THE 4-H TOMATO CLUB

4-H CLUB CIRCULAR 39

COLUMBIA, MISSOURI FEBRUARY, 1931

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
UNIVERSITY OF MISSOURI COLLEGE OF AGRICULTURE AND THE UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING
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Distributed in furtherance of the Acts of Congress of May 8, and June 30, 1914

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THE 4-H TOMATO CLUB PROJECT

Object.—The object of the tomato club is to organize boys and girls into groups for the purpose of instructing the members in the most profitable methods of tomato growing under local conditions, to demonstrate to the community the value of certain improved practices and methods; and to train the members in leadership.

Work Required.—Each club member is required to produce economically as great a yield as possible from 100 or more plants, using the best cultural methods, which include the use of good seed, growing strong healthy plants by transplanting, spraying the plant bed, use of fertilizer, early planting, thorough cultivation, field selection of seed, careful harvesting and handling, and judging and identification of the varieties best adapted to Missouri.

Records Required.—Each club member is required to keep an accurate account of all operations, expenses and receipts, and to write a story in a record book provided by the Extension Service of the Missouri College of Agriculture.

Ownership Required.—Each club member is required to own the crop and to be responsible for the demonstration field, to buy plants (or to grow plants from seed), and to provide fertilizer, spray materials, and any tools necessary for cultivating the crop.

Time Required.—Time for attendance at six or more club meetings.
Time for a one-half day club tour.
Time for one day for a county show, if one is held.
Time for attendance at a public achievement program at the close of the year's work.

Organization.—The tomato club should be organized in February so that a hot bed can be made in March. The work should close by October.

INTRODUCTION

Tomatoes are a very important cash crop for the commercial gardener and one of the most profitable and dependable for home use, for they supply fresh fruit during the bearing season and canned fruit for winter use. By proper methods, good yields can be obtained in all parts of the state by 4-H club members.

*This circular was prepared by J. W. C. Anderson, Extension Specialist in Horticulture, in collaboration with T. T. Martin, State Club Agent.

I. Organization of a Standard 4-H Tomato Club

A standard 4-H tomato club is composed of a group of five or more boys and girls from the same community between the ages of ten and twenty-one years who are working upon the same club project under the direction of a local club leader.

Meetings.—Standard 4-H clubs are required to hold at least six regular meetings during the club year. These meetings may be held as often as the local club leader and members desire; however, the meetings usually are held once each month.

Below are subjects suggested for a number of club meetings. It may be necessary to devote two or more meetings to some of the subjects. It is suggested that these subjects be followed in the order named. *Local club leaders and clubs are expected to adapt these subjects to local community conditions.*

SUGGESTED MEETINGS FOR 4-H TOMATO CLUBS

I. **Organization of the Club**—(See Club Secretary's Record Book.)

1. The business meeting.—The local club leader in charge.
   (1). Explanation of the duties and responsibilities of the club officers and members.
   (2). Election of club officers from the membership of the club: President, Vice-President, Secretary, Song and Yell Leader, and Reporter.
   (3) Selection of a name for the club. (It is suggested that the name be selected so as to identify the club and the project.)
   (4). Selection of a time and place for regular club meetings.
   (5). Appointment of a committee to work up or select an appropriate song and yell for the club.
   (6). Adjournment of the business meeting for instructions in club work
2. Instructions.—The local club leader in charge.
   (1). Distribution of club literature and explanation of its use. (Club circulars, Record Books, Club Secretary's Record Book, Club Song Book, and Recreational Activities for 4-H Clubs.)
   (2). Explanation of standard 4-H club requirements.—(See Club Secretary's Record Book.)
   (3) Explanation of the project requirements for the 4-H Tomato Club. (See this club circular, page 3;.
   (4). Setting club goals, as:
      a. Every member will try to produce at the rate of 10 tons of tomatoes per acre.
      b. Every member will complete club work and make an exhibit.
      c. Every member will try for a place on the demonstration and judging teams.
      d.

(5). Discussion of the main club event for the year, as:
   a. The tomato club tour.
   b. The 4-H club camp.
   c. The local achievement club program or round-up.
   d. The county achievement club program or round-up.
   e. The State 4-H Club Round-up.
   f. A club completion of 100 per cent.
(6). Stating specifically what each member must do to start the work.
(7). Assignment of work for the next club meeting, as:
   a. Assignment of the 4-H club pledge to be learned by all members before the next club meeting. (See suggested outline of second club meeting.)
   b. Bringing of record books to the meeting for inspection.
   c. References:
      (a). Varieties of Tomatoes, page 9.
      (b). Methods of making Hotbeds and Growing Plants, p. 9.
   d. Assignment of one or more topics to be used in response to roll call, as:
      (a). Name a standard 4-H club requirement and give one or more good reasons for the requirement.
      (b). State the variety of tomatoes which you will plant.
      (c). State how far apart you will plant your tomatoes.
      (d).
(8). The social hour, games, etc.

II. Club Meeting.—Varieties of Tomatoes, Methods of Making Hotbeds and Growing Plants.

1. The business meeting.—The club president in charge.
References: Duties of club officers, in the Club Secretary's Record Book.
   (1). Meeting called to order by the president, who leads the club members in repeating the national 4-H Club pledge, as follows: "I pledge my *head* to clearer thinking, my *heart* to greater loyalty, my *hands* to larger service, and my *health* to better living, for my club, my community, and my country."
   (2). Roll call by the secretary, the members responding by reporting on the previously assigned topics.
   (3) Reading of the minutes of the last meeting by the secretary, which should be adopted as a permanent record by the club when approved.
   (4). Unfinished business:
      a. Unfinished business from the last club meeting.
      b. Report of the committee on club songs and yells.
      c.
   (5). New Business:
      a. Appointment of a social committee to plan for some games at future club meetings.
      b. Anything for the good of the club, such as holding a club picnic, etc.
   (6). Songs and yells, led by song and yell leader.
   (7). Adjournment for work.
2. Instructions and demonstrations.—The local club leader in charge.

(1). Discussion:
a. Varieties of Tomatoes, page 9.
b. Methods of Making Hotbeds and Growing Plants, page 9.
(2). Demonstration.—An individual demonstration on the preparation of soil in the plant bed and drilling seed.
(3). Assignment of work for the next meeting, as:
a. Bringing of record books to the club meeting for inspection.
b. References:
(a). Soils, Soil Preparation, page 13.
(b). Fertilizers, page 15.
c. Assignment of one or more topics for roll call, as:
(a). Name a standard club requirement not previously given in response to roll call and give one or more good reasons for the requirement.
(b). State kind of plant bed used to start plants.
(c). Give formula of fertilizer you will use.
(d).
d. Assignment of individual demonstration to be given at next club meeting on making a hotbed.

3. The social hour, games, etc.

III. **Club Meeting—Soils, Soil Preparation and Fertilizers**

1. The business meeting.—The club president in charge.
(1). Meeting called to order by the president who leads the club in repeating the national 4-H club pledge.
(2). Roll call by the secretary, the members responding by giving a progress report on their home project work or by reporting on previously assigned topics and by handing in the record books for use in the club meeting.
(3) Reading of the minutes of the last club meeting by the secretary.
(4). Unfinished business:
a. Unfinished business from the last club meeting.
b. Report of the social committee.
c.
(5). New Business:
a.
b.
(6). Songs and yells.
(7). Adjournment for work.
2. Instructions and demonstrations.—The local club leader in charge.
(1). Discussion:
a. Soils and Soil Preparation, page 13.
b. Fertilizers, page 15.
c.
(2). Demonstrations.—Making a hotbed.
(3). Assignment of work for the next meeting, as:
a. References:
(a). Spraying, page 19.
(b). Transplanting, page 17.
(c). Early Cultivation, page 18.
b. Assignment of one or more topics for roll call, as:
1. Name a standard club requirement not previously

given in response to roll call and give one or more good reasons for the requirement
2. Name ingredients of bordeaux mixture.
3. Name the diseases which are prevented by bordeaux mixture.
4. Name the diseases which live over in the soil.

c. Assignment of individual demonstration to be given at the next club meeting on how to spray plants.

3. The social hour, games, etc.

IV. Club Meeting.—Spraying, Transplanting, and Early Cultivation.

1. The business meeting.—The club president in charge.
   (1). Meeting called to order by the president who leads the club members in repeating the national 4-H club pledge.
   (2). Roll call by the secretary, the members responding by reporting on the previously assigned topic and by handing in the club record books for use in the club meeting.
   (3). Reading the minutes of the last club meeting by the secretary.
   (4). Unfinished business:
      a.
      b.
   (5). New business:
      a. Appointment of a club committee on plans for the 4-H club achievement or round-up program.
      b.
   (6) Songs and yells.
   (7). Adjournment for work.
2. Instructions and demonstration.—The local club leader in charge.
   (1). Discussion:
      a. Spraying, page 19.
      b. Transplanting, page 17.
      c. Early Cultivation, page 18.
   (2) Demonstration on how to spray plants.
   (3). Assignment of work for the next club meeting, as:
      a. Bringing of record books to the club meeting for final instructions on how to complete the records.
      b. References:
         (a). Cultivation, page 18.
         (b). Spraying, page 19.
         (c). Diseases, page 19.
         (d). Insect Enemies of Tomatoes, page 18.
      c. Assignment of one or more topics for roll call, as:
         (a). Name a standard club requirement not previously given in response to roll call and give one or more good reasons for the requirement.
         (b). Name insects which you observed on your tomato plants.
         (c). State advantages of mulching tomatoes.
      d. Assignment of individual or team demonstrations to be given at the next club meeting as tryouts for the demonstration team.
3. The social hour, games, etc.

V. Club Meeting.—Cultivation, Spraying, Diseases, and Insect Enemies of Tomatoes

1. The business meeting.—The club president in charge.
   (1). Meeting called to order by the president who leads the club in repeating the national 4-H club pledge.
   (2). Roll call by the secretary, the members responding by reporting on previously assigned topics and by handing in their record books for inspection.
   (3). Reading the minutes of the last club meeting by the secretary.
   (4). Unfinished business;
      a. Report of the committee on 4-H club achievement or round-up program.
      b.
   (5). New business:
      a. Appointment of a committee on program for the 4-H tomato club tour.
      b.
   (6). Songs and yells.
   (7). Adjournment for work....
2. Instructions and demonstrations.—The local club leader in charge.
   (1). Discussion.
      a. Cultivation, page 18.
      b. Spraying, page 19.
      c. Diseases, page 19.
      d. Insect Enemies of tomatoes, page 18.
   (2). Demonstrations as tryouts for club demonstration team, page 15.
3. Assignment of work for the next club meeting.
      a. References:
   (a). Tour of Tomato Fields, page 22.
      (b). Judging, page 23.
      b. Assignment of definite work for every club member on the achievement club program, as:
         (a). Demonstration by the club team.
         (b). Judging by all the members.
         (c). Exhibit by all club members.
         (d). Songs and yells by the club.
         (e). Typical meeting by the club. Each member should respond to roll call by giving a summary of his or her individual club work for the year.
3. The social hour, games, etc.

VI. Club Meeting.—The Tomato Club Tour, page 22.

VII. Club Meeting.—Achievement Program or Round-up.

The club achievement program or round-up should be held at the close of the work for the club year.

Each member should hand in to the local leader the completed record book so that the results of all work of the club may be summarized for the year in the Club Secretary's Record Book.

Suggested Public Program

1. Exhibit.
2. Typical meeting by the club.

3. Talk on the club's achievements by a club member or the local club leader.
4. Team demonstrations.
5. Judging demonstrations.
6. Making awards, if given.
7. Plans for next year.
8. Adjournment.

Suggestions

Only club members who make a complete report or have their records up-to-date, should be eligible to take part in county or state contests, club camps, etc.

The events of the club achievement program and the results of the club work for the year should be carefully prepared and offered to the local newspapers for publication.

II. Discussion of Varieties of Tomatoes, Methods of Making Hotbeds and Growing Plants

(About March 1)

VARIETIES

The variety to be grown depends upon the purpose for which the tomatoes are to be used. For the market garden, or home garden, earliness is often important. Early varieties that are satisfactory are Bonny Best and Globe. Later varieties suitable for market or for canning are: Stone, Marglobe and Greater Baltimore. There are, of course, other desirable varieties in each group.

The Plant Supply.—When only a small planting is to be made, it may be more economical to buy plants if the desired variety grown from good seed can be obtained.

If, however, plants are to be grown, it is best to buy the seed from a reliable seed dealer or grower. Cheap tomato seed is a poor investment and it is safer to buy the best. The plants can be grown by one of the following methods.

METHODS

Methods of plant growing influence greatly the earliness and yield of tomatoes. It is always desirable to get the plants set early and rooted well before dry weather. The ideal should be to produce large stocky plants in time for early setting in the field but the amount of effort justified will depend upon the need for earliness. The most elaborate method is to grow the plants in a greenhouse and harden them in coldframes but this is not often possible. The most common method is to grow the plants in a hotbed.

Hotbeds.—For very early plants a hotbed should be prepared late in February or early in March. A hotbed is an enclosed plant bed usually with glass or canvas cover and provided with some arti-

ficial means of heating, such as fermenting stable manure. In making a hotbed a well drained spot should be selected on the south side of a building if possible so it will be protected from cold winds. The beds are usually made to run lengthwise east and west and the north side is higher than the south so the bed will get the full amount of sunlight. For temporary beds the boards used in making the frame can be 1 inch thick but for permanent beds the boards should be 2 inches thick. The north board should be 12 inches high and the south one should be about 8 inches high. The beds can be any length desired but should be 6 feet wide as all standard glass sash or other hotbed covers are 6 feet long. After making the frame drive stakes about 3 feet long into the ground at the corners and about every 8 or 10 feet along the sides. The frame should be nailed to these stakes to hold it in shape. Braces of 2-by-2-inch boards placed across the frame every 3 feet make it still stronger.

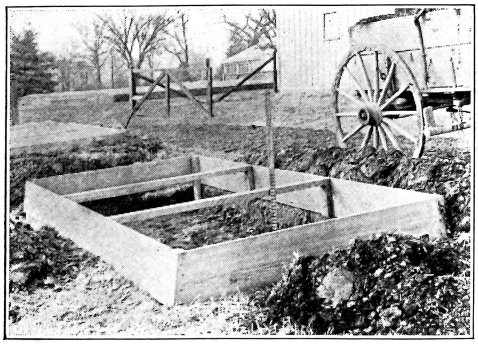

Fig. 2.—First steps in making a hotbed; digging the shallow pit, bracing and staking the frame.

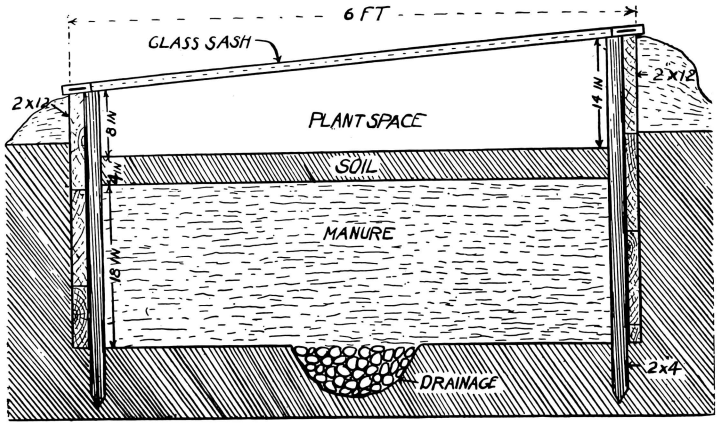

Fig. 3.—Cross-section of a manure heated pit hot bed.

After the frame is made the earth should be thrown out to a depth of 10 or 12 inches and this pit tramped full of fresh, heating stable manure. Be sure to tramp the edges and corners well. If the manure is very dry it should be wet with warm water. This will make the heat continue longer and more uniformly. Rich sandy dirt is spread on top of the manure to a depth of 4 or 5 inches as soon as possible.

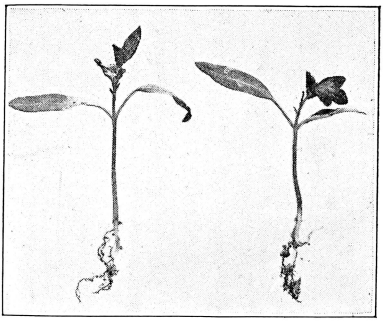

Fig. 4.—Tomato plants at the time of first transplanting.

Glass sash make the best covering for either a hotbed or coldframe but if these are not available muslin or canvas can be used and should be painted with hot linseed oil or drawn through a small vat of hot linseed oil or paraffin to make it water-proof and transparent. In very cold weather it may be necessary to put loose straw on top of the covers. In two or three days when the temperature of the bed has become uniform and is not over 90° the seed should be sown, rather thickly in rows about 4 inches apart. When the plants are about 2 inches high they should be transplanted to a coldfram eor in the hotbed placing them 3 or 4 inches apart each way. By transplanting these small plants into flat boxes containing 2 or 3 inches of rich dirt it will be possible to move them into coldframes when desirable without transplanting again. An even better system is to place these young seedlings in dirt contained in flower pots, paper bands or old strawberry boxes. When this method is followed the plants can be set in the field without disturbing the roots (see illustration on cover). A coldframe differs chiefly from the hot-bed in that it has no means of artificial heating. Its soil should contain plenty of rotted manure and sand.

Fig. 5.—A sturdy plant, such as can be produced by growing in a flower pot or berry box.

Another way to provide early plants on a small scale is to plant the seed in a flat box or soil in a window, transplanting later to a coldframe.

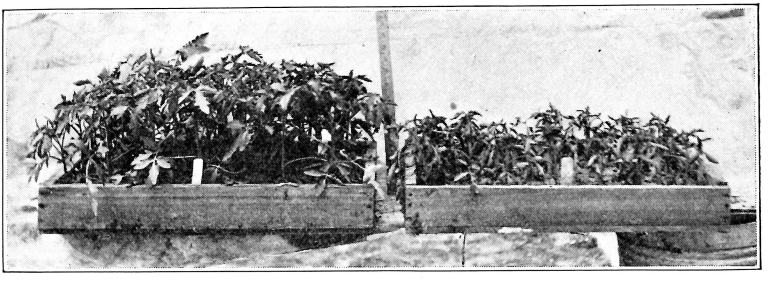

Fig. 6.—Healthy tomato plants grown in a flat box in a hotbed. These plants have been transplanted only once and are now ready to set in the field.

A method which provides good plants somewhat later is that of sowing the seed in a coldframe in the first part of April. The soil should be rich and mellow and the seed sown thinly in rows about 4 inches apart. When about 2 inches high the plants should be thinned, leaving at least, 1 inch between the bed. This method is generally best for a late market or canning crop.

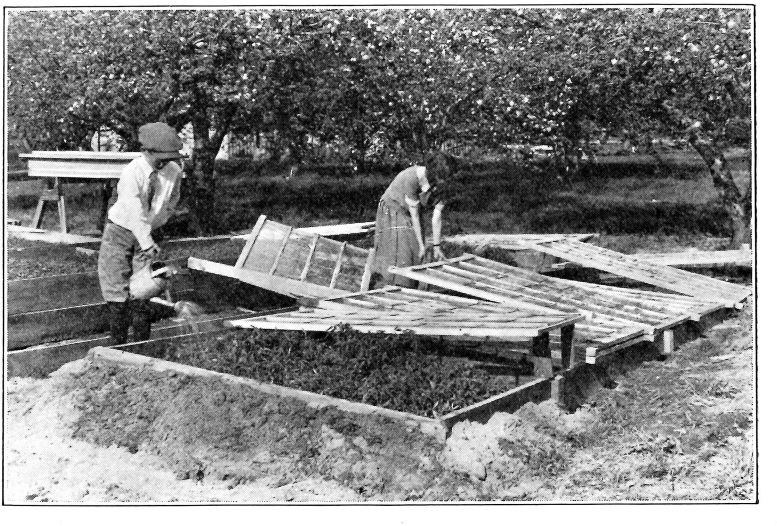

Fig. 7.—The completed hotbed. Watering plants and ventilating the bed.

The watering and ventilation of plant beds require careful attention. The object is to keep the plants growing fairly fast without becoming weak and spindling. Watering should be done on warm days and the plants allowed to dry before night. Insufficient watering will stunt the growth while too frequent watering may cause plants to "damp off". "Damping-off" is a fungus or mold disease which makes the plant rot off at the surface of the soil and thus causes much loss. It is especially troublesome during damp cloudy weather. The beds should be ventilated during the day whenever the outside temperature permits. A day temperature of from 60 to 80°, and night temperature of 45 to 50° are desirable. Tomato plants will not stand freezing.

For about a week or ten days before transplanting to the field the beds should be left open night and day without watering, covering only in case of frost. This "hardens" the plants, making them better able to withstand the shock of transplanting. Plants should be set in the fields as soon as danger of frost is past which is usually during the first half of May.

III Soils, Soil Preparation, Fertilizers

(About April 1)

SOILS

Tomatoes are grown successfully on a wide range of soils but usually do best on a fertile, well drained loam or silt loam. Light sandy soils are adapted to growing early tomatoes but the bearing season is usually short. Very heavy clay soils, which remain sticky while damp and bake hard when dry, are to be avoided. The brown loess hill soils near the Missouri River and the gravelly loam soils of the Ozark region are especially adapted to growing tomatoes of high quality. The soil must be kept fertile by rotating crops, plowing under green manure crops such as vetch or soybeans and using stable manure. Too rich a spot, such as an old barn lot, should not be planted in tomatoes, such conditions cause too rank a growth of vines with little fruit. However, garden soil, even if manured, is seldom too rich, for tomatoes are rank feeders.

SOIL PREPARATION

Fall plowing is strongly recommended. At any rate plowing should be done some time in advance of planting and the land disked or harrowed several times to kill young weeds and to pulverize and compact the soil. The last harrowing or raking should be done just before plant setting so the soil will be in good mellow condition.

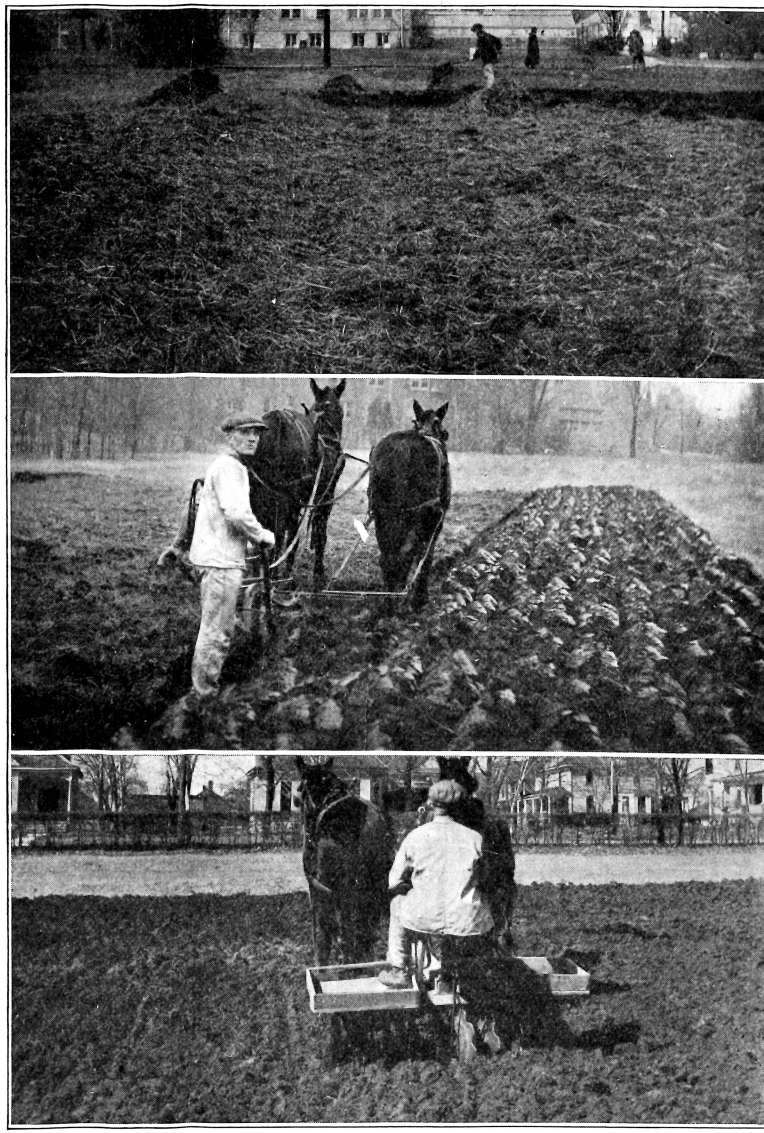

Fig. 8.—Three steps in preparing tomato land. (Above) Spreading heavy coat of manure in fall; (Center) Breaking deeply in late fall; (Below) Disking into fine condition before planting, early spring.

FERTILIZERS

Manures.—Stable manure is especially good on thin land where continuous grain farming has been practiced. Such land is usually low in organic matter and nitrogen and has a tendency to run together and bake when dry. These faults will be largely overcome by using manure. On such land it can be applied as heavily as ten to twenty tons per acre with good results. When only a small supply of manure is available it should be spread on the land, worked into the soil, then commercial fertilizer used to supplement the manure. Fertilizer is also valuable where green manure or sod has been turned under.

Commercial Fertilizer.—Experiments at the College of Agriculture show that in nearly all cases the yield of tomatoes and the earliness of the crop can be increased by the use of commercial fertilizers.

On rich soil or when used with liberal amounts of manure, super phosphate or a complete commercial fertilizer high in phosphorus, usually gives most economical results. On soils of medium fertility or with small amounts of manure a mixed fertilizer containing about 2 per cent nitrogen and 12 per cent phosphorus and 4 per cent potash gives good results. Nitrogen, phosphorus and potash are the elements of plant food which fertilizers add to the soil. On poor, badly worn or thin upland soils, a "complete" fertilizer such as 4-12-6 is best. The formula 4-12-6 means 4 percent nitrogen, 12 per cent phosphorus, and 6 per cent

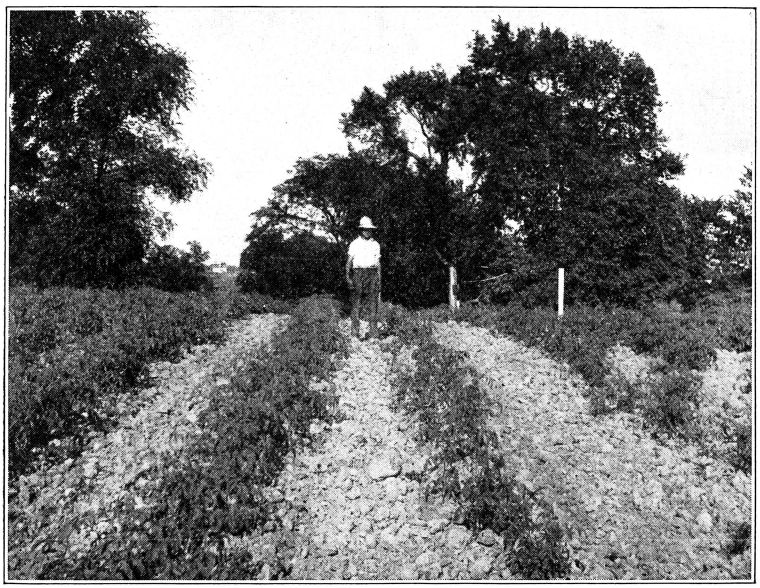

Fig. 9.—Effect of fertilizer on early vine growth. Rows at the left were fertilized with 2-12-2 fertilizer at the rate of 400 pounds per acre, mixed with the soil before the plants were set.

potash. This is especially needed on sandy upland soil where potash is usually lacking.

The amounts used may vary greatly but in Missouri most profitable returns have usually been from applications of 300 to 500 pounds per acre, using the larger amounts on the poorer soils and for the earlier crops. This is from 3 to 5 pounds to each 100 feet of row. The most economical use of fertilizer is obtained by applying it in the rows before planting. Rows may be marked where plants are to be set, and several days before planting, the fertilizer should be applied by hand or with a small fertilizer drill. It should be mixed well with the soil before setting plants.

Fig. 10.—Scattering fertilizer along the marked rows. The single shovel plow mixes the fertilizer with the soil and opens a shallow furrow for planting.

IV. Spraying, Transplanting, Early Cultivation. (About May 1)

BORDEAUX MIXTURE SPRAY

It is a splendid practice to spray the plants with bordeaux mixture while they are still in the plant bed. Two sprays should be applied. The first application should be put on when the plants are about three inches high, and the second spray should be applied thoroughly just before the plants are taken out of the plant bed for setting in the field. This protects them from leaf diseases such as leaf spot or early blight. Bordeaux mixture can be purchased as a powder or paste ready to dissolve in water and use. Where this is done, follow directions on the package for field spraying, but for spraying the plant bed make the solution just half as strong as directed. Bordeaux can also be made at home as follows: Dissolve ½ pound of bluestone (copper sulphate) in 1 gallon of water. Slake and dissolve in another gallon of water ½ pound of stone lime. These two are stock solutions and will keep as long as desired. When ready to spray, dilute the stock solutions by adding 5¼ gallons of water to each, still keeping them separate. The bordeaux mixture is made by pouring these two dilute solutions together at the same time and in equal amounts into the spray tank and mixing thoroughly. It should be used the same day it is made up. This makes a 2-2-50 bordeaux which means it is made at the rate of 2 pounds bluestone, 2 pounds of stone lime to 50 gallons of water. This 2-2-50 bordeaux is suitable for spraying the plant beds. For later spraying when plants are in the field a 4-4-50 bordeaux mixture should be used. This is just twice as strong as the 2-2-50 and can be made by using 1 pound each of copper sulphate and stone lime instead of ½ pound each.

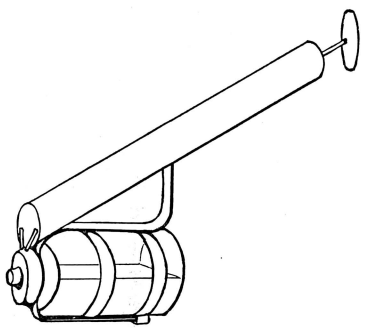

Fig. 11.—One quart hand "atomizer" type of sprayer suitable for plant beds or small gardens.

TRANSPLANTING

Before removing the plants from the beds they should be watered thoroughly and taken up with a clump of earth on the roots of each. When setting plants on a large scale a horse-drawn planter can be used to good advantage. For the smaller planting, however, a shallow furrow can be opened with a small plow, single shovel or cultivator and

the plants set in by hand. Plants should be set fairly deep especially if they have grown somewhat "leggy". Roots will form along the buried stem making the plant more resistant to drouth.

Distance of Planting.—Depends somewhat on the variety grown, richness of the soil and cultural methods. The early varieties do not vine as heavily as late ones and as a general rule should be set, 3 feet by 4 feet while the late, vigorous growing sorts in rich soil can be set 4 feet by 5 feet. These distances are satisfactory when vines are allowed to grow at will. If they are to be staked and pruned the plants can be set much closer, about 18 inches by 42 inches.

V. Cultivation, Spraying, Diseases, and Insect Enemies of Tomatoes. (About July 1)

CULTIVATION

Careful and frequent cultivation is required from the time the plants are set until the vines begin to cover the ground. Fairly deep cultivation is good while plants are small, but later cultivations should be shallow. The soil should be kept mellow and free from weeds at all times. An ordinary 5-tooth, one-horse cultivator can be used for early cultivation and a 12 or 14-tooth, one-horse cultivator is best for the shallow, late cultivation.

The practice of mulching tomatoes with straw by covering the entire surface of the ground 4 to 6 inches deep just after the first cultivation does away with further cultivation and retains moisture so that the yield is usually greatly increased later in the season. Mulching is recommended for tomatoes intended for home use or late market in sections where summer drouth is injurious.

Fig. 12. (above).—Tomatoes mulched with straw to hold moisture in the soil and save cultivation.

Fig. 13 (at right).—Starting tomatoes for culture by staking and pruning method.

The system of supporting each vine by a stake 5 to 6 feet long, pruning to a single stem and tying this stem loosely to the stake with strips of cloth or coarse cord, usually results in a greater yield of early fancy tomatoes, but requires more plants and much more labor and the total yields are about the same as for unstaked fields. They are sometimes kept pruned to two or three stems which are trained on a wire trellis or fence by tying. This is a good practice especially in a small home garden.

SPRAYING

If the plants were sprayed well while in the plant bed it may not be necessary to spray again. They should be watched carefully, however, for insects and diseases; and if any are noticed the remedies suggested should be used at once.

DISEASES

Tomatoes have diseases just as most plants and animals do. The most common ones and their preventives are mentioned below.

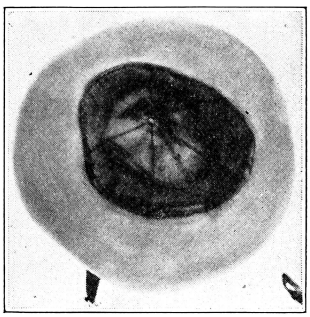

Fig. 13.—Blossom end rot.

Blossom End Rot is a disease that is caused by lack of moisture in the soil. This disease takes the form of brown or black rot at the tip ends of the tomato fruit. This can be controlled or reduced only by irrigation or by frequent shallow cultivation or by mulching with straw or other material to hold the soil moisture.

Wilt is a fungus disease which lives in the soil for several years. It causes the lower leaves and branches and finally the whole plant to turn brown and die. By slicing into the stem near the base of a diseased

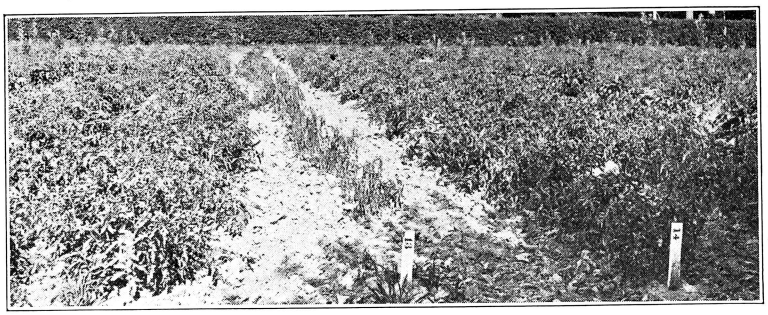

Fig. 15 —Tomatoes grown on soil infected with the wilt disease. Row 13 in center shows an ordinary variety dying of wilt infection. Note resistant variety growing on either side.

plant dark brown streaks can be seen. When the wilt is present in a field, tomatoes should not be grown on the land for several years unless "wilt-resistant" varieties are used.

There are a number of these varieties which possess a high degree of wilt resistance, and are now offered for sale by most of our reliable seed companies. The Marglobe, Marvana, Marvelosa and Break O' Day are resistant to tomato wilt.

Leaf Spot appears as small water soaked spots on the under side of the leaves, soon changing to larger brown spots with light centers and dark edges and with the leaves turning yellow and drying up and dropping off. It is very common in Missouri and in wet seasons does much damage. All plants showing this disease should be burned when they are removed from the plant bed. Spraying with bordeaux mixture made as described on page 18 or dusting with a bordeaux dust usually will control this disease. The spray mixture must always be used fresh, and the plants thoroughly covered. The first spray should be 2-2-50 bordeaux and put on before the plants are taken from the bed, as explained on page 18. As soon as the first disease spots appear spray again and every 10 days or two weeks thereafter for about 3 sprays, using 4-4-50 bordeaux. A 3-gallon pressure sprayer is a good one to use on small patches while a wheelbarrow sprayer is better for large patches.

Early Blight also spots the leaves and causes them to wither and die. In addition to this it causes spots on the stems and appears on the ripening fruit as Nail Head Spot. These are small sunken brown spots usually with light brown centers. The same methods of control should be used for the Early Blight as for Leaf Spot. The plant bed spray is especially important.

INSECT ENEMIES

Fruit Worms may cause considerable damage and their control is difficult. Picking all the wormy tomatoes early in the season and destroying them will greatly reduce later injury. Planting sweet corn as a trap crop is helpful if the ears of corn are removed before they mature in order to kill the worms. Spraying with arsenate of lead also reduces injury, using 1½ pounds of the dry form to 50 gallons of bordeaux mixture.

Grasshoppers and Cutworms are best controlled by spreading poisoned bait made by mixing 1 ounce paris green or white arsenic and 1 pound wheat bran and adding another mixture consisting of 1 pint water, ¼ pint molasses and the juice of half a lemon or orange. Water can be added to make a stiff mash and the material scattered lightly on the ground around the plants, in the evening and early morning.

Horned Tobacco Worms can be controlled by spraying with arsenate of lead or by hand picking. If they are very troublesome it will be much easier to kill them by the spraying. Arsenate of lead can be added to the bordeaux mixture or can be mixed with water and sprayed on alone. For this purpose 1½ pounds of the powdered form should be used for each 50 gallons of water. This is about one tablespoonful, rounded slightly to each gallon of water or spray. Arsenate of lead should be stirred into a paste with a small amount of water and then poured into the water or bordeaux mixture. It should be sprayed on the plants while worms are small.

Flea Beetles and Leaf Hoppers if troublesome can be repelled and many of them killed by spraying with bordeaux mixture and arsenate of lead together.

VI. The Tomato Club Tour

HOW THE TOUR IS CONDUCTED

It is recommended that the county extension agent and the local club leaders conduct the tomato club tour in early July. At that time of the year the project work will be far enough along to show results.

Usually, one all-day automobile tour is conducted for all the tomato clubs of a county. The tomato club members, their parents, local vegetable growers and other interested persons of the communities should be invited to take part in the tour. A regular club meeting should be held at noon following a picnic lunch.

The program generally consists of making a visit to one or more truck farms and to the home farms of the club members.

Some of the things that should be looked for on this trip and pointed out by the club leader or members as they are noticed are as follows: habits of growth of different varieties; size of leaves; spread of vines, shape, color and earliness of ripe tomatoes; as well as the results of fertilizer or spraying demonstrations. Take pictures of good demonstration fields when convenient to do so.

Be sure to notices all diseases and insects that are injuring tomatoes.

On this tour there should be someone who will judge the different fields. This may be done by the county agent, club leader, an impartial grower, or the truck crops extension specialist from the Agricultural Extension Service.

Points to consider in judging the fields, are the methods used in growing the crop, freedom from weeds, freedom from insects and disease, and general appearance of the field.

VII. Exhibit and Achievement Day.

EXHIBIT

Each club member should select a "plate" of five of the best tomatoes of each variety in his field for the Exhibit. It may be well to first select twice this many and choose the ones to be exhibited from these. Look over the score card carefully and select tomatoes which will score the highest, paying particular attention to uniformity, condition, size, shape and color.

JUDGING CONTEST

Before the decision of the judge is announced each club member should judge or place the exhibits in the order which he thinks they belong according to the score card. Each member should then give his reasons for the placing before the whole club. This judging contest is important and the results will help to determine the championship.

JUDGING TOMATOES

The first step in judging tomatoes is to learn how to use the score card. The score card shows the relative value of the different characters of the tomatoes. For example, uniformity of samples being compared counts 35 points while color counts only 15 points.

Explanation of Score Card

Name of Variety_____

Scored by_____Date_____

Size and shape, correct for variety	20
Color, correct for variety and uniform	15
Condition (ripeness, solidity, freedom from injury and blemishes)	30
Uniformsty	35
Total	100

Size and Shape.—Both size and shape vary considerably with the variety and this should be considered in scoring. Some varieties tend to be small and others large while some produce flat and others globe-shaped tomatoes. Smoothness is desirable and the exhibit should be scored off for any rough, irregular specimens. The scoring on this point should be less severe on such large irregular varieties as Ponderosa. Extremely large or very small tomatoes are not desirable for an exhibit.

Color.—Color also varies with the variety and with the stage of ripeness. There are varieties producing yellow tomatoes, others yellowish red, bright red and some of the purplish red. This should be considered in showing. The color should be the same over the entire tomato and for all tomatoes of each individual exhibit.

Condition.—The score under this item depends on the care in selecting perfect tomatoes of just the right stage of ripeness, free from all blemish, scars or other injury, and especially on the careful handling of the tomatoes. If it is necessary to select them several days before the exhibition day it is best to save those which are not fully ripe and to wrap them separately with paper and store in a cool dark place.

Uniformity.—The secret in selecting a winning exhibit lies first in choosing the correct type and then getting each plate as nearly uniform as it is possible to do so. They should be uniform in size, shape, color, condition and in general appearance. This is the most important single item to consider in judging and the hardest one to satisfy in selecting an exhibit, and it should be very carefully considered.

JUDGING BY COMPARISON

After club members have learned to use the score card in judging individual tomatoes, they are ready to learn to judge by comparison. At first, this may be done by comparing two tomatoes. Usually, plates of five tomatoes each constitute a judging class, each plate being designated by A, B, C, D, or by 1, 2, 3, 4.

In judging by comparison, club members should compare the sample placed first with the one placed second, the second with the third, and the third with the fourth. Reasons should be given in a similar way, which may be given in writing at first and later orally to the leader or judge. There is a tendency for beginners in judging to describe tomatoes rather than to give comparisons. Comparisons are made by taking up the essential points in a logical order as they appear on the score card. In contests, club members usually are judged on the combined results of both placings and reasons on basis of 50 points for correct placings and 50 points for correct reasons.

A free-for-all contest may be conducted in each club for the purpose of selecting the three highest ranking individual judges to represent the club on the judging team in the county contest, if one is held. Team work may be developed by giving the members of the team an opportunity to practice judging together and to discuss their own placings and reasons with each other and with the leader or judging specialist.

After the judging work has been completed but before the results of the contest have been announced, if time permits, the judge should exhibit the classes of tomatoes as placed in the contest in the presence of the contestants and explain reasons for the placings made. After understanding the placings, club members will have a fact basis for showing good sportsmanship when the results are announced.

DEMONSTRATIONS

In so far as possible, all club members should be instructed in regular club meetings by the demonstration method. As a usual thing, one or more members of each club can begin doing before the club useful phases of the work program soon after the processes have been demonstrated to the club by the club leader.

After two or three months of practical experience in handling real things, mature club members should be able to give public team demonstrations. The scope of the team demonstration usually should be limited to the essential processes of some practical phase of the club work of the current year on one subject. A team of two or three of the best demonstrators, according to the number needed, should be selected from the membership of one club, either by mutual consent or by individual tryouts in competition. All teams should have an opportunity to demonstrate before the local club group and the people of the home community, and the championship team should represent the local club at the achievement program or round-up, if one is held.

Suggested Problems for Team Demonstrations.

Making a hotbed.
Sewing seed.
Transplanting.
Making bordeaux mixture.
Applying fertilizer.
Spraying in plant bed or field.
Staking and pruning.
Judging tomatoes.

Typical Outline of a Problem for a Team Demonstration.

Producing U. S. No. 1 Tomatoes.

Team.— Prepared for a team of two members from one club, designated in this outline as "A" and "B".

Reference.—The 4-H Tomato Club Circular.

Equipment Needed.— U. S. No. 1 tomatoes in market condition, dirt bands for use in transplanting; rich soil; ingredients and equipment for bordeaux mixture, 4 ounces of copper sulphate, 6 ounces of hydrated lime, or 4 of stone lime, two 2-gallon stone jars, three heaping tablespoonfuls of arsenate of lead, a saucer, a 3-gallon pressure sprayer; blackboard; exhibit material of diseased specimens; fertilizer; 12-quart Climax baskets.

Time.— Fifteen to thirty minutes.

Procedure

A speaks and demonstrates.—	B assists.—
Leads in repeating the national 4-H club pledge; gives a brief history of the club; introduces the team; and states the problem which the team is to demonstrate.	Stands at attention until introduced and then gets demonstration material ready for A.
I. Producing U. S. No. 1 Tomatoes.—	
1. Importance of tomato growing in local community.	
2. Main problems encountered in growing, grading, and marketing tomatoes, and how they are being solved.	
3. Kind (early or late) and variety of tomatoes chosen, with reasons given for the selection made.	
4. Explains time and method of sowing seed in hot beds and of transplanting them into soil in 4-inch dirt bands.	
(1). Fills bands with earth, explaining kinds of soil, etc.	Provides A with dirt, dirt bands, and plants.
(2). Sets plants, explaining time for same and also time for setting in field; the reasons why fresh soil is used; and why bordeaux mixture is used in spray, etc. "....will continue the demonstration by showing how to make Bordeaux mixture."	Gives A a fullgrown plant ready to set in field.

A assists.—	B speaks and demonstrates.—
Provides B with diseased specimens (Previously collected and preserved in glass jars in 10 parts of 95% alcohol, 3 parts of zinc sulphate, 87 parts water. Or specimens may be pressed between blotters and mounted on cardboard for exhibition)	II. Demonstrates method of making bordeaux mixture.
Assists B as needed.	1. Exhibits diseased specimens, naming same with explanations given.
	2. Makes bordeaux mixture:
	(1). Dissolves 4 ounces of copper sulphate in one quart of water.
	(2). Dissolves 6 ounces of hydrated lime in another quart of water. (These are stock solutions and can be kept indefinitely.)

	(3). Adds 5 quarts of water to each solution to dilute it. Mixes the two solutions. (4). Dissolves 3 heaping tablespoonsful of dry arsenate of lead in water to make thin paste; then adds to bordeaux mixture and stirs. The bordeaux mixture is ready for use. (5). Explains why arsenate of lead should be dissolved before adding and why it should not be added until bordeaux is made and stirred. Explain why arsenate of lead should be used.
Get ready to spray plants.	"....will demonstrate how to apply the mixture with a 3-gallon pressure sprayer."
A speaks and demonstrates.— III. Demonstrates how to spray tomato plants and explains: 1. Need of fresh material. 2. How, when and number of times applied. 3. Gives experiences of club members and farmers. "....will continue the demonstration by explaining how we fertilize, cultivate and grow our tomatoes."	**B assists.—** Assists A and collects material used in mixing the spray. Gets fertilizer ready for use.
A assists.— Assists B as needed.	**B speaks and demonstrates.—** IV. How we grow, fertilize and cultivate our tomatoes. 1. Selection of type of soil to prevent wilt and other diseases which live over in the soil. 2. Use of green manure, stable manure, and a complete commercial fertilizer, containing .....% nitrogen, ...% phosphorous, ...% potash, at the rate of ..... pounds per acre, or about .....pounds per 100 feet of row.

	3. Scatters fertilizer along row and explains how it is stirred into soil with a cultivator before the plants are set. 4. Explains time, kind of cultivator used, methods and number of times, as adapted to season and growth for cultivation. ".....will explain and demonstrate the method we use in grading, packing and marketing our tomatoes".
A speaks and demonstrates.— V. How we grade, pack and market tomatoes. 1. Explains and exhibits kinds of package desired for the local market. Local losses from poor methods of packing cited. 2. How we grade and pack standard U. S. grades and pack a U. S. No. 1 ripe tomato. (1). Exhibits a model pack and explains: a. Variety in pack. b. Condition. c. Amount of tomatoes below grade allowed. (2). Results secured in the club. ".....will summarize the demonstration."	**B assists.—** Assists A by supplying baskets, tomatoes and material as needed. Packs tomatoes in basket and hands same to A.
A assists Quietly collects demonstration equipment. Stands at attention.	**B summarizes.—** 1. The importance of tomato growing in our community. 2. The problems presented which successful tomato growers must solve. 3. The control measures used to combat diseases. 4. How fertility of our soil was maintained. 5. How we followed grading, packing and marketing standards. 6. Results secured in the club. 7. Source of scientific information used in our work. Questions— Thanks audience for its attendance and attention.

Score Card for Judging Demonstration Teams in Missouri

		Perfect Score	Actual Score
1.	**Subject Matter**	30	
	(1) Importance of the subject-matter presented and relation to fundamental problems of home or farm.		
	(2) Accuracy of statements made in oral presentation and proper methods in doing the work.		
	(3) Completeness with reference to the giving of all steps necessary to clear understanding of process.		
	(4) Clearness and definiteness of statements made in simple language easily understood.		
	(5) Replies to practical questions. Judges' questions only should be considered in team scores. Team should give authority for subject matter presented.		
2.	**Team Work**	20	
	(1) Preparation, arrangement and use of materials. The team will be responsible for the arrangement and preparation of equipment and its use.		
	(2) Organization of work, each member in so far as practical to be kept busy with a definite part so that the work and instructions given proceed without delay, but each member of the team should be able to demonstrate the whole process.		
	(3) Appearance and conduct of the team. Appearance and conduct include the personal appearance of the members, and of the team as a whole. They should be businesslike, pleasant and so far as possible, a unit in action and appearance.		
	(4) The team member not actually directing the demonstration should reinforce the point at hand or at least should not detract from the theme of the demonstration.		
3.	**Skill**	20	
	(1) Ease in procedure.		
	(2) Workmanship and efficiency of manipulation.		
	(3) Neatness and cleanliness in doing work.		
	(4) Speed, system or dispatch.		
4.	**Results**	15	
	(1) Effect upon the audience, and also upon materials used in the demonstration, as may be shown in the finished product.		
	(2) All processes made clear.		
5.	**Practicability**	15	
	(1) Value of principles given for the home, community.		
	(2) Actual club practices shown.		
	Total Score	100	

Date_____ Demonstration team_____

Signed_____
(Judge)