bristol, Va.
	2000 per week	Fred Beery's Accredited Hatchery	Hillsboro, O.
	1500 per week	Brown Co. Hatchery	Sardinia, O.
	Limited quantity	R. W. Jones, Jr.	Woodlawn, Va.

PLANT A VEGETABLE GARDEN

A vegetable garden properly planned and managed under favorable growing conditions, should provide vegetables either fresh, canned or stored throughout the year. For maximum results it is important to carefully plan, prepare and manage the garden.

PREPARATION AND MANAGEMENT:

1. Locate the garden on fertile, well drained soil easily accessible to the residence.
2. Use liberal applications of manure to maintain fertility and organic matter.
3. Plow land as early as possible, preferably in the fall. Prepare a good seed bed.
4. Insure supply of vegetables every month of the year by careful planning.
5. Use proper amount of a high grade complete fertilizer.
6. Plant only seed of high quality from reliable sources.
7. Practice shallow cultivation at frequent intervals to conserve moisture and eliminate weeds.
8. Control insect and fungous diseases by spraying or dusting.
9. Plan to store or can surplus products.

SUGGESTED GARDEN PLAN ADEQUATE FOR FAMILY OF FIVE PERSONS

Ft. of Row	Vegetable	Variety	Seed Required	Planting Date
150	Parsnip	Guernsey	1 oz.	Mar. and Apr
75	Salsify	Sandwich Island	1 oz.	Apr. and May
50	Swiss Chard	Lucullus	1 pkt.	Mar., Apr. and May
250	Carrot	Chantenay	½ oz.	Mar., Apr. and May
125	Beet	Crosby's Egyptian	½ oz.	Mar., Apr. and May
125	Spinach	Long St. Bloomsdale Savoy or		
		Va. Savoy (Blight Resistant)	½ oz.	Mar. and Apr.
200	Peas	World's Record	1 lb.	
		Thomas Laxton	1 lb.	Feb. to May
200	Onion Sets	Ebenezer or Yellow Globe	1 lb.	Mar. and Apr.
50	Lettuce	Grand Rapids (Leaf) or	½ pkt.	Mar., Apr. and May
		Big Boston (Head)	½ pkt.	Mar. and Apr.
75	Cabbage, early	Jersey or	1 pkt.	Set plants Mar.
		Charleston Wakefield	1 pkt.	and April
200	Snap Beans	Stringless Green Pod	3 lb.	Apr. and May
150	Kale	Dwarf Blue Curled Scotch	½ oz.	Mar. and Apr.
250	Potatoes, early	Irish Cobbler	1½ pk.	Mar. and Apr.
500	Potatoes, late	Green Mountain	2½ pk.	Mar. and Apr.
175	Tomato	Bonny Best	1 pkt.	Set plants
		Marglobe or	1 pkt.	after frost
500	Sweet potatoes	Nancy Hall and Porto Rico	300 plants	Set plants May and June
800	Corn	Golden Bantam	4 lb.	Apr., May and June
		Country Gentleman	4 lb.	Apr., May and June
In	Pumpkin	Virginia Mammoth	1 pkt.	May
Corn		Cashaw	1 pkt.	May
10-15	Squash	White Bush	1 pkt.	Apr. and May
Hills		Yellow Crookneck	1 pkt.	Apr. and May
10-15	Cucumber	Early Fortune	1 pkt.	May
Hills				

SUGGESTED CROPS

200	Soy Beans	Virginia Green Pod	2 lbs.	July 15-Aug.15, after onions
250	Cabbage	Late Flat Dutch or Danish Ballhead	1 pkt.	Set plants in July, after peas
50	Lettuce	Grand Rapids (Leaf)	½ pkt.	July 15-Sept.1,after spinach
125	Spinach	Long St. Bloomsdale Savoy or		
		Va. Savoy (Blight Resistant)	½ oz.	Aug.15-Sept.15,after beans.
200	Turnips	Purple Top White Globe	½ oz.	Aug. after early potatoes
125	Turnip Salad	Powerquick White Globe	1 oz.	Aug. after early potatoes

(Courtesy Vegetable Extension Service - Blacksburg, Va.)

The foregoing plan should provide adequate amount of vegetables for canning and storage. It is estimated that a family of five requires about 300 quarts of canned vegetables annually. In addition to canning, many types of vegetables can be stored for which purpose adequate facilities should be provided.

The above garden plan is based on Virginia conditions and may not fully meet your requirements. It will be of assistance, however, in planning your garden. Helpful bulletins and circulars containing other plans and valuable information relative to various phases of gardening, canning and storage of vegetables, are available through this department.

SHIP AND TRAVEL VIA NORFOLK AND WESTERN RAILWAY

Communications relative to information desired to be published in future Bulletins may be addressed to any Agent of this Company, or to

T. GILBERT WOOD, Industrial & Agricultural Agent,
J. J. HAIRE, Assistant Agricultural Agent,
Norfolk & Western Railway Company,
Roanoke, Virginia.

If any business results, kindly notify this office. This Bulletin is mailed to anyone requesting to be placed on Mailing List.

Exhibit X-1

15,112 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

Dear Gardener:

A suggested garden plan for a family of five is attached to this letter. This plan may not fit your individual needs, but it should be of value to you in planning your own garden.

The plan as suggested contains a sufficient number of vegetables to supply a well-balanced diet throughout every month in the year. It is not just a spring or summer garden. It is an all year round garden. The selection of vegetables contains a goodly number from the green or leafy group, the root group and the fruit group.

They may be planted in the garden as outlined on the plan. You will note that the vegetables which are ready to use at approximately the same time are grouped in one portion of the garden. After these vegetables are used, that portion will be available for succession crops. Keep your land working all the time. As soon as one crop is harvested another should be planted in its place.

Crops which require all the season to grow are grouped at one side of the garden where they will not interfere with the planting of succession crops.

At the bottom of the plan you will find additional suggestions on the location of the garden, plowing, manuring, use of good seed, fertilization, etc. If you want to discuss any of your garden problems, I will be glad to have you call at my office.

Yours very truly,

Agent.

Exhibit I-8

13,714 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

SUGGESTED GARDEN PLAN FOR FAMILY OF FIVE

Ft. of: Row	Vegetable	Variety	Seed Required	Planting Date
185	Parsnip	Guernsey	1 oz.	Mar.& Apr.
75	Salsify	Sandwich Island	1 oz.	Apr.& May
860	Carrot	Chantenay	2½ oz.	Mar.,Apr.& May
125	Beet	Crosby's Egyptian	2½ oz.	" " "
125	Spinach	Long St.Bloomsdale Savoy or: Va.Savoy (blight resistant)	2½ oz.	Mar.& Apr.
300	Peas	World's Record	1 lb.	
		Thomas Laxton	2 lbs.	Feb. to May
200	Onion Sets	Ebenezer or Yellow Globe	2 lbs.	Mar. & Apr.
50	Lettuce	Grand Rapids (leaf) or	½ pkt.	Mar.,Apr.& May
		Big Boston (head)	½ pkt.	Mar. & Apr.
75	Cabbage, early	Jersey or	Set plants Mar.	
		Charleston Wakefield	1 pkt.	and April
300	Snap Beans	Stringless Green Pod	3 lbs.	Apr. & May
175	Kale	Dwarf Blue Curled Scotch	1½ oz.	Mar. & Apr.
250	Potatoes,early	Irish Cobbler	1½ pkt.	Mar. & Apr.
500	" ,late	Green Mountain	2½ pkt.	Mar. & Apr.
175	Tomato	Bonny Best	1 pkt.	Set plants
		Brimmer or Marglobe	1 pkt.	after frost
90*	Sweet potatoes	Nancy Hall and Porto Rico	500 plants	Set plants May&June
500	Corn	Golden Bantam	3/4 lb.	Apr.,May & June
		Country Gentleman	1-3/4 lb.	Apr.,May & June
In corn: Hills	Pumpkin	Virginia Mammoth	1 pkt.	May
		Cashaw	1 pkt.	May
15-15 Hills	Squash	White Bush	1 pkt.	Apr. & May
		Yellow Crookneck	1 pkt.	Apr. & May
15-15 Hills	Cucumber	Early Fortune	1 pkt.	May

SUCCESSION CROPS

200	Snap Beans	Stringless Green Pod	2 lbs.	July 15-Aug.15 after onions
250	Cabbage	Late Flat Dutch or		Set plants in July
		Danish Ballhead	1 pkt.	after peas
50	Lettuce	Grand Rapids (leaf)	½ pkt.	July 15-Sept.1 after spinach
125	Spinach	Long St.Bloomsdale Savoy or: Va.Savoy (blight resistant)	2½ oz.	Aug.15-Sept.15 after beans
200	Turnip	Purple Top White Globe	2 oz.	Aug.after beans
125	Turnip Salad	Pomeranian White Globe	½ oz.	" after potatoes (early)

The above plan should be of value to you in planning your garden. The following suggestions are also offered: (1) Locate your garden on fertile, well-drained soil, convenient to the house. (2) Plow as early as possible. (3) Plant only good seed. (4) Apply manure at the rate of from 10 to 20 tons per acre, if available. (5) If possible, fertilize with from 600 to 1000 lbs. of 5-6-5 per acre. (6) Practice frequent shallow cultivation. (7) Follow a thorough pest control program. For further information on gardening, consult your county agent or write to the Vegetable Extension Service, Blacksburg, Virginia.

Exhibit F

14916 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly. Inst. & U.S.D.A. Cooperating
Extension Service

Dear Gardener:

In spite of the present cold weather, it is tize to think about gardening. In fact, these cold winter nights afford an excellent opportunity to sit by the fireside and make some definite plans concerning the coming year's food supply. The seed catalogs offer a fascinating study in color and perfection. Secur two or three of these catalogs from some of the reliable seed houses. Many an hour can be pleasurably and profitably spent in poring over them. Each specimen is not only alluring and inviting in color, but it is likewise perfectly symmetrical in form. The true gardener, however, can never doubt his ability, aided by nature, to produce specimens which will cause even the illustrated in the seed catalogs to suffer by comparison.

Naturally, the first question which arises in planning a garden and which is suggested in studying the seed catalogs concerns the vegetables to be planted in the garden. How many and what vegetables should be included to constitute a good garden - one which will supply an abundance of fresh vegetables to the farm family throughout every month in the year? For the sake of discussion, let us say that a garden, to supply such a diet, should contain from twenty to twenty-five different vegetables. The selection of these vegetables should be given serious consideration. As a rule, vegetables which are difficult to grow should not be included by the inexperienced gardener. By far the greater number of vegetables included should be the more common or staple vegetables.

In the green or leafy group, such vegetables as lettuce, cabbage, turnip salad and curly kale deserve a place in every garden. Cabbage is available throughout the summer and fall months. The fall crop may easily be stored through the winter. Kale will over-winter in the garden. Lettuce may be available from early spring to frost. With these should be included three or four other green or leafy vegetables whose selection should be determined by individual tastes and preferences. Among those vegetables from which the selection should be made are mustard, celery, spinach, collards, endive, Swiss chard, cress and spinach mustard. Each of these vegetables has its own special merits. Spinach like kale, will live through the winter. Mustard is a delicious green, but goes to seed quickly in hot weather. For those who are particularly fond of this green, spinach mustard, a heat-resistant mustard, is recommended. Swiss chard, which belongs to the beet family, will produce more greens to the foot of row than any other green you can grow.

In the root vegetables, potatoes, onions, beets, carrots and turnips should certainly be found in every garden. Sweet potatoes should be added in certain sections of the state. Either parsnips or salsify, or both, should be included, as they will live through the winter, thus making a fresh vegetable available in the winter months.

In the fruit vegetables, tomatoes, beans, peas and corn should always be included. Lima beans, if desired, may be grown in any section of the state. Okra

Exhibit E

14923

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A & M. College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

March Suggestions for Garden Club Leaders

Plowing Is your garden still unplowed? The longer you delay this important operation, the less it will profit you. Plow now and give your soil the advantage of early plowing. Why delay when you pay?

Manuring Give your soil a chance to grow good vegetables. Just before plowing, apply a liberal amount of manure to your garden. It will help to put your land in good shape for working. An application of 20 tons per acre, annually, is none too much.

Harrowing Harrow or work the garden several times before planting. The soil is the home of the growing vegetable. You cannot prepare the seedbed too thoroughly.

Fertilization Purchase a 5-8-5 or a 4-12-4 fertilizer for your garden. Apply at the rate of 1000 pounds per acre (approximately 25 pounds per 1000 square feet). If your garden has been well manured yearly, the fertilizer may be broadcast and worked into the soil. If little manure has been used, half of the fertilizer should be placed in the row and thoroughly mixed with the soil.

Seed Order your seed at once from some reliable seed concern. Cheap seed is costly seed in the long run. Do not delay! Have your seed on hand when needed.

Selection of Vegetables Is your garden a corn-potato-beans-cabbage garden? It should contain a good selection of vegetables available throughout every month of the year. It should contain at least five or six of the green or leafy vegetables, five or six root vegetables, and a like number of fruit vegetables. Below is a list of some of these vegetables. Those followed by an asterisk should be in every garden.

Green or Leafy	Root	Fruit
Cabbage*	Beets*	Beans*
Kale*	Carrots*	Lima Beans
Lettuce*	Onions*	Corn*
Spinach	Parsnips*	Peas*
Swiss Chard	Potatoes	Peppers
Turnip Salad*	Salsify	Tomatoes*
Mustard	Sweet Potatoes	Okra
Spinach-mustard	Turnips*	Pumpkin
Celery	Radish	Squash
	Rutabaga	Cantaloupes
		Cucumber
		Eggplant

Selection of Varieties As a rule, order the old, standard varieties which have been tried and found of value. It is all right to try some new varieties each year, but do not risk your entire planting.

Planning Plan your garden carefully before planting. Place all perennials such as rhubarb and asparagus on one side of the garden where they will not interfere with the culture of annual crops. Group those vegetables together which mature at approximately the same time. Such a practice will permit the planting of succession crops and will go a long way toward insuring a good fall garden.

Hotbeds Sow your cabbage, tomato, pepper, eggplant and cauliflower seed in rows in the hotbed. Watch ventilation and watering carefully.

Planting Potatoes, peas, onions and radishes may be planted in March. In eastern Virginia, several other vegetables such as carrots, beets, turnips, etc., may also be planted. Consult Circular E-263, "Vegetable Garden Suggestions" for planting dates.

Exhibit L

13,113 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

April Suggestions for Garden Club Leaders

Plowing Unfavorable weather conditions have delayed plowing in many instances. Plow immediately.

Manuring Before plowing, make a liberal application of well rotted stable manure. Twenty tons per acre is not too much. If fresh, strawy manure is used, disc the material in before plowing to prevent the forming of air pockets. An application of nitrate of soda or sulphate of ammonia at the rate of 100 pounds per acre will hasten decomposition.

Soil Preparation The soil should be thoroughly harrowed or worked before planting. A fine, well-prepared seedbed will increase germination and aid in the production of better vegetables. Harrow if necessary several times. Don't let your desire to plant cause you to neglect thorough soil preparation.

Fertilization All vegetables require food to grow properly. Some of this food is supplied in the form of manure. The chief value of manure, however, is to increase the moisture-holding capacity of the soil. In addition to manure, an application of 5-8-5 or 4-12-4 fertilizer at the rate of 1000 pounds per acre (approximately 25 pounds per 1000 square feet) will prove profitable. One-half of the fertilizer should be used in the row and thoroughly mixed with the soil. The balance should be broadcast and cultivated in.

Selection of Vegetables Plant a well balanced garden which will supply an abundance of food throughout every month in the year. The garden should contain around 20 to 25 vegetables, about equally divided between green or leafy vegetables, root vegetables and fruit vegetables.

Planting Seed should be planted at varying depths depending upon the size of the seed. The soil should be firmed over the row after the seed is planted to insure quick and better germination. For some vegetables, such as parsnips, salsify, carrots, etc., a light mulch of well rotted manure or woods mold will aid in getting a stand.

Succession Crops A well-planned garden will permit the planting of succession crops. As soon as one crop is harvested another should be planted in its place. Group those vegetables together which will be ready for harvest at approximately the same time. All those vegetables which require the entire season to grow should be placed on one side of the garden where they will not interfere with the planting of succession crops.

Transplanting Care should be taken in removing young plants from the plant-bed. Leave as much soil as possible on the roots. Water when setting in the garden. After the water has soaked into the ground, pull some dry dirt over the moist soil and firm.

Cutworms Tomatoes, cabbage and pepper plants may be protected from cutworms by using paper bands around the stems. About an inch of the paper should be below the surface of the ground and from 1 to 2 inches above ground. Cutworms may also be controlled by poison bran mash, made from 5 pounds of dry bran, ½ pound Paris green, 1 pint of syrup or molasses, and sufficient water to make a crumbly mash.

Aphids Aphids or plant lice will seriously injure young plants unless precautions are taken. They may be controlled by spraying with Black Leaf 40 (nicotine sulphate) at the rate of 1½ teaspoonsful to 1 gallon of water. A home made spray may also be prepared by soaking 1 pound of tobacco stems or refuse in 1 gallon of water for 24 hours and spraying with this solution. Fairly satisfactory results may also be secured by spraying with a soap solution made by dissolving an inch cube of hard laundry soap in a quart of water. Regardless of the spray material used, the aphid must be hit with the spray to be killed.

Exhibit H

16,216 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va.A & M.College & Poly.Inst. & U.S.D.A.Cooperating
EXTENSION SERVICE

May Suggestions for Garden Club Leaders

The month of May is the testing period for many a gardener. Success or failure of the summer garden depends to a great extent upon what you do this month. Planting and transplanting are at their height. Fail to provide food for your vegetables now and they will fail to provide food for you later. Insects will appear to try your patience and test your ingenuity. You must decide whether you wish to raise vegetables for the insects or for your family.

Planting Seed should be planted at varying depths, depending upon the size of the seed. The soil should be firmed over the seed to insure quick and better germination. For some vegetables, such as parsnips, salsify, carrots, etc., a light mulch of well rotted manure or weeds will aid in securing a stand.

Transplanting Care should be taken in removing young plants from the plant bed. Leave as much soil as possible on the roots. Water when setting in the garden. After the water has soaked into the ground, pull some dry dirt over the moist soil and firm.

Fertilization Use a 5-8-5 or 4-12-4 fertilizer on your garden at the rate of 1000 pounds per acre (approximately 25 pounds per 1000 square feet). See that this fertilizer is thoroughly mixed with the soil.

Cutworms Tomatoes, cabbage, and pepper plants may be protected from cutworms by using paper bands around the stems. About an inch of paper should be below the surface of the ground and from 1 to 2 inches above. Cutworms may also be controlled by poison bran mash made from 5 pounds of dry bran, ½-pound Paris green, 1 pint of syrup or molasses, and sufficient water to make a crumbly mash. Keep poultry out of the garden as the mash is poisonous.

Slugs and Snails Slugs and snails eat large ragged holes through the leaves of the plants and destroy young seedlings. Remove all rotten boards and trash from the garden. Place strips of air slaked lime, soot or sifted wood ashes around the garden. Slugs and snails coming in contact with this material throw off so much slime that death follows.

Red Spiders Red spiders are small mites which do considerable damage to many vegetables by sucking the juice from the leaves, causing the leaves to yellow and die. The mites are so small that one must observe closely to see them. Dusting with sulphur is the best remedy.

Flea Beetles Flea beetles are small dark colored insects which jump about when disturbed. Cleaning up grass plots near the garden will aid in control. Dusting with 1 part calcium arsenate to 15 parts hydrated lime is recommended.

Grasshoppers and Ants Grasshoppers often damage garden crops. For control add a finely chopped orange or lemon to the poison bran mash described under cutworms. Ants may also be controlled in the garden by poison bran mash.

Chewing Insects Chewing insects, as the name implies, eat portions of the plant. Among the more common chewing insects are the Mexican bean beetle, potato beetle, cabbage worm and others. They may be controlled by spraying or dusting with magnesium arsenate in these proportions: Spray - magnesium arsenate 6 level tablespoonfuls; water, 3 gallons. Dust - magnesium arsenate, 1 part; hydrated lime, 3 parts. Place the poison where the insect feeds, which is usually on the undersides of the leaves. Thoroughness is essential for control. Start spraying or dusting when the insect first appears.

Sucking Insects Sucking insects, such as aphids or plant lice, injure the plant by sucking the juice from the leaves and causing them to yellow and curl. They may be controlled by spraying with Black Leaf 40 (nicotine sulphate) in these proportions: nicotine sulphate, 1½ teaspoonfuls; soap, 1-inch cube; water, 1 gallon. Remember it is necessary that the spray hit a sucking insect to kill it. Thoroughness as well as timeliness, is essential. A satisfactory homemade tobacco spray may be prepared by soaking a pound of tobacco stems, stalks, etc., in a gallon of water for 24 hours and spraying with the resultant mixture. Fairly good results may also be secured by spraying with a soap solution made by dissolving a 1-inch cube of hard laundry soap in a quart of water.

Diseases Many of our worst garden insects of tomatoes, potatoes, cucumber, cantaloupes, etc., may be controlled by spraying with Bordeaux mixture made up in these proportions: bluestone (copper sulphate) 4 ounces; rock lime, 4 ounces; water, 3 gallons. Dissolve the bluestone in a small amount of hot water and add water to make 1½ gallons. Slake the lime in a small amount of water and then add water to make 1½ gallons. Pour the two solutions together just before spraying. Magnesium arsenate and Black Leaf 40 may be combined with Bordeaux mixture if either chewing or sucking insects are present.

Exhibit E

13,939 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly. Inst. & U.S.D.A.Cooperating
EXTENSION SERVICE

Dear Gardener:

Thousands of gardens are destroyed annually by insects and diseases practically all of which can easily be controlled if proper control measures are practiced. Garden insects are classed chiefly as chewing and sucking insects. The spray or dust that will control one will not usually control the other.

Chewing insects, such as the Mexican bean beetle, potato beetle, cabbage worm and others, eat portions of the plant and may be controlled by spraying or dusting with a food or stomach poison such as magnesium arsenate, in the following proportions:

Spray - Magnesium arsenate, 5 level tablespoonfuls
Water, 3 gallons
Dust - Magnesium arsenate, 1 part
Hydrated lime, 3 parts

Place the poison where the insect feeds. For the bean beetle this means putting it on the undersides of the leaves. Thoroughness is essential for control. Start spraying or dusting when the insect first appears.

Sucking insects such as aphids or plant lice, injure the plant by sucking the juice from the leaves and causing them to yellow and curl. Use Black Leaf 40 (nicotine sulphate) in the following proportions:

Black Leaf 40, 1½ teaspoonfuls
Soap, 1-inch cube
Water, 1 gallon

Remember it is necessary that the spray hit a sucking insect to kill it. Thoroughness as well as timeliness is essential. A satisfactory homemade tobacco spray may be prepared by soaking a pound of tobacco stems, stalks, etc., in a gallon of water for 24 hours and spraying with the resultant mixture. Fairly good results may also be secured by spraying with a soap solution made by dissolving a 1-inch cube of hard laundry soap in a quart of water.

Certain insects cannot be controlled satisfactorily by spraying or dusting with the above materials. The Harlequin cabbage bug may be killed in its younger stages by spraying with Black Leaf 40. Adults must be controlled by hand picking.

The squash stink bug in its younger stages may also be killed by spraying with Black Leaf 40. The adults must be hand picked or trapped. If a board or shingle is placed under the plant, the insects will collect underneath it at night. They can then be killed in the early morning.

The cucumber beetle and flea beetle may be controlled fairly satisfactorily by dusting with calcium arsenate at the rate of 1 part to 15 parts hydrated lime. Dusting with hydrated lime alone will also give partial control. The former may be repelled by using turpentine at the rate of 1½ teaspoonfuls mixed with a quart of ashes and distributed around five or six hills.

Tomatoes, cabbage and pepper plants may be protected from cutworms by using paper bands around the stems. About an inch of paper should be below the surface of the ground and from 1 to 2 inches above. Cutworms may also be controlled by poison bran mash made from 5 pounds of dry bran, ½-pound Paris green, 1 pint of syrup or molasses, and sufficient water to make a crumbly mash. Keep poultry out of the garden as the mash is poisonous. Ants and grasshoppers may also be controlled in the garden by poison bran mash.

Slugs and Snails eat large ragged holes through the leaves of the plants and destroy young seedlings. Remove all rotten boards and trash from the garden. Place strips of air slaked lime, soot or sifted wood ashes around the garden. Slugs and snails coming in contact with this material throw off so much slime that death follows.

Many of our worst garden diseases of tomatoes, potatoes, cucumbers, cantaloupes, etc., may be controlled by spraying with Bordeaux mixture made up in the following proportions:

Bluestone (copper sulphate), 4 ounces
Rock lime, 4 ounces
Water, 3 gallons

Dissolve the bluestone in a small amount of hot water and then add water to make 1½ gallons. Slake the lime in a small amount of water and then add water to make 1½ gallons. Pour the two solutions together just before spraying.

Magnesium arsenate and Black Leaf 40 may be combined with Bordeaux mixture if either chewing or sucking insects are present.

If I can be of any help to you at any time, either call at my office or write me.

Agent.

Exhibit 0

15,297 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va.A & M College & Poly.Inst.& U.S.D.A. Cooperating
EXTENSION SERVICE

June Suggestions for Garden Club Leaders

Cultivation. At least 50% of the labor in gardening could easily be eliminated by proper cultivation at the right time. Weeds rob your vegetables of food and moisture. Destroy them before the injury is done. Practice thorough, frequent, shallow cultivation. Do not cultivate when the foliage is wet.

Thinning. Give the vegetables room to grow and develop properly. All gardeners sow seed rather thickly in order to secure a good stand. Many fail to realize, however, the importance of thinning. You cannot grow two beets or any other vegetable where only one is supposed to grow. Both size and quality are injured by crowding. Beets, carrots, parsnips, salsify, and turnips should be thinned to approximately 4-5 inches in the row; leaf lettuce, 4-6 inches, head lettuce, 8-10 inches; Swiss chard and kale, 12-18 inches. In thinning, such vegetables as lettuce, beets, Swiss chard, kale, etc. may be transplanted to another place in the garden.

Watering. Do not water the garden unless you give it a thorough soaking. Sprinkling the surface causes more harm than good.

Fertilization. If your vegetables are not growing properly, sidedress them with nitrate of soda or sulphate of ammonia at the rate of 150 to 200 pounds per acre (approximately 3 to 5 pounds per 1000 square feet). The material should be distributed along the row, not closer than 3 or 4 inches to the base of the plant, and cultivated in. Care should be taken that the material does not come in contact with the plant foliage or burning will result.

A complete fertilizer such as a 5-8-5 or a 4-12-4 may be used as a side dressing if you have no nitrate or sulphate on hand. Poultry manure may also be used to advantage.

Chewing Insects. Chewing insects, as the name implies, eat portions of the plant. Among the more common chewing insects are the Mexican bean beetle, potato beetle, cabbage worm and others. They may be controlled by spraying or dusting with magnesium arsenate in these proportions: Spray - magnesium arsenate 5 level tablespoonfuls; water, 3 gallons. Dust - magnesium arsenate, 1 part; hydrated lime, 3 parts. Place the poison where the insect feeds, which is usually on the undersides of the leaves. Thoroughness is essential for control. Start spraying or dusting when the insect first appears.

Sucking Insects. Sucking insects, such as aphids or plant lice, injure the plant by sucking the juice from the leaves and causing them to yellow and curl. They may be controlled by spraying with Black Leaf 40 (nicotine sulphate) in these proportions: nicotine sulphate, 1½ teaspoonfuls; soap, 1-inch cube; water, 1 gallon. Remember it is necessary that the spray hit a sucking insect to kill it. Thoroughness, as well as timeliness, is essential. A satisfactory homemade tobacco spray may be prepared by soaking a pound of tobacco stems, stalks, etc. in a gallon of water for 24 hours and spraying with the resultant mixture. Fairly good results may also be secured by spraying with a soap solution made by dissolving a 1-inch cube of hard laundry soap in a quart of water.

The squash stink bug in its younger stages may be killed by spraying with Black Leaf 40. The adults must be hand picked or trapped. If a board or shingle is placed under the plant, the insects will collect underneath it at night. They can then be killed in the early morning. The Harlequin cabbage bug may also be killed in its younger stages by spraying with Black Leaf 40. Adults must be controlled by hand picking.

Diseases. Many of our worst garden diseases of tomatoes, potatoes, cucumbers, cantaloupes, etc. may be controlled by spraying with Bordeaux mixture made up in these proportions; bluestone (copper sulphate) 4 ounces; rock lime, 4 ounces; water, 3 gallons. Dissolve the bluestone in a small amount of hot water and add water to make 1½ gallons. Slake the lime in a small amount of water and then add water to make 1½ gallons. Pour the two solutions together just before spraying. Magnesium arsenate and Black Leaf 40 may be combined with Bordeaux mixture if either chewing or sucking insects are present.

Fall Garden. Begin planning for your fall garden now. Beans, beets, cabbage, carrots, kale, lettuce, Swiss chard, turnips, and turnip salad, should all appear in the fall garden. If these vegetables are to be available this fall and winter, they must be planted from June to August, depending on the vegetable and the section of the state. Secure your seed now. Vegetables for fall and winter are the real test of a good gardener.

Exhibit P

15,413 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A & M College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

July Suggestions for Garden Club Leaders and Gardeners

Hundreds of gardeners in Virginia will have no fresh vegetables during the fall and winter months. Will you? Plan your fall garden now. Good seed is the first requisite for a successful fall garden. Order your seed at once from some reliable seedsman. The following list will give you information on vegetables and planting dates for the fall garden.

Vegetables	Varieties	Planting Dates: Tidewater and Middle Virginia	Planting Dates: Piedmont and Western Virginia
Beans	Stringless Green Pod	August 1-20	July 15-Aug. 10
Beets	Crosby's Egyptian	August 1-20	July 15-Aug. 10
Cabbage	Danish Ball Head	Set plants July 15 to August 15	Set plants July 10-20
	Late Flat Dutch		
Carrots	Chantenay	August 1-10	July 10-20
Collards	Carolina Short Stem	August 1-10	July 10-20
Celery	Easy Blanching	Set plants July and August	Set plants July 10-20
	Winter Queen		
Corn	Golden Giant	August 1-15	July 10-20
	Country Gentleman		
Kale	Dwarf Blue Curled Scotch	September	July 15-Aug. 10
Lettuce	Big Boston (head)	August-September	August 1-20
	Grand Rapids (leaf)	August-September	August-September
Mustard	Japanese Spinach Mustard	August	July 15-Aug. 10
Onion	Potato	October-November	October
Radish	Scarlet Globe	September	August
	White Icicle		
Spinach	Virginia Savoy, or Long-standing Bloomsdale Savoy	August 15-Nov. 15	August-September
Swiss Chard	Lucullus	August 1-10	July 1-August 1
Tomato	Marglobe	Set plants July 15 August 10	Set plants July 1-20
Turnip	Purple Top Globe	August	August 1-10
	Yellow Aberdeen		
Turnip Salad	Seven Top, or Pomeranian White Globe	August-September	August

Further essentials for a successful fall garden are:

1. Thorough soil preparation.
2. Firming soil after planting.
3. Liberal fertilization. Use a 5-8-5 or a 4-12-4 fertilizer at the rate of from 400 to 1000 pounds per acre (10 to 25 pounds per 1000 square feet)
4. Thorough shallow cultivation.
5. Thorough pest control measures. Magnesium arsenate at the rate of one ounce (5 level tablespoonsful) to 3 gallons of water, will control the Mexican bean beetle and other chewing insects. Nicotine sulphate (Black Leaf 40) at the rate of 1½ teaspoonsful to a gallon of water, will control aphids or plant lice and other sucking insects. Bordeaux mixture (4-4-50) will control many of the worst garden diseases.

See me at any time concerning your garden problems. Plan now for an excellent fall garden.

Agent.

Exhibit G

15,564 COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A & M College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

August Suggestions for Garden Club Leaders and Gardeners

August should be an exceptionally busy month in the garden. The summer garden will soon be a thing of the past but everyone can have a good fall and winter garden. Now is the time to plan for and plant that garden. Recent rains throughout the state have made the prospect for fall gardens most encouraging. Cash crops have in many instances sold at a loss, but no farmer need lack a bountiful supply of vegetables for fall and winter use. It all rests with the gardeners.

Planting. Beans, beets, kale, lettuce, mustard, radishes, spinach, Swiss chard, turnips, and turnip salad may be planted in all sections of the state. Carrots, collards and corn may be planted in Tidewater and Middle Virginia. Cabbage, tomato and celery plants may be set in the same section. A variety of vegetables for the fall garden may still be planted in every section of the state. Refer to the July garden letter or to V.P.I. Circular E-263, Vegetable Gardening Suggestions for Virginia Farmers, for planting dates. If you do not have either of these, get in touch with me, or write direct to the Vegetable Garden Service, Extension Division, Blacksburg, Va.

Sow the seed thickly in order to insure a good stand. Mulching the row with well rotted stable manure, woods mold, sawdust or woodpile dirt will also help to obtain a stand. Firm the soil after planting. After the plants are up, do not neglect to thin them. Give the vegetables room to grow and develop properly. You cannot grow two beets or any other vegetable where only one is supposed to grow. Both size and quality are injured by crowding.

Soil Preparation. Prepare the soil thoroughly before planting. Break up all clods and lumps.

Cultivation. At least 50% of the labor in gardening can easily be eliminated by proper cultivation at the right time. It takes just as much plantfood and moisture to grow a good crop of weeds as to grow a good crop of vegetables. Weeds rob your vegetables of this food and moisture. Destroy them before the injury is done. The time to kill a weed is when it is small, before it gets a start. Practice frequent, shallow cultivation. Do not cultivate when the foliage is wet.

Fertilization. Use a fertilizer analyzing from 4% to 6% nitrogen; 8% to 12% phosphorus; and 4% potash. In Eastern Virginia a 6-8-4 is recommended; in other sections of the state, a 5-8-5 or 4-12-4.

If no fertilizer has been applied to the land, use 1000 pounds per acre (25 pounds per 1000 square feet). If a good application of fertilizer has been made for the spring crop, this amount may be reduced from one-third to one-half.

On all crops except beans the fertilizer should be put in the row and thoroughly mixed with the soil. On beans the fertilizer should be placed along the row after the beans are up and cultivated in.

Watering. Do not water the garden unless you give the soil a thorough soaking. Sprinkling does more harm than good.

Chewing Insects. Chewing insects, as the name implies, eat portions of the plant. Among the more common chewing insects are the Mexican bean beetle, potato beetle, cabbage worm and others. They may be controlled by spraying or dusting with magnesium arsenate in these proportions: Spray - magnesium arsenate 5 level tablespoonfuls; water, 3 gallons. Dust - magnesium arsenate, 1 part; hydrated lime, 3 parts. Place the poison where the insect feeds, which is usually on the undersides of the leaves. Thoroughness is essential for control. Start spraying or dusting when the insect first appears.

Sucking Insects. Sucking insects, such as aphids or plant lice, injure the plant by sucking the juice from the leaves, causing them to yellow and curl. They may be controlled by spraying with Black Leaf 40 (nicotine sulphate) in these proportions: nicotine sulphate, 1½ teaspoonfuls; soap, 1-inch cube; water, 1 gallon. Remember it is necessary that the spray hit a sucking insect to kill it. Thoroughness, as well as timeliness, is essential. A satisfactory homemade tobacco spray may be prepared by soaking a pound of tobacco stems, stalks, etc., in gallon of water for 24 hours and spraying with the resultant mixture. Fairly d results may also be secured by spraying with a soap solution made by dissolving a 1-inch cube of hard laundry soap in a quart of water.

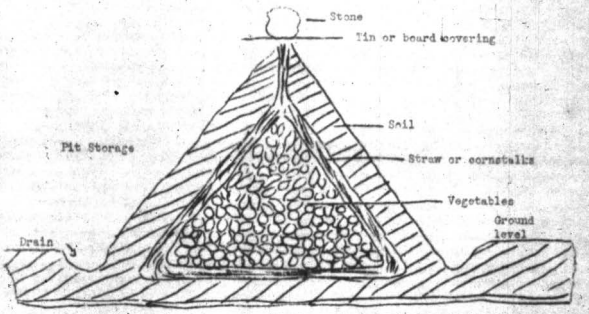
Agent.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

October Suggestions for Garden Club Leaders and Gardeners

The season of garden planting is over for another year. There is, however, still an abundance of food available in your garden. A goodly share of this will soon cease to exist. A little care will prevent this loss and at the same time supply the farm table with an abundance of fresh vegetables through the winter months. Store this food and thereby reduce the cost of the winter menu, as well as improve the health of the family.

There are two chief types of home storage--cellar storage and pit storage. A cool, well ventilated cellar under the dwelling offers good conditions for the storage of vegetables, provided the cellar is properly insulated. If the cellar contains a furnace a room may be partitioned off at one end suitable for the storage of vegetables. Ventilation may be afforded by windows. Many gardeners, however, lack a good storage cellar, but they can easily resort to pit storage.



If pit storage is to be used, select a well-drained place in the garden or in some place convenient to the kitchen. Dig out the soil to a depth of 6 to 8 inches over an area sufficiently large to accommodate the vegetables to be stored. As a matter of convenience, it is suggested that several small pits be constructed rather than one large one. Place a layer of three or four inches of straw or corn stalks in the bottom of this pit and place the vegetables in a conical pile on top of this material. They are generally piled to form a mound about 2½ or 3 feet in height. They should then be covered with a layer of straw or corn stalks. Over this should be placed a layer of dirt to the depth of 2 or 3 inches. As winter approaches, the dirt covering should be increased until it is from 4 to 6 inches deep. Ventilation should be secured through a small opening in the top of the pit, loosely filled with straw or cornstalks and covered to prevent rain entering the pit.

Among the vegetables that may be kept in pit storage are Irish potatoes, beets, carrots, turnips, rutabagas, parnips and salsify. Parsnips and salsify may be left in the ground if desired, as freezing does not injure these two crops. Spinach and kale will also live through the winter in normal years. Sweet potatoes for home use should be placed in the basement near the furnace, on a shelf near the kitchen stove, or near the chimney on the second floor.

Onions should be stored in a dry, well-ventilated place such as the attic. Pumpkins and squash may be kept in dry, well-ventilated cellars, but a dry, frost-proof place above ground is best. Individual specimens should not be allowed to touch each other. Cabbage may be stored in out-door cellars or pits. Celery may also be stored in a specially constructed trench, or in a hotbed pit.

Store the surplus food for winter use. For additional information, see me or write the Vegetable Extension Service, V.P.I., Blacksburg, Virginia.

Agent.

#15582 **Exhibit B**

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
State of Virginia

Va. A. & M. Col.
and Poly. Inst.
and U. S. Dept. of
Agriculture Coop.

EXTENSION SERVICE
COUNTY AGENT WORK

FARM STORAGE FOR FRUITS AND VEGETABLES

Prepared By
L. B. Dietrick, Vegetable Gardening Specialist
and
V. R. Hillman, Agricultural Engineering Dept.

Many farms without cellar or other suitable means for vegetable storage may secure such storage at very slight expense if one of the means suggested in these pages is followed.

Figure 1, is a building of post and slab construction. After the dirt is dug away, two rows of posts through the center form the walk-way and the front of the vegetable bins. Two other rows of posts, one on either side, form the outside walls. Slabs or boards are placed on the outside of these posts and hold in place by dirt which is tamped back in place as the wall is built. If the edges of the slabs are straightened, a fairly tight wall results. They may be nailed lightly to stay better in position until the dirt is replaced. Rails or poles may be used instead of slabs or lumber if some old metal roofing or other such material is available to place on the outside of the wall to keep the dirt from sifting through. Vegetable bins 2 or 3 feet wide are built along each wall and shelves for canned fruit placed above.

LOCATION:--The most convenient location for building one of these storage houses is in the side of a hill or bank. There is no need then to provide drainage, and entrance may be gained at floor level of the storage without using steps. Figure 2 shows how the front wall will look. The front is boarded up with slabs or plank, and a heavy door provided to keep out frost in cold weather. The whole structure must be covered with from 2 to 3 feet of earth for insulation. In most localities a south or southeast exposure will be most desirable. In warmer territory it may be desirable to extend the roof a few feet to partly shade and protect the front wall in order to hold the temperature down to a desirable point.

VENTILATION:--The most important part in the construction of the storage is the provision for proper ventilation. Good ventilation must be provided. This is secured by an out-take flue 12 inches square placed in the top near the back of the storage room. Intake air is secured through flues on either side of the door. The front wall is tightly boarded on the inside of the posts, which leaves a space between this and the outside boards. One outside board on either side of the door is hinged as shown and may be opened for ventilation. If these doors are opened when the outside air is cooler than the cellar, cold air will enter, pass down the wall and into the house at the floor. Warm air will escape through the out-take flue and the house, together with its contents, can be brought down to a safe storage temperature.

During cool nights the ventilators are left open but they must be kept closed in warm weather and during warm days to prevent the circulation of warm air through the cellar. In very cold weather all openings must be kept closed to prevent freezing temperatures. The out-take flue should be stopped with papers or a burlap bag if no damper is provided in the stack.

FLOOR:--It is important to note that the floor is not solid but is made up of boards 4, 6, or 8 inches wide with 1½ or 2 inch openings between them. This floor is laid on sills 6 or 8 inches high to allow good circulation of air under the vegetables. Notice in figure 5 that a large part of the intake air goes under the floor and filters up through the floor and storage space.

STONE CONSTRUCTION:--Figure 3 shows a similar plan but of stone construction. These stone walls should be 16 to 20 inches thick and, if care is taken to select large well shaped stones, quite a good wall will result with only clay mortar. Cement mortar will be more satisfactory, however. The intake flue on this stone building is a stone chimney built on one side of the door with a hooded opening at the top and an opening through the wall at the bottom as indicated in figure 5. Figure 4 shows an outside view of the completed structure before dirt is placed over it. This building should also have 2 to 3 feet of dirt over it for insulation.

DIMENSIONS AND CAPACITY:--The minimum size for these storage cellars is 6½ or 7 feet wide by 8 feet long and 7 feet high in the center. If the bins are made 2½ feet deep and 2½ feet wide the full length of the cellar, they will hold approximately 40 bushels of vegetables. Two 16 inch shelves above these bins will give shelf space for about 200 half gallon cans of fruit or vegetables. These figures given are inside dimensions and may be increased by any amount desired if more storage is required. The side wall should in no case, however, be built more than 7 feet high if this type of construction is used, as in heights greater than this the walls will need more reinforcing to support the pressure of the earth.

PRODUCTS THAT MAY BE STORED:--Vegetables which may be stored in this cellar are Irish potatoes, beets, carrots, turnips, rutabagas, parsnips, salsify, cabbage and celery. Rotting or diseased vegetables should not be stored as they not only spoil, but will damage other vegetables in storage. Sweet potatoes will not keep in this kind of storage. They require a warm, dry place. If apples are to be stored, a two compartment cellar should be provided, as apples absorb tastes and odors readily.

These plans are suggested as a means of securing the cheapest possible storage structure, coupled with convenience and proper ventilation. If more permanence, cleanliness, rodent control, etc., are desired, this same type of structure may be built of reinforced concrete in any size required.

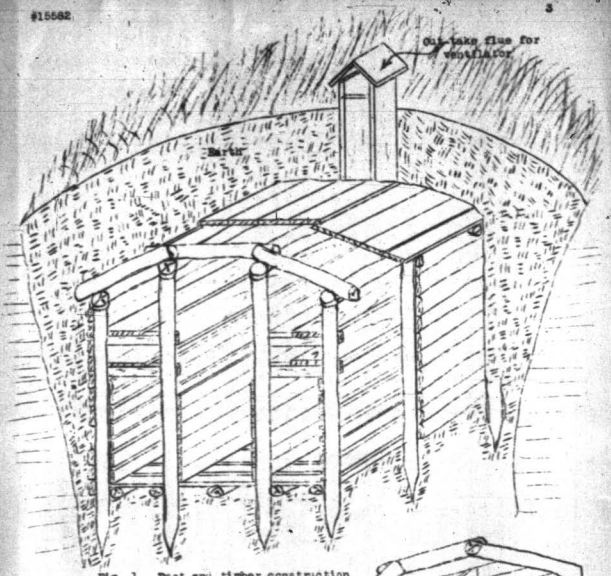


Fig. 1 - Post and timber construction

Fig. 2 - View of front wall

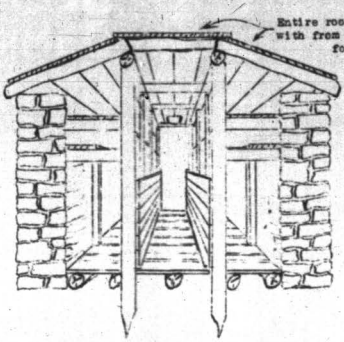


Fig.3 - Showing stone wall with bin and shelf construction

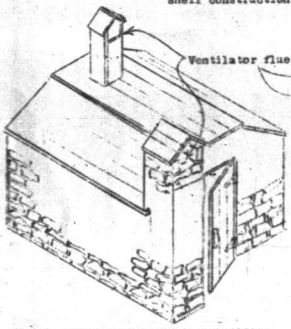


Fig.4 - Outside view of stone building
Note stone chimney on front for air intake

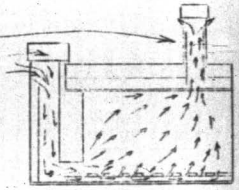


Fig.5 - Showing operation of the ventilating system. Proper ventilation is most important to proper storage.

EXHIBIT B

EMERGENCY RELIEF ADMINISTRATION
11 SOUTH TWELFTH STREET
RICHMOND, VIRGINIA

March 17, 1934

SUBSISTENCE GARDENS IN VIRGINIA

Suggestions for Organization and Development

AIM: Through means of gardens to provide a balanced diet throughout the year for as many relief families in Virginia as possible, to assist and demonstrate to others the value of subsistence gardens.

Organization:

1 - State Committee

1 - Mr. Wm. A. Smith, FERA Administrator, Chairman
2 - Mr. Sydney T. Adair, Assistant Director, Vice Chairman
3 - Mr. Arthur James, Director Public Welfare
4 - Miss Margaret Woll, Director Social Service Bureau
5 - Miss Ella Agnew, State Director Women's Work CWA
6 - Mr. John R. Hutcheson, Director Extension Division V. P. I.
7 - Miss Maude Wallace, State Home Demonstration Agent, V. P. I.
8 - Mr. C.A. Montgomery, Assistant Director Extension, V. P. I.
9 - Mr. Walter Newman, State Supervisor of Agricultural Education
10- Miss Martha Creighton, State Supervisor Home Economics, Richmond, Va.
11- Mr. L. B. Deitrick, State Garden Specialist, V. P. I.
12- Mrs. Eula Porter Robins, Nutrition Advisor, FERA
13- Mr. A. G. Smith, Horticulturist, Salem, Va.
14- T. C. Walker, Consultant on Negro Affairs.

2 - County Committee

A - There shall be formed immediately in each County a Subsistence Garden Committee, composed of -

Director of Relief or Welfare
County Garden Director
Home Demonstration Agent - white and colored
Farm " " " " "
Agricultural Teacher " " "
Home Economics Teacher " " "

An outstanding person from each Magisterial District in the County, suggested either by Home or Farm Agent, Relief Director, Agricultural or Home Economic Teachers. This person, who should know gardens, shall become Chairman of the District Committee which shall be organized by him with necessary assistance of County Committee. (It is hoped that the District Supervisors of the State Social Service Bureau and the District Home and District Farm Demonstration Agents will be

willing to serve as consultants, and keep an eye on the progress of the program in their various counties throughout the year.)

B. Magisterial District Com. in County.

The District representative on the County Committee, as mentioned above, should be Chairman of the Magisterial District Committee and should select a representative of each town or community in the District to serve on the Magisterial District Committee.

C. Local or Community Committee

The representative on the Magisterial District Committee becomes the chairman of the local or community committee which he represents. This local committee may number five and should be composed of men and women able and willing to give the time necessary to make the garden work a success.

3 - Cities

Every City should form a Subsistence Garden Committee, composed of the Relief Director, Farm and Home Agents wherever possible, and a selected group of men and women who know vegetable gardens and are willing to work. They should assist in securing a person to serve as garden director.

EMPLOYED STAFF

State Office

Director of Subsistence Gardens
Specialist in Gardens
Specialist in Food Preservation
Office Secretary
Stenographer
Filing Clerk

State Supervisors -- State Home Demonstration Agent and her staff, who will recommend County Directors and give general supervision to the program.

County ---------- Garden Director for those counties needing a full time worker.

" " " certain groups of counties.

Cities ---------- " " " those cities requiring full time worker, and some small cities requiring a

part time worker.

Office help will be furnished from the regular personnel of the relief office.

DUTIES OF COMMITTEES

The STATE COMMITTEE is to meet at the call of the Chairman. The members will serve as advisors of the field workers and through the State Director should receive monthly reports of progress; they should feel free at all times to make suggestions concerning needed changes, etc.

The COUNTY AND MAGISTERIAL DISTRICT COMMITTEES, assisting the County Garden Directors, are responsible for the organization and development of the regular garden and food preservation work for the year. These Committees will be of great assistance in locating and reporting on approved forms both relief and marginal cases which shall be given aid.

DUTIES OF EMPLOYED STAFF

STATE DIRECTOR

1. Shall be responsible for developing and carrying out such plans as may be approved by the State Committee.
2. Shall take a part in organizing counties for immediate work.
3. In consultation with garden and food preservation specialists, shall see that proper instructions are prepared and distributed to County Garden Specialists, Committee members and local gardeners and render reports to State Committee.
4. In co-operation with State Specialists, prepare simple but adequate weekly report forms for County Directors.
5. Provide county directors with report forms and see that they are returned promptly.
6. File reports in such a manner as to make them accessible to proper persons at all times.
7. Shall see that the proper persons in the State, such as District Relief Directors and District Farm and District Home Demonstration Agents, in addition to the members of the State Committee, receive copies of monthly reports.
8. Shall compile and file in the State office a complete report of all work accomplished, together with recommendations for another year.

The State Director, in fact, is responsible for beginning and developing the subsistence garden project in Virginia for the year.

FOOD PRESERVATION SPECIALIST:

1. Shall assist in setting up efficient county organizations.

2. Consult with garden specialist and prepare information on a balanced food program for canning, drying and storing, giving selection and quantities of fruits and vegetables needed to adequately feed families of varying numbers.
3. Prepare bulletin covering food preservation work for families participating in this program, with directions for home made canners and driers.
4. Together with Director, be responsible for arranging canning schools; see that county directors make ample provision for saving all surplus foods, that families may have sufficiently balanced diet throughout the winter.

GARDEN SPECIALIST:

1. Shall assist in setting up effieient county organizations.
2. Shall plan and distribute information on the amount and selection of vegetables to be planted; planting, fertilization, cultivation; pest control, and storage.

3. In so far as possible assist County Garden Directors in arranging and holding garden meetings.

4. Have general supervision over County Garden Directors.

COUNTY DIRECTOR:

1. The County or City Garden Director is directly attached to the office of the County or City Relief Director and looks to that official for direction in all matters pertaining to the social and relief aspects of the work, reporting all case work to the County Relief Director; in all matters pertaining to the agricultural and home economics side of the work, she must look for guidance to the County Farm and Home Agents; on matters of organization she should consult both the County or City Relief Director and the Demonstration Agents.

2. Become thoroughly familiar with all instructions sent from State office and follow them systematically.

3. Secure from County Relief Director names of families in each Magisterial District who are already on relief and eligible for garden seed and fertilizer. Such lists should be given to the Chairman of the Magisterial District Committee, who in turn passes them on to the Chairman of the local or community Committee, with instructions to select the necessary number of the most worthy cases.

In so far as possible a fair distribution of seeds and fertilizer should be made to all sections or communities in the county. Surpluses in any magisterial district will be returned to the County Garden Director for general distribution within the County.

Duties of the employed staff (Cont'd.)

4. Form a County Committee composed of Relief Director, Home and Farm Agents, white and colored; Agricultural and Home Economics teachers; white and colored; and one representative from each magisterial district.

   At the first meeting have a definite plan to present for suggestions and approval.

5. Develop Magisterial District Committees and the local organization on this same plan.

6. Send at once to State office the following information that no time may be lost in getting to work.

   Seed: Estimated distribution of families as follows:

   Number with 3 in family _____

   Number with 5 in family _____

7. Later in the season send in:

   Estimated number of cans or jars needed
   Estimated number of rubbers for jars
   Number of jars left over from last year that can be used if new rubbers are provided.

8. Reports:

   On report blanks furnished by State office keep complete weekly reports of all activities; file one copy in local office and send one to the State office.

9. Prepare for canning season by securing cooperation of needed number of home makers who are good canners, Home Economics teachers at home for the summer, and Home Economics senior college students who have had definite canning instructions, all of whom may be willing to contribute their services if transportation is provided wherever necessary. In anticipation of this program, prepare a budget for the absolutely necessary transportation expense for these volunteer workers. After being approved by the local Relief Director, this budget will be submitted to the State Director for approval before expenses for such travel is authorized.

10. Keep careful records of conditions of gardens and make necessary preparations for saving surplus products.

11. Encourage people to seed plantbeds for producing early plants for transplanting. Some families may even make a small income by disposing of surplus plants if they come early enough. Seed saving should also be stressed.

12. Arrange for garden meetings within the county.

To sum up:

A County Director should see -

That as many families as possible have gardens.
That they are provided necessary seed, fertilizer and instructions to make a garden.
That they make proper use of materials in planting and cultivating gardens.
That they have instructions for preparing vegetable for daily use.
That they can, dry or store all surplus food.
That they make a simple but complete report on their garden, project.

Cities

1. These families on relief who have back yards in condition to turn into gardens are fortunate and should be encouraged.

   In general cultivating open squares is not practical for many reasons -- the soil is often unsuitable for vegetable production without enormous expense.

   The people working the gardens are rarely able to reap the benefit as the vegetables are stolen as soon as ripe.

2. Relief gardens may be used as work relief when Relief Director is able to secure plots of 1 to 5 acres and have them worked by men or women. Produce thus raised is to be stored by the Relief Director for future use. Directions covering this phase will be prepared immediately and released.

Winter Gardens

In all sections of the State particularly Southside and lower Tidewater, certain healthful vegetables may be grown throughout the year, certainly for ten months. Any garden project should take these winter gardens into consideration.

L. B. Dietrick

L. B. DIETRICK,
DIRECTOR OF SUBSISTENCE GARDENS.

Exhibit V

EMERGENCY RELIEF ADMINISTRATION
11 SOUTH TWELFTH STREET
RICHMOND, VIRGINIA

March 27, 1934

DUTIES OF THE COUNTY GARDEN DIRECTOR

1. A bulletin outlining our plan of organization for the Subsistence Gardens Project in Virginia is attached. Familiarize yourself with this plan, first of all.

2. Report to the County Relief Director and to the County Home and Farm Demonstration Agents the fact that you are now on duty. The County Relief Director will plan for office, desk, and filing space for you.

3. Secure the blank application cards for Subsistence Gardens from the County Relief Director. Note that these cards are serially numbered. You are responsible for returning every card to the state office.

4. Secure at the same time from the County Relief Director, a list of the relief cases in the county, which are capable of carrying a garden project to a successful conclusion. It is hoped that the County Relief Director has been able, as requested by Miss Woll, to compile this list for you according to the magisterial districts of the county. If not, get her to assist you in compiling the list in that way.

5. If possible, secure a map of the county, showing the magisterial districts, and upon which you may mark off the various local communities of the districts.

6. SELECTION OF DISTRICT CHAIRMEN: Secure the name of an outstanding person (preferably a woman) in each magisterial district, who will serve without financial remuneration, as chairman of the Magisterial District Garden Committee. This chairman of the Magisterial District Garden Committee will represent her district on the County Garden Committee.

   Advice on the selection of this person may be secured by conferring with the County Relief Director, the County Home Demonstration Agent, County Farm Demonstration Agent, Home Economics and Agricultural teachers (if any in the district concerned.)

7. Make a personal call upon the person recommended in each district, asking her (or him) to serve as Chairman of the Magisterial District Garden Committee. As you secure each acceptance, outline the duties of the position, as found on page 4 of this bulletin, and give the Chairman the cards allotted to the district, and the names of the relief cases to be considered in the district. The number of gardens you allot to each magisterial district from your county quota will depend upon the need.

8. Collect the filled-in and signed application cards from each magisterial district chairman within a week's time after distribution of seed and fertilizer, if possible. Check them with the County Relief Director, that she may have on file proper records of all cases, and then forward the cards immediately to the State Director, after making a list of the families which have received seed and fertilizer.

   Blue copies of the cards will be returned by the State Director to you for filing in the County Relief Office.

9. Where the number of relief cases listed in the County Relief Office is not sufficient to take all of the gardens allotted to the county, marginal families may be considered. By marginal families we mean those families whose financial circumstances are such that they cannot afford to purchase garden seed and fertilizer, yet who, without having a garden, would fall upon relief rolls later.

10. MEETING OF COUNTY GARDEN COMMITTEE: Since it is time to begin planting gardens, it is suggested, that you launch this program in your county through these personal visits to the district chairmen, without waiting to get your entire County Committee together.

It is desirable, however, that you call a meeting of your County Committee as soon as possible, (certainly within the first week) to outline the general plan of the Subsistence Gardens Project in the State, and to discuss the problems which have arisen in connection with the inauguration of the program in your county. The County Garden Director will serve as chairman of the County Garden Committee, and will call committee meetings when necessary.

Be ready for this first meeting by preparing in advance an outline of just what you plan to discuss. Be sure that you have definite plans ready in advance for each and every meeting of the County Garden Committee.

11. STARTING THE GARDENS: Instructions for planning, planting, and fertilizing the gardens will be forwarded to you to give out with each package of garden seed. Request your Local Committee Chairmen at the District Committee meetings, to check up, as far as possible through their Local Committee, to see that these instructions are followed in starting the gardens and to discuss the instructions with the individual gardeners.

12. BULLETINS: Additional bulletins, giving timely instructions on gardening will be sent out from time to time by the State Garden Specialist. These bulletins will be sent from the State Office directly to the individual gardeners, to the County Garden Directors, and to committee chairmen.

In many instances, it will be necessary for the magisterial district chairmen to call meetings of the District Committees to discuss thoroughly the instructions contained in the bulletins. You will attend all of these meetings to go over the instructions with the local chairmen, who make up the Magisterial District Committee.

You may be able to meet two or three such Magisterial District Committee groups in a day, by having the meetings planned for both morning and afternoon. You will also attend as many of the local Committee meetings as possible.

It is desirable that you make personal visits to as many of the subsistence gardens as possible, from time to time.

13. FOOD PRESERVATION: When you have the garden program well launched, begin to plan for the food preservation program. Instructions for canning and drying of the vegetables will be sent to the County Garden Director and not to the individual families. We shall depend upon you and the organization you perfect to instruct the homemaker of each family, having a subsistence garden, in safe and effective preservation of the surplus vegetables.

In organizing the County work to teach and demonstrate methods of food preservation, secure the cooperation of the needed number of home makers, home economics teachers, or home

economics senior college students, who have had definite canning instructions and are good canners. Of these groups, those who are home demonstration club members, or have been 4-H Canning Club members should be especially useful.

All those selected to aid should be people who are thoroughly reliable and willing to contribute their services if transportation is provided, wherever necessary.

LEADER'S SCHOOLS: Well in advance of the canning season plan to conduct leader's schools for this group, to instruct them in demonstration methods of presenting the information sent you by the State Food Preservation Specialist.

The State Food Preservation Specialist will plan well in advance of the canning season regional food preservation schools for County Garden Directors, primarily for the purpose of discussing demonstration methods.

BUDGET FOR EXPENSE OF VOLUNTEER WORKERS: Before making definite arrangements with these volunteer workers, prepare a budget for the absolutely necessary transportation expense for them and submit it to the County Relief Director for approval. Then send the budget to the State Director of Subsistence Gardens for approval, and authorization of the travel expense.

CONTAINERS NEEDED: By May 15, submit to the State Food Preservation Specialist an estimate of the number of cans, or jars and rubbers needed for the food preservation work in your county. In making this estimate, secure a record from each subsistence garden family of the number of jars left over from last year which might be used if new rubbers were provided. Include the number of any filled, as well as of unfilled, jars in this estimate.

15. You are responsible for each and every application card issued to your county. Each card represents a garden allotted to your county. No seed and fertilizer shall be given out by the local committee member without securing a signed card for the same.

16. DISTRIBUTION OF SEED AND FERTILIZER: A definite number of application cards for gardens have been allotted to your county. Should the number of cards exceed the number of relief or marginal families in the county, they should be returned immediately to the State Office.

The excess quantity of seed and fertilizer assigned to your county will be transferred by the State Office to another county. Seed and fertilizer must not be given to persons who are financially able to purchase these materials.

The seed, fertilizer and seed potatoes are being shipped to the County Relief Director in each county, who will make arrangements for temporary storage. She will be responsible for transportation to the various magisterial districts of the county. It will be desirable for you and your District and Local Committee members to give her as much assistance as possible.

The responsibility for the final distribution to the individual gardeners within each magisterial district becomes yours through your committees.

17. REGIONAL MEETINGS OF COUNTY GARDEN DIRECTORS: Regional meetings of County Garden Directors will be held when necessary throughout the season. The meetings will be for the purpose of discussing problems and outlining procedure. They will be held at some central point within each region so that all County Garden Directors will be able to attend the meeting and return to their respective counties the same day.

DUTIES OF THE MAGISTERIAL DISTRICT GARDEN CHAIRMAN

1. To divide the District as to local communities or neighborhoods.

2. To secure one responsible person, man or woman, in each local community or neighborhood to serve as chairman of a Local Committee of five members. This person would represent his community on the Magisterial District Committee.

3. Where the colored population is large, to secure the services of a reliable negro in each community or neighborhood, to serve as an assistant to the local community chairman. This negro would promote the garden program with the negro population of the community, and would serve on the Community and on the Magisterial District Garden Committee.

4. To instruct the local chairman as to his duties in carrying out the plans of the Subsistence Gardens as outlined on page 5.

5. To give to each local chairman the names of relief cases in his local community, asking him to discuss these names with his committee and to select from this list the families who could be relied upon to cooperate in the garden plan.

6. To call, at the earlist possible moment a meeting of the Magisterial District Committee:

   a. To allot the gardens in the district. In allotting the gardens in any district the relative proportion of needy white and needy negro families should be noted and the gardens allotted to whites and negroes accordingly. As fair a distribution as possible should be secured throughout the county.

   b. To distribute the application cards to the community chairmen in the numbers allotted to the various communities.

   c. To discuss with the local chairmen their duties as given on page 5.

7. To report to the County Garden Director immediately after the Magisterial District Committee meeting, the estimated distribution of families in the district as follows:

   Number with 3 in the family.
   Number with 5 or more in the family.

   Garden seed is being furnished in two collections. Collection I is suitable for a family of 2 or 3, or for a family of 4, where the children are small. Collection 2 will meet the needs of a family of 4 where the children are grown, or of families of 5 and 6 or more. The County Garden Director must have this information in order to know how to distribute the seed by magisterial districts.

8. To see that seed and fertilizer is distributed immediately in the district; to be responsible for the collection of the filled-in and signed application cards from the local chairmen of the district within a week after the distribution of seed and fertilizer, and to hold them for the County Garden Director.

9. To promote the Subsistence Gardens Program through the District and Local Committees in accordance with instructions, from time to time, from the County Garden Director.

10. To assist County Garden Director in planning for canning demonstrations where needed.

    a. In keeping track of progress of both production and preservation of fruits and vegetables.

    b. In making final reports.

DUTIES OF THE LOCAL GARDEN CHAIRMAN

1. Confer with Magisterial District Chairman and

(a) Secure names of people on relief who are in his community.
(b) Appoint a local committee of five, either men or women. This committee will select from the relief list those who are capable of and willing to handle subsistence gardens.

2. Attend Magisterial District Committee meeting -

(a) Secure cards for signature of garden recipients and instructions for filling out cards. The information on the application cards should be filled in as soon as possible but the card should not be signed by the applicant or committee member until the delivery of the seed and fertilizer.
(b) Return filled-in and signed cards and also unused cards to the Magisterial District Committee Chairman.

NOTE: Cards are serially numbered and each Local Chairman is responsible for reporting on every card given to him - none must be lost or destroyed.

3. Seed, fertilizer and potato seed will be delivered to Magisterial districts. Local Chairmen are responsible for -

(a) Securing services of residents in community, gratis, for any necessary delivery. No funds are available for this service. The garden recipients will also assist in so far as possible by calling at some designated place for their seed and fertilizer.

4. Visit individual gardens whenever possible to check on progress and discuss instructions.

5. Notify Magisterial District Chairman as to progress of program.

Very truly yours,

EMERGENCY RELIEF ADMINISTRATION
William A. Smith, Administrator

F B Dietrick

L. B. DIETRICK,
Director of Subsistence Gardens

SET-UP FOR SUBSISTENCE GARDENS

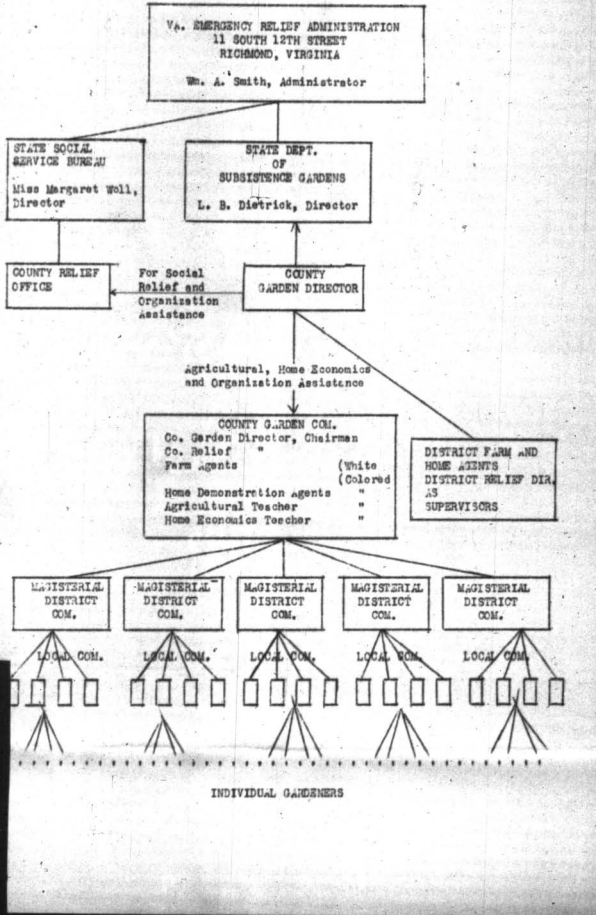


Exhibit V

DUTIES OF THE CITY GARDEN DIRECTORS

1. A bulletin outlining the plan of organization for the Subsistence Gardens Project in Virginia is attached. Familiarize yourself with this plan, first of all.

2. Report to the City Relief Director and to the County Home and Farm Demonstration Agents, if any, the fact that you are now on duty. The City Relief Director will plan for office, desk, and filing space for you.

3. Secure the blank application cards for Subsistence Gardens from the City Relief Director. Note that these cards are serially numbered. You are responsible for returning every card to the state office.

4. Secure at the same time from the City Relief Director, a list of the relief cases in the City, which have sufficient space for a garden and are capable of carrying a garden project to a successful conclusion. Get the City Relief Director to assist you in compiling this list by wards.

5. If possible, secure a map of the city, showing the wards, and upon which you may mark off the various local communities of the wards.

6. SELECTION OF WARD CHAIRMEN: Secure the name of an outstanding person (preferably a woman) in each ward, in which relief gardens are to be located, who will serve without financial remuneration, as chairman of the Ward Garden Committee. This chairman of the Ward Garden Committee will represent her ward on the City Garden Committee. Advice on the selection of this person may be secured by conferring with the City Relief Director, the County Home Demonstration Agent, County Farm Demonstration Agent, Home Economics and Agricultural teachers and from any citizens who have promoted garden programs in your city in the past.

7. Make a personal call upon the person recommended in each ward, asking her (or him) to serve as Chairman of the Ward Garden Committee. As you secure each acceptance, outline the duties of the position, as found on page 3-4 of this bulletin. Give the Chairman the cards allotted to the ward and the names of the relief cases to be considered in the ward.

8. Collect the filled-in and signed application cards from each ward chairman within a week's time after distribution of seed and fertilizer, if possible. Check them with the City Relief Director, that she may have on file proper records of all cases, and then forward the cards immediately/the the State Director, after making a list of the families which have received seed and fertilizer.

Blue copies of these cards will be returned by the State Director to you for filing in the City Relief Office.

9. Where the number of relief cases chosen from the enrollment in the City Relief Office as being eligible to have a garden, is not sufficient to take all of the gardens allotted to the City, marginal families may be considered. By marginal families we mean those families whose financial circumstances are such that they cannot afford to purchase garden seed and fertilizer, yet who, without having a garden, would fall upon relief rolls later.

MEETING OF CITY GARDEN COMMITTEE: Since it is time to begin planting gardens, it is suggested, that you launch this program in your City through these personal visits to the ward chairmen, without waiting to get your entire City Committee together, unless there is a garden committee functioning as a result of garden

work in the past, or unless a city garden committee could be organized without loss of time. In any event it is desirable, that you call a meeting of your City Committee as soon as possible, (certainly within the first week) to outline the general plan of the Subsistence Gardens Project in the State, and, to discuss the problems which have arisen or might arise in connection with the inauguration of the program in your City. The City Garden Director will serve as chairman of the City Garden Committee, and will call committee meetings when necessary.

Be ready for this first meeting by preparing in advance an outline of just what you plan to discuss. Be sure that you have definite plans ready in advance for each and every meeting of the City Garden Committee.

11. STARTING THE GARDENS: Instructions for planning, planting, and fertilizing the gardens will be forwarded to you to give out with each package of garden seed. Request your Local Committee Chairmen at the Ward Committee meetings, to check up, as far as possible through their Local Committees, to see that these instructions are followed in starting the gardens and to discuss the instructions with the individual gardeners.

12. BULLETINS: Additional bulletins, giving timely instructions on gardening will be sent out from time to time by the State Garden Specialist. These bulletins will be sent from the State Office directly to the individual gardeners, to the City Garden Directors, and to committee chairmen, (Ward and Local).

In many instances, it will be necessary for the Ward Chairmen to call meetings of the Ward Committees to discuss thoroughly the instructions contained in the bulletins. You will attend all of these meetings to go over the instructions with the Local Chairmen, who make up the Ward Committee.

You may be able to meet several such Ward Committee groups in a day, by having the meetings planned for both morning and afternoon. You will also attend as many of the Local Committee meetings as possible.

It is desirable that you make personal visits to as many of the subsistence gardens as possible, from time to time.

13. FOOD PRESERVATION: When you have the garden program well launched, begin to plan for the food preservation program. Instructions for canning and drying of the vegetables will be sent to the City Garden Director and not to the individual families. We shall depend upon you and the organization you perfect to instruct the homemaker of each family, having a subsistence garden, in safe and effective preservation of the surplus vegetables.

In organizing the City work to teach and demonstrate methods of food preservation, secure the cooperation of the needed number of home makers, home economics teachers, or home economics senior college students, who have had definite canning instructions and are good canners. If you find it possible to locate women who have been home demonstration club members, or 4-H Canning Club members they should be especially useful.

All those selected to aid should be people who are thoroughly reliable and willing to contribute their services if transportation is provided, wherever necessary.

LEADER'S SCHOOLS: Well in advance of the canning season plan to conduct leader's schools for this group, to instruct them in demonstration methods of presenting the information sent you by the State Food Preservation Specialist.

The State Food Preservation Specialist will plan well in advance of the canning season regional food preservation schools for County and City Garden Directors, primarily for the purpose of discussing demonstration methods.

BUDGET FOR EXPENSE OF VOLUNTEER WORKERS: Before making definite arrangements with these volunteer workers, prepare a budget for the absolutely necessary transportation expense for them and submit it to the City Relief Director for approval. Then send the budget to the State Director of Subsistence Gardens for approval, and authorization of the travel expense.

CONTAINERS NEEDED: By May 15, submit to the State Food Preservation Specialist an estimate of the number of cans, or jars and rubbers needed for the food preservation work in your City. In making this estimate, secure a record from each subsistence garden family of the number of jars left over from last year which might be used if new rubbers were provided. Include the number of any filled, as well as of unfilled, jars in this estimate. Secure this information from the prospective gardeners at the time the cards are signed by them for the receipt of seed and fertilizer.

15. You are responsible for each and every application card issued to your City. Each card represents a garden allotted to your City. No seed and fertilizer shall be given out by the local committee member without securing a signed card for the same.

16. DISTRIBUTION OF SEED AND FERTILIZER: A definite number of application cards for gardens have been allotted to your City. Should the number of cards exceed the number of relief or marginal families in the City, they should be returned immediately to the State Office.

The excess quantity of seed and fertilizer assigned to your City will be transferred by the State Office to another City or County. Seed and fertilizer must not be given to persons who are financially able to purchase these materials.

The seed, seed potatoes, and fertilizer are being shipped to the City Relief Director in each City, who will make arrangements for temporary storage. You will be responsible, with the aid of your committees, for the distribution of these materials to the individual gardeners within each Ward.

17. REGIONAL MEETINGS OF CITY AND COUNTY GARDEN DIRECTORS: Regional Meetings of City and County Garden Directors will be held when necessary throughout the season. The meetings will be for the purpose of discussing problems and outlining procedure. They will be held at some central point within each region so that all City and County Garden Directors will be able to attend the meeting and return to their respective headquarters the same day.

DUTIES OF THE WARD GARDEN CHAIRMAN

1. To divide the Ward as to local communities or neighborhoods.

2. To secure one responsible person, man or woman, in each local community or neighborhood to serve as chairman of a Local Committee of three members. This person would represent his community on the Ward Committee.

Where the colored population is large, to secure the services of a reliable negro in each community or neighborhood, to serve as an assistant to the local community chairman. This negro would promote the garden program with the negro population of the

community, and would serve on the Community and on the Ward Garden Committees.

4. To instruct the local chairman as to his duties in carrying out the plans of the Subsistence Gardens as outlined on page 4-5.

5. To give each local chairman the names of relief cases in his local community, asking him to discuss these names with his committee and to select from this list the families who could be relied upon to cooperate in the garden plan.

6. To call, at the earliest possible moment a meeting of the Ward Committee for the following purposes:

   a. To allot the gardens in the Ward, these being chosen from the names recommended in each local community. In allotting the gardens in any Ward the relative proportion of needy white and needy negro families should be noted and the gardens allotted to whites and negroes accordingly. As fair a distribution as possible should be secured throughout the City.

   b. To distribute the application cards to the community chairmen in the numbers allotted to the various communities.

   c. To discuss with the local chairmen their duties as given on page 4-5.

7. To report to the City Garden Director immediately after the Ward Committee meeting, the estimated distribution of recommended families in the Ward as follows:

   Number with 3 in the family.
   Number with 5 or more in the family.

   Garden seed is being furnished in two collections. Collection I is suitable for a family of 2 or 3, or for a family of 4, where the children are small. Collection 2 will meet the needs of a family of 4 where the children are grown, or of families of 5 and 6 or more. The City Garden Director must have this information in order to know how to distribute the seed by Wards.

8. To see that seed and fertilizer is distributed immediately in the ward; to be responsible for the collection of the filled-in and signed application cards from the local chairmen of the ward within a week after the distribution of seed and fertilizer, and to hold them for the City Garden Director.

9. To promote the Subsistence Gardens Program through the Ward and Local Committees in accordance with instructions, from time to time, from the City Garden Director.

10. To assist the City Garden Director in planning for canning demonstrations where needed. This would include, among other things:

    a. Keeping track of progress of both production and preservation of fruits and vegetables.

    b. Making final reports.

DUTIES OF THE LOCAL GARDEN CHAIRMAN

Confer with Ward Chairman and

(a) Secure names of people on relief who are in his community.

2. Appoint a local committee of two, either men or women. With this committee select from the relief list those who are capable of an willing to handle subsistence gardens.

3. Attend Ward Committee meeting -

(a) Secure cards for signature of garden recipients and instructions for filling out cards. The information on the application cards should be filled in as soon as possible but the card should not be signed by the applicant or committee member until the delivery of the seed and fertilizer. Read the agreement on the card to the recipient before allowing him to sign.

(b) Return filled-in and signed cards and also unused cards to the Ward Committee Chairman.

NOTE: Cards are serially numbered and each Local Chairman is responsible for reporting on every card given to him - none must be lost or destroyed.

4. Seed, fertilizer and potato seed will be delivered to a central point in the city. Local Chairmen are responsible for -

(a) Securing services of residents in community, gratis, for any necessary delivery. No funds are available for this service. The garden recipients will also assist in so far as possible by calling at some designated place for their seed and fertilizer.

5. Visit individual gardens whenever possible to check on progress and discuss instructions.

6. Notify Ward Chairman as to progress of program.

EMERGENCY RELIEF ADMINISTRATION
William A. Smith, Administrator

L. B. DIETRICK,
Director of Subsistence Gardens

SET-UP FOR SUBSISTENCE GARDENS

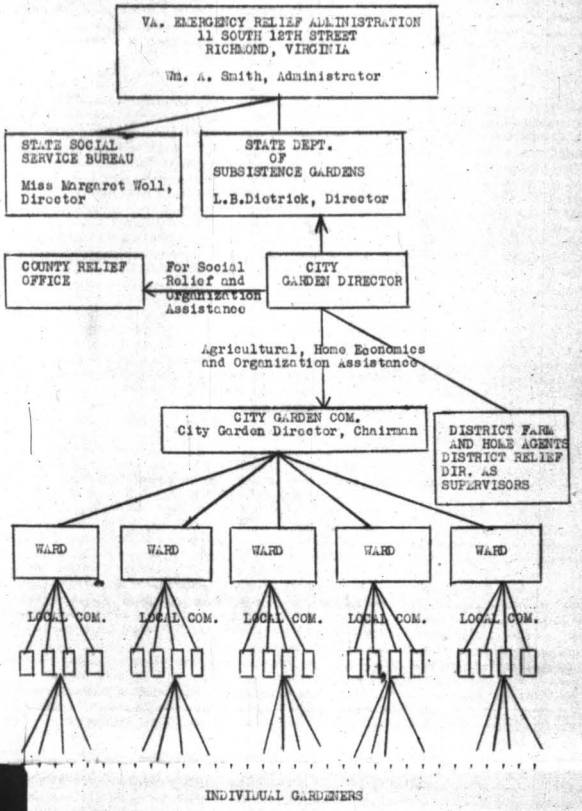


Exhibit W

GARDENING INSTRUCTIONS

Plant all the following seed immediately after your garden is prepared: Parsnip, carrot, peas, onion sets, and white potatoes.

Do not plant any snap bean, lima bean, tomato, cucumber, corn, squash, or pumpkin seed until all danger of frost is over.

Save all the cabbage seed for planting later in the season.

Save one-half of the mustard and beet seed for later planting.

ADDITIONAL SUGGESTIONS FOR CERTAIN CROPS

SNAP BEANS: Enough seed is in the package to make four or five plantings at different times throughout the season. Not over 75 to 150 feet of row should be planted at any one time, depending on the size of the family. Plant this amount of seed about every two weeks to prolong the picking season. When some of the short lived vegetables have been harvested, you can plant those rows to snap beans.

POLE LIMA BEANS: Plant all of the seed after the danger of frost is over. Pole Lima Beans will ordinarily bear until killed by fall frosts.

BEETS: Plant one-half of the seed now and save the remainder for fall planting. Use the excess plants at thinning for transplanting.

CABBAGE: The cabbage is intended for fall use and not for early summer consumption. Plant all the seed in April or May, depending upon the region where you live.

CUCUMBER: Make two plantings about a week apart, so as to have a reserve planting in case the first is destroyed by insects or weather conditions.

KALE: Save all the seed for planting in Eastern Virginia in late summer. In the rest of the State plant one-half of the seed as soon as the ground is prepared; the other half should be saved for the fall garden. The lower leaves of the kale plant may be harvested as it grows and the plant will continue to produce new leaves for later use. Use the young plants for transplanting at the time of thinning.

LETTUCE: Sufficient seed is enclosed for several small plantings at intervals during the spring and fall. Save one-half of the seed for fall planting.

SPINACH MUSTARD: Enough seed is in the package to make several plantings. Make the plantings in April and May and again in August to extend the harvesting period.

TOMATO: Only a few plants are necessary if they grow properly. Make two plantings, ten days apart. Sow the seed in rows and later transplant the seedlings to the garden. The plants that the grower does not need, should be given to neighbors, or sold.

PUMPKIN: Plant in corn rows.

TURNIP: Save the seed for planting in the late summer and fall, depending upon the region where you live.

Remember that this collection of seed is intended to furnish you with a continuous supply of vegetables throughout the season, and not for just one short period of time.

Plant the vegetables in rows, according to the chart.

STEPS IN PREPARING THE GARDEN

1.- Locate the garden on sunny, well-drained, fairly fertile soil, not too near large trees, convenient to the house.

2.- Apply a liberal amount of rotted manure, if available, but do not make heavy applications of fresh, strawy material. Woods mould may be used as a substitute for the manure, if it can be conveniently obtained.

3.- Plow or spade the manure or leaf mould deeply into the soil, but do not work the soil when it is wet.

4.- Scatter about two-thirds of the commercial fertilizer broadcast over the garden area, after digging the soil.

5.- Thoroughly pulverize the large lumps of soil by repeated raking and, at the same time, work the fertilizer carefully and fully into the soil.

6.- Mark off straight rows as far apart as those on the chart. It is not necessary to ridge the land for planting, if the soil is well drained. Use level culture.

7.- Arrange the rows according to the chart, which provides for vegetables of a certain height and size to be in a particular part of the garden.

SUGGESTED GARDEN ARRANGEMENT

VEGETABLES	Seed for 100 feet of row	Distance between rows in feet Hand cultivation	Distance between plants in row in inches	Depth of planting seed by inches
WHITE POTATOES	1/2 peck	2 1/2	18	4
PEAS	1 lb.	2 to 2 1/2	1 to 3	2 to 3
ONION SETS	1 lb.	1 1/2	3 to 4	1
LETTUCE	1/4 oz.	1 1/2	4 to 6	1/4
PARSNIP	1/2 to 1 oz.	1 1/2	4 to 5	1/4 to 1/2
CARROT	1/2 to 1 oz.	1 1/2	3 to 4	1/4 to 1/2
BEET	1 to 2 oz.	1 1/2	4 to 6	1/2 to 3/4
SPINACH MUSTARD	1 oz.	1 1/2	4 to 6	1/4
KALE	1/2 to 1 oz.	2	12 to 18	1/2
SNAP BEANS	1/2 to 1 lb.	2	3 to 6	1 to 2
TOMATO	33 plants	3	36	1/4
CUCUMBER	1/2 oz.	4	36	3/4
SQUASH	1/2 oz.	4	36	1
CORN	1/4 lb.	3	10 to 15	1 to 2
PUMPKIN	1/2 oz.	in corn	in corn	1
POLE LIMA BEANS	1/2 lb	4	36 to 48	1 1/2
" CABBAGE	66 plants	2	18	1/4
" TURNIP	1 oz.	1 1/2	4 to 6	1/2

" Plant in rows after one of the short lived vegetables has been harvested.

Exhibit X

INSECTS AND DISEASES COMMONLY FOUND ON GARDEN PLANTS
and
METHODS OF CONTROL

May 18, 1934.

Vegetable	Insects or disease	Description:	Control
Beans, snap	Mexican Bean Beetle;	Adult 1/4 in. long 1/5 inch wide. Orange to copper colored with 8 black spots on each wing. Larva orange color 1/20 to 1/3 inch in size. Covered with long branched spines. Feeds on under surface of the leaves.	Spray under side of leaves with magnesium arsenate at the rate of 5 level tablespoonsful of arsenate to three gallons of water, or dust with magnesium arsenate one pound of arsenate to three pounds of limehydrate. Do not use after pods are formed. Brushing against the foliage with a stick will knock off many insects and they may then be destroyed by covering with soil. Pull up the badly infested plants and destroy. Plow under plants as soon as harvest is complete.
Beans, Lima	Same as Snap Beans		Do not use lead or calcium arsenic on bean plants.
Cabbage	Imported Cabbage Worm	Larva about 1 inch long, velvety green in color, comes from the common white butterfly. Feeds on the upper surface of leaves.	Magnesium arsenate. Add five level tablespoonsful to three gallons of water. Hand picking helps.
	Cabbage Looper	Larva, pale green becomes striped - about 1 inch long, loops or doubles as it crawls	Same as for Imported Cabbage Worm
	Cabbage Louse or aphid	Small sucking insects, gray in color, and covered with a fine, waxy powder.	Spray with a solution made by dissolving one inch cube of hard laundry soap in a quart of hot water. Or tobacco extracts. Black Leaf 40 at the rate of 1½ teaspoonsful to a gallon of water with a small amount of soap as a spreader, or nicotine dusts may be used. Home made preparations may be made by soaking tobacco stems in water -- one pound to one gallon for 24 hours.
Corn	Corn Earworm	Larva when full grown are 1 1/2 to 2 in. long and light green to brown in color.	No satisfactory or practical control.
Cucumber	Striped Cucumber Beetle	About 1/4 inch long. Body yellow marked with three longitudinal black stripes	Divide the hills for seed in quarters. Plant one quarter each week so that if one planting is lost enough plants will be saved for a stand. When young plants begin coming through the soil, keep covered with hydrated or builders lime until danger of injury is past.

	Melon Aphis	Small sucking insects-greenish to jet black color.	Same control as for Cabbage Aphis.
Cucumber	Bacterial Wilt.	Plants wilt and die at all stages of growth.	Pull and destroy infected plants, without disturbing healthy ones. Cucumber Beetles may carry this disease from plant to plant. Keep Beetles under control.
Kale	Same insects and diseases as cabbage		Same as cabbage.
Onions	Thrips	Small, yellowish insects active and numerous. May destroy Onions by reaping the leaves and sucking the juices.	Spraying with tobacco extracts as for cabbage aphis will aid in controlling the insect. Satisfactory results are not always obtained.
Potato, Irish	Colorado Potato Beetle	Oval insects about 3/8 inches long. Has 10 black stripes running lengthwise over its yellow wing cover. Deposits masses of yellow colored eggs.	Hand picking. Spraying or dusting with arsenicals such as arsenate of lead, one level teaspoonful to each pint of water, or Paris Green or Magnesium arsenate. Most effective when insects are young.
	Flea Beetle	The adult is a jet-black, shiny and hard shelled beetle about 1/20 inch long. Eats small round holes in the leaves.	Spray with Bordeaux Mixture, or dust with a copper-lime dust, or hydrated lime alone.
	Aphids	Small, sucking insects, pink or green in color.	Use Tobacco Extracts as for cabbage aphis.
	Scab	Rough, pitted spots on tubers.	Use fresh soil for planting, if possible. Do not use lime, fresh stable manure, or wood ashes for fertilizer. Keep the soil acid.
Peas	Aphids	Sucking insects, pale green in color. They gather in clusters about the tips of the young vines.	Same as for cabbage aphis.
Pumpkin	Same as Cucumber		
Squash	Same as Cucumber		
Tomato	Tomato Wilt	Plants gradually yellow, wilt, and die. Water vessels turn black.	Use wilt-resistant varieties when the garden soil becomes infected.
	Tomato Hornworm	Large green worms. One worm undisturbed is able to strip a large plant, leaving only the stem	Hand picking or spraying plants with arsenate of lead or magnesium arsenate

Fruit Worm	Same as corn ear worm.	Spraying with arsenate of lead or magnesium arsenate will help. If sweet corn is nearby, tomatoes are not apt to be troubled.
Damping Off	Small plants may suddenly fall over and die, or black dead areas may appear on stem near soil.	Give seedlings plenty of air and keep soil surface dry by cultivation.
Cut worms	Nearly smooth caterpillars 1 to 2 inches long, grey or brownish in color. Feed at night.	Hand picking. May be found an inch below soil surface within 3 or 4 inches of cut plant. Poison bran bait put down in the late afternoon. Paper bands may be used. About an inch of the paper should be below the soil surface and one or two inches above ground.

Exhibit F

EMERGENCY RELIEF ADMINISTRATION
11 SOUTH TWELFTH STREET
RICHMOND, VIRGINIA

VEGETABLE INSECT CONTROL — NO. 37

General Considerations

Do not let the insects become numerous. Destroy them before they become established and begin to increase.

Do not allow any plants to remain in the garden after harvest is complete. They serve as a source of infestation for new plantings of similar plants.

Keep the garden area free from weeds and trash that might harbor insects, and particularly in the winter, since many insects over-winter in such material.

Keep plants growing rapidly. Frequently they will outgrow insect injury.

Pull out and destroy any plants that are heavily infested with insects.

KINDS OF INSECTS

Injurious plant insects are divided into two classes with reference to the way they eat.

1st - Insects with biting mouth-parts, which feed by biting off parts of the plants.

2nd - Insects with sucking mouth-parts, which feed by sticking their beak into the leaf and sucking out the juices.

The biting insects may be killed by placing poisonous materials on the leaves of the plant so that the insect will eat some of the poison in eating the leaf, or they may be killed by hand picking.

The sucking insects are not injured by stomach poisons used for the biting insects. Materials are used which will kill the insect by coming in contact with it.

WAYS OF CONTROLLING INSECTS

Hand Picking. Go over the garden at regular periods and pick off and destroy such insects as the potato beetle, the terrapin bug on cabbage, cabbage worms and tomato worms.

Brush against the bean plants with a stick. Cover the knocked-off insects with a few inches of soil. This will kill the Mexican bean beetle. Destroy all old plants.

HOME-MADE REMEDIES FOR DESTROYING INSECTS

1st - Soap solution to be sprayed on the insects.

Dissolve a 1 inch cube of hard laundry soap in a quart of hot water. This spray material must come in contact with the insect to kill it. Use against sucking insects, such as plant lice or aphids.

2nd - Tobacco Extracts. - Soak one pound of tobacco stems, or stalks, for twenty hours in one gallon of water. Use against sucking insects.

Hydrated, or Builders Lime. Use on cucumbers, squash, and pumpkins to keep off the striped cucumber beetle, and on tomato plants for flea beetles. Place the material in a burlap sack and shake over the plants. Keep young plants covered with lime until danger of injury is over.

MANUFACTURED MATERIALS

Magnesium Arsenate - Add five level tablespoonsful to three gallons of water for a spray, or one part of arsenate to three parts of lime for a dust. The material must be placed on the under side of the leaves to control the Mexican beetle. Do not use after pods are formed. Magnesium arsenate can also be used for biting insects, such as the potato bug, cabbage worms, and tomato worms.

Black Leaf 40 - A Tobacco Extract. Add 1-1/2 teaspoonful to one gallon of water. A one inch cube of hard laundry soap dissolved in each gallon will increase its effectiveness. Use against sucking insects, such as aphis or plant lice.

HOME-MADE PROTECTION

Cut Worms - Tomato, peppers, and cabbage plants may be protected against this insect by using paper bands around the stems. About an inch of the paper should be below the soil surface and from one to two inches above ground.

Exhibit Z

SUBSISTENCE GARDENS 1934

Suggested Plans for Conduct of Food Preservation Phase of Program

The method of conducting the food preservation work will have to be adapted to the various local situations in the counties and cities. It is probable that no one method will be satisfactory for use throughout any one county or any one city. Methods which would be possible to use are:

1. Canning and drying of produce from own garden by individual in own home.

2. Canning and drying of produce from own garden by individual in community canning center.

   (a) This community canning center might be established in a church kitchen, school lunch room, vacant room or building equipped for the purpose, or in some home. If school buildings are to be used for this purpose the Garden Director must be sure to obtain the consent of the school board for their use.

   (b) This canning center might be permanent in the neighborhood, or it might be a center which would be set up for a day or two at a time, with portable equipment. The portable equipment might be taken from one neighborhood to another, for the establishment of these temporary centers, by the Garden Director, or by the volunteer assistant. If this plan is followed the equipment should be scheduled in advance for the various neighborhoods, and the gardeners given ample notification in order that they might make good use of the centers. The use of one set of equipment should not be attempted for too many neighborhoods.

   (c) In some localities in other states travelling canning kitchens have been used -- these consisting of retorts, steam boilers and tin-can sealers set up on a chassis.

3. Neighbors pool equipment, and work together to can and dry the produce from their several gardens. This method might have the advantage of saving time and fuel, and would permit those skilled in the work of food preservation to instruct those less skilled.

4. Canning and drying of garden produce by skilled canner "on shares". Since our program is an educational program, as much as it is one for providing subsistence, this method should not be used except for the purpose of canning and drying the produce of their gardens for those who are incapable of doing it for themselves -- either because of lack of intelligence, or for other causes.

ints to be Considered in the Conduct of the Food Preservation Work

1. No matter what plan is to be followed, some member of each subsistence gardens family must be given the opportunity to observe a canning and drying demonstration, or of having instruction in the canning and drying of vegetables. This instruction must be given:

   (a) As insurance against spoilage of food.
   (b) As a precaution against food poisoning.

2. To accomplish this, the Garden Director must arrange, probably with the help of her county(or city)garden committee, to find volunteer assistants to give demonstrations of canning and drying to groups in each neighborhood of her county or city. The assistance of the county or district home demonstration agent should be especially valuable to the Garden Director in locating and securing these volunteer assistants. Home demonstration club women, home economics teachers, college senior home economics students, would give valuable assistance, if their help could be secured. In some cases is may be

desirable for the volunteer assistant to spend a day, or even two days in instructing an individual canner, in that individual's home, in careful methods of canning. White assistants and negro assistants should be secured if possible.

3. The Garden Director must instruct all volunteer assistants in demonstration methods of canning and drying. To do this she must give a demonstration in canning and drying, just as she wishes it to be given by the volunteer assistants, and require that all volunteer assistants observe this demonstration. She must require this, whether or not her assistants are experienced canners and demonstrators. In connection with the demonstration, she must outline our plans and aims to the volunteer assistants and must impress upon them the precautions which we wish to have observed. She must plan this demonstration meeting well in advance of the canning season to make sure of having her volunteer assistants ready to do their part at the time the garden produce is ready for canning. It may be best for the Garden Director to plan a series of these demonstration meetings throughout her county(or city) if she is to make it possible for each volunteer assistant to attend one of them.

The Garden Director, with the possible assistance of the local committee members, must see to it that one or more members of each subsistence gardens family avails herself of the opportunity given her to learn to can and dry the garden produce.

The Garden Director, with the help of the local committee members must see to it that each subsistence gardens family (1) lives up to its agreement to preserve such produce as may be needed for use of the family during the winter, and (2) follows the instructions in canning and drying as given by the volunteer assistants. To enable the members of the local committees to give effective help in these matters, it is suggested that the local committee members be urged to attend the canning demonstrations given in their localities by the volunteer assistants.

The volunteer assistants may give the canning and drying instruction to the individuals at community canning centers, through supervising the work of these individuals while they can and dry their own garden produce at the community canning center. The canners receiving instruction in this way would not need to attend a canning and drying demonstration.

The Garden Director, with the help of the volunteer food preservation assistants, and possibly of that of the local committee members, must assist each subsistence gardens family in figuring how much of each class of vegetables ought to be canned or dried if the family is to have enough to carry it through the winter months. The instructions for this will be found in Bulletin 38 "Canning & Drying". It is suggested that the families be encouraged to preserve any fruits which may be available (wild berries,etc.) by canning or drying, or through jelly-making, to supplement their supply of vegetables.

The Garden Director must instruct the volunteer food preservation assistants in keeping the simple records of their work with the subsistence gardens family which our program requires. The Garden Director must be responsible for securing these records from the volunteer assistants.

The Garden Director must enlist, if possible, the assistance of the local committee members in securing a final record of the yield of each garden in canned, dried and stored produce. These report forms are to be sent from the state office to the Garden Directors in the future.

Within a very few days following the May regional meetings, it is suggested that each Garden Director call a meeting of her county (or city) garden committee to secure the committee's help in determining the best method of conducting the food preservation program ought to be followed in each of the neighborhoods of her territory. This should give the Garden Director a rather definite idea of the number of volunteer assistants needed in her county.

To determine the number of volunteer assistants, it would be well for the Garden Director to map out her plan for the use of these assistants. For instance, if the gardens are more advanced in one section of the county (or city) than they are in another, a volunteer assistant might help in that section first and then go to

another section to give a demonstration or to assist with the work there. It may be necessary in some neighborhoods for the volunteer assistant to return to those neighborhoods to give a second demonstration as later crops mature and are ready for canning and drying.

If the method is used whereby individuals can their own produce at the community center, under supervision of the volunteer assistant, it might be desirable in some neighborhoods, to secure a volunteer assistant who would plan to supervise that center on one or two, or more days of each week. Perhaps some assistants could give only one half day a week to this work, but would still be of valuable help.

Wherever possible secure a volunteer assistant to help with the program in her own immediate neighborhood. This would cut down on the amount of expenditure needed for paying transportation expenses of the volunteer assistant. In some instances, however, it may be necessary to ask the volunteer assistants to assist with the program in neighborhoods other than their own.

When the Garden Director determines how many volunteer food preservation assistants she will need, and has made out a schedule assigning them, she will then be in a position to estimate the number of miles each one will need to travel to help her with her program. She will then be in a position to make the budget of expenses for the volunteer food preservation assistants, which was requested of her on page 5 of the bulletin mailed to each Garden Director on March 17. The bulletin was entitled SUBSISTENCE GARDENS IN VIRGINIA. Refer to that bulletin for instructions concerning the making of this budget.

In making the budget, allow five cents per mile for the use of the assistant's car. The total budget for the entire canning season may not exceed $125.00 for any county or for any city.

Of course the Garden Director will plan to take care of as many of the canning and drying demonstrations and as much of the food preservation instruction in her territory as is possible.

Be sure that each volunteer assistant understands, before she begins her work, what the arrangement is for transportation allowance, and that the budget is limited.

The Garden Director is requested to make every effort to notify the state office within a week after the regional meeting what plans have been made for the conduct of the food preservation program in her territory. Especially, notify the state office of any plans to establish community canning centers; how many of these centers are planned; what type of center; what equipment is to be used in them; what are the plans for financing the establishment of these centers.

The Garden Director must notify the state office immediately if possible of the probable need for glass jars and tin cans in her territory.

If tin can sealers are to be available to the canners at community canning centers, the Garden Director may estimate the need for tin cans by estimating the total need for containers of those families who would be using the tin can sealers at the centers. Use the canning budget in bulletin 38 "Canning & Drying" for making this estimate and subtract from the number obtained the number of cans (filled and empty) on hand in the homes, to secure the number of containers still needed to care for the garden produce.

Use this same method in figuring the need for glass containers for those families who will can at home, and who do not have access to a tin can sealer.

If sealers are available, more tin than glass containers should be supplied to a county or city for a given sum of money. The state budget for furnishing containers is limited, and it is desirable that each Garden Director reduce her needs for these to the minimum. She may be able to secure some of these for use in her county or city from the sheriff's office. She may be able to launch a drive for containers through the churches or clubs of her community.

Each Garden Director must notify the state office immediately of her need for new jar tops. This number should have been obtained from each individual family at the time the cards were signed.

It is necessary for each Garden Director to attend to submitting these estimates at the very earliest possible moment. The reason for this is that bids must be secured for the purchase of these in large quantities, which will be needed to supply the gardeners of the state. Also the orders, must be placed by the state office in time to secure the containers for use in the canning season.

No old jar rubbers should be used in canning the garden produce. As far as possible, new jar rubbers will be supplied to the cities and cities for families unable to supply them for themselves. Any local agency wishes to make a donation of these for the use of the subsistence gardens families, the Garden Director is asked to notify the state office immediately that these have been supplied for her territory.

THE GARDEN DIRECTOR, AND NOT HER VOLUNTEER ASSISTANTS, IS RESPONSIBLE FOR THE SUCCESS OF THE FOOD PRESERVATION PROGRAM IN HER COUNTY OR CITY.

Sarah Porter Ellis

William A. Smith, Administrator,
(Mrs) Sarah Porter Ellis,
Food Preservation Specialist

Exhibit 'A'

PLAN FOR DEMONSTRATION OF CANNING AND DRYING.

FOR USE OF GARDEN DIRECTORS AND OF VOLUNTEERS

FOOD PRESERVATION SPECIALISTS

I. Preparation for Demonstration

1. Study canning bulletin No. 38, a copy of which is to be furnished to each by state office - Understand what methods of canning and drying are to be used in connection with Subsistence Gardens program.

2. Study this bulletin in planning demonstration, and make definite demonstration plan.

3. Practise demonstration before giving it.

4. Be sure to have everything needed before giving demonstration.

   a. Use equipment for demonstration which it would be possible for Subsistence Gardens families to obtain or to improvise. Use only those vegetables which are found in subsistence gardens.

   b. Do not use pressure cookers or tin can sealers for demonstrations with groups of canners, who are to do all of their canning in their own homes. Use these for work in community canning centers, if it is possible to obtain them.

   c. Show, or mention, the various types of improvised equipment which might be used by the canners in their homes.

5. Dry a small quantity of greens and other vegetables to show at demonstration.

6. Be sure that personal appearance is clean and neat. (Wash dress or apron; hair neat.)

. Order of Demonstration - Can one non-acid vegetable to which you add vinegar; can tomatoes, or soup mixture, to which tomato is added. (For workers in canning center, use pressure cooker for one vegetable.) Dry greens and at least one other non-acid vegetable.

1. Before demonstration begins:

   a. Arrange all utensils on table.

   b. Prepare most of vegetables to be canned or dried. Save part of these to clean and prepare during demonstration to show how this must be done.

   c. Wash jars and have ready to sterilize.

   d. Put vegetables on dryer and place in oven to dry. Try to do this in time to have the drying period end just before the close of the demonstration. (4 or 5 hours)

   e. Put plenty of water on to heat for use in processing, etc.

2. In beginning demonstration, outline aims of food preservation program.

   a. To furnish subsistence - (agreement of gardeners)

   b. To be educational - to teach people to take care of their own needs this year and other years.

3. Stress the need of volunteer assistants adhering to our method of canning. The probable lack of knowledge, and its resulting carelessness, on the part of the families with which we are working would result in:

   (1) Danger of food spoilage. This would defeat purpose of program.

(2) Danger of food poisoning.

4. Put dried vegetable in glass or jar of lukewarm water. Allow to stand during demonstration, to show effect of soaking at end of demonstration.

5. Show equipment, and tell how it might be improvised.

   Lard buckets.
   Wash boilers.
   Wash pots.
   Racks for bottom of canners.

6. Show that jars have been washed in hot, soapy water. Put these in to be sterilized. Before putting them in, show how to test jars, covers and rubbers. Show how to adjust clamp on glass-top jars. Show various types of jars, if possible.

7. Begin preparation of vegetable which is to be canned in hot water canner. While preparing this, call attention to what you are doing. Have table arranged so that all may see you work. Discuss the following as you work:

   a. Cause of food spoilage.

   b. Why various methods of food preservation are effective.

   c. Need for selection of fresh food.

   d. Need for canning or drying soon after food is gathered.

   e. Steps in canning food

      (1) Selection

      (2) Preparation

      (3) Precooking - discuss undesirability of too long a cooking.

      (4) Packing - not too dense a pack.

      (5) Sealing of jars - need for complete seal.

      (6) Processing - begin to count time when water boils. Need for full length of time of processing:

         To avoid spoilage.

         To prevent food poisoning.

         Discuss precautions which must be observed before canned non-acid food is used.

         Discuss undesirability of too long a processing.

      (7) Removal from processor. Cooling of jars out of draft.

      (8) Storage of canned food.

7. If the demonstration is being given at canning center, where pressure cookers are available to individuals, demonstrate canning of one non-acid vegetable in pressure cooker, also. Leave out vinegar.

   As soon as cans have been put into hot water canner, and discussion of that method has been completed, pack vegetables into jar to be canned in pressure cooker. Discuss:

   a. Structure of pressure cooker.

   b. Adjustment of cover, and use of cooker in canning.

   c. Reduction of pressure in cooker before opening it.

Have someone watch time of processing, and keep pressure constant.

8. While jars are processing, demonstrate drying of vegetables.

   a. Discuss home-made dryers and their operation - (It may not be possible to show the one you are using until the close of the meeting, if the materials on it have not finished drying)

      (1) Suggest use of the top of stove for drying; the oven; the drying oven; brooder stove; outdoor trench.

   b. Prepare vegetables (one green leafy vegetable, and at least one other) for drying.

   c. Blanch them.

   d. Arrange in dryer.

   e. Discuss temperature and length of time of drying.

   f. Show dried vegetables which have been soaked, ready for cooking.

   g. Urge drying of non-acid vegetables which cannot be stored or canned in a pressure cooker.

9. Show how to make canning budget for families of various sizes.

   a. Ask volunteer assistants to instruct the gardeners, with whom they are working, how to make their own canning budgets.

10. Discuss storage of canned goods.

11. Give each volunteer assistant, who is to give canning demonstrations, a copy of this outline. Give each one enough copies of canning bulletin 38, to supply one bulletin to each of the families, with which she is to work.

The supply of bulletins 38 is limited. They are not to be distributed to people other than those working on the Subsistence Gardens program.

Exhibit G'

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
State of Virginia, Va. A. & M. College & Poly. Inst. & U.S.D.A. Cooperating
EXTENSION SERVICE

CHART FOR VEGETABLE SEED TREATMENT 1934*

Vegetable	Disease	Treatment
Beet	Damping-off	1 lb. red oxide of copper to 50 lbs. seed
Cabbage, Cauliflower, Broccoli, & Brussels Sprouts	Damping-off	1 lb. zinc oxide to 50 lbs. seed, or 1 oz. Semesan dust to 15 lbs. seed, or soak 90 minutes in normal liquid Semesan solution.
	Black rot	Soak 20 minutes in 1-1000 corrosive sublimate solution and then wash thoroughly; or soak 90 minutes in normal liquid Semesan solution; or soak for 25 minutes in water heated to 122°F. and then rinse in cold water.
	Blackleg	Hot water treatment as recommended above for black rot.
Celery	Septoria blight	Soak 10 to 30 minutes in 1-1000 corrosive sublimate solution and then wash thoroughly; or soak for 30 minutes in water heated to 118°F. and then rinse in cold water.
Cantaloupe, and Cucumber	Anthracnose and Angular leaf spot	Soak for 5 minutes in 1-1000 corrosive sublimate solution and then wash thoroughly.
	Damping-off	1 lb. red oxide of copper to 50 lbs. seed.
Eggplant	Phomopsis blight	Soak 10 minutes in 1-1000 corrosive sublimate solution and wash thoroughly.
	Damping-off	1 lb. red oxide of copper to 50 lbs. seed.
Lettuce	Damping-off	1 lbs. red oxide of copper or zinc oxide to 50 lbs. seed.
Peas	Damping-off	1 lb. red oxide of copper to 30 lbs. seed; or 2½ oz. Semesan to 50 lbs. seed.
Pepper	Anthracnose, Bacterial spot, and Cercospora leaf spot	Soak in 1-1000 corrosive sublimate solution for 5 minutes, then wash thoroughly.
	Damping-off	1 lb. red oxide of copper to 50 lbs. seed.
Spinach	Damping-off	1 lb. red oxide of copper to 50 lbs. seed.
Sweet Potato	Black rot and Scurf	Soak seed tubers in 1-1000 corrosive sublimate for 10 minutes and bed without washing.
Tomato	Early blight, Bacterial spot, and Septoria blight	Soak for 7 minutes in 1-1000 corrosive sublimate solution, then wash thoroughly.
	Damping-off	Soak for 1 hour in a solution of 1 lb. copper sulphate in 5 gal. water and dry without washing; or dust with 1 lb. red oxide of copper or zinc oxide to 50 lbs. seed.
Watermelon	Anthracnose, ~~Angular leaf spot~~, & damping-off	Same as for cantaloupe and cucumber.

* Material prepared by Dr. Harold T. Cook, Plant Pathologist,
Virginia Truck Experiment Station, Norfolk, Virginia.

Exhibit P

COOPERATIVE EXTENSION WORK
IN
AGRICULTURE AND HOME ECONOMICS
STATE OF VIRGINIA

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE AND UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING

EXTENSION SERVICE

Blacksburg, Va.
July 16, 1934

Dear County Agent:

L. B. Dietrick, In Charge of Vegetable Extension, states that their department has outlined a program for the sectional meetings at the Farmers Institute which should be of real interest and value to truck crop growers. Through an error, only part of this program was included in the mimeographed form sent you covering the entire Institute. The complete program for the Vegetable Gardening Section follows:

2:00 Recent Developments in Truck Crop Production - Dr. H. H. Zimmerley, Director, Virginia Truck Experiment Station

2:20 Seed Treatment for Vegetable Crops - Dr. Harold T. Cook, Plant Pathologist, Virginia Truck Experiment Station

2:50 Discussion

3:00 Recent Developments in Insect Control - Dr. Harry G. Walker, Entomologist, Virginia Truck Experiment Station

3:30 The Importance of Organic Matter in Truck Crop Production - Dr. Jackson B. Hester, Soil Technologist, Virginia Truck Experiment Station

The men who are discussing the above subjects are authorities in their line and are well worth hearing. I hope that you will do everything possible to get some truckers to attent the Institute and take in the Vegetable Section.

The vegetable program is scheduled for Wednesday afternoon, August 1, and will be held in room 300 of the Agricultural Hall.

Yours very truly,

C. A. Montgomery
Assistant Director

CAM:MPM

Exhibit B' No.44

EMERGENCY RELIEF ADMINISTRATION
11 South 12th Street
RICHMOND, VIRGINIA May 22nd, 1934

COMMUNITY CANNING CENTERS

1. By a "Community Canning Center" is meant any establishment in a neighborhood where the subsistence gardens families might meet to can(or have canned for them) their garden produce.

2. The community canning center might be a permanent establishment (or permanent for the canning season) It might be located in:

   (a) A building constructed and equipped for the purpose.
   (b) A vacant room in a building equipped for use during the food preservation season.
   (c) A school lunch room. Consent of the school board must be secured in each case for the use of school property.
   (d) A church kitchen.
   (e) A bakery which is no longer in use. The ovens in this sort of a place would be especially good for use in the drying of vegetables.
   (f) A rural school house. It might be possible to construct out-of-door stoves or ovens to use for all processing. The use of the inside of the building is recommended for the preliminary steps in canning and drying because it is important that the food be prepared for processing in a place where flies would not have access to it. The school building, if unscreened, could be screened in a satisfactory way by the use of mosquito netting. The out-of-door stoves might be:
      (1) Constructed of brick or stone, with sheet metal top, or so constructed that a retort or wash pot would fit down into them.
      (2) Improvised from a discarded oil drum.
      (3) Made by placing a sheet iron top over a long trench, dug to hold the fire. This trench would have to be open at each end to permit a draught for the fire.

   (g) The kitchen of a residence, if one is available.

3. The community canning center, instead of being permanent, might be set up in a community, for just certain days of each week. This could be accomplished by the use of portable equipment. This equipment could be kept in service in one center or another on each day of the week.

   The Garden Director or the volunteer assistant, who is to supervise the work at the center, might take the equipment from one locality to another.

4. The main reason for the establishment of community canning centers, in connection with the subsistence gardens program, would be to give those families which do not have the most desirable equipment at home, an opportunity to use pressure cookers, and other pieces of adequate canning equipment, for canning and drying their garden produce.

5. The community canning center should serve, as far as possible, as a place where individuals might come to can and dry their own produce under supervision. If any garden families are incapable of canning and drying, or of learning to can and dry their produce, then arrangements might be made to have the produce canned for them - a small toll being exacted for this ("on shares").

6. If individuals are to use the center for canning their own produce, a time schedule for the use of the canning center by the individuals should be made, so that each one might know when she might count upon having the use of the kitchen and its equipment. This would eliminate the possibility too, of too many people attempting to use the kitchen and its equipment, at one time.

7. A competent canner should be on hand at all times to supervise the work of the people using the canning center and to teach those needing it, correct methods of canning. This regulation should apply no matter what the type of the canning center might be.

(a) A volunteer assistant might be secured from among home demonstration club women, home economics teachers, college senior home economics students, or former 4-H Canning Club members, to assist with this phase of the program. It might be well to plan this supervision so that it would not be a burden to any one person, by securing the assistance of a volunteer for half a day a week, a day a week, or for whatever time the volunteer might find it possible to give.

(b) It would be the responsibility of the Garden Director in every case to know that the supervisor of the canning center was familiar with the canning methods recommended for use in the subsistence gardens program.

(c) It might be possible to secure the services of the home demonstration agent to give occasional supervision to all canning centers.

8. Equipment for a community canning center: This would vary with the size and permanency of the canning center.

(1) If plans should be made to locate a center permanently in a building constructed especially for the purpose, or to locate it for the food preservation season, in a vacant room or building, the following equipment is suggested:

(a) One or more tin can sealers. It is not necessary to purchase the attachment for re-flanging the cans, in purchasing sealers for the canning center.
(b) Two or more retorts. Size 2(capacity 48 No.2 cans) or size 3(capacity 150 No.2 cans) are suggested.
(c) Retort baskets - twice as many as there are retorts.
(d) Crane for lifting the baskets into and out of the retorts.
(e) Tank or tub to be filled with water for cooling tin cans as they are taken from the processor.
(f) Table space, at least 25 linear feet, for work surface. Tables with a washable surface, which would not be spoiled by placing hot vessels upon it, are recommended. Tables on rollers, to be moved from place to place, would be useful. Tables having shelves below them would be handy.
(g) Sink and drainboards.
(h) One or more floor trucks if possible. A child's wagon would be useful in a small center.
(i) Perforated metal baskets or trays to use in washing vegetables. A sink strainer or sieve would be helpful for this in a small center.
(j) Other equipment, as sharp knives(possibly a knife sharpener) spoons, forks, scales, tubs, tongs for lifting hot containers, pans, vegetable cutters, vegetable cutting boards, dish cloths, dish towels, soap,kitchen cleanser, brooms, mops.
(k) Some container for garbage and provision for frequent removal of this.
(l) Dryers(home-made or commercial) and ovens, or stove surface, for drying of vegetables
(m) Sanitary facilities; provision for washing of hands, (soap and water).

(2) If plans should be made to locate a canning center on each day of the week(or only on certain days of the week) in a church kitchen or school lunch room, it is possible that pressure cookers or tin can sealers(if canning is to be done in tin) would be the only equipment which it would be necessary to supply. These(especially the cookers) might be borrowed.

(3) If a canning center were to be set up at a rural school house where the precooking and processing were to be done out of doors, the following equipment is suggested:

(a) Sufficient table space. This might be improvised by placing boards on saw-horses.
(b) Tubs or wash pots for washing vegetables and for processing.
(c) Large kettles for precooking.
(d) Pressure cookers if possible.
(e) Portable ovens to be used for drying; home made dryers to be set up on top of the stove or on top of the other heating apparatus. A screen propped up on bricks on top of the stove, would serve very well as a dryer. A cover made of thin cloth, and provided with a hole for the escape of moisture, is needed for use over this type of dryer, if it is to be used on top of the stove.
(f) Knives, pans, towels, etc., as listed above for the permanent center and as might be obtainable.
(g) Provision for sanitary disposal of refuse at a distance from the building.
(h) Sanitary facilities; provision for washing of hands.

(4) The portable equipment, to be taken by the Garden Director or by the volunteer assistant, from place to place, might consist only of pressure cookers(one or several) large kettles, hot water processor, sharp knives, etc.

(5) In equipping any community center, it might be well to keep the fact in mind that probably the center will be only temporary, and that it might be best to secure a type of equipment which could be disposed of later for home use.

In securing pressure cookers, it would be well to get them in sizes which a woman would not find too heavy to lift. The 18 quart or 25 quart sizes are recommended.

9. Any Garden Director, who plans to establish community canning centers and wishes advice as to efficient arrangement of equipment, may secure suggestive arrangement plans from the State Food Preservation Specialist, by writing in a request.

10. No funds are available in the state, for the purchase of equipment, or for the establishment of community canning centers, or for their operation(fuel, lights, etc.) Arrangement for this must be made locally. In some places in other states, these expenses have been cared for by appropriations made by the boards of county supervisors, school boards, civic organizations, banks, Red Cross, mill or factory owners, planters, etc.

The Garden Directors who contemplate the establishment of community centers, might discuss with their Relief Directors,the possibility of having part of the work of the center paid for through the work relief program.

In many canning centers, it is customary to charge a toll consisting of a portion of the food canned, for the use of the equipment. This, if charged, should be kept as low as possible since each family is supposed to can and have in its possession, enough produce to carry it through the coming winter.

Where canning is done for a family, it is customary to take a certain portion of the canned goods as payment for the service.

In either case, the amount of toll to be charged, should be decided upon locally - possibly by the county (or city) garden committee. Other regulations for the operation of a canning center should be made by the local committee, also.

11. Personnel needed for operation of community canning center:

(a) Supervisor, who is experienced canner.
(1) She should be required to follow canning instructions as given in our canning bulletin.

(2) She would teach inexperienced canners how to can, and would supervise the work of all canning done at the center.
(3) She would be in authority at the center; would make plans for the use of equipment; would portion out the routine operating tasks of the center to the various canners using the center.
(4) She would keep the necessary records and submit these upon call, to the Garden Director. She would take charge of any labelling of canned goods.
(5) She would handle any temporary storage of canned goods or other material.
(6) She would see that the center were kept clean and in order.

(b) One responsible person appointed to record and watch the time of processing. Jars, or cans, to be placed in the processor, might be marked with the owners name and the name of the product, by using a waxy blue pencil, before these containers are placed in the processor.
(c) Possibly a man for doing heavy lifting, tightening clamps on the retorts, turning hand sealers.
(d) Possibly someone to make a schedule for the use of the center by the various families of the community.
(e) Large centers would require several permanent helpers.

12. It might be well to post large placards on the walls of each center, giving the regulations of the center, and possibly instructions for the use of the pressure cookers, canning recipes, etc. Any Garden Director needing suggestions for these may secure them by writing her request to the State Food Preservation Specialist.

13. Records of the work accomplished should be kept at each canning center and held for the Garden Director, who in turn will hold them until requested to send them to the state office. The following records are suggested:

(a) Name of family using the center.
(b) Record of each family using the center.
(1) Date of each use.
(2) Number of members using.
(3) Hours spent.
(4) Amount of each vegetable canned each time.
(5) Number and kind of containers furnished(if any).
(6) Amount and kind of canned product.
(7) Work performed in payment for seed or containers or for the use of the center(if any).
(c) Cost record of any materials purchased.

14. Each Garden Director is requested to secure as many pictures as possible (kodak or others) of the gardening and food preservation operations in her territory, to submit with her final report.

Where activity and conditions warrant it, it might be possible to secure the services of the official photographers of the U.S.D.A. to take these pictures. If you feel that this might be done in your territory, notify the state office.

Sarah Porter Ellis

William A. Smith, Administrator,
(Mrs) Sarah Porter Ellis,
Food Preservation Specialist

Bulletin 38

Canning and Drying

Subsistence Gardens Project

VIRGINIA EMERGENCY RELIEF ADMINISTRATION

1934

W. A. SMITH, *Administrator*

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ACKNOWLEDGMENT is given to the Agricultural Extension Service, Virginia Polytechnic Institute, for part of the subject-matter covered in this bulletin, and to Miss Janet Cameron, Food and Nutrition Specialist, of the Home Demonstration Division of that Extension Service, for her assistance in preparing this manuscript for publication.

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Food Preservation Specialist Subsistence Gardens Program
Virginia Emergency Relief Administration

May, 1934

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Subsistence Gardens — Canning and Drying

Part of the Vegetables for Winter Use.—Enough seed was distributed for the subsistence gardens of the State to supply each family receiving these with an adequate amount of vegetables during each month of the year. One of the instructions which each gardener agreed to follow, in accepting the seed, was to plant these seeds, not all at once, but in a succession of planting to give a supply of fresh vegetables through the various weeks of the summer. Another instruction was to plant some of the seeds at the right season to produce a winter garden. In addition, it is necessary for each family to plan to store some of the vegetables; it is necessary for them to can or dry, or otherwise preserve, enough of the vegetables to supply the family throughout the winter months.

Cause of Food Spoilage and Aims in Food Preservation.—When food of any kind spoils, it is due either to the action of certain properties within the food itself—these known as "enzymes"—or to the feeding upon the food by microscopic living organisms—bacteria, yeasts, and molds. Bacteria, yeast, and molds are found everywhere—in the air, water, soil, and on the food itself.

The enzymes in the food cause it to ripen. They cause the decay of the food also, when it becomes over ripe. It is because of the continued ripening and decaying action of these enzymes in fruits and vegetables after they have been gathered that it is necessary to can, or otherwise preserve them, just as soon as possible after they have been gathered. The longer the fruits or vegetables stand, the harder becomes the task of canning them to make them keep.

The micro-organisms—bacteria, yeasts, and molds—must, like all living things, have conditions favorable to them, if they are to live and grow. All of them need suitable food, warmth, and moisture. Most of them need oxygen; others such as the bacterium which causes the poisoning known as botulism, grow best in the absence of oxygen. When they feed and grow upon any food, they produce within that food the characteristics known as "spoilage"—fermentation, presence of a bad odor, moldiness of the food, etc.

The problem, then, in preserving food is to remove at least one of the conditions favorable to these micro-organisms, or to destroy the micro-organisms themselves. After these are destroyed, others must be kept from gaining entrance to the food.

The former method is used when food is frozen to preserve it; when it is dried; when it is preserved in so much sugar, salt, spice, or vinegar that the food becomes unsuitable to the micro-organisms. The latter method is used when food is heated in the canning process so that all micro-organisms are destroyed, and the jars are sealed to prevent the entrance of other micro-organisms.

Methods of Canning.—The methods ordinarily used in home canning are (1) the open kettle, (2) the hot-water canner or (3) the pressure-cooker methods.

Regardless of which method is to be used, it is important to have

the kitchen, or place where the canning is to be done, free from dirt, dust and flies. Have hands and clothing clean, and use only clean utensils, towels, etc. Where there is dirt of any kind there are extra micro-organisms, and this adds to the problem of preserving the food.

The Open Kettle Method may be used successfully for canning fruits or tomatoes—these being acid in nature. This method consists of cooking the food sufficiently, and then packing it into clean, sterilized jars, sealing the jars to prevent the entrance of additional micro-organisms.

The use of the **pressure-cooker** is recommended for the canning of all non-acid foods. Therefore, if possible, it should be used for all vegetables other than tomatoes. If this is not possible, however, the **hot water canner** may be used successfully if tomato is mixed with the vegetable for canning, so that the mixture is at least one-third tomato, or if vinegar is added to the vegetable (two tablespoonsful to a quart).

The reason back of this precaution is that certain bacteria go through a spore stage, upon heating, which makes it almost impossible to kill them. These spores develop after the jars cool down, to spoil the food, or sometimes to cause a deadly poison in the food. These spores are not destroyed by boiling the food. They are destroyed by the intense heat reached under pressure in the pressure-cooker. They are destroyed when the food is made acid (by mixing with tomato or adding vinegar) and heated to boiling point (212 degrees F. or 100 degrees C.) for a sufficient length of time. The recipes for processing in the hot water canner, as given in this bulletin, all call for vinegar. If the vinegar is left out, the time of processing must be increased 50%.

When food is canned in a **"waterless" cooker** or a **"steam cooker,"** or when it is canned in the oven, even at 275 degrees, the contents of the jars do not reach a temperature higher than 212 degrees, and the spores are not killed.

If no pressure-cooker is available, it is better to dry, rather than to can the non-acid vegetables.

STEPS IN CANNING

Selection of Food to be Canned.—Use only good, firm, fresh foods for canning. If old, or partly spoiled foods are used, it is very much harder to can them so that they will keep. Any food is at its best for canning when it is at the stage of ripeness at which the family likes best to eat it. Particularly where vegetables are concerned, it is a good thing to observe the rule of "not more than two hours from the garden to the can."

A better-looking canned fruit or vegetable may be secured by grading the material for size, and for the same degree of ripeness before canning it.

Preparation of Equipment.—Wash jars, rubbers, and lids (or tin cans and covers if these are to be used) in clean, hot soapy water. Rinse thoroughly and test the jars and lids for flaws. Do this by running the finger around the edge of the glass jar, or of the glass lid, to detect nicks or cracks. Discard such jars and lids for canning purposes, as they

would make it impossible to seal the jars completely enough to keep the contents from spoiling. If the inner lining of a screw top lid is cracked, discard the lid.

If there is any further doubt about the condition of a jar, make an additional test by placing hot water in the jar, place rubber and lid in position, make a tight seal, and turn the jar upside down. Leave it in this position for about five minutes. If a slow leak has shown above the rubber, it is probably the lid which is defective. If it shows below the rubber, it is probably the jar.

A jar rubber is in good condition when it may be doubled over and pressed without cracking, or when it is stretched to twice its size, yet comes back to the original size and shape, when it is released. It is never advisable to use jar rubbers a second time.

Never use defective jars, jar lids, or rubbers for canning of foods, as it would be impossible to secure a perfect seal with these. Without a perfect seal, even though all micro-organisms in the food and jar have been killed in the canning process, new micro-organisms could enter the jar and cause the contents to spoil.

After the jars, lids, and rubbers have been washed and tested and found to be safe to use, they should be immersed or inverted in a pan of water and boiled about five minutes to sterilize them. After sterilization, care should be taken to avoid touching the jars and lids on the inside—especially for use in canning by the open kettle method.

To avoid breakage, the jars should be kept hot while they are being filled with hot food. To do this, allow them to stand in a pan of hot water, the hot water being about two inches deep. Adjust the sterilized rubbers on the jars before filling them.

Pre-Cooking and Packing.—Prepare the vegetables to be cooked according to the method indicated for each in the table of canning recipes.

A short pre-cooking of the material is recommended before packing it into the jars. This makes the method a **hot-pack** instead of a **cold-pack** method such as was recommended a few years ago. Tomatoes and fruits may be canned by the cold-pack method ("blanching" by dipping in hot water, and following this with a cold dip), but the **hot-pack** method has the advantage of wilting and shrinking the food before it is packed, thus allowing more food to be packed into the jar, and of shortening the canning period, because less time is required for the material to reach the temperature of the canner.

In pre-cooking the food, heat it in a minimum quantity of liquid until it boils. Pre-cook each variety of food for the length of time suggested in the table of recipes. Pack it into the clean, sterilized jars, on which the sterilized jar rubbers have been adjusted. Work quickly to avoid cooling the material, and pack to within one-half inch of the top of the container. Fill this jar with the hot liquid, in which the vegetable has been pre-cooked, or with boiling water, letting it run down between the pieces of vegetable to prevent too dense a pack. Remove air bubbles from the can by inserting a knife or other small utensil down into the food material, and then withdrawing it.

Add salt (one teaspoonful to a quart) to each jar of vegetable as it is being packed. Seal and process.

Sealing of Jars.—If jars are to be put in hot to be processed, they may be sealed completely before being processed. If the cold-pack method is used, seal them only partially before processing, and complete the seal as soon as the jars are removed from the canner.

Occasionally, when a glass jar is taken from the pressure cooker, it is found that the rubber has bulged. If this is the case, the jar must be opened, a new rubber put on, and the jar must be re-processed for five minutes.

Processing.—After the jars or cans have been packed (hot or cold) they should be heated for a time sufficient to destroy all micro-organisms. This step is called "processing." Sometimes the "processing" is accomplished in a hot water canner, sometimes in a steamer, steam pressure cooker, or in an oven. It is very important that the time be watched and the food processed for the exact length of time recommended in the table of recipes.

Processing in the Hot Water Canner.—Place a rack in the bottom of the canner. The canner may be any vessel, preferably with a close fitting cover, which is deep enough to hold the rack and the jars and to allow the water to cover the jars by at least one inch. A washboiler or a lard bucket may be used to good advantage for this purpose.

A rack may be made of hardware cloth or wooden strips, securely nailed at each end to strips of wood, which raise the rack about three-fourths of an inch from the bottom of the boiler. Do not use a resinous wood for making the rack.

Heat the water to nearly boiling. Place the jars, packed with the hot food, on the rack in the water. Start to count the time for the processing period, when the water comes back to an actual boil.

For Processing Jars in the Steam Pressure Cooker.—Pour boiling water into the cooker until it is about one inch deep. Place the jars on the rack in the cooker and adjust the cover of the cooker. Place the cooker over the fire, but do not close the pet-cock until a steady stream of steam has escaped from the cooker for seven minutes. Then close the pet-cock and, when the pressure within the cooker has risen to the number of pounds desired, begin to count the processing time.

Keep the pressure at the same level throughout the processing time, by adjusting the heat under the cooker. Sudden drops in pressure cause a loss of liquid from the glass jars within the cooker.

At the end of the processing period remove the cooker from the fire. If glass jars are in the cooker, the cooker must be removed from the fire at the end of the processing period, and allowed to cool until the gauge registers zero before opening the pet-cock. The pet-cock must then be opened slowly, to allow the steam to escape, before removing the cover cautiously from the cooker. Remove the jars from the cooker, and allow them to cool gradually. Do not allow jars to stand in a draft, while they are cooling, as this may cause them to break.

If the food is being processed in tin cans, the pet-cock may be opened at the end of the processing period. When all of the steam has been released, the cover of the cooker may be removed and the cans taken out and plunged into cold water for quick cooling.

If Processing Jars in a Steamer, Which Is Not a Steam Pressure Cooker, place the jars far enough apart to allow free circulation of the steam. Keep the water in the steamer boiling actively. Allow the same amount of time for processing in this as for processing in the hot water canner.

It is best not to attempt to process jars in the oven unless it is equipped with an oven thermometer. Arrange the jars far enough apart to allow free circulation of air. It may be best to place the jars on a tray in the oven, because they are apt to run over. Begin counting the time when the jars are placed in the oven. Maintain the temperature of the oven at 275 degrees, but allow 50% longer time for the processing than is called for in processing in the water canner.

Processing in High Altitudes.—The time for processing, as given in the table of recipes below, should be followed in places with an altitude of 1,000 feet or less. For all altitudes above 1,000 feet, the time should be increased 10% for each additional 500 feet.

Size of Jars.—If half-gallon jars are used for canning tomatoes, pickled beets, fruits or ripe pimentoes, five minutes should be added to the processing time given for pint and quart glass jars. Jars as large as one-half gallon should not be used for processing non-acid foods.

Quantities With Which to Work.—It is not wise to attempt to can a large quantity of non-acid vegetables at a time. Work with just the amount that can be packed and put into the canner at one time. If an extra quantity is allowed to wait in a warm, moist state, "flat sour" is apt to develop in the food before it is processed.

Canning of Fruits.—Fruits are canned by much the same method as is used for vegetables. Wash and prepare the fruit. Then pre-cook it for about five minutes in a syrup of the proper thickness. Pack the pieces of fruit into hot, sterilized jars and fill the jars to within one-fourth inch of the top with the syrup in which the fruit has been cooked, instead of with the boiling water. Seal and process in boiling water. The syrups are made, and used as follows:

Thin Syrup.—One part sugar, 4 parts water—used for apples, pears, raspberries, and other sweet berries where a rich product is not desired.

Medium Syrup.—One part sugar, 2½ parts water—used for sweet plums, blackberries, sweet cherries.

Thick Syrup.—One part sugar, 1 part water—used for peaches, sour cherries, pineapple, and other sour fruits.

Very Thick Syrup.—One and one-half parts sugar, 1 part water—used for rhubarb, gooseberries, currants, and other very sour fruits.

In making the syrup, heat the liquid with the sugar, stirring it, until the sugar is dissolved.

The amount of syrup required for filling the jars varies with the size of the pieces of fruit, and the fullness of the pack. However, it is probable that about one-half cup of syrup will be required to fill a pint jar of fruit, and one cup of syrup to fill a quart jar of fruit.

TIME REQUIRED FOR PROCESSING

Fruits Processed In Boiling Water (Fruits Packed Hot)

Apples, 5 minutes
Berries (all kinds), 5 minutes
Cherries, 5 minutes
Peaches, 20 minutes
Pears, 20 minutes
Plums, 10 minutes
Rhubarb, 5 minutes

Vegetables—Processed in Boiling Water

Produce	Method of Preparation for Processing	Time Required for Processing in Boiling Water Glass Jars Pint and Quart
Beets	Select young, dark red beets. Wash thoroughly. Cut off tops, leaving an inch or more of the stem, and leaving the roots. Pre-cook in boiling water or steam, until skins slip. Slip off skins. Pack into jars which have been boiled. Add 1 teaspoon salt and 2 tablespoons vinegar to each quart. Fill jars with water in which beets were pre-cooked or with boiling water. Seal and process.....	2 Hours
Beans (Lima or Butter Beans)	Can only young, tender beans. The older ones may be dried successfully. Gather these in the early morning and can as soon as possible. Shell the beans and keep in shallow pans until ready for pre-cooking. If they are heaped in deep pans and allowed to stand in a hot kitchen, flat-sour is likely to develop. Cover with water, and boil 5 minutes. Pack into hot jars to within an inch of the top. Add 1 teaspoon salt and 2 tablespoons vinegar to each quart, and fill jars with water in which beans have been cooked. Seal and process...	2½ Hours
Beans (String or Snap)	Wash, string, and snap or cut into pieces of desired length; boil 5 minutes in water to cover and pack quickly into hot jars. Add 1 teaspoon salt and 2 tablespoons vinegar to each quart jar. Seal and process.....	2½ Hours
Carrots	Select young, tender carrots. Wash and scrape. Use carrots whole, sliced or cubed. Cover with boiling water and cook 5 minutes. Pack into hot jars. Add 1 teaspoon salt, and 2 tablespoons of vinegar, and fill jar with boiling water. Seal and process.....	2 Hours

Product	Method of Preparation for Processing	Time Required for Processing in Boiling Water Glass Jars Pint and Quart
Corn	Can immediately after gathering. It is very difficult to can corn successfully, unless it is canned when it is young and tender. Test one kernel on each cob, by pricking it with the sharp point of a knife. The corn is at a satisfactory stage for canning if it is milky. If it appears to be doughy when it is pricked, discard that cob. Remove husks and silk, and clean carefully. Place cobs in boiling water and pre-cook for 5 minutes. Dip cobs into cold water, and cut corn from cob. Add one-half as much boiling water as corn. Heat to boiling, add 1 teaspoon salt, 2 tablespoons vinegar, and pack into hot jars to within 1 inch of the top, this space being left at the top for the swelling of the corn in heating. Seal and process	3 Hours
Kale (Other greens such as chard, beet tops, turnip greens, dandelions, spinach, spinach mustard.) Drying rather than canning is recommended for greens	Can only young, fresh greens. Wash thoroughly in several changes of water. Tie into cheesecloth or other thin cloth. Immerse in boiling water for 4 minutes. Pack into hot jars, being careful not to overpack the jars. It is safer to pack greens in pint jars. After packing, cut across from top to bottom of container, to leave a thin space through which a reasonably free circulation of liquid may take place. This helps to prevent spoilage. Add ½ teaspoon salt and 1 tablespoon vinegar to each pint jar. Seal and process	3 Hours
Peas	Follow the same instructions as for butter beans or lima beans. One teaspoon of sugar may be added to each pint jar if desired	3 Hours
Pumpkins and Squash	Wash and cut into sections. Peel and cut into 1-inch cubes. Add a small amount of water and simmer until heated thoroughly. Pack hot into hot jars. Add 1 teaspoon salt and 2 tablespoons vinegar to each quart. Seal and process. These may be mashed before packing if desired	3 Hours
Soup Mixture	Select any variety of vegetables suitable for soup (tomato, onion, corn, carrots, peas, lima beans, celery, green pepper, if available). Make sure that the mixture contains at least one-third tomato, for without the acid of the tomato, the mixture is not safe to can in hot water. Clean and prepare vegetables, and heat together in small quantity of hot water until boiling. Pack hot into hot jars. Add 1 teaspoon salt to each quart. Fill jars with the water in which the vegetables have been cooked, or with tomato juice. Seal and process.	3 Hours

Product	Method of Preparation for Processing	Time Required for Processing in Boiling Water Glass Jars Pint and Quart
Tomatoes	Select firm, ripe tomatoes. Put into cloth or wire basket, and dip in boiling water for about a minute (according to ripeness). Remove and plunge into cold water for an instant. Drain at once, core and peel promptly. Pack whole or cut into pieces. If whole, fill with a thick tomato sauce, or with the juice of other tomatoes. Add 1 teaspoon salt to each quart. Seal and process	30 Minutes
Tomato Juice	Select firm, ripe tomatoes. Wash and cut out stem end, and cut into sections. Add small quantity of water to start cooking. Cook slowly in a covered pan until soft, stirring occasionally to prevent burning. Put through a sieve fine enough to remove seeds. Bring to boiling, and put into jars or bottles. Add 1 teaspoon salt to each quart. Seal and process.	5 Minutes

Vegetables—Processed In Pressure Cooker

Each vegetable should be prepared and packed just as has been suggested for it in the table above, except that the vinegar may be omitted when vegetables are to be processed in the pressure cooker.

Product	Time Required for Processing in Pressure Cooker					
	Glass				Tin	
	Pint		Quart		No. 2 or No. 3	
	Time, Minutes	Pressure, Pounds	Time, Minutes	Pressure, Pounds	Time, Minutes	Pressure, Pounds
Beets	35	10	40	10	30	10
Beans (Lima or Butter)	35	10	40	10	30	10
Beans (String or Snap)	35	10	40	10	30	10
Carrots	35	10	40	10	30	10
Corn	90	10	100	10	80	10
Kale or Other Greens	60	10	65	10	55	10
Peas	45	10	55	10	45	10
Pumpkin and Squash	60	10	75	10	70	10
Soup Mixture	Process the longest length of time needed for any vegetable used in the mixture.					

Storage of Canned Foods.—All canned foods should be labelled if possible, and stored in a cool dark place until needed for use.

Precautions in the Use of Canned Non-Acid Foods.—Discard any cans or jars, showing evidence of spoilage. **Do not taste** canned non-acid foods which are doubtful in appearance or odor. Even a taste might cause serious illness. Do not throw spoiled food where chickens or other animals might get hold of it.

Always boil canned non-acid foods (meaning all canned foods except canned fruits and canned tomatoes) for ten minutes before tasting or using them.

***Making of Sauerkraut.**—Select excellent quality of cabbage, remove core, outer green leaves, and any decayed or bruised leaves. Shred cabbage fine, and pack into a clean, water tight container (earthen crocks are fine). Add salt as it is packed, using 2-ounce (¼-cup) salt to 5 lbs. cabbage, distributing it evenly. Fill container within 2 inches of top and cover with a clean cloth and wooden cover which should be weighted down so brine will rise to the top as the salt extracts the juice. Set aside until fermentation is complete (as bubbles cease to rise, about ten days). Remove the scum. Protect the surface by pouring over it a layer of paraffin to exclude the air. It is then ready to be stored in a cool place.

How Much Should Be Canned or Dried.—The table below shows the amount of vegetables and fruits, which should be canned or dried for each and every person in the family, who is above ten years of age. It is easy then, to figure out how much should be canned or dried to supply a family, of any size, with canned fruits and vegetables.

Multiply each amount shown in the table by the number of people in the family, who are above ten years of age. Add one-half of the amount shown in the table for each and every child between the ages of two and six years and three-fourths of the amount for each and every child between the ages of six and ten.

When the total amount has been figured, it would be well to add one-tenth more to this to take care of emergencies (possible breakage of cans, etc.).

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* Virginia Agricultural Extension Service Circular E-307, "Can and Dry Your Garden Products"—Janet L. Cameron.

Amount of Food To Be Canned or Dried for Each Person Above Ten Years of Age

Product	Amount to Can	Amount to Dry	The amounts recommended for canning and drying are based upon the vegetables being used in addition as follows:	
			Number of months when product may be used fresh from garden	Months to use stored
Greens. (Some of each of the two following should be canned or dried to make up the total amount:)	Ten and one-half qts. (21 pts.). (This would allow ½ pt. serving 3 times a week for 14 weeks.) (*If* greens may be had fresh from the garden throughout the year, none need be canned or dried.	All greens may be dried satisfactorily.		
Kale	.....	.....	8½	0
Spinach Mustard	.....	.....	6	0
Cabbage	0	.....	7	3
Lettuce	0	0	3	0
Tomatoes	Twenty-four qts. (48 pts.). (This would allow ½ pt. serving 4 times a week for 36 weeks.)	0	5	1 (picked green, whole plant pulled up while tomato is green)
Other Vegetables (Can or dry some of each of the eight following to make up the 24 qts. per person):	Twenty-four qts. (48 pts.) to be canned or dried. (This allows ½ pt. serving 4 times a week for 36 weeks.			
Snap Beans	.....	.....	5	
Lima Beans	.....	.....	3	
Beets	.....	.....	7	3
Peas	.....	.....	2	0
Corn	.....	.....	4	0
Carrots	.....	.....	7	3
Pumpkin	.....	.....	0	3
Squash	.....	.....	4	0
Turnips	0	0	4	4
Onions	0	0	2	5
Parsnips	0	0	4	0
Fruits	Twenty-seven qts. (54 pts.) to be canned or dried. (This would allow ¾ pt. serving 6 times a week for 36 weeks.)			

If vegetables are not available, in fresh form, from a spring and summer garden, or from a fall and winter garden, as suggested in the table above, then more should be provided by canning, drying, brining, etc., than is indicated in this table.

*DRYING VEGETABLES AND FRUITS

General Directions

Because of the cost of jars and cans, it is practical to dry fruits and vegetables. Where storage space is a consideration, this is especially helpful, for 100 pounds of fresh vegetables will average 12 pounds when dried.

The food must be fresh and prepared for drying as soon as picked. Whether drying in the sun, in the oven or on a cook stove dryer, it is good to reduce the moisture as quickly as possible to prevent discoloration and produce a good product. In general, sun drying does not produce as good a product as the oven or cook stove dryer method. Excellent driers may be made at home from framework of wood and several trays covered with wire and inserted on cleats in the frame, at about three inches apart.

If drying in an oven, the door should be left slightly open so moisture may escape. A very slow oven is required. To prevent charring before it dries, it is highly desirable to have a thermometer convenient. Suggested temperatures for drying are given as a guide. Vegetables must be drier than fruits to keep successfully, and also need to be stored more carefully, since they absorb moisture more quickly if exposed to air. Fruits are more easily dried because of their sugar content.

DRYING OF VEGETABLES

*Green String Beans.—All varieties of string beans can be dried. Wash and string the beans carefully. The very young and tender string beans can be dried whole. Those that are full grown should be cut in one-fourth to one-inch lengths. Blanch by placing in a thin cloth or strainer and dipping in boiling water for 3 to 10 minutes. Spread in thin layers on trays of drier and dry until brittle. Start drying at 110 degrees F. and raise temperature gradually to 145 degrees. Test by pressing the cut piece; if it is impossible to press water and is leathery, it is dry enough.

*Dry Shelled Beans.—Different kinds of beans, after maturing and drying on the vines, can be treated as follows: Shell, wash, and spread in thin layers on the trays of the drier. Heat 10 minutes, beginning at 100 degrees F. and gradually raising the temperature to 180 degrees. This high temperature will destroy all insect eggs that might be on the beans. Cowpeas or any field pea can be treated in the same way. Cool and store carefully. The heating of the bean or pea destroys its vitality, and legumes thus treated cannot be used for seed. Dry until no water can be pressed from a cut bean.

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* Virginia Agricultural Extension Service Circular E-307, "Can and Dry Your Garden Products"—Janet L. Cameron.

*Corn.—Select very young and tender corn in the milk stage. Prepare at once after gathering by removing husk and silk. Heat on the cob in boiling water from 5 to 10 minutes or until milk is set. Drain well and cut from cob. Cut first tip of grain, then slice grains about halfway down the cob and scrape out the remainder of grain with back of knife. In that way chaff is left on cob. Dry at from 120 degrees to 140 F. Dry until no water can be pressed out.

Greens.—Remove leaves from main stem of plant. Wash carefully. Place in colander or tie in cheese cloth, in such a way, that the layer of greens is not deep. Dip in boiling water long enough to set the color and to wilt the leaves. Dry slightly in a clean towel and spread on trays of dryer. Place in oven, with very low heat and with oven door open, for four or five hours—or until leaves are dry and crisp.

*Peas.—In case of the very young and tender so-called English peas, the pods may also be used. Wash and cut in one-fourth-inch pieces and blanch 3 to 4 minutes in boiling water. Garden peas are shelled, sorted according to size, and blanched or boiled from 1 to 6 minutes. Test by mashing between fingers; no water should come out. Dry small peas at 110 degrees to 135 or 140 degrees F. It is very important to dry peas so slowly that they will dry all the way through, else they may easily mildew and spoil.

Lima Beans or Butter Beans.—These are shelled and dried. If gathered when young and tender, wash, shell, and blanch from 5 to 10 minutes, the length of time depending on the maturity of the beans. Remove surface moisture and dry at the same temperature as for string beans. Test as for snap beans.

Soup Mixture.—Prepare and dry separately each vegetable to be used in the soup mixture. Test each vegetable as indicated above. When all are dried, put them together in the desired proportion.

It is suggested that cabbage and carrots, which might not be dried ordinarily, be dried for this use.

When ready to use the soup mixture, rinse the vegetables in cold water, soak them in lukewarm water over night, and boil in water or soup stock.

DRYING FRUITS

*Only fresh ripe fruits should be used for drying. In Virginia, fruits may be dried in the sun; however, most fruits dried in the sun becomes discolored. On very hot, dry days fruits may be dried in the sun until the surface begins to wrinkle and then finished in the drier.

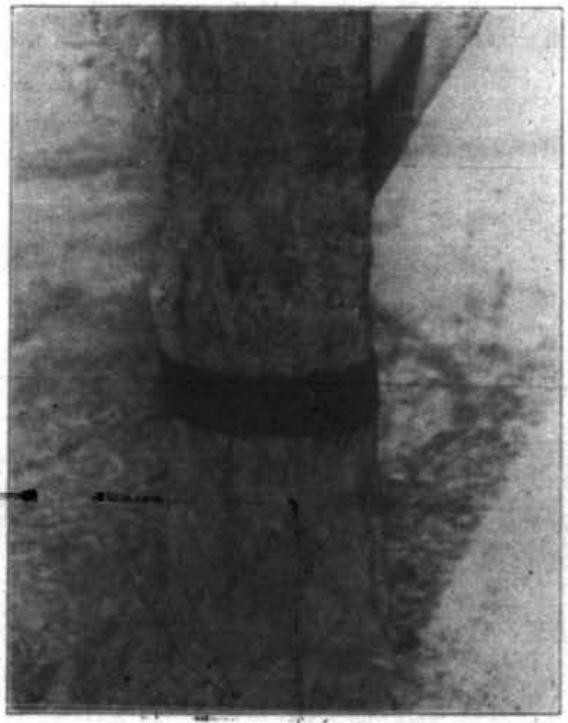
The cut fruit when exposed to the air for some time becomes discolored. This is a natural result and does not affect the food value or the flavor of the dried product. In commercial drying of fruits this darkening is often prevented by subjecting the fruits to the action of

* Virginia Agricultural Extension Service Circular E-307, "Can and Dry Your Garden Products"—Janet L. Cameron.

Bulletin No. 131 February, 1934

Information for Virginia Fruit Growers

PREPARED BY DEPARTMENTS OF HORTICULTURE, PLANT PATHOLOGY AND ENTOMOLOGY



A chemically-treated codling-moth band on each tree trunk helps to reduce the codling moth population.

VIRGINIA AGRICULTURAL AND MECHANICAL COLLEGE AND POLYTECHNIC INSTITUTE
AND THE UNITED STATES DEPARTMENT OF AGRICULTURE, COOPERATING
EXTENSION DIVISION, JNO. R. HUTCHESON, DIRECTOR
BLACKSBURG, VIRGINIA

DISTRIBUTED IN FURTHERANCE OF THE ACTS OF CONGRESS OF MAY 8 AND JUNE 30, 1914

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The Extension Division carries the Agricultural College and United States Department of Agriculture to the farmer and farm home. It endeavors to meet their problems in soils and crops, horticulture, dairying, live stock, poultry, agricultural engineering, home economics, agricultural economics, and community development. This is done by personal visits, meetings, and correspondence of County Farm and Home Demonstration Agents and Specialists, through boys' and girls' and women's club work, cow testing and purebred live stock and other associations and organizations, and the distribution of bulletins, circulars, newspaper articles, etc.

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Information for Virginia Fruit Growers

INTRODUCTION

Quality is the greatest factor in the successful marketing of fruit in both domestic and foreign markets. It costs as much or more to harvest insect and disease blemished fruit as it does clean fruit. Freight and other marketing charges are just as great on low grade fruit as on fruit of high quality.

The apple and pear export bill is designed to protect the reputation of our fruit in foreign markets by restricting the movement of unclassified fruit to these markets. Similar action may be expected in connection with the movement of low grade fruit into the domestic markets.

We have had two very short commercial apple crops in succession in Virginia and in the United States. During these years Europe has also had small crops. We can reasonably expect that the crop in Virginia and the United States will be larger in 1934. We can also expect that the movement of apples into the export markets will be handicapped by restriction of various kinds, such as tariffs, embargoes and quarantines. Although there may be some modification of quotas, duties will still be required. To continue in the business of fruit growing, it is necessary to produce at lower cost.

Total fruit production for the world is on the increase. Competition is becoming keener. To meet this competition successfully in all markets of the world, Virginia fruit growers must produce a larger percent of cleaner and better fruit.

Efficient spraying is the most important operation in producing fruit of high quality. A spray program that does not control worms, scab and scale is too costly and cannot be countenanced when the welfare of the fruit industry is dependent upon marketing fruit of high quality, free from insect and disease blemishes.

Because of experiences and research work of 1933, a year of insect and disease epidemics, it is believed that further improvement has been made in the spray calendar for 1934. The program is designed to give more efficient control of aphis, scale and codling moth, and to produce a larger percentage of fruit that will meet the sanitary regulations of the foreign countries in which much of our fruit is marketed.

As in previous years, the calendar contains more or less set schedules, but is not so rigid that it cannot be varied sufficiently to meet the local needs of every grower if he will study it carefully. In these schedules the aim is to protect the grower's bank balance, and at the same time enable him to produce clean fruit. The grower, therefore, should make no radical changes in the schedules until he is sure that such changes are suited to his particular conditions. This spray calendar is the result of a very careful study on the part of the workers in the departments of plant pathology, entomology, and horticulture, and the authors feel that if the recommendations regarding the time of application, manner of application, and materials to be used are followed carefully, Virginia growers will be able to produce a high percentage of clean fruit at a reasonable cost.

THE VIRGINIA SPRAY SERVICE

The object of the Spray Service is to supply Virginia fruit growers with up-to-date information on developments in the field of spraying. The service makes recommendations as to the proper materials and equipment to use, and gives the correct time and method of applying the various sprays and spray materials in the different fruit sections of the state.

The information of the Spray Service is disseminated under the direction of the State Extension Division and is governed by the information furnished by the Experiment Station. The spray notices are sent out from Blacksburg to the county agents, fruit growers' organizations, and authorized individuals who fill in the dates of application and mail them to the growers. Every fruit grower in Virginia is privileged to receive this spray service information free of charge. Those not receiving same and desirous of so doing should notify the Spray Service at Blacksburg.

The spray notice cards call attention to the name and number of the spray (which corresponds to the schedule found on p. 6), materials to be used, time to apply the spray, and the insect pests and fungous diseases to be controlled. The actual dates of application will be given for sprays No. 4, 5, and 6. The time to apply sprays No. 1, 2, and 3 will refer to the stage of bud, blossom, and fruit development; spray No. 1 referring to the first showing of green in blossom buds, No. 2 referring to the pink bud, and No. 3 to the time of petal-fall. Because of variation in development due to varieties, soil, and climatic conditions, growers are in the best position to gauge the time of these applications. Sprays No. 4, 5 and 6 will be governed by reference to the time of the beginning of the petal-fall spray, and the brood development of the codling moth. These are known as the 1st, 2nd, and 3rd cover sprays, respectively.

Careful attention to each recommendation made on the spray notice card is essential to the success of the season's program. Each one is designed for a specific purpose and would not appear if it could be safely omitted.

THREE MAIN CONSIDERATIONS IN SUCCESSFUL SPRAYING

During times of economic stress, fruit growers attempt to reduce costs whenever possible, and, as may be expected, those operations that require the heaviest outlay of cash, such as spraying, come in for the most drastic revisions. Some experiment with new materials, others reduce the number of sprays, while still others try to economize by reducing the concentration of the materials, or by skimping on the coverage.

The 1933 season was favorable to scab development. Many growers were unable to apply the pink and petal-fall sprays at the proper time with the result that a high percentage of the fruit did not make the No. 1 grade. *Proper timing* of sprays is the most important of all considerations. The second most important consideration for success in spraying is applying the material in a thorough manner. A heavy application made to the lower and outside parts of the tree, with little or no spray reaching the top and inside, will not give satisfactory control of either insects or diseases. *Complete coverage* is essential for good results. The *right kind of spray material* is the third most important consideration in successful spraying. Proper equipment and a good water supply are other factors essential to success.

VIRGINIA APPLE SPRAY PROGRAM

	NAME	TIME	MATERIAL FOR 100 GALLONS OF SPRAY	PURPOSE
1	DORMANT or DELAYED DORMANT	Before growth starts.	Oil to make 3% strength and tar oil to make 2½% strength.	Scales Aphis Red mite
		When first buds show green, and completed by time first leaves are ¼-inch long.	Oil to make 3% strength and ½ gallon creosylic acid (1). If lime sulphur 32° Baume is used instead of oil, use 12 gallons of lime sulphur and 1 pint of nicotine sulphate.	Scales Aphis Red mite Scab
2	PINK	When the majority of cluster buds have separated.	Lime sulphur, 32° Baume, 10 quarts. When curculio, bud moth, or tent caterpillar are present, include lead arsenate, 3 lbs.	Scab Mildew Leaf spot Curculio Bud moth
3	PETAL-FALL	When most of the petals have fallen.	Lime sulphur, 32° Baume, 10 quarts; and lead arsenate, 3 lbs. (If scab is not a serious factor, one of several substitutes may replace lime sulphur, such as dry lime sulphur or one of the wettable sulphurs.)	Scab Mildew Leaf spot Codling moth Curculio Leaf roller
4	FIRST COVER SPRAY	About 17 days or three weeks after the petal-fall stage, or as advised by the Spray Service.	Lime sulphur, 32° Baume, 10 quarts; and lead arsenate, 3 lbs. Or Bordeaux mixture 2-4-100, as advised by the Spray Service (2). (If scab is not a serious factor, one of several substitutes may replace lime sulphur, such as dry lime sulphur or one of the wettable sulphurs.)	Scab Mildew Leaf spot Blotch Codling moth Curculio
5	SECOND COVER SPRAY	About four or five weeks after the petal-fall stage, or as advised by the Spray Service.	Lead arsenate, 3 lbs., and 2-4-100 Bordeaux mixture. (For bitter rot use 4-8-100 Bordeaux.)	Codling moth Blotch Bitter rot
6	THIRD COVER SPRAY	In late June or in July, as advised by the Spray Service.	Lead arsenate, 3 lbs. (3), and 2-4-100 Bordeaux mixture. (For bitter rot use 4-8-100 Bordeaux mixture.)	Codling moth Blotch Bitter rot

AN ADDITIONAL SPRAY OR SPRAYS WILL BE ADVISED, IF WORM INJURY THREATENS IN JULY AND AUGUST.

(1) The creosylic acid should be added after the oil has been diluted in the spray tank. Keep the agitator running during the process of mixing and until the solution is applied to the tree. Do not use creosylic acid with lime-sulphur.

(2) Choice of material in this spray is governed by weather conditions. If it is hot, (85° or over), use Bordeaux as recommended. If it is cool, use a sulphur fungicide. About six pounds of hydrated spray lime should be used in each 100 gallons of spray solution whenever lead arsenate is combined with lime-sulphur. Spray lime is preferable.

(3) Growers who apply an arsenical spray in July must be prepared to remove any excessive residue that may persist at picking time. Growers who cannot wash their fruit must use a non-lead spray such as calcium arsenate in Spray No. 6.

NOTE—Good results have been secured by using a mixture of 8 quarts of lime-sulphur, 32° Baume, and 6 pounds of calcium sulphide in pink and petal-fall applications.

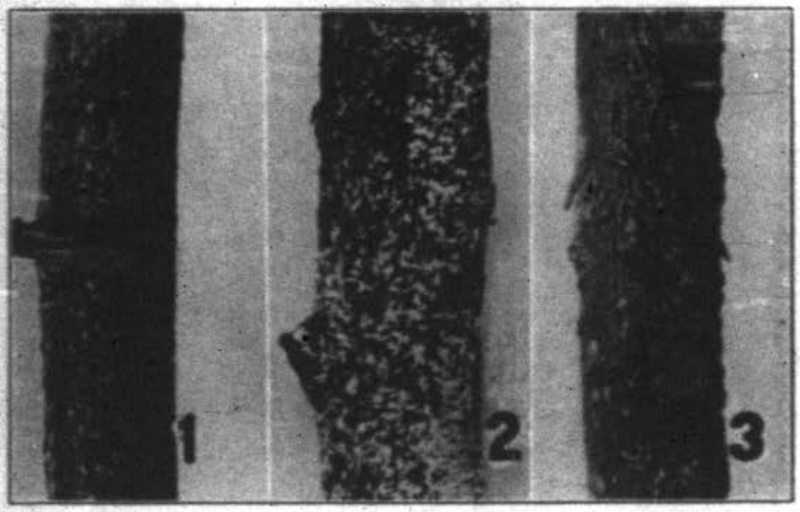
New spray materials are constantly offered to growers. Better control at less cost are claimed for these by their manufacturers. When money is scarce, growers are more apt to take chances. When spray materials other than those recommended in the schedules have been properly tested and found superior, they will be recommended by the Spray Service.

DISCUSSION OF THE SPRAY CALENDAR FOR APPLES

As a result of the most serious outbreak of rosy aphis on record in the state, a scab epidemic that completely destroyed the apple crop in some of the orchards, and with codling moth on a rampage in most of the important apple sections, the apple crop in Virginia in 1933 was one of the poorest in quality in the history of the fruit industry. No business enterprise can long survive under conditions where a large percent of its output goes to the cull pile. The apple industry with its millions of dollars of investment is no exception to the rule. Since apple growing is the most important branch of the Virginia fruit growing business, the following is the most important of the spray calendars. Every apple grower should familiarize himself with the name, the number, and the materials used for every spray, and the specific diseases and insect pests to be controlled by them. For a fruit grower to be successful, a working knowledge of these fundamentals is essential and too much emphasis cannot be laid upon its importance.

The following discussion is prepared for the purpose of informing the grower about the materials used, the purpose of each spray, and the facts governing the timing of these sprays.

Spray No. 1 (Dormant or Delayed Dormant). Virginia apple growers suffered heavy losses from rosy aphis last year. It is difficult to say what the



Scale insects on twigs. 1. San Jose scale. 2. Scurfy scale. 3. Oyster shell scale. These insects are controlled by the delayed dormant spray as discussed elsewhere in this bulletin.

aphis situation will be in 1934. Under these conditions it seems advisable to take out the best insurance available. Tar oils have proved efficient in the control of rosy aphis.

Buds Ready to Receive Delayed Dormant Spray.

Scale insects are still on the increase in Virginia orchards and a menace to our markets. Weather conditions continue favorable for the development of San Jose scale. The economic situation of recent years has been such that many growers have not been putting on the scale sprays. In other cases, growers have not been using enough material to cover the trees properly. This was found out in a recent study made in one of the largest apple growing sections of the state. This study shows that only ten out of every sixteen growers put on a complete dormant spray and that the average amount of spray material applied per tree was only 2.7 gallons. It is not possible to control scale with that kind of coverage.

Scale infested fruit is a distinct drawback to the successful marketing of our fruit, especially in those foreign markets which do not allow scale infested fruit to enter.

France has recently increased the quota for American apples. We can expect to have more apples to market in 1934. It is, therefore, important that we be in a position to take advantage of every market outlet. A 3 percent oil spray applied while the trees are dormant will give satisfactory control of scale. In order that scale and aphis be controlled at the least cost, the spray service is recommending that all commercial orchards receive the dormant spray of 3 percent strength of lubricating oil combined with tar oil to make 2½ percent strength when diluted in the tank, or the delayed dormant application of lubricating oil and cresylic acid.

Tar-Petroleum Oil Combinations

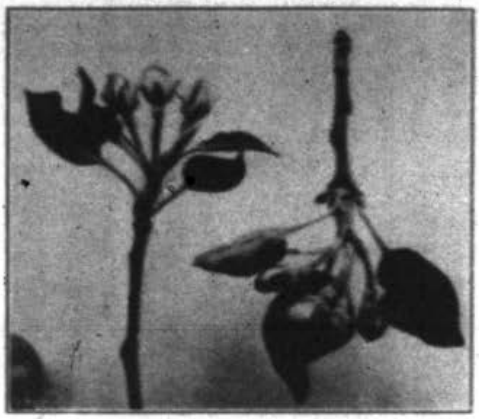
The preparations of tar oil and lubricating oil combinations on the market contain varying proportions of tar oils. It is, therefore, necessary that the grower bear this in mind when purchasing or diluting these preparations. If the brand of material to be used does not contain tar oil and lubricating oil in the proportion recommended by the spray service, an additional amount of lubricating oil emulsion may be added.

Tar oil sprays should only be applied when the trees are completely dormant.

Sprays No. 2 and 3 (Pink and Petal-Fall). The explanations given in the calendars for these sprays need not be amplified except to emphasize the value of the pink and petal-fall sprays as the most important for scab, leaf spot, and codling moth. Both the pink and petal-fall sprays are absolutely essential for

scab control because they are applied when the first infections occur. The first brood of the codling moth appears shortly after the petal-fall application is made and to control codling moth it is essential to kill the first brood.

Spray No. 4 (First Cover Spray). Codling moth infestation has increased to such an extent in recent years that the situation is alarming. There are several reasons for the present serious situation. First, weather conditions have been almost ideal for the development of this insect since 1930. Second, the spray programs of the past few years have been arranged in a large measure to meet the spray residue tolerance, which has resulted in a large carry-over of worms from late broods. Third, many growers have not been able to carry out good orchard management programs. Spray equipment has not been adequate to apply the sprays on time, pruning has been neglected allowing the trees to become thick resulting in poor coverage on the inside and in the tops of the trees, and in some cases, sprays have been omitted entirely. This application is the most important of all cover sprays. It is also one of the important scab sprays. The eggs of the first generation are laid on the leaves. It is, therefore, important that the spray be put on at the proper time. As the young worms feed to some extent upon the leaves, the spray should be put on in a very thorough manner. The under side of the leaves should be covered as well as the upper side. Every effort should be made to secure as nearly as possible 100 percent kill of the first brood worms. The first cover spray should be put on in every orchard and on all varieties.



Time for the Pink Spray.

Spray No. 5 (Second Cover Spray). This spray must be applied in every orchard about five weeks after the beginning of the petal-fall spray. It should be timed with codling moth development, and to keep the fruit and foliage covered. It is important for codling moth, and where bitter rot and cloud are prevalent, as first infections may appear at this time. *Spray the tops and inside of the trees thoroughly.*

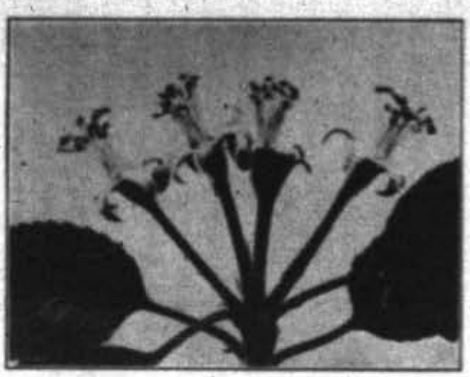
Spray No. 6 (Third Cover Spray). This spray will be recommended for every orchard as it is the last application which can be made with safety. Because of bitter rot and blotch, it is important. The spray will be timed for the most effective control of the second brood worms.

Supplementary Sprays

In the event of a possibility of late infection of cloud, bitter rot, phoma spot, or other late seasonal diseases, Bordeaux mixture 4–8–100 may be required in addition to the regular program. Additional codling moth sprays will also be recommended if necessary to secure adequate control of worms.

Supplementary Codling Moth Control Measures

A chemically-treated codling-moth band on each tree trunk aids in reducing the codling moth population if the loose bark has been scraped from the limbs and trunk and the crotches and scars cleaned out before the bands are used. The bands should be placed on the trees between June 1 and 15. After the crop is picked, they should be removed and burned. Cost of band and placing on tree is about 5 cents per tree. It is important to scrape and clean each tree during the winter months. A properly banded tree is shown in the illustration on page 1.



Bloosoms in Ideal Condition for Petal-fall Spray.

There are several other measures which help in keeping down the codling moth infestation. These consist of a thorough clean up in the orchard, scraping the loose bark from the trees during the winter, destroying weak and dying trees, reducing the packing shed menace, moving culls out of the orchard daily, and putting on additional sprays around the packing house.

SPRAY RESIDUE

Experience warns us that an arsenical application made in July, and especially after July 10, will necessitate some means of removal of excessive residue at picking time. If lead arsenate is omitted and nothing but Bordeaux mixture is applied for control of bitter rot and cloud in July, preparation must be made to remove the visible residue that may persist at picking time. Fruit must pass a visibility inspection as to residue as well as meet a chemical tolerance.

DILUTION TABLES FOR LIME-SULPHUR

Experience in preparing lime-sulphur concentrate shows that this product varies in specific gravity as indicated by its Baume test. This is due to the variation in the quality and quantity of the sulphur and lime used, also to the length of the boiling period. The formulas given in this bulletin are calculated to produce lime-sulphur that will test approximately 32 degrees Baume. This is what is known as standard lime-sulphur concentrate.

Whenever this concentrate is above or below the standard the dilution tables on page 11 are necessary to determine how much of the concentrate should be used for the winter and summer spray mixtures. The table indicates these amounts for lime-sulphur concentrate, varying in test from 22 to 35 degrees Baume.

The most satisfactory procedure is to test the diluted mixture in the spray tank. This is done with an especially sensitive hydrometer. Using such a hydrometer, the reading for the winter strength spray material in the spray tank should be about 5 and the summer strength material 1.25 degrees Baume.

DILUTION RATES FOR WINTER SPRAYING

Specific gravity	Baume test of concentrate in degrees	No. of gals. of water for each gallon of lime sulphur	AMOUNT IN GALLONS TO USE IN			Baume test of diluted solution
			50 gal. tank	100 gal. tank	200 gal. tank	
1.318	35	8.5	5¾	10½	21	About 5
1.306	34	8.1	5½	11	22	" 5
1.295	33	7.7	5¾	11½	23	" 5
1.283	32	7.3	6	12	24	" 5
1.272	31	7	6¼	12½	25	" 5
1.261	30	6.7	6½	13	26	" 5
1.250	29	6.4	6¾	13½	27	" 5
1.239	28	6.14	7	14	28	" 5
1.229	27	5.9	7¼	14½	29	" 5
1.218	26	5.67	7½	15	30	" 5
1.208	25	5.25	8	16	32	" 5
1.198	24	4.9	8½	17	34	" 5
1.188	23	4.7	8¾	17½	35	" 5
1.179	22	4.4	9¼	18½	37	" 5

DILUTION RATES FOR SUMMER SPRAYING

Specific gravity	Baume test of concentrate in degrees	Rate of dilution	AMOUNT IN QUARTS TO USE IN			Baume test of diluted solution
			50 gal. tank	100 gal. tank	200 gal. tank	
1.318	35	1 to 45	4½	9	18	1.25
1.306	34	1 to 43½	4¾	9½	19	1.25
1.295	33	1 to 41½	5	10	20	1.25
1.283	32	1 to 40	5	10	20	1.25
1.272	31	1 to 37½	5¼	10½	21	1.25
1.261	30	1 to 35½	5½	11½	23	1.25
1.250	29	1 to 34½	5¾	11½	23	1.25
1.239	28	1 to 32½	6	12	24	1.25
1.229	27	1 to 31	6½	13	26	1.25
1.218	26	1 to 29½	6¾	13½	27	1.25
1.208	25	1 to 27½	7¼	14½	29	1.25
1.198	24	1 to 26	7½	15	30	1.25
1.188	23	1 to 24½	8	16	32	1.25

AMOUNT OF SPRAY SOLUTION REQUIRED FOR TREES OF VARIOUS AGES

The harvest season and the cull pile offer the best opportunity to check upon the efficiency of our spray program and its application. Poor results can usually be traced to one or all of three things — namely, use of the wrong material, incorrect timing, or poor and insufficient application. As a rule, the use of insufficient material causes most of our troubles. It is poor economy to attempt to skimp on material; on the other hand, it is poor business to waste it. Trees of various sizes and ages require a definite amount of material to cover them properly. Unless it is definitely known how much spray solution is required by trees of different ages, it is difficult to know how much material to buy or how to check up on the men doing the work. The table on page 12 will aid in determining how much material to buy and whether too much or too little is being used on the trees. For thorough spraying, trees of normal size should receive approximately the amounts of diluted spray solution given in the accompanying table.

AMOUNT OF SPRAY MATERIAL REQUIRED FOR TREES OF VARIOUS AGES

AGE OF TREES	APPLE TREES	PEACH TREES
1 to 3 years	½ to ¾ gallon	½ to 1 gallon
3 to 5 years	¾ to 2 gallons	1 to 2 gallons
5 to 6 years	2 to 3 gallons	2 to 2½ gallons
6 to 8 years	2½ to 4 gallons	2½ to 4 gallons
8 to 12 years	3 to 5 gallons	3½ to 5 gallons
12 to 18 years	5 to 8 gallons	4 to 6 gallons
18 to 25 years	8 to 12 gallons	4 to 6 gallons
25 years and older	12 to 15 gallons	

For the dormant spray less material will be required. The above table is for trees in full foliage.

HOW TO ESTIMATE AMOUNT OF MATERIALS TO BUY

In order to estimate the amount of lime-sulphur needed for the season, multiply the number of trees of the same age by the quantity of solution estimated per tree, then multiply this by the number of applications to be applied. For the dormant spray 24 gals. of concentrate material testing 32 degrees Baume is required for each 200-gal. tank. For 1,000 trees eight years old about 3 gals. of dilute material will be required for each tree. Three thousand gallons would require 15 tanks. Fifteen tanks would require 360 gals. or 7 bbls. Three summer sprays would require 15,000 gals. of dilute materials. Diluted 1-40, 5 gals. of concentrate would be required for each 200-gal. tank. Fifteen thousand gals. equals 75 tanks, 375 gals. of concentrate or 7 bbls. For this orchard 15 bbls. of concentrate lime-sulphur solution should be purchased.

In estimating arsenate of lead, multiply the number of trees of the same age by the quantity estimated in the table for trees of that age; multiply by the number of applications to be used, dividing the total by 100, which will give the number of 100-gal. tanks required to spray the orchard; next multiply this by 3 which will give you the number of pounds of powdered lead arsenate to order.

A CALENDAR OF IMPORTANT EVENTS IN THE APPLE GROWING SEASON

The table on page 13 is of special interest to apple growers in the Winchester, Staunton, and Crozet sections, because it contains facts which will enable them to anticipate in a general manner the succession of diseases, insect pests, and sprays for the 1934 season. With slight variations in time, this outline also applies to other apple growing sections of Virginia. The seasonal climatic differences during 1929, 1930, 1931, 1932, and 1933 varied extremely, yet the appearance of the different diseases and insects has been quite constant. This indicates that the table may be used with considerable accuracy in predicting these events for 1934.

Supplementary Directions For Apples

Leafhoppers. Contact insecticides can be effectively employed during the period when the nymphs are present. The first brood of the white apple leafhopper *(T. pomaria)* can be reduced in numbers by combining nicotine with one of the regular sprays. The exact time will depend upon the hatching of the leafhopper eggs, which occurs between the petal-fall, and three-weeks spray. A special spray can be applied sometime in August for the second brood.

CALENDAR OF IMPORTANT EVENTS IN THE APPLE GROWING SEASON

EVENT	WINCHESTER		STAUNTON		CROZET	
	1932	1933	1932	1933	1932	1933
Delayed Dormant Spray	Apr. 4-18	Apr. 3-14	Apr. 1-19	Mar. 29-Apr. 7	Apr. 3-14	Apr. 1-8
First rosy aphis	Apr. 3	Apr. 3	Apr. 4	Apr. 1	Apr. 4	Apr. 2
Pink Spray	Apr. 25-28	Apr. 24-27	Apr. 25-30	Apr. 19-26	Apr. 21-27	Apr. 13-18
Mildew on apple		Apr. 20				
Petal-Fall Spray	May 10-21	May 10-20	May 7-17	May 3-14	May 3-11	May 1-8
Frog-eye	May 15	May 9			May 12	May 15
Cedar rust	May 25	May 12				
Scab	May 25	May 10	May 1	May 2	May 7	May 4
3-Weeks' Spray	May 25-June 2	May 25-June 1	May 26-June 6	May 20-30	May 19-26	May 17-25
First codling moth larvae	May 25	May 25	May 27	May 24	May 6	
Rosy aphis leaving apples	June 10	June 1	June 2	June 4		
Maximum egg-laying, first brood codling moth	June 1-4	May 21-28	May 25-June 10	May 23-27	May 14-27	May 28-June 12
Apple blotch	June 28	June 10				
Rose chafer						
5-Weeks' Spray	June 6-11	June 8-14	June 6-16	June 4-12	June 7-12	June 8-16
Black rot	July 1	July 5				July 12
Bitter rot	July 5	July 8				
Maximum egg-laying, second brood codling moth	July 27-Aug. 8	July 21-Aug. 24	July 19-29	July 15-23	July 15-30	July 17-Aug. 1
Cloud or sooty blotch	Aug. 9	Aug. 9				Aug. 20
7-Weeks' Spray	June 20-25	June 20-26			July 6-12	July 10-20
Maximum egg-laying, third brood codling moth	Aug. 26-Sept. 5	Aug. 25-Sept. 15	Aug. 29-Sept. 4	Sept. 1-8	Aug. 20-31	Aug. 30-Sept. 2
Maximum activity of leaf roller		Sept. 1-15				

Orchards that were badly infested with leafhoppers during 1933 will be again infested during 1934. These orchards should be watched and as soon as the young hoppers appear a contact spray should be applied to the undersurface of the leaves. The fruit grower has the option of making a special application of nicotine to the section of the orchard subject to leafhopper injury or of adding nicotine to the delayed petal-fall spray.

For a special leafhopper spray, nicotine and oil should be used in the following proportion: Three-fourths pint of 40 percent nicotine sulphate and one gallon of summer oil to each 100 gallons of spray. Penetrol at the rate of ½ gallon to each 100 gallons of spray can be substituted for the oil.

Where the grower desires to apply a combined spray, the following proportions are recommended:

Cal-mo-sul	12½	pounds
Penetrol	2	quarts
Nicotine sulphate 40%	¾	pint
Arsenate of lead	3	pounds
Water	100	gallons

SPRAY CALENDAR FOR PEACHES

Since it is possible to prevent arsenical burning of peach trees by the use of the zinc lime material, we can safely recommend a very much higher pressure for spraying peach trees. In order to spray a peach tree properly, especially when it is in heavy foliage, it is necessary to use from 300 to 350 pounds pressure with rods carrying angle nozzles. The spray should be directed upward and outward from the center of the tree. A peach tree cannot be sprayed properly by simply spraying from the outside; it must be sprayed from the center outward to the tips of the limbs.

The following materials may be used as fungicides on peaches: Dry mix, either formula; self-boiled lime and sulphur; and calcium sulphide. The zinc-lime spray is not intended as a fungicide but as a control for bacteriosis, and the prevention of arsenical injury to the twigs and foliage.

Arsenical injury and bacteriosis have become serious problems in the last few years and zinc-lime spray is recommended as the most promising material now known for their prevention. It is very important that the zinc-lime material be used in all lead arsenate applications on peaches. When this material is used for the control of bacteriosis, 5 to 7 applications are necessary. The first application should be made as soon as the petals have fallen; the others at two-week intervals thereafter. When bacteriosis is not a problem, the zinc-lime spray may be used only in the lead-arsenate applications. The zinc-lime spray may be used with the common fungicides such as calcium sulphide; dry mix, either formula; and self-boiled lime and sulphur. In case these fungicides are used with zinc-lime spray, they should be added after the zinc-lime material has been prepared in the spray tank. When lead arsenate is used with the zinc-lime spray alone, or is combination with fungicides and the zinc-lime spray, it should be added last. There are two forms of zinc sulphate available for use as spray material, mono-hydrate zinc sulphate and crystal zinc sulphate. The mono-hydrate form contains approximately 89 percent zinc sulphate, whereas the crystal contains approximately 56 percent zinc sulphate. The mono-hydrate is used at the rate of 5 pounds to each 100 gallons of water, and the crystal at the rate of 8 pounds to each 100 gallons of water. The directions for preparing the zinc-lime spray are given on page 21.

SPRAY CALENDAR FOR PEACHES

NO.	TIME OF APPLICATION	MATERIALS TO USE	PARASITES
1	Dormant season (before buds have commenced to swell), February or March.	Lime-sulphur, 32° Baume, 12 gallons; add water to make 100 gallons of spray. If oil emulsion is used for scale, it should be used with 6-6-100 Bordeaux mixture for the control of leaf curl. Lime-sulphur, however, may be used with home-made oil emulsions. If lime-sulphur is used with lignin pitch oil emulsion, it should be used at the rate of 1 to 15 for the control of leaf curl.	Scale Leaf curl
2	Immediately after the petal drop.	Zinc-lime spray, either formula A or B. Formula A. Zinc-sulphate (crystal form)..... 8 pounds Hydrated lime..... 8 pounds Water..... 100 gallons Formula B. Zinc-sulphate (monohydrate form) . 5 pounds Hydrated lime..... 8 pounds Water..... 100 gallons Add 2 pounds of powdered lead arsenate for each 100 gallons of spray. The lime contained in the zinc-lime spray is sufficient.	Curculio
3	One week after No. 2.	No. 3 same as No. 2.	Curculio
4	Eight to 12 days after No. 3.	No. 4 same as No. 2.	Curculio Scab
5	About 3 weeks after No. 4.	Calcium sulphide, 12½ pounds, or 16 pounds of dry mix; or self-boiled lime-sulphur (16-16-100) to each 100 gallons of water. The Spray Service will notify growers if the zinc-lime spray is necessary in this application.	Scab Brown rot
6	Two to 3 weeks before fruit ripens.	No. 6 same as No. 5.	Brown rot

Supplementary Directions For Peaches

Peach Borer. The earth for 15 or 18 inches around the base of trees should be cleaned of grass and weeds and leveled off, without, however, digging up the soil any more than necessary to break the surface crust. If borers are present in the trunk of the trees somewhat above the ground level, as indicated by the presence of gum or frass, a few shovelfuls of earth should be thrown around the tree and leveled off to form a bed for the application of the "poison" high enough to subject the infested trunk to the fumes of the gas. Exposed roots should be covered with a light layer of soil, since these are less resistant to gas fumes than the bark of the trees.

After the soil around the base of the tree has been prepared the "poison" is applied evenly in a circular band an inch or two wide entirely around the tree, care being taken that the inner part of the band is about 2 inches from the tree trunk. Use ½ to ¾ ounce for trees 3 to 6 years old, and 1 ounce or more for very large trees. As soon as the chemical has been applied, cover it carefully with several shovelfuls of dirt, making a cone-shaped mound around the tree trunk by packing the earth with the back of the shovel. The "poison" can be applied either in the fall or spring. The best results, with least injury, are secured when the soil temperature is about 60° F. These temperatures occur about April 15 and September 20. The paradichlorobenzine should not be applied to trees less than three years old.

SPRAY CALENDAR FOR CHERRIES

NO.	TIME OF APPLICATION	MATERIALS TO USE	PARASITES
1	Dormant season.	Lime-sulphur, 32° Baume, 12 gallons; add water to make 100 gallons of spray.	Scale
2	Immediately after petals fall.	Lime-sulphur, 32° Baume: *Sour Cherry*, 12 quarts and water to make 100 gallons of spray. *Sweet Cherry*, 10 quarts, and water to make 100 gallons of spray. Add 2 pounds powdered lead arsenate to each 100 gallons of solution.	Leaf spot Curculio
3	One week after No. 2.	Same as in No. 2.	Leaf spot Curculio
4	Three weeks after No. 3.	Same as in No. 2.	Leaf spot Curculio Brown rot
5	Immediately after fruit is harvested.	Same as in No. 2, but omit the lead arsenate.	Leaf spot

SPRAY CALENDAR FOR PLUMS

NO.	TIME OF APPLICATION	MATERIALS TO USE	PARASITES
1	Dormant season.	Lime-sulphur, 32° Baume, 12 gallons; add water to make 100 gallons of spray.	Scale and general clean-up
2	As soon as petals fall.	Lime-sulphur, 32° Baume, 12 quarts, and water to make 100 gallons of spray; add 2 pounds powdered lead arsenate to each 100 gallons of solution.	Curculio Leaf spot
3	One week after No. 2.	Same as in No. 2.	Curculio Leaf spot
4	Three weeks after No. 3.	Same as in No. 2.	Curculio Leaf spot
5	One month before fruit ripens.	Self-boiled lime and sulphur.	Brown rot and other fungous diseases

SPRAY CALENDAR FOR GRAPE

NO.	TIME OF APPLICATION	MATERIALS TO USE	PEST
1	Dormant season.	Lime-sulphur, 32° strength, diluted 1 to 8.	Scale and general clean-up
2	When second or third leaf shows.	Bordeaux 4-5-50. Add ½ pound resin fish oil soap.	Anthracnose Bitter rot Black rot Mildew
3	Before blossoms open.	Same.	Same
4	After blossoms fall.	Same.	Same
5	Ten to fourteen days later.	Same.	Same
	Then at 2-week intervals until within two weeks of harvest time.	Same.	Same

Lead arsenate, 2 pounds powder to each 50 gallons of solution, should be combined with Bordeaux if chewing insects make an appearance.

Burgundy mixture may be substituted for Bordeaux in the last spray in order to prevent discoloring of the fruit. The following formula is suggested:

Sodium carbonate (Sal soda)	1½ lbs.
Copper sulphate	1 lb.
Water	50 gals.

Prepare and apply same as *Bordeaux*.

SPRAY CALENDAR FOR RASPBERRIES AND BLACKBERRIES

NO.	TIME OF APPLICATION	MATERIALS TO USE	PEST
1[1]	In spring just after growth begins.	5½ gallons commercial lime-sulphur in 50 gals. water and ½ pound calcium caseinate.	Anthracnose
2	One week before bloom.	1 gallon commercial lime-sulphur in 50 gals. water and ½ pound calcium caseinate.	Anthracnose

[1]Spray No. 1 should be applied after growth begins but not after the leaves have reached ½ inch in length

Anthracnose causes cankers on the canes of the raspberry and blackberry. It is the most important disease of bush fruits in Virginia and can be effectively controlled by the application of two lime and sulphur sprays according to the accompanying calendar. The addition of a casein spreader at the rate of ½ pound to 50 gallons of spray material is necessary to secure control.

SPRAY CALENDAR FOR STRAWBERRY

NO.	TIME OF APPLICATION	MATERIALS TO USE	PEST
1	When growth begins.	Bordeaux mixture, 4-5-50 formula.	Leaf spot
2	Before blossoming.	Same.	Same
3	Just after blossoming.	Same.	Same
4	After leaves have been mowed and burned.	Bordeaux mixture plus 1 pound lead arsenate to each 50 gallons Bordeaux.	Leaf spot Flea beetle

Should leaf roller appear, or if it has been prevalent, add lead arsenate at rate recommended in No. 4 spray in each application.

METHODS OF PREPARING SPRAY MATERIAL

Every fruit grower should be familiar with the methods of preparing such spray materials as are used in his orchard. The following discussion indicates the methods of preparing and using spray materials with special emphasis on the use of certain insecticides, such as lead arsenate, nicotine sulphate, and oil emulsions.

Concentrated Lime-Sulphur

Two formulas are in general use. The first of these requires 50 pounds of lump lime, 100 pounds of sulphur, and 50 gallons of water. The second formula requires 62½ pounds of lump lime, 125 pounds of sulphur, and 50 gallons of water. The second formula will produce a concentrate with a higher test than the first. Both formulas are good.

Preparation. Slake the lime with 15 to 20 gallons of water in the container in which the boiling is to be done; add the sulphur and increase the amount of water to 50 gallons, and boil for one hour. Stir constantly and keep water up to 50 gallons. Strain the solution through a brass strainer as it is poured into barrels or reservoir. The container should be sealed tightly. Hydrated lime may be used instead of lump lime, but the amount used must be one-third more by weight than the lump lime.

Testing. Lime-sulphur concentrate should be tested only when it is cool. By using a Baume hydrometer, procurable at most hardware stores, the test can

be made and the figures recorded plainly on the head of the barrel. The standard strength of lime-sulphur concentrate is 32 degrees Baume. The Baume test is simply an indication of the specific gravity of the concentrate compared with that of water. It is necessary to know the test of every barrel of concentrate in order to determine the amount to be used for winter and summer spraying.

Dilution. Standard lime-sulphur concentrate is diluted at the rate of 1 part to 7.3 of water for winter spraying and 1 part to 40 for summer spraying. When the test is not standard, the rates of dilution are given in the dilution tables on page 11.

Caution: Lime-sulphur will not kill chewing insects and it will not control bitter rot of apples. It should not be used as a late summer spray on apples because it is liable to cause spray burn. Concentrated lime-sulphur should never be used on peaches during the growing season.

Bordeaux Mixture

Bordeaux mixture is the most effective fungicide for certain diseases, particularly apple blotch and bitter rot. It is commonly used as a mid-season spray for apples.

Two methods of preparing Bordeaux mixture are now in use. The new method of using powdered ingredients has certain advantages over the old one of using stock solutions. Both methods are described in the following paragraphs.

Instant Method of Preparing Bordeaux Mixture

Materials:

1. Finely powdered copper sulphate (bluestone). This material should be as fine in texture as a high grade of table salt, or fine granulated sugar.
2. Hydrated spray lime. A hydrated lime which is of such fineness that 98 or 99% of it will pass through a 300-mesh sieve; lime low in magnesium but carrying a very high content of active calcium oxide; a lime free from grit and coarse materials. Such lime is sometimes called chemical hydrated lime because it is used in the chemical industry. Agricultural, mason's and finishing limes are not satisfactory for use in preparing Bordeaux mixture. Hydrated spray lime does not refer to any particular brand of lime, but to hydrated lime which meets the requirements mentioned above as to fineness, calcium hydroxide content, freedom from grit and coarse particles, and contains less than 2% magnesium oxide.
3. Water.

Steps in making Bordeaux mixture on the basis of a 200-gallon spray tank:

1. Weigh out 4 lbs. powdered bluestone and 12 lbs. hydrated spray lime.
2. Fill spray tank one-fourth full of water.
3. Start the agitator (be sure agitator is working).
4. Add powdered bluestone by pouring in slowly or washing it through the strainer.
5. Add water until tank is three-fourths full (agitator running).
6. Add hydrated spray lime, either in dry form or as a thick paste.
7. Fill tank and allow engine to run a minute longer.

If arsenate of lead is used, it should be added last.

Vigorous agitation is essential. If the agitator is not functioning properly, spray the mixture back on itself through the use of the rod or gun.

Old Method Bordeaux Mixture

Bordeaux mixture is produced when dissolved copper sulphate (bluestone) and milk of lime are poured together. A chemical reaction takes place between them which results in the formation of a voluminous precipitate.

Formulas are generally designated by the proportion of materials used. For example: 2–4–100 formula =

Copper sulphate (blue stone)	2 lbs.
Calcium oxide (stone or quick lime)	4 lbs.
Water	100 gals.

When hydrated lime is used, about one-third more by weight than quicklime should be taken. The 2–4–100 formula then is as follows:

Copper sulphate (blue stone)	2 lbs.
Hydrated lime	6 lbs.
Water	100 gals.

Preparation According to Old Method. Dissolve 2 pounds of copper sulphate (bluestone) in an earthenware or wooden vessel. This is done by suspending the bluestone at the top of the vessel so that it is just covered with water, thus enabling the dissolved material to settle at the bottom of the container. Slake 4 pounds of lump lime in a separate vessel. Dilute each solution to 50 gallons and pour simultaneously into the spray tank.

In commercial operations it is customary to have large concentrate tanks in which 1 pound of bluestone has been dissolved in each gallon of water. In other words, a 50-gallon tank would contain 50 pounds of bluestone dissolved in 50 gallons of water. The lime is slaked so that each gallon of water contains 1 pound of lime. Both tanks are then placed side by side and the required number of pounds of each material is poured into the tank, using 1 gallon of each solution to represent 1 pound. The required amount of water is added to each tank and the solutions are then run through a common outlet into the spray tank. For a 200-gallon spray tank, 4 gallons of bluestone solution would be placed in one dilution tank and 8 gallons of the lime water in the other tank. Water should then be added until each tank contains 100 gallons, after which the contents of both tanks are emptied into the spray tank through a common opening as indicated above. For the successful use of this method, a gravity water system is necessary to fill the concentrate and the dilution tanks. The latter should be high enough to permit the solutions to flow by gravity into the spray tank.

A method in common use is to add the required amount of bluestone solution directly to the spray tank. After adding water, sufficient to fill the tank two-thirds full, the proper amount of the lime solution is added.

The formula given above results in what is known as 1–2–50 Bordeaux mixture.

Dilution. The 1–2–50 formula is used on apples, pears, and quinces unless otherwise specified. In the case of sprays for melons or special sprays for other fruits, the correct information may be secured by writing to the Extension Division at Blacksburg, Virginia, or to the Virginia Truck Experiment Station, Norfolk, Virginia.

Caution: Do not use Bordeaux mixture on peaches during the growing season. Whenever Bordeaux mixture is used in the early season for spraying apples, russetting and burning of the fruit is liable to follow. This spray should be used as a mid-summer spray. It is the most effective spray material known for the

control of bitter rot of apples. Never use agricultural lime in preparing Bordeaux mixture.

Dry Mix Sulphur Lime

The dry mix sulphur lime material has largely replaced self-boiled lime and sulphur as a peach fungicide in Virginia. The advantage of this material over self-boiled lime and sulphur is that it is more uniform in strength, gives equally as good control of diseases, and is cheaper and easier to prepare. There are two formulas given:

Formula No. 1

50 pounds of dusting sulphur.
42 pounds of hydrated lime.
8 pounds of powdered lignin pitch, known under such trade names as Goulac, Bindex powder, and Bandarene flour.

Formula No. 2

50 pounds of dusting sulphur.
46 pounds of hydrated lime.
4 pounds of calcium caseinate, known under the trade names, Kayso, Spracein, Adheso, Spreado, and Spray Spread.

The preparation of the above formulas is the same, with the exception of the difference in the amount of ingredients used. In preparing either formula, the ingredients should be thoroughly mixed and screened through a 14– to 16–mesh screen. Another important feature which should not be overlooked is the necessity of using the very best grade of hydrated lime available in making dry mix.

In the preparation of Formula No. 1, powdered lignin pitch (Goulac, Bindex, or Bandarene flour) is used as the wetting and sticking agent. In Formula No. 2, calcium caseinate (Kayso or Spracein) is used for that purpose. There are some advantages in using Formula No. 1, since it is cheaper to prepare, stays in suspension better, and is easier to wet into a paste form than Formula No. 2. Formula No. 2, however, makes a good dry mix. The sticking qualities of any dry mix depends largely upon the quality of the ingredients used in its preparation and the thoroughness with which they are mixed. Either a dust mixer or a barrel mixer may be used to mix the ingredients. They may also be mixed in a box with a hoe, but this method is not entirely satisfactory.

Rate of Dilution. Dry mix, either formula, should be diluted at the rate of 8 pounds to 50 gallons of water, or 32 pounds to 200 gallons, when used as a peach fungicide. When dry mix is used as an apple spray, it should be used at the rate of 10 pounds to each 50 gallons of water, or 40 pounds to 200 gallons.

How to Dilute. The proper amount of the dry mix material should be placed in a water-tight barrel and sufficient water added to produce a thin paste after thorough stirring with a paddle. The paste is then poured through the strainer into the tank, which should be from one-half to two-thirds full of water, after which it is filled. The tank agitator should be running. Lead arsenate is added in the usual manner.

Cautions: Do not place dry mix at the bottom of the tank and then add water. Do not dilute dry mix unless it has been thoroughly mixed and sieved. Use a good grade of dusting sulphur only, and the best grade of hydrated lime available. When spraying peaches, use 8 pounds of dry mix to 50 gallons of water; but when spraying apples, use 10 pounds to 50 gallons of water.

Zinc-Lime Spray

The zinc-lime spray is a new material introduced as a control measure for bacteriosis and for the checking of arsenic injury to peach foliage, twigs, and fruit. As a control measure for bacteriosis, 5 to 7 applications are necessary. When bacteriosis is not a problem, the zinc-lime material should be used in the lead arsenate application only, or as indicated by Spray Service. This material may be combined with the common peach fungicides, such as calcium sulphide; dry mix, either formula; and self-boiled lime and sulphur.

Formulae for Zinc-Lime Spray

A	Zinc sulphate (crystal form)	8 pounds
	Hydrated lime	8 pounds
	Water	100 gallons
B	Zinc sulphate (mono-hydrate form)	5 pounds
	Hydrated lime	8 pounds
	Water	100 gallons

Preparation of Zinc-Lime Spray. Fill the spray tank about two-thirds full of water and start the agitator. Then slowly add the zinc sulphate and continue the agitation until the zinc sulphate has dissolved. Mix the hydrated lime into a thin paste with water and wash it in through the tank strainer. Continue the agitation until the zinc sulphate and lime are thoroughly mixed. This will only take a few minutes.

If a fungicide, such as calcium sulphide, dry mix, or self-boiled lime and sulphur, is to be used in combination with the zinc-lime material, it should be added last, and only after the zinc-lime material has been thoroughly agitated.

When lead arsenate is used with zinc-lime spray, either alone or in combination with a fungicide, it should be made into a thin paste and poured into the tank through the tank strainer while the agitator is running.

These combination sprays should be used as soon as prepared.

Self-Boiled Lime and Sulphur

This fungicide has been in common use to control scab and brown rot of peaches. It is a summer spray for peaches.

Preparation. Place 8 pounds of stone lime in a vessel and slake with hot water. As soon as slaking begins, add 8 pounds of flowers of sulphur made up into a thin watery paste. Stir vigorously and add water to prevent burning. Cool immediately by adding water after slaking ceases, which may require from 5 to 25 minutes, depending upon the quality and condition of the lime.

Dilution. The product resulting from the formula given above should be diluted to 50 gallons for use. In commercial orchards, 200 gallons of the mixture are prepared at one time. To produce this amount, it is necessary to use 32 pounds of stone lime and 32 pounds of sulphur.

Caution: Self-boiled lime and sulphur cannot be stored, therefore, it is necessary to prepare it freshly every time it is used. It should be properly diluted before adding lead arsenate in combination sprays.

Dry Lime-Sulphur

Dry lime-sulphur is a substitute for liquid lime-sulphur. It is made by removing the water from liquid lime-sulphur. The usual amounts recommended by manufacturers are about as follows:

1. For scale in the dormant or delayed dormant period of the tree, use 12 to 15 lbs. of dry lime-sulphur in 50 gallons of water, or 9 to 11 tablespoonfuls in one gallon of water.

2. For summer sprays, use 3 to 4 pounds of dry lime-sulphur in 50 gallons of water, or 2½ to 3 tablespoonfuls in one gallon of water.

Note: Dry lime-sulphur may be used on all plants and trees that can be sprayed with liquid lime-sulphur. It should not be used on peach trees after the dormant period of the tree. For best results in controlling scale, dry lime-sulphur should be used at strength comparable to that of liquid lime-sulphur, in which case it takes approximately 4 pounds of dry lime-sulphur to equal one gallon of liquid lime-sulphur. Our spraying recommendations for the dormant period call for 12 gallons of liquid lime-sulphur 32° Baume to make 100 gallons of spray. To get comparable strength with the dry lime-sulphur we should use 48 pounds of the dry lime-sulphur to make 100 gallons of spray in the dormant applications.

Caution: Dry lime-sulphur is entirely different from dry mix sulphur lime. Buy dry lime-sulphur from reliable manufacturers only.

Calcium Sulphide

Calcium sulphide has been used as a summer fungicide for both apples and peaches. It should not be substituted for lime sulphur in the pink and petal-fall applications on varieties of apples which are very susceptible to apple scab. The material may be used, however, with good success in the cover sprays following the use of lime sulphur on all varieties. The amount generally used for spraying apples is 12½ pounds for each 100 gallons of water. If spraying varieties which are susceptible to scab, this amount should be increased to 16 pounds for each 100 gallons of water.

Calcium sulphide is a very effective summer spray for peaches. It may be used in conjunction with the zinc lime spray (zinc Bordeaux) and lead arsenate. When using calcium sulphide with the zinc lime spray, add the calcium sulphide after the zinc sulphate and hydrated lime have been thoroughly mixed in the spray tank. Twelve and one half (12½) pounds for each 100 gallons of water is sufficient when spraying peaches for scab and brown rot control.

Wettable Sulphur

The term "wettable" sulphur includes the sulphur-lime dry mix as discussed on page 20, also a number of proprietary sulphur preparations sold under various trade names. These preparations usually contain free sulphur in a fine form, a wetting agent, and sometimes hydrated lime or a certain amount of inert material. Several of these wettable sulphurs have been used in Virginia with varying results. At present, however, flotation sulphur seems to be the most promising one in the group.

Flotation Sulphur

Flotation sulphur is produced as a by-product in the purification of manufactured gas. The original sulphur paste material is washed free of soluble impurities and the resulting product is a very effective fungicide, and low in cost. The material can be purchased either as a paste, or in a dry-wettable form. The dry form is produced from the paste and is more convenient to use. The dry form is perhaps a little, althought not considerably, less efficient as a fungicide.

The paste contains approximately fifty percent sulphur, which fact should be kept in mind when comparing prices, or in calculating the amount to use. Flotation sulphur is one of the most all-around satisfactory wettable sulphur preparations, both from the standpoint of fungicidal efficiency and safety.

Cop-O-Sil

Cop-O-Sil is a new proprietary preparation which contains copper as the fungicidal agent. This material is sold in the form of a thin paste. It is recommended as a substitute for either lime-sulphur or Bordeaux. Cop-O-Sil has been used more extensively in New Jersey than elsewhere, and has apparently given promising results under New Jersey conditions. This material is said to be less caustic than lime-sulphur, and has a further advantage in that it can be used with the summer oils where such are used as an aid in the control of the codling moth. Sulphur-containing materials cannot be used in this manner without risk of serious injury. Cop-O-Sil should be used with lime. Tests of the material in Virginia have not been sufficiently extensive as yet to establish definitely the value of the material in this State.

Lead Arsenate

Lead arsenate is the most commonly used internal insecticide. It kills such chewing insects as codling moth, curculio, and leaf roller. It is used either in the powder or paste form. The powder form is in most general use and is recommended.

Dilution (very important). Lead arsenate is prepared for spraying by adding 1½ pounds of the powder or 3 pounds of the paste to 50 gallons of the spray material, such as lime-sulphur or Bordeaux.

When combining lead arsenate and lime-sulphur add the materials to the spray tank in the following order:

1. Pour in the required amount of lime-sulphur.
2. To reduce arsenical injury it is advisable to add 6 pounds of hydrated lime for each 100 gallons of spray.
3. Add the required amount of lead arsenate. Do not add the lead arsenate until the tank is full of water and you are ready to drive out to spray.

It is advisable to make a thin paste of the lime and also of the lead arsenate by adding a sufficient amount of water to each of these materials in a bucket. Stir well and then pour into the spray tank. Never pour anything into the spray tank without running it through the screen.

Freshly slaked lime can be used in place of the hydrated lime and in the same quantity.

Caution: When spraying peaches with lead arsenate and water, the amounts of zinc-lime recommended on page 21 must always be added to prevent burning. Furthermore, lead arsenate is a deadly poison and must be kept away from children and farm animals.

Nicotine Sprays

Nicotine in the form of nicotine sulphate is the most effective contact insecticide known for such sucking insects as aphids and red bugs. It is not advisable to prepare home-made nicotine preparations for a commercial orchard.

Dilution. Add 1 pint of nicotine sulphate to every 100 gallons of spray material.

Caution: Rosy aphids appear in largest numbers at the time of the green tip stage of the buds. In order to kill these insects it is necessary to cover them with the nicotine solution. It is apparent from this fact that thorough spraying is necessary to control aphids. Young apple trees and other plants infested with aphids should also be sprayed. Nicotine sulphate is a deadly poison and must not be left where livestock can get at it.

The addition of nicotine sulphate in the delayed dormant spray is largely governed by local conditions. If aphids are not present at the time set for this spray, nicotine should be omitted. This condition must be determined by observations of the grower in his own orchard.

Tar Oil (Coal Tar Creosote) for Aphis Control

Tar oil is a product of the distillation of coal tar and is very effective against aphis eggs when applied in the dormant period. From 2½ to 3 gallons of actual tar oil in 100 gallons of spray are required for satisfactory control of the rosy aphis under Virginia conditions. The spray must be applied in the dormant period and not in the delayed dormant period. Tar oil in the delayed dormant spray kills buds.

At present it is not practical to make home-made tar oil emulsion, because the tar oil does not emulsify as easily as petroleum oil. It is advisable, therefore, to purchase a prepared tar oil emulsion. If interested only in aphis control in the dormant spray, tar oil emulsion can be used alone. If interested in control of scale insects and red mite as well as aphis in the dormant spray, it will be necessary to use petroleum oil (3%) along with the tar oil.

There are many grades of tar oil but experience has shown that only certain tar oils are satisfactory insecticides. Technical specifications of a tar oil suitable for spraying fruit trees are as follows: the oil should be within the distillation range of 225° C to 400° C, and it should be crystal free at 5° C. Some of the more satisfactory tar oils used in Virginia during the last few years begin boiling around 240° to 245° C and about 65% is off at 355° to 360° C. In every instance the tar acid content should be very low, 10% or less.

Tar oil irritates the skin and eyes if not protected while spraying. An application of grease or vaseline before starting to spray will give much protection to the skin. If burning occurs from the use of tar oil, wash the face and hands thoroughly with soap and water, then bathe with rubbing alcohol or a weak solution of borax water.

OIL SPRAYS

Oil sprays are used for scale and red mite control and not for the control of the rosy aphis.

Cresylic Acid

Cresylic acid is intended to control aphids and is used most effectively about the time the eggs are hatching, or are ready to hatch. It is compatible with oil emulsions or Bordeaux mixture but not with lime-sulphur. After diluting the oil emulsion in the spray tank and with the agitator running, pour in cresylic acid at the rate of one-half gallon per 100 gallons of spray mixture. ***When the first leaves are one-half inch long, cresylic acid will injure buds and should not be used.*** Spraying should be completed by the time the first leaves are about one-fourth inch long, and to do this, spraying should begin when the first buds show

signs of breaking dormancy. Cresylic acid is heavier than water and sinks to the bottom of the tank when the agitator stops. For this reason, the agitator should run a couple of minutes before starting to spray. Greasing the face and exposed skin will prevent the biting effect sometimes experienced in spraying with cresylic acid or tar oil sprays.

Lubricating Oil Emulsions

Lubricating or engine oil emulsions are made in a number of different ways. Two methods are given.

Cold Mix Oil Emulsion

Materials needed: 1. Lubricating oil, commonly known as engine oil. The following brands have been used successfully: Nabob, Diamond Paraffin, Junior Red Engine Oil, Atlantic Red Engine Oil, and Lybra.

2. Emulsifier. One of the following: Lignin pitch, or calcium caseinate.

3. Water.

Lignin pitch (waste sulphite material) occurs as a brown powder, and also as a dark syrup-like liquid. The essential constituents of the two forms of lignin pitch are the same. This material is sold under the following trade names: Goulac (powder), Glutrin (liquid), Bindex powder, Bindex liquid, Bandarene flour, and Bandarene liquid. This material may be obtained through your spray dealer. The lignin pitch material in either form is the best and cheapest emulsifier available at present for making the cold mix oil emulsions.

Calcium caseinate is sold under the following trade names: Kayso, Spracein, Adheso, Spreado, and Spray Spread.

Mix the materials in the following proportions:

Formula A

Engine oil	2 gallons	50 gallons	54 gallons
Water	1 gallon	25 gallons	27 gallons
Powdered lignin pitch or calcium caseinate	4 ounces	6 pounds	6 1/4 lbs.

Formula B

Engine oil	2 gallons	50 gallons	54 gallons
Water	1 gallon	25 gallons	27 gallons
Liquid lignin pitch	6 fl.oz.(3/8 pt.)	1 1/8 gals.	1 1/4 gals.

Steps in Making the Stock Emulsion

1. Run the required amount of water into the spray tank or other container in which the emulsion is to be mixed.

2. When lignin pitch is used, add it directly to the water in the tank, since it goes into solution very readily. When calcium caseinate is used, it must be worked up in water to a smooth paste in a bucket or tub. Add the paste to the water in the spray tank.

3. Start agitation and mix the emulsifier thoroughly with the water in the tank.

4. Start the pump and begin adding the oil gradually, pumping the mixture back on itself in the tank. The oil should be slowly added with continued pumping until all of it is added. Continue pumping the mixture back on itself in

the tank, maintaining from 200 to 300 pounds pressure, until the mixture has passed through the nozzles at least twice. When the stock emulsion is completed, it will appear creamy and there will be no oil scum on its surface. Pump or run the stock emulsion into barrels or tubs for storing. The stock emulsion should be thoroughly stirred each time before any is taken out for dilution into spray strengths.

Amount of stock emulsion to use: Use 4½ gallons of the stock emulsion in making 100 gallons of spray solution. This makes a 3 percent oil spray. It is advisable to add the stock emulsion to the spray tank while the tank is being filled, rather than to wait until the tank is almost full.

Cautions in making stock emulsions: 1. Follow the order of adding the materials as outlined above. Never reverse the order by adding oil, then the emulsifier, and lastly the water.

2. Never add the emulsifier to the oil but always to the water.

3. Never use lumpy calcium caseinate. Calcium caseinate carried over winter usually does not make a good emulsion. Always use fresh calcium caseinate.

4. If a stock emulsion has been kept long enough for the oil to begin separating, it should be re-emulsified. This is done by pumping the material back on itself in the tank as was done in making the original emulsion.

Tank-Mix Method of Making Oil Emulsion

If the Bordeaux-oil combination is being used as a dormant spray for peach trees, the tank mix method of making the oil emulsion may be used. Fill the tank about one-fourth full of water and prepare the Bordeaux in this water. Start the agitator, add the required amount of oil. Pump the mixture until the oil is emulsified. The Bordeaux mixture acts as the emulsifier.

Steps in making oil emulsion by the tank-mix method.

1. Fill the tank about one-fourth full of water, or until the agitator is covered.
2. Start the agitator, add required amount of emulsifier.
3. Pour in the required amount of oil.
4. Pump mixture through nozzles back into spray tank until mixture is emulsified.
5. Fill the tank with water. It is advisable to keep the agitator running while going from the place of filling to the place of spraying.

Proportions Required for Emulsifying Enough Oil for One Tank of Diluted Oil Spray

	TANK OF			
	100 gals.	200 gals.	300 gals.	400 gals.
Water	One-fourth full	Agitator covered	Agitator covered	Agitator covered
Emulsifier:				
Powdered lignin pitch or casein	6 oz.	12 oz.	1 1/2 lbs.	1½ lbs.
(or)				
Liquid lignin pitch	½ pint	1 pint	1½ pints	2 pints
Oil	3 gals.	6 gals.	9 gals.	12 gals.

The same pressure may be used as in spraying, and it is not necessary to change nozzle discs in order to emulsify each tank of spray.

SOAP WASHES

Soap washes are effective for killing aphids and soft-bodied larvae of other insects. Fish oil, or fish oil soap, is generally used when large quantities are required. The commonly used formula is 1 pound of soap to 6 or 7 gallons of water.

Caution: Soap washes should not be used in combination with Bordeaux mixture and lime-sulphur preparations.

SUMMER OILS IN APPLE ORCHARDS

Some years ago apple growers in the Western States began to test out various petroleum oils in combination with arsenate of lead for the control of the codling moth. Summer oil was also used in combination with nicotine. As a result of these tests, it was found that the use of oil in the summer time not only increased the effectiveness of the arsenate of lead in killing the newly hatched worms, but also had the direct effect of destroying large numbers of codling moth eggs before these eggs hatched. Before the residue situation developed the use of summer oils became a rather general practice in many sections of the West. The oils have been tested out in the East to some extent, and it has been found that whenever the application of summer oil follows a lime sulphur spray serious injury to the foliage is likely to result. The presence of the oil film on the apple greatly increases the difficulty of removing the spray residue. *The fruit grower should bear in mind that wherever oil is combined with arsenate of lead in our Virginia program, it will probably be necessary in order to remove the residue to use wetting agents and to heat the solution.*

RODENT CONTROI.

To the fruit grower who has cared for his orchards and grown them to the age of profitable bearing, it is most discouraging to see his trees die and go out because of injury from mice. Yet thousands of valuable trees, both young and mature, are killed in this way in Virginia orchards every year. The loss amounts to hundreds of thousands of dollars annually. In numbers the mice are increasing rapidly from year to year. Injury in the orchards is mounting each year. To cut down this injury and loss as much as possible, growers should adopt a regular program of mouse control in their orchards.

Injury from Mice

The two groups of mice which are responsible for most of the injury to fruit trees are the so-called meadow or field mice and the pine or short tail mice.

Meadow mice construct tunnels above ground in the grass and wild growth, and by their feeling habit injure the trees above the ground. The injury consists of removal of the bark from a point just below the surface to a height of several inches above the ground.

Pine mice are burrowing animals constructing underground tunnels or using runways made by ground moles. They live and feed largely under ground. Pine mice feed to some extent outside their burrows, reaching the surface through the openings in the roof of the tunnels which permits the use of poison as a control measure. Generally speaking, the injury from pine mice is below the surface of the ground and consists of eating the roots or gnawing the bark from the roots

and lower parts of the crown. The true extent of the injury can only be found by removing the soil from about the tree and exposing the trunk and roots below the surface.

Control Measures

Control measures that destroy one group of mice can also be used against the other.

Cultivation and the destruction of grass and wild growth and other trash about the base of the tree, along fences, and other places of shelter afford some control.

Running hogs in the orchard also aids greatly in keeping down these pests. While cultivation and running hogs in the orchard are very important in reducing the damage done by mice, no insurance against mouse damage is so reliable as complete extermination of the mice. The use of poison bait has proved very effective for this purpose.

Poison Baits

Poison baits are prepared according to several formulas, two of these are given here.

Sweet Potato Formula:

Cut three (3) quarts of sweet potatoes into half inch cubes and place in a metal pan. Mix one-eighth (⅛) ounce of powdered strychnine sulphate and one-eighth (⅛) ounce of baking soda together, and with a pepper box sift this slowly over the freshly cut sweet potatoes, stirring the potatoes constantly so that the poison will be distributed evenly over the bait. This bait should be used while fresh. The poison should be distributed systematically between rows as well as under the trees, especially under and close to the tree trunks, dropping the bait frequently into the mouse tunnels through the natural openings or through holes made with a sharpened stick.

Glazed Wheat Formula:

Dissolve ½ ounce of strychnine sulphate in 1¾ pints of boiling water, add 4 pounds of white sugar and dissolve. Stir constantly while dissolving sugar. When dissolved, add 1 gallon of wheat and cook for 15 minutes, stirring constantly to prevent burning and to coat each grain with the poisoned sugar. Remove from the stove and stir every 10 or 20 minutes while the grain is cooling. Stir oftener if weather is cold. This is done to separate the grains and glaze them. If the mixture should be sirupy when cooled, return to stove and cook until the desired glaze is secured.

The grain should be placed in a container, one container under each tree. Keep close to trunk of tree and have opening slanting down hill to avoid flooding with water.

Starch Coated Grain Bait:

1 tablespoonful gloss starch
1 oz. powdered strychnine
1 oz. baking soda
¼ pt. heavy corn syrup
1 tablespoonful glycerine
12 qts. wheat or 20 qts. steam crushed white oats

Mix the 1 tablespoonful of gloss starch in ½ teacupful of cold water, stir into ½ pint of boiling water to make it a thin clear paste. Mix 1 ounce of powdered strychnine with 1 ounce of powdered bicarbonate of soda and stir the mixture into

the hot starch to a smooth creamy mass free from lumps. Stir in ¼ pint of heavy corn syrup and 1 tablespoonful of glycerine. Apply to 12 quarts of wheat or to 20 quarts of steam crushed whole oats and mix thoroughly to coat each kernel. Allow the bait to stand over night before using in order that the grain may absorb the poison.

Teaspoonful quantities of the poisoned bait should be placed in poison stations, well distributed over the infested area. The poisoned bait may also be placed within the entrance of the burrows or through openings into the tunnels made with a stick, a teaspoonful in a place.

Caution: All poison containers and all utensils used in the preparation of poisons should be kept plainly labeled and out of reach of children, irresponsible persons and livestock.

Poison Stations

Poison stations are used to make poison bait readily accessible to mice without exposing it to the weather. A wooden poison station which has given good re-

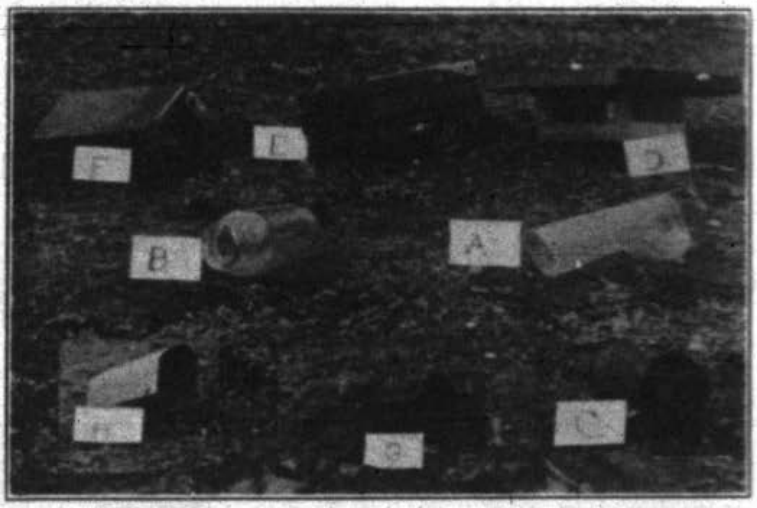


Fig. 1. Types of poison stations used in distributing poison bait in mice infested orchards.

sults may be constructed as directed below (Fig. 1, D). Square pieces of 1 by 8 inch boards are cut for the tops and 1 by 6 inch boards for the bottoms, two side walls are cut from 1 by 1½ inch strips into 6 inch lengths. The whole is fastened together with four nails. Another type of home made station may be constructed from pieces of wood and old pieces of tin as shown in figure 1, G, H.

Drain tiles of 1½ inch diameter or larger serve fairly well as poison stations (Fig. 1, E). Tile stations absorb moisture rather freely in damp places which results in moldy baits. Fig. 1, A, shows a poison container made of glass which is used by the fruit growers in different fruit sections. This container allows the mice free access yet prevents rain from getting in and the bait from spilling out.

Wide-mouth bottles (Fig. 1, B) and glass jars may be used, as may tin cans, though the latter are less effective than wooden, glass or tile containers.

When Poison Bait Should Be Put Out

The first application of poison bait should be put out in late fall, a second one during the winter, and a third one in the spring. If poison stations are used the stations should be examined from time to time and refilled as required. The poison stations should be on high ground to avoid standing water and so placed that there will be a circulation of air to aid in keeping the bait dry and in good condition. Under conditions of a moderate infestation, one station to a tree should be sufficient. It should be placed close to the base of the tree to escape orchard machinery, and should be covered lightly with vegetation, prunings, or other material that will afford shelter for the mice. When the infestation is heavy, the number of stations may be increased.

Note: Through a co-operative project between the United States Department of Agriculture and the Horticultural Department at Blacksburg, Virginia, growers may purchase steam crushed whole oat poison bait at cost. The cost of this bait is 6½ cents a pound f. o. b. the Federal Mixing Plant at McGammon, Idaho. The minimum amount which will be sent to any one shipping point is 100 pounds. The purchase price of the bait must be sent with the order. Checks should be made out to the Poison Bait Fund.

Protection Against Rabbits

In young orchards where there is danger that trees may be damaged by rabbits, protection best takes the form of some material wrapped about the base of the trees. Tar paper is effective but should be removed each spring as injury to the bark will result if allowed to remain.

Newspapers and building paper are effective.

The most satisfactory material is hardware cloth with from two to four meshes per inch. It can be purchased in rolls 36 inches wide. The roll may be cut in two at the center, making each strip 18 inches wide. These strips are cut into pieces at 14-inch intervals so that pieces 14 x 18 inches are obtained. Roll and bend the strip about the trunk of the tree in such a manner that the long way is up and down the trunk, and that the edges overlap well. Push the lower edges well down into the soil; twist a small wire loosely about the center.

Repellent washes may also be used to good advantage. A wash of ordinary whitewash applied with a bush to the tree trunks has given good results in some cases. Rubbing the trunk with a piece of fresh liver has also given good results. A repellent wash recommended by the United States Department of Agriculture is:

Fish oil	½
Concentrated lime-sulphur	½
Water	½

Mix the materials thoroughly and paint the tree from the ground well up into the scaffold limbs.

Sulphurated Oil

"Sulphurated oil," made by adding sulphur to heated linseed oil, has been found to be an excellent repellent for rabbits by R. B. Harvey of St. Paul, Minnesota.

Sulphurated Oil. Heat raw linseed oil until it is smoking hot (about 270° C.). Remove from fire and add sulphur *slowly* and *carefully* until 10% by weight, of sulphur has been added.

Dilute with water or turpentine and spray on trees with oil sprayer.

Caution: Remove the heated oil from the fire before adding the sulphur. Be sure to stir in the sulphur very slowly.

BRIDGE-GRAFTING

There are few fruit growers who have not suffered loss because of the girdling of their trees by mice and other rodents. Girdled trees may be saved by bridge-grafting. A bridge graft is made by using scions to connect the two portions of the bark of a stock which have been separated by an injury. The best time to do bridge-grafting is in the spring after the bark begins to slip; about the time the buds are swelling.

Equipment

Equipment needed for bridge-grafting is a sharp knife, a hammer, small wire nails (cigar box nails), grafting wax, spade, pruning shears, and large well matured scions.

Scions

Scions the thickness of a common lead pencil are preferred. They should be taken from the previous season's growth. Water sprouts make good scion wood if the buds are well developed and the wood is well matured. Scions may be cut any time while they are dormant and buried in moist sand, sawdust, or soil, until needed. If placed on top of the ice in an icehouse and properly covered, they will keep well. It is very essential that the scions be kept dormant until they are set.

Scions should be long enough to bridge the girdled or wounded area and overlap three to four inches on sound tissue above and below the wounded area.

Types of Bridge-Grafting Used

Common Bridge-Grafting Method:

The simplest and, where it is feasible, the most easily made union, involves an L-shaped cut in the bark. Below the wound the L is inverted. Each arm of the L is about one and one-half inches in length and each cut an inch or two from the edge of the wound. The scion is beveled at either end, principally on the side destined to be set against the tree; the other end is beveled sufficiently to give a rather sharp angle to the wedge. The bark in the angle of the L cut is raised sufficiently to admit the scion, which is then inserted and the small wire nails driven through the bark and the scion. Nailing is necessary because it is very difficulty to bend the bark back sufficiently to set the nail directly into the scion without injury to the bark and because of this there is a tendency for the bark to shrink wherever it is cut vertically and its great tension relieved. This union is best suited to trees with thin or only moderately thick bark. Scions should be set right end up, that is, as they grew on the tree. One scion for each two inches in the circumference of the tree will be sufficient. After the scions are in place the area about the ends of the scions should be carefully waxed to prevent drying out, and to exclude air and moisture.

Inlay Method of Bridge-Grafting:

For trees with thick bark, or for cases where scions are set into the roots, the inlay graft is preferable. In operation, the scion is cut at ends to a long, flat,

shallow bevel, two to four inches on the inner side, and ends are cut square instead of to a wedge shape. About one-third to one-half of the wood is removed in making the bevel. The scion is laid across the area to be bridged, making any necessary allowance for bending scion, and the outline is lifted out and the scion inserted and fastened in place with small cigar box nails, using care to have the cambium of the scion in firm contact with the cambium of the stock at one side at least and preferably on both sides and end. When the scions are placed and fastened after this fashion, the ends of the scions and wound are covered with wax. When brush wax is used, it is best to insure prevention of injury to the cambium from the hot wax by placing a small amount of hand wax about the union of stock and scion, which will not injure growth and which prevents the hot wax from flowing into direct contact with fresh cuts. To prevent splitting of the scion, holes may be made in the scion by the use of a small automatic drill or gimlet.

Approach Grafting:

Where trees have had their roots so badly injured that scions can not be readily attached to them, small seedling or nursery trees three to six feet in height are planted at the base of such trees and the tops grafted into the tissues above the wound according to one of the above mentioned methods.

Grafting Waxes

Both hand wax and brush wax are used in bridge grafting. Hand wax is applied with the hands and brush wax with a brush while hot. Brush wax is easier to apply and is most satisfactory.

Formula for hand wax:

Resin	4 lbs.
Beeswax	2 lbs.
Tallow	1 lb.

The resin is melted first, then the beeswax is put in, and, when this has melted, the tallow is added. As soon as the tallow lumps have disappeared, the mixture is poured into cold water. When cool enough to handle, pull with the hands until the wax is a pale amber color. The pulling gives the wax texture and toughness. This wax is applied when pliable with the hands. In cold weather the wax requires considerable working unless it is kept in warm water. The hands must be greased in order to keep the wax from sticking.

Formula for brush wax:

Resin	5 lbs.
Beeswax	1 lb.
Powdered charcoal	½ lb.
Raw linseed oil	¼ lb.

The resin is melted, the beeswax added and melted, the linseed oil added, the mixture removed from the fire and the charcoal stirred in a little at a time to avoid boiling over. As soon as the cooking is completed, the wax may be cooled somewhat and used at once. The wax is applied with a brush while hot.

The use of brush wax necessitates the use of equipment to melt the wax for field use. Such equipment may be purchased, but a very convenient outfit may be made at home from a 5 gallon oil can. The top of the can is cut out and a pan is used in its place that will nest in, but will not drop through. This pan is used as a container for the wax. One side of the can is cut horizontally across at the bottom and up the sides from the horizontal cut to midway up the sides.

This flap is then pulled up to admit the entrance of a flat oil lamp, which is used to heat the wax. The flap may be pulled down partially to protect the flame from the wind. The flame can be raised or lowered to regulate the heat. (See Fig. 2.)

Wound Dressings

A wound dressing should possess the following properties: It must check the weathering of the wound; must prevent growth of bacteria and fungi; should also be of such a nature as not to injure the cambium and bark. The ideal dressing is a protective compound and an antiseptic. It does not hasten the healing process except as it prevents decay.

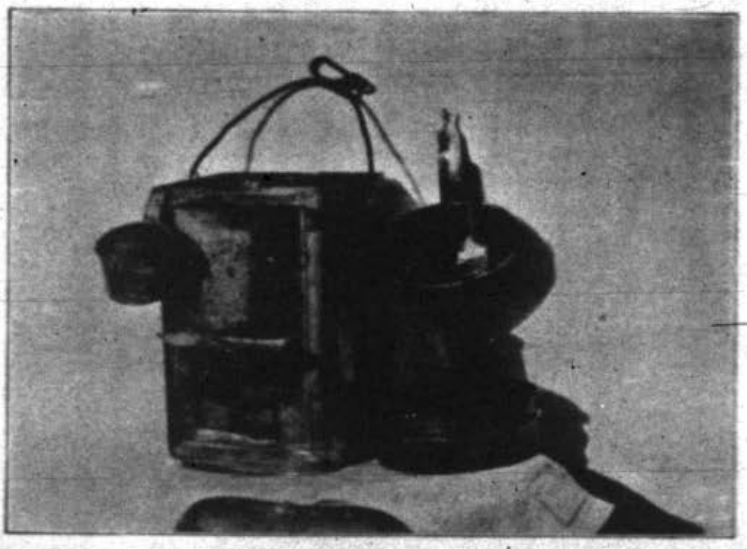


Fig. 2. Home-made apparatus for melting brush wax. Small pan on left was used as a container for hand wax.

Most coverings for pruning wounds tend to injure the cambium and delay callus formation around the wound. Bordeaux mixture paste and white lead make good dressings for pruning wounds on apple trees. Bordeaux mixture paste does not stick for any great length of time. White lead thinned with linseed oil to a thick paste makes a good all-around dressing for common pruning wounds. It does not cause injury.

Paraffin Asphaltum Dressing:

Asphaltum	8 parts (by weight)
Paraffin	2 parts (by weight)

This preparation has no harmful effects on the tissues and is a very durable covering.

Common grafting wax may also be used as a wound dressing without injury to the tissues.