

UNITED STATES SCHOOL GARDEN ARMY
DEPARTMENT OF THE INTERIOR
GARDEN MANUAL

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BUREAU OF EDUCATION
WASHINGTON



LESSONS IN SCHOOL-SUPERVISED GARDENING
FOR THE SOUTHEASTERN STATES

VEGETABLES

FOLLOW THE PIED PIPER

Join the United States
School Garden Army.



LESSONS IN SCHOOL-SUPERVISED GARDENING FOR THE SOUTHEASTERN STATES.

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LESSONS IN SCHOOL SUPERVISED GARDENING FOR THE SOUTHEASTERN STATES.

The following lessons are suggested as a course for the upper grades of the grammar school. Each lesson can be covered in a 15 or 20 minute recitation period. A Teacher's Manual and Planting Charts are being issued to accompany these lessons.

I. PLANNING THE GARDEN.

Lesson 1: FIRST CATCH YOUR RABBIT.

You remember the story of the boy who was telling about the rabbit he was going to eat, and his father said, "Son, first catch your rabbit." Well, that's the way you must do with these school gardens. Before you can eat the crops you expect to grow, you must get the garden.

For you boys and girls living in the country this will probably be an easy matter. Your fathers will be glad to give you a piece of land for your own use, as large as you are able to handle, where you can grow as many kinds of crops as you wish.

For you boys and girls living in the towns or cities it may be a little harder to get the land for your garden. But many of you will have a back yard of your own where many vegetables can be grown; or your next-door neighbor will be glad to let you use his back yard. At any rate, don't be discouraged if you can't find a place for your garden the first thing. By looking around and sticking to it you will find that there are a great many back yards and vacant lots near your own home which the owners will be proud to let you use after you have told them of the wonderful work the School Garden Army is doing.

If your garden is to be in a back yard, pick out one that is not shaded too much by trees or buildings. Growing things need sunlight and plenty of it. And try to pick out land that isn't all clay or gravel. You can't expect to grow much on soil like that. Ask one of your friends who is a farmer or who has a garden of his own to help you pick out the right place for your garden.

Lesson 2: SELECTING THE GARDEN SITE.

In selecting the garden site, give the home lot first consideration, even though much work is required to clean up, drain, and fertilize the ground. The lot about the house is a permanent part of the home, and money expended in its improvement is an investment.

Only when there is no available space at the home of the child should vacant lots be considered. Teachers should help those children who have no garden space at the home to secure permission to use nearby vacant lots. Judgment must be used in selecting vacant lots. The lot should be as near the home as possible so that the distance traveled in going to and from work is reduced to a minimum.

A vacant lot near enough to be seen from the home will be easier to protect from garden thieves. Money will be saved by selecting the lots several months before the time of planting in order that street sweepings and stable manures may be obtained to fertilize the soil.

Soils of heavy clay that lack humus will require much labor and fertilizer. The cost of improving these vacant lots is so large that the advisability of using them is doubtful. Permission to use the lots for several years should be obtained. Diversified gardens should not be attempted on clay lots the first year. Better results will be obtained by planting one or two of the hardier crops, such as corn, beans, cow peas, etc.

Lesson 3: CLEANING UP THE BACK YARD.

Use all space for growing vegetables. Clean up the back yard completely. Cart away all stones, brush, and ashes. Vegetable tops, weeds, and grass piled in one spot and covered with earth and manure will decay and may be added to the soil as humus later.

If the back-yard garden is small, a wire fence inclosing it is highly desirable. This will allow a maximum amount of light and a free circulation of air, both of which are desirable for the best development of plants and the prevention of such diseases as mildew. Board fences are objectionable in that they often prevent free surface drainage.

The yard should be so graded that no water will stand on the surface of the ground. Sometimes an open ditch leading into the alleyway or to some lower ground will be necessary. Water from the eaves of buildings may be carried away in such ditches or preferably in underground pipes, laid to the alley or sewer openings.

Lesson 4: MAKING A DIAGRAM OF THE GARDEN.

As soon as the location of the garden has been selected, each child should make a garden diagram. The plot should be measured and a drawing made to show the dimensions and points of the compass. The making of garden diagrams is a good exercise for a class period in drawing or gardening. Drawing paper or large sheets of wrapping paper may be used for this work. A convenient unit of measure is one-quarter inch to represent 1 foot of garden space.

Southeastern States lessons 5 and 6 give suggestive garden diagrams, but the varying conditions in the different planting zones makes it impossible to draw one plan to fit all cases.

In placing the lines to represent crops on the diagram, there are certain rules to remember. Rows of vegetables should run across rather than up and down a hill. Tall crops, such as corn, pole beans, etc., are usually planted at the north or west end of the garden to prevent the shading of other crops. Late planting of cool weather crops are often benefited by the shade of taller plants. The seed bed in which seedlings are started during the hot weather for transplanting in the fall will be more successful if partially shaded.

In making a garden plan for any zone in the South, it will be necessary to consider the companion and succession crops that are to be used in the spring, summer, fall, and winter plantings. The depth of planting, distance of plants and rows, and list of companion crops, is given in the Planting Charts.

Lesson 5: PLAN OF GARDEN THAT HAS PROVEN SUCCESSFUL.

(Furnished by Miss Vera Millsaps, Gastonia, N. C.)

TALL HEDGE PROTECTS HOTBED AND SEED BEDS.

North end.	Other seed beds	Hot bed 3 by 10	House adjoins garden directly on this notheast corner.
For late planting:	Footpath		
	English peas		Garden gate.
Beans.	English peas		
	Tomatoes		Foot-path.
Collards.	Tomatoes		
	Tomatoes		Climbing Beans
Spinach.	Beans		
	Beans		Butter
Kale.	Cauliflower.		
	Turnips		Climbing Beans
Turnips.	Parsnips		
	Cabbage		Butter
Late cabbage.	Cabbage		
	Cabbage		Climbing Beans
	Onions		
	Onions		Butter
	Peppers		
	Parsley		Climbing Beans
	Beets		
	Radishes		Butter
	Lettuce		
	Lettuce		Climbing Beans
	Squash		
Rutabaga.	Okra		Butter
	Okra		
	Climbing butter beans		Climbing Beans

25 by 50 feet.

Lesson 6: DIAGRAM OF A GARDEN 50 BY 75 FEET.

(From "Farmers' Bulletin 934." United States Department of Agriculture.)

Gate.	
	Hotbed.
Lettuce, radishes, followed by celery	
Lettuce, radishes, followed by celery	
Onions, followed by celery	
Onions, followed by celery	
Onions, followed by celery	
Parsnips, followed by celery	
Parsnips, followed by celery	
Carrots, followed by kale	
Carrots, followed by kale	
Beets, followed by kale	
Beets, followed by kale	
Beets, followed by kale	
Peas, early varieties, followed by fall cabbage	
Peas, early varieties, followed by fall cabbage	
Peas, late varieties, followed by fall cabbage	
Peas, late varieties, followed by fall cabbage	
Beans, followed by fall potatoes	
Beans, followed by fall potatoes	
Beans, followed by fall potatoes	
Cabbage, followed by fall potatoes	
Cabbage, followed by fall potatoes	
Cauliflower, kohlrabi, followed by fall potatoes	
Tomatoes, followed by spinach	
Tomatoes, followed by spinach	
Eggplant, peppers, followed by spinach	
Cucumbers, followed by turnips	
Muskmelons or squash, followed by turnips	
Early potatoes, followed by fall beans	
Early potatoes, followed by fall beans	
Sweet corn, followed by fall peas	
Sweet corn, followed by fall peas	
Sweet corn, followed by fall peas	
	A s p a r a g u s R h u b a r b
	o r H e r b s
	Open Seed Bed.
	Cold Frame.

Lesson 7: SEASONAL CHOICE OF VEGETABLES.

Grow only those crops that can be used at home or readily sold in the markets. Do not try to grow too many varieties; select the more easily grown crops at first, such as onions, radishes, peas, beans, turnips, beets, tomatoes, and cabbages. Study the local demands of your community and plant your garden to meet these.

The amount of space devoted to producing vegetables for home use will depend upon the size of the family, and the rest of the garden space may be planted in crops to be sold in the local market. If a smaller garden is a necessity, only those crops used at home should be planted. By careful attention to succession and companion crops, one-fourth of an acre can be made to supply a family of six with all the vegetables needed.

Plan a general scheme similar to that below. Always keep in mind that your plan must provide for a continuous succession of garden crops.

TWO IMPORTANT POINTS—KEEP YOUR GARDEN BUSY AND PLANT ONLY THOSE THINGS YOU CAN EITHER EAT OR SELL.

PLANTING PLAN.

First crop.—Consisting of early cabbage plants from hotbed or seedbox, radishes, onion sets, early peas, early potatoes, turnips, and mustard. These crops may be planted two weeks before the last killing frost.

Second crop.—Consisting of beets, parsnips, carrots, lettuce, salsify, spinach, wrinkled peas, cauliflower plants, celery seed, onion seed, parsley, and sweet corn. These crops may be planted about the date of the last killing frost.

Third crop.—Consisting of snap beans, okra, and tomato plants. These crops should be planted two weeks after danger of frost is over.

Fourth crop.—Consisting of lima beans, pepper plants, eggplant, cucumbers, melons, squash, and sweet potatoes. These crops can not be planted until all danger of frost is over, which is about four weeks after the last killing frost.

The above suggestions may be adopted by any community with such additions as needed. The main thing is to have a definite planting plan; one that contains succession crops.

Lesson 8: PLANTING DATES BY ZONES.

In the eight States designated as the Southeastern Division of the United States School Garden Army, there are seven distinct planting zones. The United States Department of Agriculture recognizes these zones on an outline frost map. In order to avoid confusion, arising from reference to two maps (one for fall and one for spring planting), the letters A, B, C, D, E, and F, on the above map, indicating zones, have been adopted in distinguishing zones in these lessons. The semitropical part of Florida has been labeled Zone T.



Outline map of the United States, showing zones based on the average date of the last killing frost in spring.

Altitude and nearness to large bodies of water will make slight differences in the planting dates, even in the same zone. A city on the southern edge of a zone will have a slightly longer growing season than one on the northern edge. If local conditions change the planting dates in a town in any zone, the planting plan given in lesson 7 should be followed.

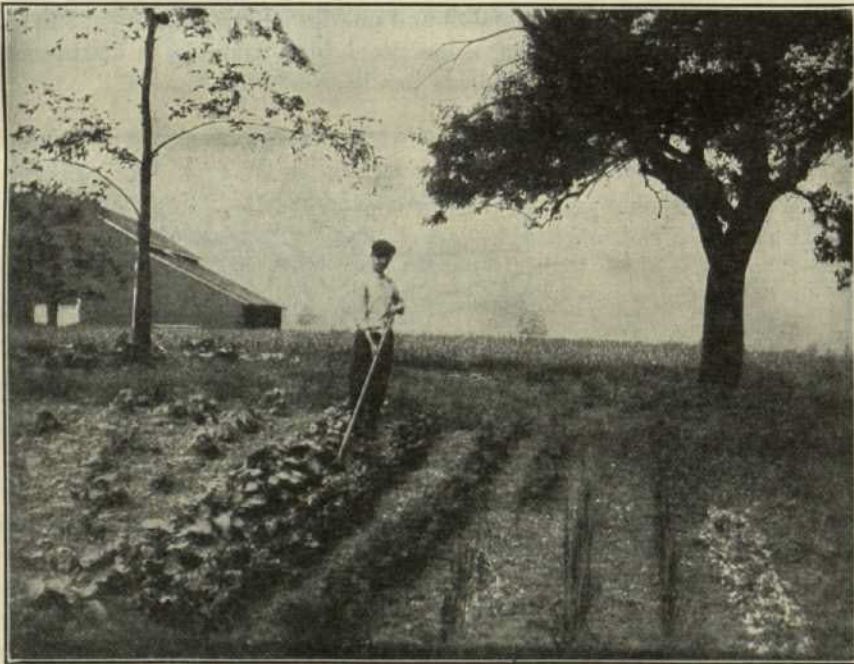
Teachers and supervisors of companies in the United States School Garden Army should constitute themselves as a group of investigators. Any suggestions for the improvement of lessons or corrections to meet local conditions will be appreciated.

Lesson 9: ROTATION OF CROPS.

Crop rotation, as understood in farm practice, means arrangement for growing different crops successively on the same soil. The object of rotation is to save the plant food in the soil, and, at the same time, keep the soil in such condition that it will grow large quantities of food. On large farm areas the growing of crops by limited applications of fertilizer and hasty preparation is necessary and thus crops with different needs are selected to follow each other.

In the vegetable garden the limited area makes it much easier to handle the problem of fertilizers and improvement of the physical condition of the soil. Heavy applications of fertilizer are necessary for practically all vegetables and the garden soil should always be worked thoroughly and deeply. From the standpoint of the physical and chemical condition of the soil, it should not usually be necessary to rotate crops. Practical gardeners often prefer to use the same land year after year.

The prevalence of certain insects and diseases may make it necessary to change the location of crops, or even to eliminate one or more crops for several years. Tomatoes should never be replanted on soil on which plants have been destroyed by wilt the year before. Changing the crop to another section of the garden, however, is often successful. Club root in cabbage, cauliflower, and collards may also be prevented by planting in another site.



Companion Cropping.

Lesson 10: COMPANION CROPS.

The plan of growing two or more crops on the same land at the same time is called companion cropping. Rows of crops that mature quickly may be planted between rows of other vegetables that occupy the land a long time, or plants that are ready for harvest in a short time

may be set or planted with slow-growing plants. By this method every square foot of space may be utilized, as the first crop will be ready for use when the second begins to need all the space.

Examples of companion cropping as carried out in the South are given in the following list:

1. Rows of radishes or lettuce planted between rows of beans, cabbage, beets, carrots, or onions.
2. Early snap beans planted between rows of cucumbers, melons, or winter squashes.
3. Tomato, eggplant, or pepper plants set between rows of the spring crop of Irish potatoes.
4. Radishes used to mark the rows of parsnips, parsley, and carrots.
5. Celery plants set between rows of early cabbage.
6. Rows of eggplants set between rows of early English peas.
7. Head lettuce plant set between each two cabbage or cauliflower plants.
8. Pumpkins or winter squashes planted every 8 feet in rows of corn.
9. Pole beans planted in the row, to run on corn or sunflowers.
10. Snap beans or cowpeas in rows of corn.
11. Turnips, mustard, or kale planted in rows of corn or late tomatoes.
12. Sweet potato plants set between spring cabbage.

Time may be saved in companion cropping by starting many vegetables that can be transplanted easily in the seed bed.

Lesson 11: SUCCESSION CROPS.

The garden soil should be kept well occupied throughout the growing season, which in many parts of the South is 11 or 12 months in length. As soon as one crop is harvested another should be planted. Time may be often saved by having plants in the seed bed, ready to transplant to the ground from which another crop has been gathered. The plan of having one crop follow another immediately is called succession cropping. Often three or four crops may be grown on the same ground in one year.

The following are examples of succession cropping. Teachers should visit local gardeners to study successions used in each zone.

1. Radishes followed by snap beans, followed by Irish potatoes.
2. English peas followed by sweet potatoes.
3. Early potatoes followed by okra.
4. Spring onions followed by tomatoes, followed by kale.
5. Lettuce followed by bush lima beans, followed by spinach.
6. Irish potatoes followed by an early variety of sweet corn, followed by mustard.

For a continuous supply of vegetables for the table, certain crops should be planted every 15 days. In cool seasons of the year there should be included in this list radishes, lettuce, English peas, turnips, beets, carrots, onions. In the warm season of the year snap beans and corn should be planted for continuous supply.

II. SOIL PREPARATION.

Lesson 12: SOILS.

Three general types of soil are recognized: Sand, clay, and loam or humus soils. Many combinations of these soils exist. In the Southeastern States clay soils predominate in the Piedmont section, and sandy soils in the coastal plain region. An excellent basis for a garden soil consists of one-third sand, one-third clay, and one-third humus. Soil types may be recognized and improved as follows:

HOW CAN SANDY SOILS BE MADE COMPACT?

Examination of sandy soils shows that many of the particles are large, with sharp edges, and as a result the soil is so open that it can not retain the rain or hold the plant food within the reach of the roots. To make a sandy soil compact, then, something must be added to fill up the pore spaces. This can be partially done by applying barnyard manure, by turning under green crops, and by adding clay or loam.

HOW CAN A CLAY SOIL BE MADE MELLOW?

Examination of a dry clay soil shows that the particles of clay are very fine, like wheat flour, with smooth, rounded edges. Such particles fit closely together and produce a compact soil, which prevents roots penetrating easily or the rain entering before it evaporates. To make a clay soil mellow, something must be done to make the pore spaces larger. Thorough tillage of the soil, the application of organic matter and lime, and drainage, will all help to do this. Occasionally the addition of sand or fine coal ashes is needed.

Lesson 13: GARDEN TOOLS.

The equipment for home garden work need not be elaborate or expensive. A spading fork, hoe, rake, and garden line are indispensable. The spading fork, hoe, and rake should be strongly made of tempered steel and seasoned wood and be well balanced. The very cheap tools are expensive in the end. The heavy grubbing or chopping hoe, commonly used in the South, is not satisfactory for the use of children, except when the soil is being prepared. A light steel hoe, square at one end and pointed at the other, is a good type to select. A 12-inch rake is heavy enough. Garden tools sold under the trade name of "Ladies' Size" are adapted to the use of children. In the small garden other tools, except a spray pump, are not necessary, but time will be saved and the result be more successful if a shovel, pick or mattock, hand weeder, and trowel are added to this equipment.

A large garden, after plowing and harrowing, can be cared for with a hoe, rake, and spading fork, but the other tools listed above should be purchased if possible. In cultivating large areas the addition of a wheelbarrow and a wheel hoe or hand plow will save time and labor. Wheel hoes, with attachments for several kinds of work, are inexpensive and great labor savers. A scuffle hoe and potato hook will also be found useful, but the wheel hoe should be first purchased.

In all gardens some kind of spray pump is essential. In the small garden a hand sprayer, costing from \$0.75 to \$1.50, is all that is needed, while in large gardens a knapsack or bucket pump will be more economical. Spray pumps and spraying materials are discussed in leaflets on insects and plant diseases.

Lesson 14: DRAINING THE GARDEN.

Many back yards will need drainage in order that the best crops may be produced. Surface water and water that stands in the soil, but too near the surface, will be removed by well-constructed drains. The lowering of the free water in the soil will permit the roots of the plant to feed deeper and prevent damage in times of drought. Air will be admitted to warm the soil and aid root growth. Chemical action will be increased and tillage made easier by proper drainage.

Open ditches will usually be satisfactory in removing surplus water, but such drains occupy space that might be used for growing crops, and the edges furnish a place for weed growth.

Covered drains are generally more satisfactory. When the garden is being prepared ditches should be dug so that all sections of the garden will drain into them. By filling the bottom of these ditches with stones, open spaces enough will be left between the stones so that surplus water will be carried away. The stone drain should then be covered with garden soil, but the stones should have been placed so that the ones at the top will not be reached by the spade or plow when the soil is being prepared. Boards or rails may be used in place of stones.

Tile drains are laid in the same way that stone or board drains are made, but are more satisfactory in that they do not become clogged by filling with earth. The cost of tile to drain a garden is small and increased production will pay cost of both tile and labor.

Lesson 15: PREPARING THE SOIL.

In the Southeastern States the garden season extends throughout the year. Something should be harvested from the garden every month. That part of the garden that is not planted should be broken up deeply and pulverized thoroughly. The soil is in the right condition to work when it crumbles in the hand after being squeezed. If it packs into a mud ball it is too wet to work.

Small gardens should be broken up with a spading fork. Larger areas can be plowed more economically. Plants thrive better in soils that have been broken deeply (12 or 14 inches), because the roots receive more air and have a larger feeding area. Break all clods soon after the soil is turned; always before they are baked by the sun. The surface of the soil should be raked until it is smooth.

A liberal dressing of well-rotted stable manure should be worked into the soil. This supplies food for the plant, improves the physical condition of the soil, and helps to hold moisture in dry seasons. If the soil is too acid, lime may be used to "sweeten" it, or neutralize the acid character. To remedy this condition, apply evenly 1 pound of air-slaked or 2 pounds of ground lime stone to every 30 square feet of garden space.

The garden soil should be prepared very thoroughly. Careful and thorough work in the beginning will save time and labor later in the season.

III. ENRICHING THE SOIL.

Lesson 16: HUMUS.

Humus is a word the meaning of which every soldier in the United States School Garden Army should know. Humus is the decayed parts of plants and animals.

By lifting the loose leaves in the forest a black leaf mold is exposed that is almost pure humus. The black humus-filled soils of swamps are often taken up and carted long distances to spread on cultivated land. Pure humus is so valuable that it is packed in barrels and bags and shipped long distances for use in greenhouses. Commercial fertilizers applied to soil lacking humus will not produce a crop.

In the South many soils lack humus. The hot sun burns it and the quick, washing rains carry it away to the lowlands and down the rivers. Cities and towns are great wasters of humus. The garbage man carries away humus when he takes the table scraps and refuse food. Humus is burned in great quantities in the form of leaves and grass clippings raked from the lawn. The street cleaners carry away animal manures and leaves that would make humus for your garden.

Every good gardener knows the value of humus and saves it all. The best way to save humus is to make a humus pile. In the small garden near the home garbage or other animal and plant material that will decay quickly may be buried between the rows of vegetables.

Lesson 17: THE HOME HUMUS PILE.

Every home should have a humus pile. Select a well-drained location 8 or 10 feet square and begin to pile material that is to make humus for the next year's garden. Manure, leaves, lawn clippings, skins, and rinds of fruits, husks, pods, and stems and leaves of harvested crops should all be piled together to make humus for the next crop. Long vines and coarse stems will decay more quickly if chopped with a hoe into small sections before adding to the pile. In building the pile keep the top flat or concave so that rains will soak through the material rather than wash it away. The decay in the humus pile will form vegetable acids that make land sour and next spring when the humus is applied ground limestone should also be spread at the rate of 1 bushel to every 500 square feet of garden space.

There are some plants that should not be added to the humus pile. Tomatoes attacked by the bacterial wilts and other plants badly affected by diseases or insects should be burned. Coarse woody stems will take such a long time to decay that it is best not to add them to the pile.

In the small city garden some objections may be raised to humus piles. House flies breed in decaying materials and a humus pile not properly cared for will lead to trouble with the city health department. If the pile is kept covered with 6 or 8 inches of earth there will be no trouble from breeding flies. When much manure and garbage is placed in the pile at once, the odor produced by decay may be objectionable. If the materials are put on in small quantities and 6 or 8 inches of earth placed over each layer this objection will be eliminated.

Lesson 18: MANURE.

All garden crops require rich soil, well supplied with humus. Barnyard or stable manure is the best garden fertilizer, because it furnishes this humus. In some localities it is impossible to get manures for the garden and dependence must be placed upon commercial fertilizers.

When manures are selected for the garden care should be taken that there are no elements in them injurious to the soil. Sawdust and shavings in manure tend to make the soil sour. If the manure used comes from stables all shavings and sawdust should be removed if possible. The manure from sheep, pigeons, and chickens contains a great deal of plant food. These manures are more valuable than the ordinary barnyard manures, but must not be distributed too thickly over the garden.

It is customary to work coarse manure into the garden soil in the fall so that it will have time to decay. In the spring well-rotted manure can be worked into the soil with a digging fork. The amount of manure necessary for the garden depends upon the condition of the soil. Poor, worn-out soils will necessarily need more than rich, mellow soils. From 20 to 30 tons of manure per acre is generally very satisfactory. This means about a pound of manure to every square foot of garden space.

Humus may be added to the garden soil by planting a leguminous crop. Cowpeas, soy beans, or vetch are excellent crops for this purpose. Such crops gather nitrogen from the air and store it in their roots. After these crops are plowed into the soil the nitrogen is "fixed" and becomes available for the young, growing plants. This method of supplying humus is only employed between cropping times and can not be successfully used to any great extent while the garden is being used.

Lesson 19: FERTILIZERS.

Many Southern soils have been in continuous cultivation for so many years that they no longer furnish enough food for plant growth. This food must be supplied by the gardener, or plants will not develop as they should.

We may supply this plant food by adding humus, manures, or fertilizers to the soil. Humus is any decayed vegetable or animal matter that we add to the soil to help plants grow. Lawn-grass cuttings, rotted leaves, clover crops, etc., make excellent humus for the garden.

Fertilizers are chemical compositions that contain food necessary for plant growth. Most fertilizers are composed of the three elements needed by plants: Nitrogen, phosphoric acid, and potash. No definite rule can be given for this kind and quantity of fertilizer to be applied to the garden as this varies with the condition of the soil and the kind of crop to be raised.

Garden fertilizer may be bought from your local dealer. All such fertilizer is graded and labelled under the direction of the United States Government. A careful selection should be made and only the amount needed should be purchased. From 50 to 100 pounds of high-grade garden fertilizer may be applied to every 400 square feet of cultivated garden space.

As potash is scarce and expensive at the present time, 1918, wood ashes may be used in its place. Unleached wood ashes should be applied to the garden at the rate of 1,500 pounds per acre.

Whenever it is possible, barnyard manures should be used to enrich the garden soil, but in some cities it is impossible to get them. In such cases, dependence must be placed on commercial fertilizers.

IV. SEEDS.*Lesson 20: THE SEED LIST.*

Seeds for the garden should be selected in advance of the planting period. Only the amount of seed absolutely necessary for planting should be purchased. There will be a serious shortage of garden seed for some time to come and care must be exercised not to waste any. The following table gives the approximate quantities of seed necessary to supply vegetables for a family of four. The amount needed by the student may be estimated from this table.

Beans:	Melon:
Bush lima..... 1 pint.	Muskmelon..... 1 ounce.
Pole lima..... 1 pint.	Watermelon..... 2 ounces.
Snap..... 1 or 2 quarts.	Onion sets..... 4 to 6 quarts.
Beets..... 4 ounces.	Pea, English..... 4 to 6 quarts.
Cabbage:	Parsley..... 1 packet.
Early..... 1 packet.	Parsnip..... $\frac{1}{2}$ ounce.
Late..... $\frac{1}{2}$ ounce.	Radish..... 1 ounce.
Carrot..... 1 ounce.	Salsify..... 1 ounce.
Cauliflower..... 1 packet.	Spinach:
Celery..... 1 packet.	In spring..... $\frac{1}{4}$ ounce.
Corn, sweet..... 1 to 2 pints.	In fall..... $\frac{1}{2}$ pound.
Cucumber..... 1 ounce.	Squash:
Eggplant..... 1 packet.	Hubbard..... 1 ounce.
Kale..... 2 ounces.	Summer..... 1 ounce.
Lettuce:	Tomatoes:
Head..... $\frac{1}{2}$ ounce.	Early..... 1 packet.
Leaf..... $\frac{1}{2}$ ounce.	Late..... $\frac{1}{4}$ ounce.
	Turnip..... 2 to 3 ounces.

It is not supposed that any family will use all the vegetables listed, nor will all families require the same amount of any crop. The pupil should select his seed from this list and make successive plantings so that fresh vegetables may be obtained throughout the season.

Lesson 21: BUYING GARDEN SEED.

It is very important that the best garden seed be bought. In many small towns in the south, seeds are sold largely from drug stores. Many of these stores purchase from reliable seedsmen, but in buying be sure that your supply has not been kept over from last year.

Although many seeds of a certain kind may look alike, yet the crops they produce will vary greatly. A seed is simply a baby plant wrapped in an outer covering, and it is hard to tell what the seed will produce unless its ancestors are known. The best seeds have had their ancestors carefully selected by the man who grew them. The poorer plants were discarded and only the best allowed to mature and produce these seeds. This process is called selection of seed and is a very important step in producing the best varieties. Reputable seedsmen make it a rule to handle only selected seeds.

The different varieties of plants have been produced by selection. It is better for a pupil to purchase a packet of a certain variety of seed, say Scarlet Globe Radish, than simply a packet of unnamed radish seed. He is much more likely to get a satisfactory crop and he will learn much more about gardening in growing the crop.

In planning the seed order, therefore, the first thing to consider is, buy good seed, and the second, buy by varieties.

Seeds may be bought in bulk much cheaper than in packets. As a general rule better seeds are obtained in this way. The seed bought in bulk should be divided into seed packets, each packet containing sufficient seed for the garden of the individual pupil. The cost of the smaller packets should be computed from the cost per pound of the bulk seeds.

SUGGESTIONS FOR THE SEED ORDER.

1. Where possible, buy in bulk from reliable seed houses.
2. Buy only named varieties.
3. Select only those varieties recommended on lists sent out from this office, or those varieties that have proven satisfactory to your local gardeners.
4. Keep a record of the success of your varieties to guide you in the future.



Select standard varieties adapted to your locality.

Lesson 22: SEED TESTING IN THE SCHOOL.

The germinating power of seeds sold by reliable seedsmen has usually been tested. If there is any doubt in regard to seeds purchased or saved from last year, they should be tested. A seed consists of two parts, an embryo and an outer covering. If the embryo plant is alive, it

will sprout into growth under favorable conditions. If dead, the seed is worthless. We ought to know the seed we plant is good.

The following are simple ways of testing the vitality or sprouting quality of seeds:

1. Fill a water tumbler, a cup or bowl half full of clean moist sand. Place ten seeds on top of the sand. Cover the top of the tumbler with a small piece of glass or a saucer. Keep the seeds moist and warm. Note the proportion of seeds that germinate.

2. Cut three or more pieces of blotting paper so that they will lie flat in a pie or soup plate. Place 10 seeds between each two layers of the paper. Add enough water to moisten the paper. Keep in a warm room. Note the proportion of seeds that germinate.

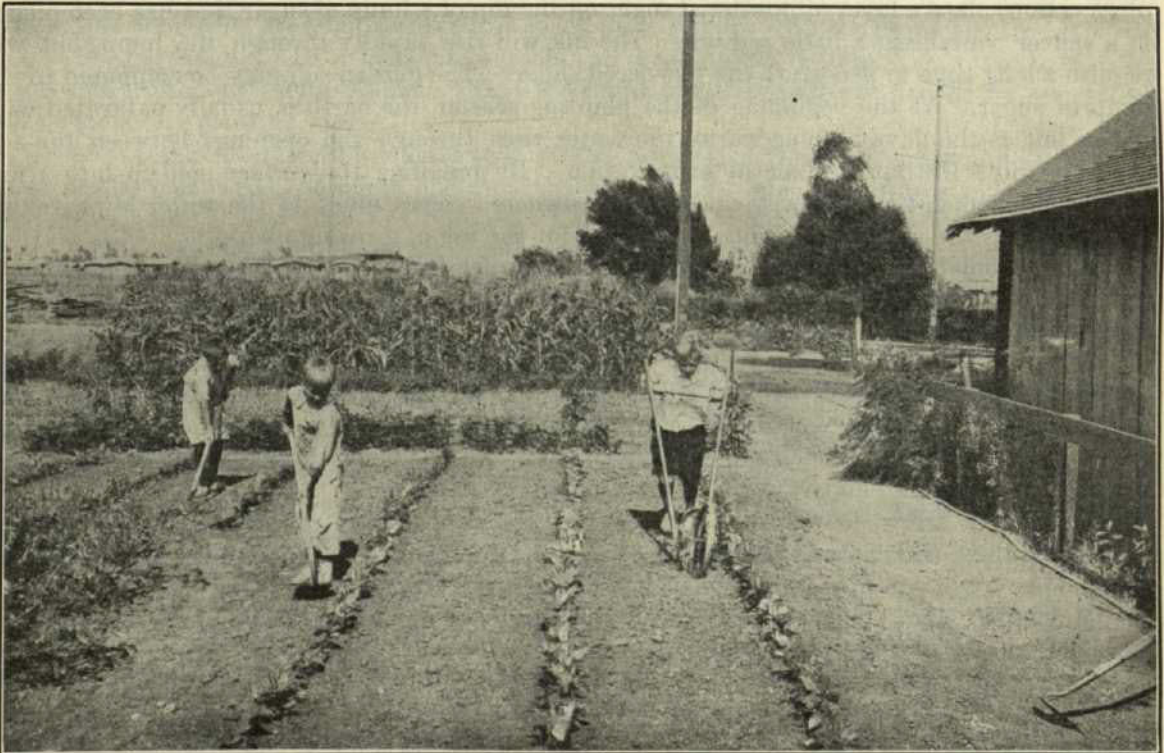
3. Plant 10 seeds in the soil of a flower pot or window box. Keep the soil moist and warm. Note the proportion of seeds that germinate.

Pupils should keep a record of these experiments, carefully noting results. If the pupil places 10 bean seeds in a germinating dish and 7 grow, let him work out the percentage of vital seeds.

V. PLANTING AND CARE OF THE CROP.

Lesson 23: PLANTING THE GARDEN.

Be sure the soil is prepared thoroughly before you begin to plant. If any part of the garden has been packed since spading, it should be again loosened, all clods broken, and the surface made smooth and fine by the use of the rake.



Long straight rows are easiest to cultivate. Utilize all the garden space.

Before beginning to plant, the garden diagram should be consulted. Remember that in a hill-side garden, the rows should run across the slope. When the ground is level, there are some advantages in running the rows north and south, but long straight rows are easier to cultivate.

When the direction of the rows has been determined, garden stakes should be driven at either end of the garden where the first row is to be. The garden line should be stretched tightly between these stakes and the seed drill opened with the hoe directly under the line. The sowing of lettuce, turnips, mustard, kale, and other salad and greens crops broadcast is not advisable. Better results will be obtained by sowing crops in rows and cultivating.

As soon as the drill is opened, the seeds should be sown. It will be helpful to leave the planting line in place in order that the seeds may be placed directly under the line. When the seeds are sown, the planting line should be taken up and the seeds covered. Firming the soil along the row after planting will bring the moist soil in close contact with the seeds and hasten germination. The stakes at the end of the row should be left in place and marked with the name of the vegetable planted. Next, measure from these two stakes the distance for the next row, set two more stakes and proceed as before. Continue measuring the row distances accurately, placing stakes, stretching line, opening drills, planting seeds, covering the seeds and firming soil and labelling the stakes, until the whole garden is planted.

Lesson 24: MULCHES.

Mulches are used for two purposes: To retain moisture in the soil and to protect crops in cold weather.

The dust mulch is used only to conserve moisture in the soil. Moisture comes up through the openings in the soil by capillary action. To help children to understand this process by actual observation, place a layer of powdered sugar on the top of a lump of sugar that has been placed in a saucer containing a little red ink. The ink will rise rapidly through the lump, but will require a long time to penetrate the powdered sugar. The garden soil may be compared to the lump of sugar. At the beginning of the planting season, the earth is usually saturated with water, but as the days become warm, the water rises through the openings between the soil particles and is lost into the air by evaporation. By breaking the surface soil up into a fine dust, which acts in the same way as does the powdered sugar, much of the water is prevented from reaching the surface, and thus is retained for the use of growing plants.

A dust mulch should cover the surface of the garden from the time the soil is prepared until the last crop is harvested. The garden rake or wheel hoe, with fine tooth attachment, are good tools to use in making the dust mulch. A hand weeder is useful in mulching the soil near plants.

Straw, leaves, and pine needles placed between growing plants retain moisture in much the same way as does the dust mulch. Heavy coverings of these materials are often used in hot, dry, weather to preserve moisture for the starting of fall crops. Irish potatoes are sometimes grown to maturity under such mulches, but results are not generally as satisfactory as those produced by thorough cultivation and dust mulching.

Mulches of straw, leaves, and pine needles are also used to protect the winter garden. By placing these materials on the surface of the soil, the plant stems and roots will be protected and the plant will continue to live even though the top is damaged by frost.

Mulches of plant stems and leaves will add humus to the soil if turned under, or they may be raked up and placed on the humus pile.

Lesson 25: SURFACE TILLAGE.

From the time the crop is planted the surface of the ground should never be allowed to become hard or baked. A surface dust mulch should be made with the rake or wheel hoe as soon as the soil can be worked after each rain. Keep the top of the soil loose and the surface particles fine at all times. In case of a rain, before the crops have appeared above the ground

to mark the rows, the space between the rows may be cultivated without damaging the seedlings by stretching the garden line between the garden stakes and cultivating between the lines. Care should be taken, however, not to work the soil directly over rows where small seeds have been planted.

When plants are small, cultivate near to the row, but be careful not to move enough soil to loosen the roots of the seedlings. As the plants grow, cultivation near them should become shallow. A hand weeder is a useful tool to use in working near plants of all sizes. Deeper cultivation should, however, continue between the rows.

A good practice to follow is to work the ground thoroughly once each week. Even though a dust mulch is present, the plants will be benefited by cultivation. The dust mulch retains the moisture but cultivation improves the physical condition of the soil, makes the soil warmer, helps the air to reach the plant roots, mixes the fertilizer more thoroughly with the soil, and thus makes plant food available and destroys weeds and insects.

Lesson 26: WEEDS.

It need not be considered strange if the conscientious United States Garden Army soldier dreams several times during the garden season that weeds have covered the garden, are lifting the house, and have transformed the city into a wilderness.

Any plant—even a vegetable—that is growing in a row where you do not wish to have it, is a weed. The weeds that we have to fight day after day, however, are not generally useful plants, but are strong growers that contest every foot of space with the crop.

If the garden is to be a complete success, all weeds must be removed. Weeds take up space and crowd out useful plants. Plant food and moisture that are needed by vegetables will be stolen by growing weeds.

Some of the most troublesome weeds of the South are Bermuda grass, Johnson grass, horse nettle, chickweed, ragweed, and smart weeds. These and other weeds may be divided into two classes: Those that are reproduced from underground stems, rootstocks or bulbs (nuts), and those that have many fine roots, commonly spoken of as fibrous rooted plants.

Fibrous rooted plants are destroyed by pulling up the plant. Pulling those that grow from underground stems and bulbs, however, leaves the stem or bulb in the ground to sprout a new plant. To conquer this class of weeds, rootstocks, bulbs, and underground stems must be dug and completely raked out of the soil. These plants may be also killed by not letting any green part live above the ground for two years. For this reason chickens and pigs are kept on Bermuda grass and nut grass land for two years before it is used for a garden.

Many weeds produce great quantities of seed. To save work later, destroy all weeds in fence corners and along open ditches. It is even worth while to mow weeds in near-by vacant lots before the seeds are ripe.

Lesson 27: THINNING CROPS.

Back-yard gardeners sow seeds thicker than the plants can grow to maturity. Children especially like to see even the finest seeds in the bottom of the seed drill. Teachers should constantly impress upon garden army soldiers the fact that seeds are now scarce and expensive; that only the required amount be planted.

Even when the greatest care has been exercised, more seedlings will grow than can develop a crop as mature plants. Consult the Planting Charts for distance between plants. All seedlings nearer together than the distance given should be pulled when young. As plants

grow the roots spread out, and when large plants are pulled the roots of those we wish to have remain will be disturbed and these plants killed or their growth checked.

Salad and "greens" crops may be planted thicker than other crops, as the thinnings may be pulled and used, thus giving more room to plants that are left. Beets and turnips, even when planted for the roots, may be sown thickly and the thinnings used for greens until the plants stand at the right distance for the best root development. Beet leaves and even the whole plants, with roots up to one-half inch in diameter, make excellent greens and should be used much more commonly. In thinning, to leave beets and turnips for a root crop, whole plants should be pulled rather than the tops cut off. In pulling the greens, disturb the other plants as little as possible.

Lesson 28: WATERING THE GARDEN.

The right degree of moisture should be maintained in the soil to secure the best plant growth. If the soil becomes too dry, growth is retarded. Moisture may be retained in the soil by frequent cultivation, but in dry seasons it is often necessary to irrigate the garden. In applying water, always remember that thoroughly saturating the soil once each week is much more beneficial than sprinkling the soil a little every day.

Where the open-ditch system of drainage is employed, the garden may be watered by stopping up the lower outlets of the ditches with boards, against which earth has been packed, and then turn the hose in the ditches. The same practice may be carried out with tile drains if the opening at the upper level is left exposed and the lower ends closed. In gardens where the slope permits, water may be run in furrows between the rows of vegetables. Automatic lawn sprinklers used on the hose are satisfactory if left in one place until the soil is saturated, but moved before the surface is washed.

Overhead irrigation is now being used in many commercial gardens. To use this method in the home garden enough inch water pipe should be secured to extend the length of the garden. Holes should be bored in the pipe at 2-foot intervals and a special nozzle screwed in each hole. The pipe is closed at one end and placed so that the other end may be connected with the kitchen faucet by a length of hose. The pipe should be placed on posts 2 feet above the ground or above the head of the worker, but should be secured so that it may be turned to water different sections of the garden. A boring outfit may be purchased for about \$5 and the nozzles for 5 cents each. An outfit secured by a school may be loaned to all gardeners in the community. Very small openings made on a line in the pipe may be used in place of the nozzles. Where the water pressure is strong one pipe will water the average city lot garden, but in large gardens the pipes should be placed 50 or 60 feet apart. By connecting these lines of pipe with one head pipe the whole garden may be watered at once.

The amount of water to be applied even in a dry season will depend on the abundance of the supply and low cost. In cities where water is sold at a high meter rate, it may not be economy to water the garden.

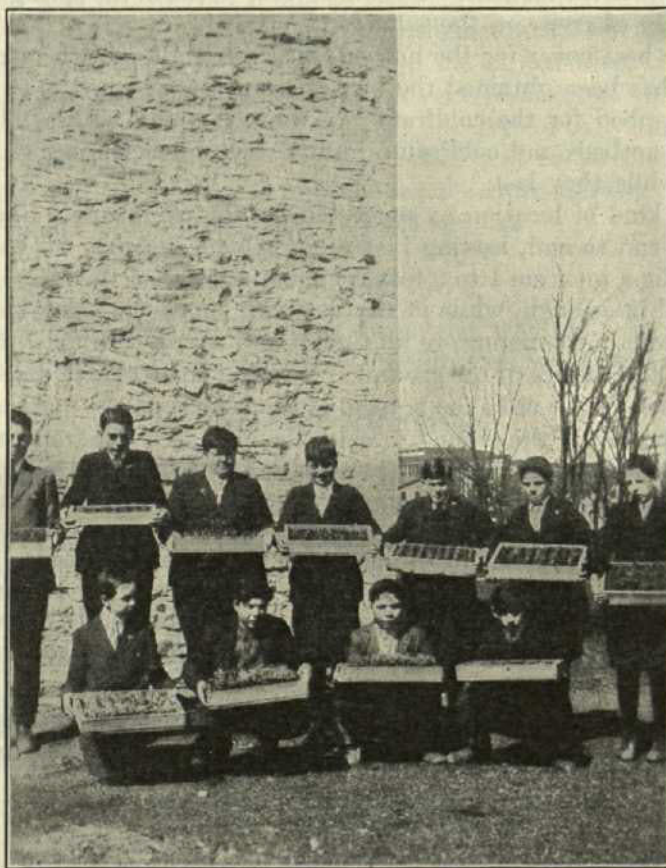
Lesson 29: THE COLDFRAME.

The coldframe is a valuable addition to the garden equipment in all zones. In the South it serves a double purpose: To protect plants from cold before it is time to set them in the open garden and to shield seedlings, started for the fall and winter gardens, from the hot sun of summer.

The United States School Gardener should search the home basement or out buildings for old window sash. If any is to be found, replace broken panes and use putty to fasten all glass in place. Standard coldframe sash may be purchased in sizes 3 by 6 or 3 by 3 feet. In case

glass sash can not be obtained, the making of a coldframe need not be given up. Make a frame of narrow boards and cover it with two thicknesses of muslin. A specially prepared cover, known as glass cloth, is now sold to use in making coldframes. Stretch the cloth to be used tightly over the board frame and tack it in place.

Now that the cover is ready for use, select a board 1 inch thick and 12 inches wide. From this saw three pieces, one 2 inches shorter than the length of the glass or cloth covered sash, and two pieces the exact width of the sash. Nail the two pieces to the end of the other so that the corners are square. Next cut a board 6 inches wide, two inches shorter than the cover sash, and nail it in the open end of the box and square with the top of the other boards. You now have a box without top or bottom, three sides completely inclosed and one side with a 6-inch board at the top and 6 inches of open space near the ground.



For an early start, grow seedlings in flats.

A deep seed bed, somewhat larger than the frame, should be made in a section of the garden that is protected from north winds, but not where it will receive the wash from the eaves of a building or higher ground. Work rotted manure into the ground at the rate of 1 bushel to each 9 square feet. Now place the board frame over the seed bed with the partly open end toward the south. With a spade work the soil from under the south ends of wider boards until the 6-inch piece rests on the surface of the ground. You now have buried the end boards so that the box is 12 inches high at the north end and 6 at the south. Bank loose earth or manure about the boards and put the cover in place and hinge it to the north side with hinges or strips of

leather. After the seedlings are started the coldframe will need ventilation on warm days. This may be accomplished by placing blocks 1 inch square under the edges of the south end. The opening may be increased by moving these blocks toward the north.

If the coldframe is to be used in summer, the glass cover should be taken off and replaced by a muslin-covered frame. The muslin-covered frame should be supported a foot or more above the plants so that there will be a free circulation of air.

Lesson 30: THE HOTBED.

The hotbed is a coldframe to which some kind of artificial heat has been added. This heat is usually produced by the fermentation of manures. The hotbed should be used much more generally in the South. In practically all zones there are cold seasons when tender seedlings will need protection and artificial heat. To gain several weeks in the spring will enable gardeners to increase the number of crops on the same land.

Glass sash is the best cover for the hotbed, but heavy glass cloth or canvas may be used. As soon as the sash has been obtained the box or frame on which it is to be placed should be made exactly as described for the coldframe. Two-inch plank will last longer if used in the construction of both hotbeds and coldframes, but if well banked the inch boards will give as satisfactory results while they last.

Select the same kind of location as suggested for the coldframe. Space will be saved by placing these frames end to end, leaving just room enough between for the gardener to stand. On the site selected dig a pit from 1 to 3 feet deep and the size of the frame. In southern zones the former depth will be enough, while in the northern zones the latter should be used.

Secure enough fresh horse manure to fill the pit and tramp it in until the top of the manure is 3 or 4 inches below the surface of the ground. Now put the frame in place by pushing the end boards down the side of the pit until the bottom of the boards on the north and south side of the frame are even with surface of the ground. Bank the outside of the frame to the top with earth or manure. Next cover the manure in the frame with 5 or 6 inches of rich, finely powdered soil. Put the sash in place and leave it closed for several days. A soil thermometer should be placed in the soil. Keep the surface soil about as moist as you would the soil in a flowerpot of a house plant. When the thermometer falls to 85 degrees, it is time to sow seeds.

In place of the pit a pile of manure several feet in thickness may be made on the surface of the ground. The frame is then placed on the pile and the outside banked with manure. Good soil 5 or 6 inches deep is now placed inside the frame, kept watered, and the temperature recorded as above.

The manure placed in the pit or pile should give heat from fermentation for several weeks. Care must be taken to ventilate the beds on all days when the sun is warm.

VI. GARDEN CROPS.

Lesson 31: LETTUCE GROWING.

Three types of lettuce are commonly grown: Head, Cos, and Leaf Lettuce. All should have a place in the Southern home garden. Head lettuce forms a solid head like cabbage and the inner leaves are white and tender. The leaves of Cos lettuce or Romaine grow erect and curve inward at the tips and edges, thus partly shading and blanching the center. The leaves of Leaf lettuce curve outward and the whole plant is green through exposure to the sun.

SOIL AND FERTILIZER.

The soil for lettuce should be very rich in humus. Heavy application of well-rotted manure must be worked into the soil before the plants are set if the best results are to be obtained. As lettuce is a leaf crop, nitrogen-carrying fertilizers are very beneficial. Several applications of liquid manure will show immediate results. One tablespoonful of nitrate of soda to 2 gallons of water, makes an excellent growth stimulant if applied two or three times after transplanting to the garden. Be sure that the nitrate of soda is thoroughly dissolved and that the solution is not poured on the plants.

PLANTING AND TRANSPLANTING.

In hot weather, head lettuce will go to seed rather than form a head. The plants should be started in a protected seed bed or cold frame at least six weeks before the time of planting in the garden. In the late summer or early fall, the seedlings are covered to protect them from the sun that the plants may be ready to transplant to the garden when the cool season begins. In the late winter, the cover should be used to protect the plants from the frost that they may be set in the garden in time to mature before the very hot days of early summer. Cos and Leaf lettuce may be sown directly in the garden as they stand heat better than Head lettuce. The best plants will be obtained by treating as outlined for the Head lettuce. By shading the rows with muslin, Leaf lettuce may be grown well into the summer.

CULTURE.

Frequent, shallow cultivation should be given in dry weather. In wet seasons, the cultivation should be deeper, and more thorough. Remove all weeds and keep the surface soil loose at all times.

YIELD AND MARKETING.

One hundred feet of row will produce from one hundred to one hundred and fifty heads. For home use, the plants should be gathered just before the time of using that the leaves may be crisp and tender. For market, the whole head should be removed by cutting the stem just under the lower leaves. Remove the outer, ragged and discolored leaves, and sell to your neighbor or grocer at once.

Lesson 32: PARSLEY GROWING.

Parsley furnishes such an addition to artistic appearance of the table and so much to the flavor of foods that its use should be more common. The amount of space required for the growing of a supply for the family is so small that no home garden should be without the crop.

SOIL AND FERTILIZER.

A deep, rich, moist soil produces the best crop of parsley. Too much manure can hardly be used in preparing the soil for this crop. Cotton-seed meal worked into the soil will supply nitrogen to stimulate a quick growth. Liquid manure and nitrate of soda used as suggested for lettuce (Lesson 31) will also hasten growth.

PLANTING AND TRANSPLANTING.

Parsley is generally sown in the garden row where it is to stand. The seeds are very small and often low in germinating qualities. Soaking the seeds for 24 hours before planting will hasten germination. To avoid sowing too thickly, the seeds are often mixed with fine sand.

The addition of a few radish seeds to the sand will mark the rows so that cultivation may begin before the parsley has appeared above ground. When the plants are well established this crop will stand more heat than most cool season crops. By picking the leaves the plants will produce well into the summer. Shading the plants will prolong the summer growing season, for this reason parsley is often grown in the shade of shrubs or in flower beds. In the Northern zones of the Southeastern Division a few plants lifted from the garden before the cold weather and kept as house plants, will furnish a supply of leaves for use throughout the winter.

CULTURE.

Parsley should be cultivated often and all weeds removed. Keep the soil moist at all times.

YIELD AND MARKETING.

One hundred feet of row will produce many hundred bunches of leaves. For the market, the crisp quickly grown leaves should be made into small bunches and sold immediately.

Lesson 33: ENDIVE GROWING.

Endive is grown very little in the South. In the home garden, however, it might well be grown to produce salad materials at such times as lettuce is not available.

SOIL AND FERTILIZER.

A rich, light loam is required to stimulate the best growth. Only thoroughly decomposed manures should be used. If nitrate of soda and liquid manure are used, care should be taken not to get any of the solution on the plants, as endive is susceptible to leaf rot, especially after blanching begins.

PLANTING AND TRANSPLANTING.

The seeds of endive are usually sown in drills at the beginning of the cool season. For a fall crop, in Northern zones, the seeds should be started in midsummer. At this time, it is best to start the seedlings in a seed bed and transplant to the garden at the beginning of cool weather. In either case, the plants should eventually stand 12 inches apart in the rows and the rows should be made 18 inches to 2 feet apart.

CULTURE.

Endive is a surface feeder, and thus culture should be shallow. The plants must be kept growing rapidly or the leaves will become tough and bitter. About three months after planting, the crop is ready to be blanched. This is done by tying the outer leaves when dry over the inner and harvesting when the color has disappeared from the latter.

YIELD AND MARKETING.

The whole plant is cut for market in the same way as with lettuce. A short row is all that will be needed for family use. For home consumption, the plants should be tied for blanching at different times, as rot often sets in as soon as blanching is completed.

Lesson 34: SPINACH GROWING.

There are two types of plants grown under the name of spinach, although they are very different in structure. The common cool-weather spinach forms a rosette of leaves near the ground, while the New Zealand spinach is a hot-weather crop, and forms a large branching

plant. When the whole of the United States is considered, spinach is the largest crop grown exclusively for "greens." In the South there are many other crops grown for use as "greens," but spinach merits a larger use than it has at present. If given a thorough trial this crop is sure to supplant many less desirable "greens" crops.

SOIL AND FERTILIZER.

A light, sandy loam will produce the best crop. Heavy applications of well-rotted manure should be worked into the upper 8 inches of soil or a liberal broadcast application of a good grade of garden commercial fertilizer may be used in place of the manure. Cotton-seed meal cultivated into the surface soil, between the rows of growing plants, will stimulate leaf growth. Nitrate of soda and liquid manure as described for lettuce will be beneficial. The crop must be kept growing by the use of fertilizer or it will produce a seed stalk rather than the desired leafy head.

PLANTING AND TRANSPLANTING.

The fall and spring crop of spinach should be sown in the garden where the plants are to grow. The seeds often germinate slowly and are of low vitality. The seeds should be sown rather thickly and the plants thinned to stand 6 inches apart. If the weather is warm and dry when the fall planting is made, the crop should be watered until the plants are well established. New Zealand spinach should be started in the early spring. This crop may either be sown in the row where it is to stand and thinned so that the plants stand 1 foot apart or the seedlings may be grown in the seed bed and transplanted to the garden.

CULTURE.

As spinach is a surface feeding crop, shallow cultivation should be given often. The New Zealand spinach may be cultivated more deeply, but deep working near the plant will destroy some roots. Keep all weeds pulled and water the crop when growth seems to be checked.

YIELD AND MARKETING.

One hundred feet of row will produce from 1 to 2 bushels of the fall and spring crop. When a large rosette of leaves is formed, the whole plant is removed by cutting the tap-root just below the surface of the ground. Remove dirty and torn outside leaves and sell by dry measure. There is little market demand for New Zealand spinach, but as a home "greens" crop it is excellent. If the leaves are picked as needed the plants will continue to produce throughout the summer.

Lesson 35: MUSTARD GROWING.

Mustard probably ranks next to turnips as a "greens" crop in Southern gardens. The curled leaved varieties are typical cool season crops, but the Chinese varieties now being introduced will produce well into the summer.

SOIL AND FERTILIZER.

As a surface-feeding leaf crop mustard makes its best growth on a soil rich in nitrogen. Liberal applications of well-rotted manure should be worked into the soil before the crop is sown and cottonseed meal or nitrate of soda used between the rows to hasten growth. As the plant is a strong grower, however, a fair crop may be made on a relatively poor soil.

PLANTING AND TRANSPLANTING.

Mustard should be sown rather thickly in rows and the small plants used as the crop is thinned. After the plants have been thinned to stand 6 inches apart the crop may be continued by picking the leaves rather than pulling the entire plant. Chinese mustard sown in the spring will produce after most cool season "greens" crops have matured.

CULTURE.

Shallow cultivation should be practiced to maintain a soil mulch and to work fertilizers used as top dressing into the soil. Be sure to keep the rows free from weeds.

YIELD AND MARKETING.

One row, 100 feet long, will produce from 1½ to 3 bushels of "greens." The leaves or young plants should be used or sold by dry measure as soon as picked.

Lesson 36: CHARD GROWING.

Chard, often called Swiss chard, is a form of beet that develops a heavy top rather than a large root. The leaves are green in color and often much wrinkled. The leaf stalks and midribs are broad and nearly white. The roots are small and white and are not used. This plant should be grown much more commonly in the Southern home garden than is the case at present.

SOIL AND FERTILIZER.

A rich, humus filled soil is necessary for the best development of this crop. The plants should grow quickly if the leaves have the succulent quality that is desirable. Top dressings of cottonseed meal or nitrate of soda will produce this succulency.

PLANTING AND TRANSPLANTING.

The seeds of chard are usually sown in the row where the plants are to grow. A good plan is to plant the seeds 2 inches apart and use the thinnings for "greens" until the permanent plants stand 8 inches to 1 foot apart. In the more northern zones an extra early spring crop may be obtained by starting the seedlings in flats or cold frames and transplanting to the garden when danger of frost is over. This crop stands heat better than beets, the spring crop lasting well into the summer if the soil is kept moist. An early fall crop may also be produced if the seedlings are started in shaded seed bed. Good results can be obtained by shading a whole row with old muslin or burlap. The cloth should be raised 6 or 8 inches above the ground.

CULTURE.

The soil between the rows should be worked deeply and shallow cultivation given near the plants. For the best development of the midribs the crop should be thinned while the plants are small.

YIELD AND MARKETING.

From 3 to 5 bushels of greens may be produced from 100 feet of row. The thinnings and leaves may be sold by dry measure for greens. The permanent plants left after thinning will continue to produce if the outer leaves are picked as needed. These plants may also be left until large and the whole plant pulled and sold in bunches of from 6 to 12 plants.

Lesson 37: KALE GROWING.

Kale belongs to the cabbage family, and at the present time is grown little in the southern home garden. Cities having a larger foreign population use it rather extensively. Large quantities are now grown near Norfolk, Va., for shipment to northern cities. Because of its ability to stand heat, cold, and drought, it should be much more generally grown.

SOIL AND FERTILIZER.

Because of the hardy growing qualities of this vegetable it may be placed in the poorest soil of the garden. Like other leaf crops, however, it responds to good loam and heavy fertilization. A warm, sandy loam should be selected for the winter crop, while a moist, heavy loam produces best in summer.

PLANTING AND TRANSPLANTING.

The curled varieties should be used in spring, while Siberian kale and Norfolk kale stand the cold of winter better. The seeds may be sown in the row where the plants are to grow, but the best results will be secured by starting in a seed bed and transplanting 1 foot apart in the garden row. If planted in the row, it should be thinned so that the permanent plants are 1 foot apart.

CULTURE.

Less tillage is required for this crop than for many others. The best results will be attained, however, by frequent cultivation.

YIELD AND MARKETING.

From 2 to 4 bushels of "greens" may be produced on a row 100 feet long. If a few of the leaves of the permanent plants are picked, the same plants will continue to produce new foliage. The hardier varieties, planted in the fall, will produce greens throughout the winter, except in the most northern zones. For market the whole plant may be pulled or the leaves picked. Both for home and market the leaves should be used before they attain full size, or the midribs will become tough and stringy.

Lesson 38: COLLARD GROWING.

The seeds and young plants of collards and cabbage look so much alike that the two can not be readily distinguished. Collards are not grown to any extent in the North, but in the South they are to be found in many home gardens. The principal crop is produced in the fall, when it is used as a substitute for cabbage.

SOIL AND FERTILIZER.

Collards are easier to grow than most of the other members of the cabbage family. Any good garden soil will produce a crop, but a deep moist soil gives best results. A light, warm soil is best for plants that are to stand into the winter. Norfolk and Siberian kale will withstand more cold than collards and should take their place after severe freezing begins.

PLANTING AND TRANSPLANTING.

Collards should be started in flats or seed beds and transplanted to the garden as a succession crop to a summer vegetable. If a spring crop is to be raised, the plants may be started in flats, cold frames, or hotbeds. Seeds may also be sown in the row where the plants are to stand and thinned to 1 foot apart.

CULTURE.

Thorough cultivation should be given. The culture should be shallow near the plants, as the roots feed near the surface.

YIELD AND MARKETING.

One hundred feet of row will produce from 3 to 5 bushels of leaves. As the plants grow, by picking the lower leaves the crop will produce for a long time. The leaves are sold by measure and may be picked at intervals or the whole plant pulled and the stalk stripped of its leaves at one time.

Lesson 39: RADISH GROWING.

Radishes may be divided into types according to the time of growing, as spring, fall, and winter, by shape, as round, half long, and long, and by color, as white or scarlet. Some variety of this crop should be present in the garden throughout the cool season. This may be accomplished by sowing a short row every two weeks. The crop takes little room and matures quickly.

SOIL AND FERTILIZER.

A light, warm soil produces the best crop. Abundant moisture should be given at all times. A little commercial fertilizer, thoroughly mixed with the soil under the seed, will hasten development.

PLANTING AND TRANSPLANTING.

Radishes are always sown in the row where they are to grow. The short season of growth and small foliage makes this a desirable companion crop to plant between large plants requiring a long season of growth. In northern zones late fall and early spring crops may be grown by sowing and allowing to mature in hotbeds or cold frames. In the more southern zones the crop may be grown in the open garden throughout the winter.

CULTURE.

Light, thorough cultivation should be given and all weeds removed.

YIELD AND MARKETING.

One hundred feet of row will produce from 60 to 120 dozen radishes. For market the soiled outside leaves should be removed and the root washed. They should then be tied into uniform size bunches containing 1 dozen each.

Lesson 40: TURNIP GROWING.

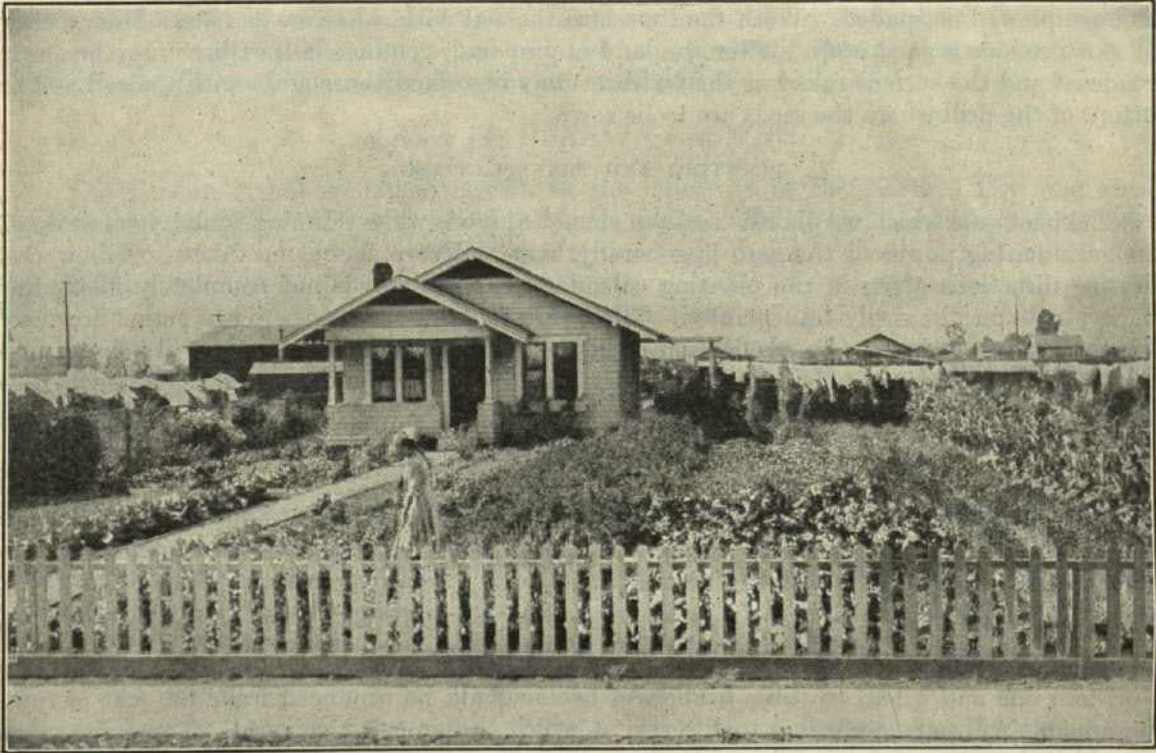
The turnip is largely grown in the South as a "greens" crop and for its roots. The seeds are sown both spring and fall, but the fall and winter "greens" crop is planted most extensively. The seeds germinate so readily and the seedlings are such hardy growers that the crop receives less attention than its value merits.

SOIL AND FERTILIZER.

While turnips will grow on most soils, heavy, soggy clays should be avoided as should also lands containing too much nitrogenous matter. A light garden soil will produce an excellent crop. A little complete commercial fertilizer mixed with the soil under the seed will prove helpful.

PLANTING AND TRANSPLANTING.

Turnips should be sown in rows and the seedlings thinned to from 3 to 8 inches apart. As the seeds are very small, children will usually sow several times as many as are required. Mixing the seeds with sand will help to prevent the use of too large a quantity. The thinnings from the rows may be used for greens, but care must be taken in removing the thinnings, not to loosen the plants to be left for a root crop.



Utilizing all available space.

The practice of raking a small plat of land and sowing turnips broadcast should be discouraged. By this method the soil can not be cultivated when it bakes and the plants are often stunted and the leaves tough. Much better greens and roots will be produced by sowing in rows and giving thorough cultivation.

CULTURE.

Keep the soil loose and all weeds removed. If a good root crop is desired, the plants must be thinned to stand 6 or 8 inches apart.

YIELD AND MARKETING.

A 100-foot row will produce all the greens needed by a family. By proper thinning, the same length of row will yield two or three bushels of roots. The first of the spring and fall crops are sold in bunches of from five to eight turnips. Later in the season, the roots are sold by the peck. In all cases, however, the roots should not be over 5 inches in diameter, as they become tough and woody as they grow larger. Turnip greens are sold by the peck.

SOIL AND FERTILIZER.

The largest roots are produced in a light, sandy loam. The soil should be worked deeply and the fertilizer mixed to the very bottom of the loose earth. The method of preparing the row and mixing the fertilizer given for parsnips, gives excellent results with salsify.

PLANTING AND TRANSPLANTING.

The seeds are planted in rows where the crop is to grow. As the seeds are large and germinate well, one seed should be planted where each plant is to stand. If there is doubt of the germinating quality of the seeds, sow one seed every 2 or 3 inches and thin so that the plants stand 4 or 6 inches apart.

CULTURE.

Cultivate the soil deeply and often. As soon as the seedlings are well established, do not be afraid to work close to the plants as the roots are long and straight. Salsify requires a long time to develop. The rows should be kept free from grass and weeds at all times.

YIELD AND MARKETING.

From 2 to 3 bushels of roots constitutes an average yield for 100 feet of row. The long tap roots should be dug without breaking the tips. The tops are usually cut off and the roots sold in bunches. The roots may also be sold by the peck. The root is not injured by freezing and can be dug even in Northern zones as needed during the winter. As the roots are best when freshly dug, it is best to leave the home supply in the ground until needed and to sell in bunches the right size for the use of an average family.

Lesson 45: CABBAGE GROWING.

Two types of cabbage are generally grown, the conical-headed and round-headed. The conical-headed varieties are generally the earlier although some early round-headed varieties are now offered by seed houses. Both types require the same kind of culture.

SOIL AND FERTILIZER.

Cabbage thrives best in a rich, moist soil, but as it is a gross feeder, it will succeed on soil where other crops fail. After the plants are transplanted to the garden, they should be watched carefully. As soon as they are once established, a quick growth should start. If this is not the case, light applications of cotton-seed meal or liquid manure should be given, but these fertilizers must not come in direct contact with the plants. After the plants are half grown, however, all nitrogenous fertilizers should be withheld or the heads will crack open and spoil.

PLANTING AND TRANSPLANTING.

In cold zones, the spring crop should be started in hotbeds or cold frames. The fall crop is generally sown in the seed bed. If the weather is hot the seed bed should be shaded. Before transplanting to the garden, all cover should be removed for several days to harden the plants to exposure to heat or cold. Soak the soil thoroughly several hours before transplanting that the soil may adhere to the roots.

CULTURE.

Shallow cultivation should be given often. Companion crops should be removed as the cabbage require the row space. If too much nitrogen is present in the soil and the heads begin to crack, cutting the roots on one side of the row with the hoe or hand plow will prevent further trouble.

YIELD AND MARKETING.

One hundred feet of row should produce 50 solid heads. The stems may be cut just below the head or the whole plant pulled. For market, the stem should be cut off and the outer leaves removed. It is sold by the crate, head, or pound. When cabbage is stored in pits or cellars, the roots, stems, and outer leaves are left on.

Lesson 46: CAULIFLOWER GROWING.

Cauliflower is much harder to grow than cabbage and is not as often found in the home garden. Garden Army workers should grow several crops of cabbage successfully before attempting this crop. In Gulf coast regions having a moist atmosphere it succeeds best.

SOIL AND FERTILIZER.

For the fall and winter crop, a warm, sandy loam is desirable. The spring crop should be set on a heavier, moister soil. The land should be prepared deeply and thoroughly. Heavy applications of commercial fertilizer will improve results. Commercial fertilizers may also be worked into the soil where the row is to be several weeks before planting.

PLANTING AND TRANSPLANTING.

The seeds should be planted in frames, hotbeds, or seed beds, as outlined for cabbage. Cottonseed meal and manures should not be used in the seed bed unless thoroughly decomposed. The seed bed should be kept moist at all times. When started in cold frames or hotbeds it is desirable to transplant to a seed bed, setting the plants 4 inches apart. In about four weeks the plants are ready to be set in the garden. See Planting Chart for distance of rows and plants.

CULTURE.

Thorough, deep cultivation should be practiced. An application of nitrate of soda or liquid manure when the plants are heading will prove helpful. When the heads are about 4 inches in diameter the outer leaves should be tied together over the center to keep it white.

YIELD AND MARKETING.

Fifty heads should be produced on 100 feet of row. Not all of the crop will be ready for use at one time. The field should be gone over and the heads harvested as they mature. The stalk should be cut just below the leaves and the outer leaves removed. Cauliflower is sold by the head.

Lesson 47: BRUSSELS SPROUTS GROWING.

Brussels sprouts form many small heads in the axils of the leaves on a tall stem. As the plant stands cold well, it is grown in the early spring and fall in all southern zones.

SOIL AND FERTILIZER.

A deep light loam is required for the best growth. The seed bed should not be heavily fertilized but after the plants are set in the garden applications of liquid manure or nitrate of soda will form quickly grown succulent heads. Cottonseed meal worked into the soil between the rows will produce a similar result.

PLANTING AND TRANSPLANTING.

The seeds are planted in frames or seed beds as with cabbage. In from six to eight weeks the plants will be ready for the garden. Soak the soil before the transplanting and set in the open ground after a rain if possible.

CULTURE.

Cultivation should be deep and thorough. The heads form in the axils of the lower leaves first. These leaves should be cut away when the head is about half grown to give the heads a chance to expand properly.

YIELD AND MARKETING.

From 1 to 2 bushels of heads is an average yield for 100 feet of row. The small heads are cut as they mature, those near the base of the plant being ready first. The heads are sold by the quart, often being placed on the market in berry baskets.

Lesson 48: KOHL-RABI GROWING.

Many plants store food in the leaves or roots but kohlrabi stores its nourishment in an enlargement of the stems at the base of the leaves and above the roots. This vegetable is easily grown and should be planted in every home garden. In one United States School Garden where kohlrabi was grown for the first time this year the cook refused to use anything but the leaves, thinking it a new kind of greens.

SOIL AND FERTILIZER.

A rich loam soil should be selected and prepared deeply. Only well-rotted manures should be used before the crop is sown or the seedlings set. A heavy application of commercial fertilizer will grow the enlarged stem quickly and keep it from being tough and woody.

PLANTING AND TRANSPLANTING.

The seeds may be planted in the row where the plants are to stand. Better results will be obtained, however, by sowing in flats or frames and transplanting as outlined for cabbage. When the seedlings are 5 inches high they should be set in the garden.

CULTURE.

Cultivation should be frequent and of medium depth. Weed the crop often. When sown directly in the garden the plants should be thinned to 6 or 8 inches apart.

YIELD AND MARKETING.

In from two to three months after sowing the crop will be ready for harvest. The plants should not be allowed to grow too large, as the stem becomes tough and woody if not gathered at the right stage. When the enlarged stems are about 3 inches in diameter the crop is in the harvesting stage. The crop may be sold by the bunch or by measure.

Lesson 49: ONION GROWING.

The onion is one of the most important vegetables grown in the United States. Both flat and globular shapes are produced, but the globular type produces a greater yield and is preferred in most markets. Onions of three colors, white, yellow, and red, are grown. There are equally good varieties of all colors. The quantity of onions grown on a small area is large, and the crop should be grown in even the smallest home garden.

SOIL AND FERTILIZER.

In selecting the part of the garden for onion planting, choose, if possible, a section that has been planted for several years and has been thoroughly cultivated and heavily manured for previous crops. A light loam completely filled with humus is the most ideal soil, especially if the subsoil is somewhat heavier. It is almost impossible to use too much thoroughly decomposed manure in getting the soil ready for this crop. Nitrate of soda or liquid manure applied several times during the growing season will hasten and increase production.

PLANTING AND TRANSPLANTING.

The seed for the spring crop of onions may be planted directly in the garden and just as early as the soil can be worked. When seeds are sown in the open ground, radishes should be used to mark the rows. Better results will be secured by starting in a seed bed. As the weather is often warm and dry when the fall crop is sown, the seed bed should always be used. For the seed bed, select a loose, moist loam and fertilize it heavily with rotted manure. Sow the seed thickly in rows 4 inches apart and transplant to the garden when the plant stems are slightly smaller than a lead pencil. The seedlings should be set in the garden in rows 12 inches apart, and plants every 3 inches. In the middle zones seedlings set in the garden in early winter will produce an early spring crop. Onion sets may be used instead of seeds. They are more expensive, but surer to produce a crop.

CULTURE.

The onion crop needs a lot of hard work. Culture should not be over 1 inch deep, but a soil mulch should be preserved at all times. All weeds and the thinnings should be removed when small. It is a good plan to weed the crop every week.

YIELD AND MARKETING.

The onion is marketed both as a mature bulb and as green or bunch onions. Green onions are pulled and marketed in bunches of 8 to 12 each. The mature bulbs are ready for harvest when the stem bends just above the bulb and the top falls over. After pulling, the bulbs should be left in the sun to dry and then sold or stored. The spring crop is usually pulled as needed for use or sale while, the fall crop may be stored for winter use. From 30 to 60 bunches of green onions and about 1 bushel of matured bulbs should be harvested from a row 100 feet long.

Lesson 50: IRISH POTATO GROWING.

The Irish potato is the most important staple vegetable in all markets. It is grown in the garden and also in certain sections on large areas. A continuous supply of fresh tubers is now to be found in large city markets throughout the year. In the larger United States School Gardens, the crop should always be planted. In all zones but F two crops can be raised each season.

SOIL AND FERTILIZER.

A heavy, rich loam produces the best crop. The soil should be prepared deeply and heavy dressings of well-rotted manure worked in thoroughly. Potatoes do not yield well on stiff clays, but sand loams heavily fertilized give good results, especially with the spring crop. Potatoes will stand a slightly acid soil. Soils that are very acid should be treated with lime the year

before the potatoes are planted. A half handful of commercial fertilizer worked into the soil where each seed piece is to be planted, will help the plants to make a quick start.

PLANTING AND TRANSPLANTING.

Medium-sized potatoes should be cut into pieces containing two eyes. The seed drills are then made where the crop is to grow and the pieces planted 1 foot apart in rows 3 feet wide. The spring crop should be planted about two weeks before the last frost date. In the middle zones, the fall crop must often be planted when the weather is hot and dry and will be surer to produce good tubers if several thorough waterings can be given. The spring crop is usually grown from northern seed. Potatoes harvested in early summer may be used to produce the fall crop.

CULTURE.

The land should be cultivated as soon as the plants break the ground. In case the plants are a long time in appearing, a mulch may be maintained by raking the surface of the soil lightly. Flat culture is generally advisable, although in wet seasons the plants may be "hilled."

YIELD AND MARKETING.

One hundred feet of row will produce from 2 to 5 bushels of tubers. For home use the tubers may be dug before they have matured. If prices are high, the crop may also be sold at this time. The spring crop does not keep well and should be used or marketed in a short time after digging. The fall crop is stored for winter use.

Lesson 51: ENGLISH PEA GROWING.

English or garden peas may be divided into two classes—smooth and wrinkled varieties. The smooth varieties will stand more cold, but the pods and seeds are small. Of the wrinkled type, there are both low growing and tall varieties.

SOIL AND VARIETIES.

As the crop must be grown in the cool season, a light, warm soil is desirable. The soil need not be deep, but it should be well prepared. A light application of commercial fertilizer scattered along the row and mixed with the soil will stimulate a quick growth.

PLANTING AND TRANSPLANTING.

The seeds should be sown in rows where the plants are to stand. In the most southern zones, the crop will grow throughout the winter. In the more northern zones a smooth variety, such as Alaska, may be planted just before the freezing weather of winter, to begin growth even before the ground can be worked in the spring. A fall crop can be grown in the middle zones, but often the weather is too hot at the time it should be started.

CULTURE.

The soil should be cultivated often during the season of rapid growth. Even in the cool weather the surface should be kept loose.

YIELD AND MARKETING.

When the pods are well filled and before the seeds become hard, the pods should be picked. As the pods mature at different times, several pickings can be made. The seeds should be shelled and used soon after picking. The part of the crop to be sold should be delivered as soon as picked.

Lesson 52: GROWING SNAP OR BUSH BEANS.

In selecting varieties of "snap" beans, both the green-podded and yellow-podded types should be considered. In certain sections of the South there seems to be a prejudice against a yellow-podded bean, while other sections grow it almost exclusively. The yellow-podded varieties are not as badly affected by rust and should be selected for the fall crop.

SOIL AND FERTILIZER.

Beans will grow well on soils of wide variation, but heavy clays tend to dwarf the plants and decrease the yield. A sandy loam into which 2 inches of rotted manure has been worked makes an excellent soil. The soil should be deeply prepared. Three quarts of a good garden commercial fertilizer sprinkled in a row 100 feet, done before the beans are planted and mixed with the soil, will make the early period of growth rapid.

PLANTING AND TRANSPLANTING.

Beans are always planted in the row where they are to grow. Place the seeds 2 inches apart and directly under the planting line. As soon as the row is planted, cover with 2 inches of soil and firm the soil over the row with the back of the hoe. Successive planting should be made every two weeks during planting seasons.

CULTURE.

When the soil is in condition, cultivate it 2 inches deep every two weeks. Work the soil near the plants with a light hoe or hand weeder.

YIELD AND MARKETING.

Snap beans should be picked only when the plants are dry. Always pick "snap" beans before the pods begin to harden. The last picking should be made at the time the beans in the pod are about half grown. "Snaps" lose their brittleness in a few hours after picking, and should be used or sold at once. In preparing for market all ill-shaped and disease-spotted pods should be removed. Pick some of the larger seeded varieties when full grown but not hard, and use for shell beans. If all the crop is not needed for "snaps" or "shell" beans it may be left until the seeds are ripe and the seed used as dry beans or for seed.

Lesson 53: GROWING POLE BEANS.

Yellow-podded and green-podded beans are represented by tall-growing or pole varieties. Both types should be planted in the home garden. It is a good plan to plant the yellow two weeks after the first planting of green varieties. A good motto for the home gardener is: "Every inch of garden fence covered with climbing beans."

SOIL AND FERTILIZER.

Pole beans require a richer soil than "snap" beans. Unless the ground has been heavily fertilized for preceding crops, at least 3 inches of well-rotted manure should be spaded into the soil. In the hill or row where the seeds are to be planted commercial fertilizer or well-rotted manure should be mixed with the soil. A half handful of fertilizer or shovelful of manure is about the right quantity to use in each hill. Be sure that the one used is well mixed into the soil, and never use fresh manure in this way.

PLANTING AND TRANSPLANTING.

Pole beans are planted in rows to run on wire fences, trellises, or string attached to a wire, or in hills to run on poles. For planting to climb on trellises or fences, place the seeds 4 inches apart. When using poles, set them 3 feet apart in the row and 3 to 4 feet between rows. Plant four to six seeds around each pole and cover 2 inches deep.

CULTURE.

Cultivate the soil every week when it is in workable condition. Start the beans to climbing up the strings or poles.

YIELD AND MARKETING.

Pole beans may be used both as "snap" and "shell" beans, some of the varieties being suitable for both purposes. For "snaps" pick the pods before the seeds are half grown. The shell beans should be picked when the beans are nearly full sized, but before they begin to harden. Shell beans are usually removed from the pod and sold by the quart. This is a profitable money crop for the home gardener. The boy who shells a large quantity of beans will keep out of mischief for a long time.

Lesson 54: BUSH LIMAS.

The bush Limas may be divided into large and small seeded varieties. The large-seed sorts take less time to pick and shell, but are not as prolific as the smaller types. A few rows of both should be tried in large gardens, but generally the small-seeded varieties are more profitable. Both types occupy the soil for a long time, and in very small gardens climbing varieties sown to run on fences should take the place of bush Limas.

SOIL AND FERTILIZER.

A rich, well-drained soil is best for this crop. Work 2 to 3 inches of rotted manure into the soil the fall before planting or very early in the spring. Commercial fertilizer or rotted manure worked into the soil along the rows before the seed is planted will hasten maturity.

PLANTING AND TRANSPLANTING.

The seed is sown in rows where the plants are to grow. Make the seed drills 2 inches deep, plant the seed 4 inches apart, cover and firm the soil above the seed.

CULTURE.

Cultivate about 2 inches deep every week when the soil is in condition. Pull all weeds from the row.

YIELD AND MARKETING.

When the seeds in the pod are nearly grown the pods should be picked and the seeds shelled for use. If the seeds are not allowed to mature, the plants will continue to produce for a long time. Two hundred feet of row will supply a large family. If the seeds are allowed to mature they may be sold, used in the winter, or for seed.

Lesson 55: GROWING POLE LIMA BEANS.

As with bush Limas, there are both large seeded and small seeded varieties of pole Limas. The large seeded pole Lima produces a much smaller yield, but can be picked and shelled much more rapidly. Usually the small-seeded varieties are more profitable.

SOIL AND FERTILIZER.

Pole Limas require a soil rich in humus; unless the ground has been heavily fertilized for previous crops, at least 3 inches of well-rotted manure should be spaded into the soil. In the hills or rows where the seeds are to be planted, well-rotted manure or commercial fertilizer should be mixed with the soil. A half handful of fertilizer or a shovelful of manure is about the right quantity to use in each hill. Be sure that the one used is well mixed into the soil and never use fresh manure in this way.

PLANTING AND TRANSPLANTING.

Pole Limas are planted to run on wire fences, trellises, strings attached to wires, or in hills to run on poles. For planting to climb on trellises or fences, plant seeds 4 inches apart. When using poles, set them 3 feet apart in the row and 3 or 4 feet between rows. Plant four to six seeds around each pole, and cover 2 inches deep.

CULTURE.

Cultivate the soil every week when it is in workable condition. Guide the vines in climbing the strings and poles.

YIELD AND MARKETING.

If the pods are picked while the seeds are green, the vines will continue to produce for a long time. When the seeds are nearly full grown, but before becoming hard, the pods should be picked and the seeds shelled. Like pole beans, this is a profitable crop and one that will keep garden army soldiers busy a long time. Space along fences that is often wasted can be planted with Lima and pole beans.

Lesson 56: GROWING COWPEAS.

The blackeyed pea is the most commonly grown of the cowpeas. It is a sure cropper. When planted in rows and cultivated, it makes a large yield. Under field conditions, it is a common practice to sow the blackeyed peas broadcast in corn when the last cultivation is given it. A few rows of peas planted every two weeks will furnish the home table.

SOIL AND FERTILIZER.

Peas will make a good yield on any good garden soil. However, a soil too rich in nitrogen will cause the plants to make too much vine. As a rule, peas do not require any fertilizing, but on poor soil a small quantity of commercial fertilizer will increase the yield of peas.

PLANTING AND TRANSPLANTING.

In the home garden peas should be planted in drills and covered not more than 2 inches. Peas may be planted so as to furnish a midsummer crop when snap beans are scarce.

CULTURE.

Less work is required to grow a crop of blackeyed peas than any other of the garden crops. All that is necessary after the plants are up is to hoe or plow around them once or twice. The plants soon cover the ground.

YIELD AND MARKETING.

Blackeyed peas make a good supply of seed. For summer use, the pods should be harvested when the pea is full grown. Never wait until the pods are yellow, unless the peas are to be shelled, dried, and stored away for winter use.

Lesson 57: GROWING PEANUTS.

The peanut is a staple crop in the southern zones in the Southeastern Division. It is grown most commonly as a field crop, but should be planted in large home gardens. A boy having more land than he can well care for, when planted to the crops that require intensive cultivation, would do well to plant the extra space to peanuts.

SOIL AND FERTILIZER.

A light, sandy loam produces the best crop. Plow or spade the land deeply and break all clods thoroughly. If the land is wet, drainage must be provided. An application of lime will usually help the crop. Well-worked soils, containing one-half clay, will often produce a large yield. Baking, cracking clay should be avoided.

PLANTING AND TRANSPLANTING.

For planting in the home garden, the pods are shelled, but care must be taken not to injure the kernels. Diseased or poorly formed kernels should not be planted. All danger of cold weather should be over before the seeds are planted, but in zones D and E the planting season is short, as the crop must mature before frost. The rows should be 3 feet apart and the plants 1 to 2 feet apart. Cover the seeds from 1 to 2 inches deep.

CULTURE.

Cultivate, when soil is in condition, every 10 days. In the large gardens referred to above, horse culture should be used or the work done with a wheel hoe.

YIELD AND MARKETING.

Peanuts yield from 30 to 50 bushels to the acre. The crop should be watched and harvested when most of the nuts are ripe. In wet seasons, however, the earlier maturing nuts will sprout if left in the ground too long. The vines are dug and left for a short time for the nuts to dry. The nuts are then picked and stored or sold.

Lesson 58: GROWING SWEET CORN.

Sweet corn is not grown in the Southeast to such a large extent as in most parts of the North. Some of the smaller varieties of field corn are raised for table use in the South. They are not sugar corns and should be planted to be ready for use only when sweet or sugar corn can not be had in the garden. There are two reasons why sweet corn is not more generally grown in the South: It does not stand extreme summer heat well and the corn-ear worm destroys much of the crop.

SOIL AND FERTILIZER.

A well-enriched garden soil will grow a good crop of corn. The crop must grow rapidly to mature before the hot weather of summer, or, in late plantings, to escape frost in fall. For this reason a little commercial fertilizer should be placed in the seed drill and mixed with the soil to hasten early growth.

PLANTING AND TRANSPLANTING.

Corn should not generally be planted in the very small home garden, as other crops will produce much more food on the same area and in the same length of time. It is generally planted in the row where it is to stand. In the North it is commonly planted in hills, while in the South it is planted in drills, one seed every 18 inches. To escape hot weather the planting should be done on the earliest date possible. If a late crop is to be grown the young plants will need to be watered to prevent their being "dwarfed." In the northern zones E and F it is easier to produce a satisfactory crop. In zone F sweet corn may be planted every 15 days from May 1 to July 1 for succession. In warmer zones a field variety may be planted to furnish table corn in mid and late summer.

CULTURE.

The soil should be cultivated about two inches deep, and when in condition to work, every 15 days. All weeds should be removed from the rows.

YIELD AND MARKETING.

One hundred feet of row will produce from 8 to 10 dozen ears. To be of the best quality the ears should be harvested at just the right stage of development. When the kernels are full grown but before they begin to harden is the right time to pick. In marketing the husks are left on. Corn is usually sold by the dozen ears. It should be sold or used as soon as harvested.

Lesson 59: GROWING OKRA.

Okra is strictly a hot-weather plant. It grows best in the cotton belt of the Southern States. It may also be grown successfully in the corn belt. In the northern part of the United States it is seldom seen in the home garden; however, it can be grown if dwarf varieties are selected and the seedlings started under glass. The plants are very tender to frost and are among the first of the garden plants to be killed in the fall. Okra is one of the most profitable crops for the city trucker.

SOIL AND FERTILIZER.

Okra will grow and make a good crop in many types of soil. It makes its best yield, however, in a deep, rich, well drained, sandy loam soil. If manure is to be put on the soil it is best to spread it evenly over the surface in late fall or winter and then work well into the soil. Light applications of commercial fertilizer every two or three weeks in the early summer will be found helpful.

PLANTING AND TRANSPLANTING.

In the South okra is planted in the row where it is to grow. It may be planted under glass and as soon as all danger of frost is over transplanted to the open garden. The seeds are slow to germinate, and if the ground is cold they will remain in the ground several weeks before coming up. Seed should be planted thickly, and after the plants are well up they should be thinned.

CULTURE.

Okra should receive shallow and frequent cultivation until the plants cover the ground.

YIELD AND MARKETING.

One hundred feet of row will produce more than enough pods to supply a family of five. It is necessary to harvest okra every day. If the seed pods are not cut off the plants will cease to produce new ones.

Lesson 60: GROWING MUSKMELONS OR CANTALOUPE.

Two types of muskmelons are commonly grown: The small fruited and large fruited. The names muskmelon and cantaloupe are often used interchangeably for the same variety. A common practice is to designate the larger elongated type as muskmelons and the smaller rounded sorts as cantaloupes. There are green-fleshed and yellow-fleshed varieties of both types. The same methods of growing apply to both.

SOIL AND FERTILIZER.

The soil should be well drained and contain an abundance of humus. A good garden soil into which two inches of rotted manure has been worked is excellent for the crop. If the soil is not well fertilized, a handful of garden commercial fertilizer or shovelful of manure should be mixed thoroughly with the soil where each hill is to be planted. Just before the vines begin to "run" another application of fertilizer hoed into the soil around the hill will hasten maturity.

PLANTING AND TRANSPLANTING.

Muskmelons should not be planted in the garden until the soil is well warmed by spring sunshine. An earlier crop may be secured by planting the seeds in flower pots or berry baskets six weeks before time to plant in the garden and placing the pots or baskets in a hotbed. The seeds are generally planted in the garden where the plants are to grow. The rows should be 4 feet apart and the hills 4 feet. Six to eight seed should be planted in each hill, and when the seedlings are 3 inches high they should be thinned to two in each hill.

CULTURE.

All the ground between the hills should be kept loose by the use of hoe and rake or wheel hoe. If it rains soon after the crop is planted the soil should be worked as soon as it is in condition. Shallow cultivation as often as once each week will prove beneficial.

YIELD AND MARKETING.

It is difficult to determine when the melon is in the right condition for use. A little experience will enable one to tell by the color and hardness when the fruit is ready for picking. Examination of the fruit stem will also aid in selecting melons that are ready for the table, as the stem cracks as the fruit ripens.

Lesson 61: WATERMELON GROWING.

The watermelon needs heat to develop to perfection. It is grown as a staple field crop to a greater extent in the Southern States than anywhere else in the world. In small home gradens, it should not be planted as its value is so low compared with the amount of space required and the time taken to mature the melons. Garden Army soldiers who do grow this crop must prepare to do sentry duty when the fruit is maturing as it has a habit of escaping during dark nights.

SOIL AND FERTILIZER.

A light, sandy loam into which several inches of rotted manure has been worked will produce a satisfactory crop. The surface soil should be worked until it is loose and all clods broken. The plowing or spading need not be deep. Commercial fertilizer or rotted manure placed under the hill at the rate of a handful of the former or shovelful of the latter will give the young plants a quick start. In using either fertilizer, it should be worked into the soil of the hill thoroughly before the seeds are planted.

PLANTING AND TRANSPLANTING.

The seeds are generally planted in hills where the crop is to stand, but for an early crop, they may be started in flower pots and transplanted to the garden as given for muskmelons. In transplanting all kinds of melons, cucumbers, and squashes, that are started in flower pots the dirt must be slipped from the pot without breaking the ball of earth and the whole set in the garden hill. If individual plants are taken up as with tomatoes they usually die. Watermelon hills should be from 6 to 8 feet apart. Plant six seeds and thin to two plants to each hill.

CULTURE.

The watermelon crop should be cultivated often enough to keep the surface soil loose. Cultivation should be shallow. The soil should be kept moist but not wet.

YIELD AND MARKETING.

Each hill should produce from four to six melons. In selling a price is usually fixed on each melon which depends on the size, quality, and time of year.

Lesson 62: CUCUMBER GROWING.

Cucumbers are used while in the immature state and thus require a shorter growing period than melons or winter squashes. For this reason, planting may continue later than with the other large vine crops. Cucumbers are grown for two purposes; the large fruit for table use and the small for pickling.

SOIL AND FERTILIZER.

A light, sandy loam soil will produce the earliest crop, but by thoroughly preparing heavier soils they may be used. Never try to grow cucumbers on a wet clay. Prepare the soil a week or more before planting and mix a handful of good garden fertilizer or a shovelful of manure with the soil where each hill is to be.

PLANTING AND TRANSPLANTING.

Cucumber seed may be planted in flower pots as given for muskmelons. Unless much time can be given to the care and transplanting of the seedlings, it will be as well to wait until the soil is warm and then plant the seed in hills in the open garden. The hills should be 4 feet apart in the row and the rows 4 feet apart. The hills may be forced by making bottomless boxes 4 feet square and 6 inches deep, and placing glass or cloth over one open end. These boxes will protect the plants on cold nights and may be used until the seedlings are several inches tall. On hot days, the boxes should be removed, especially those covered with glass. This method of starting an early crop may be used with muskmelons and watermelons. When the seedlings are 3 inches tall, thin to three to each hill.

CULTURE.

Shallow cultivation should be given often enough to keep the surface loose. Pull all weeds among the vines when the weeds are small.

YIELD AND MARKETING.

Cucumbers are sold by the dozen. One hundred feet of row will produce from 50 to 100 dozen. Special varieties may be grown or the larger varieties picked when small for pickling. Pickling cucumbers are sold by the peck.

Lesson 63: GROWING SQUASHES.

Two types of squashes are grown: The small crook-necked and scalloped summer varieties, and the large winter squashes. The former are also known as bush varieties to distinguish their method of growth from the long trailing vines of the latter. Bush squashes are used in the immature stage while the vine types are allowed to mature.

SOIL AND FERTILIZER.

A good moist garden soil is satisfactory for growing squashes. A small amount of commercial fertilizer worked into the soil of each hill before the seeds are planted will be beneficial. Squashes will grow on land not previously cropped, but in this case rotted manure should be worked into the ground when the land is prepared and a shovelful mixed with the soil where each hill is to be planted.

PLANTING AND TRANSPLANTING.

The seeds are generally planted in the open ground, although summer squashes are sometimes started in pots or berry baskets in a hot bed, and transplanted as outlined for muskmelons. The plants of both types grow rapidly and quickly cover any companion crops planted near them. The large or winter varieties and late plantings of summer squashes are badly affected by vine and fruit borers, for which reason they are not generally grown in parts of the South.

CULTURE.

Squashes are surface feeders and cultivation should be shallow. The surface soil should be loose at all times. When cultivating, if the plants are not making steady progress, stir commercial fertilizer or rotted manure into the soil in a circle about the hills and water the ground thoroughly.

YIELD AND MARKETING.

A 50-foot row of summer squashes will more than supply the requirements of any home. Summer squashes are sold by the dozen or crate. Winter squashes are sold by the pound or a price fixed on the individual squashes, according to size.

Lesson 64: GROWING PUMPKINS.

The pumpkin is not grown in many parts of the South. The midsummer hot dry weather often destroys the crop unless the soil is deep, rich, and moist. Insects that bore into the vine and fruit are also very destructive. The growing of pumpkins should be undertaken only in very large gardens that have the above soil conditions and by a garden army worker who is willing to spend much time fighting insects.

SOIL AND FERTILIZER.

A good garden soil should be selected and fertilized by covering the surface with an inch or more of well-rotted manure. Work this manure into the soil thoroughly with a spading fork or harrow. Where the hills are to be planted mix a handful of commercial fertilizer with the soil and work in with the hoe until the fertilizer can not be seen.

PLANTING AND TRANSPLANTING.

Pumpkins are planted in hills where the plants are to grow. Make the rows 8 feet apart in the row. Plant six seeds in each hill, and when the seedlings are 6 inches tall, thin to two to each hill.

CULTURE.

The surface of the soil should be kept loose until the vines cover the ground. Cultivation near the plants should be shallow, as the roots feed near the surface.

YIELD AND MARKETING.

One hundred feet of row should produce about 100 pumpkins. The pumpkin is allowed to mature and will usually be sold by United States school gardeners by the individual pumpkin. When grown on a large scale they are sold by the ton.

Lesson 65: GROWING TOMATOES.

The tomato is one of the most important vegetable crops. In large cities it is to be found on the market at all seasons of the year. The Florida crop begins to ripen in December, or about the time that the Carolina crop is killed by frost. Georgia, Carolina, and Virginia early crops furnish a supply in spring and early summer until the northern crop is ready for harvest. The large smooth type is most generally grown and should always be one of the home garden crops. A few plants of the smaller types may be grown for use in preserving.

SOIL AND FERTILIZER.

For the fall and winter crop a light, sandy loam with a southern exposure should be selected. Many types of soil will, however, produce a good crop. The soil should be prepared deeply and a light application of commercial fertilizer worked in with a rake. In preparing the row it is a good plan to make a trench 6 inches deep and mix fertilizer with the soil as it is put back in the trench.

PLANTING AND TRANSPLANTING.

Tomatoes are usually started in hotbeds, cold frames, or seed beds. The one to select will depend on the zone and the time of the year. In the spring in colder zones the flat, to be kept in the house or schoolroom, should be selected. Start the plants six or eight weeks before the time to set in the open ground. For the fall crops the shaded seed bed should be used in growing seedlings, although tip cuttings of spring plants may be rooted for use.

CULTURE.

Tomatoes should be given shallow cultivation. When the plants are small, cultivating 2 or 3 inches deep every week will be satisfactory, but from blossom to "picking time" culture should be shallow enough so that the roots will not be cut.

YIELD AND MARKETING.

One hundred feet of row will produce from 3 to 6 bushels of fruit. The fruit is generally picked when partly ripened and the tomatoes placed in the shade. Under heavy foliage the fruit may be left to ripen on the plant. For local markets the fruit is usually sold when fully colored but before it is soft.

Lesson 66: TRAINING TOMATO PLANTS.

In the home garden tomato plants should never be left to trail on the ground. To do so will cause the fruit to be small and ill-shaped, and contact of the fruit with the soil will often cause blossom end or brown rot. The systems of training tomatoes are as follows:

SINGLE-STAKE TRAINING.

Drive a stout stake 4 or 5 feet long down beside each tomato plant. Cut off all the suckers near the root, so as to send up only the main leader. Tie this to the stake with rags or raffia, tying anew from time to time as the leader grows upward. Pinch off the side branches back to the first fruiting stem. Continue this treatment as the vine grows until you have a tall plant with ripening fruit.

BARREL-HOOP TRAINING.

Drive three stakes about 4 feet long down around the plant at such a distance that a barrel hoop will fit them snugly. Nail one hoop to them about 15 inches from the ground and another at 30 inches. Pinch off some of the branches at the base of the plant, so as to have three or four leaders growing up. As these reach the first hoop tie them to it with cotton rags or raffia and start them up to grow inside the second hoop. When they reach this, tie again.

TRELLIS TRAINING.

To make a single trellis, drive a stake down by each plant, having it project 3 or 4 feet above the ground. Fasten two or three strands of light wire horizontally on the stakes, having the first about 15 inches above the ground. Pinch off the suckers at the roots and tie the main shoot to lower wire as soon as it is tall enough. Let the side branches run along the wires, tying if necessary. Train on the second wire when it is reached.

A double trellis may be made in this way: Drive stakes down each side of the row 6 inches away from the plant, with their tops about 15 inches from the ground. Nail narrow strips along the tops of the stakes and, as the tomato grows, train the branches over the strips.

Lesson 67: MORE ABOUT TOMATOES.

WATERING.

The tomato crop is produced on individual plants. In many parts of the eastern South the rainfall has been heavy since tomatoes were set in the open ground, which has stimulated heavy growth of leaf and stem. Since the first of June (1918) there has been much less rain and the hot drying days have caused many plants to wilt. Gardeners have mistaken this condition for "tomato wilt," and destroyed their plants. Before pulling up plants on which the lower leaves are wilting, water thoroughly. If the plant revives, the trouble was due to

lack of moisture rather than to the bacterial disease. Lack of moisture increases "blossom end rot."

An excellent way to water plants is to place a 2-quart can, in which a large opening has been made in the bottom, between two plants and fill the can with water each night. This will carry the moisture to the roots without loss. By placing manure in the can the plants may be watered and fertilized at the same time. The same result may be attained by digging a hole 8 inches in diameter and 8 inches in depth between two plants, then filling the hole with manure and pouring a pailful of water through the manure three times a week. If wilting tomatoes fail to revive under this treatment, "tomato wilt" is probably present, and badly affected plants should be destroyed.

THE TOMATO INSECTS.

The leaves of the tomato are often eaten by the large green tomato worm. Only one or two worms attack each plant. As soon as the eaten leaves are discovered the worm should be found and killed. Small brown worms (fruit worms) eat into the fruit. These insects should be picked by hand and destroyed.

SUN SCALD.

In midsummer the tomato is subject to sun scald where the fruit is exposed to the sun. This may be prevented by picking the fruit when it begins to turn color and ripening in the shade.

Lesson 68: GROWING EGGPLANT.

The eggplant prefers warm days and hot nights. It is a hardy hot-weather plant. Eggplants are grown in most home gardens. The plants are usually slow growers when young, but after a root system is developed, the plant soon produces a large bush. The plants will respond to special care and attention.

SOIL AND FERTILIZER.

Eggplants will grow best on a light, sandy soil. The soil should be deep, rich, and well drained. If barnyard manure is used for fertilizer, it should be well rotted before being applied to the garden. Good results may be obtained by using commercial fertilizer. After the plants are set to the garden, frequent applications of fertilizer rich in nitrogen will be found helpful.

CULTURE.

Eggplants require frequent cultivation to keep down weeds and to conserve moisture. After the plants begin to bloom, a heavy straw or leaf mulch will help to conserve the water for the plants.

YIELD AND MARKETING.

Eggplants are very prolific. A few plants will supply a family. The fruits should be harvested for home use and the market when two-thirds grown.

Lesson 69: PEPPERS.

Two classes of garden peppers are commonly grown. The large-fruited pepper, of which Bull Nose is a typical variety, should always be found in the home garden. A few plants of small-fruited peppers, a typical variety of which is Small Chili, may also be added. The plants occupy the soil for a long time and by throwing out new branches continue to produce a crop if the fruits are picked green.

SOIL AND FERTILIZER.

Peppers make the best growth in a light, sandy loam. Well rotted manure placed 1 inch thick on the surface and then spaded into the soil thoroughly will insure strong growth. A small handful of commercial fertilizer thoroughly mixed with the soil where each plant is set will give the plants a quick start. When commercial fertilizer is used under the crop, it should always be so well stirred into the soil that no trace of the fertilizer is visible. In cooler zones pepper plants should be started in boxes in the house or school room or in hot beds. The seeds should be sown about seven weeks before the plants are to be set in the garden. Fill the boxes with soil made of one-half leaf mold and one-half garden soil. Drop the seeds 3 inches apart in rows 4 inches apart and cover one-half inch deep. When the plants are 6 or 7 inches tall, they are ready to transplant to the garden. Seeds may be sown closer together in the boxes, but will then have to be transplanted to flower pots or other boxes before being set in the garden.

CULTURE.

The pepper plants should be cultivated once each week and all weeds destroyed. When the plants are small cultivation between the rows should be deep, but from the time they are half grown only the upper 2 inches of soil should be worked.

YIELD AND MARKETING.

One hundred feet of row will produce from 3 to 6 bushels of fruits of the large varieties. When these fruits are 2 inches in diameter and while yet green they are picked for use or sale. The small fruited varieties are picked when green or after ripening.

Lesson 70: SWEET POTATOES.

The sweet potato is one of the most important crops in the Southeastern States. In the South, the word "potato" when used alone, always refers to the sweet potato while in the North it refers to the Irish potato. Both white and yellow varieties are grown. In large home gardens space should always be devoted to the production of this crop.

SOIL AND FERTILIZER.

Light loam well fertilized with rotted manures produces the best crop. The prevalent idea that rich land is not suitable for this crop, is a mistake. Most soils will, however, produce a fair crop but heavy clays should be avoided if possible. The land should be plowed or spaded deeply and the manure worked well down into the seed bed. Land that has been fertilized for other garden crops will yield a good grade of table potatoes, without the use of additional fertilizers although the quantity will be smaller. When commercial fertilizers are used, they should be sown along the rows and mixed thoroughly with the soil a week or more before the sets are put out.

PLANTING AND TRANSPLANTING.

Sweet potatoes are grown from sets or "draws." To produce the sets the potatoes are placed in a hot bed or cold frame and covered with 2 inches of soil six or eight weeks before the plants are to be set in the garden for the late crop the potatoes should be placed a half inch apart so that diseases will not be transmitted from one to another as might be the case if they touch. When the sets are 4 or 5 inches high, they should be removed from the frames or seed bed by pulling gently on the stem of the set. In wet or clay land the sets should be placed on small ridges. On light land the ground should be left level.

CULTURE.

The surface of the soil should be kept loose until the vines cover the ground. Cultivation should be shallow. It is desirable to cultivate even after the vines begin to cover the ground. The vines should be moved to one side and care taken that they are not cut or covered.

YIELD AND MARKETING.

One hundred feet of row should produce from 2 to 3 bushels. When ready for harvest, the vines are removed and the potatoes dug. Care should be taken not to bruise the potatoes or they will rot about the scars. The late crop should be stored for winter use in dry cellars or pits.

VII. ENEMIES OF THE GARDEN.

Lesson 71: INSECTS AND PLANT DISEASE.

As soon as the vegetable plants appear above the ground they are liable to be attacked by insects or plant diseases. For the different insects and plant diseases that attack each vegetable and the remedies, see the Planting Charts. Plant diseases are also known as fungus diseases, blights, rusts and leaf spot. The insects and diseases must be destroyed by spraying if a full crop is to be produced.

To apply spray properly, some kind of spray pump is necessary. Small and inexpensive bucket or knapsack spray pumps are manufactured and should be purchased by all who have large vegetable gardens. Small hand sprayers costing from seventy-five cents to a dollar and a half may be purchased for use in small gardens. In cases where a teacher is regularly employed to direct a company in the United States School Garden Army, a spray pump should become the property of the garden department of the school and may be loaned to many gardeners each year.

In case a spray pump can not be purchased, the spray mixtures may be applied by using a clothes brush or old broom (from which all but 8 inches of the handle has been cut off). Dip the brush or broom in the spray mixture and sprinkle the plants in the same way that the housewife sprinkles clothes. Be sure to apply the mixture to the under side of the leaves.

Lesson 72: DESTROYING BITING INSECTS.

One class of insects that must be dealt with in the vegetable garden, bites out the substance of stem, leaf or fruit. *Remember that all insects that chew away parts of the plant tissue, belong to this class.* Potato beetles, cut worms, cabbage worms and tomato worms are good examples of biting insects. The insects chew and swallow the portion of the plant in much the same way that people take their food. The simplest way to kill such insects is to poison their food.

Arsenate of lead, either in the paste or powder form is the most effective poison to use to kill biting insects. It may be purchased of seedmen and at most hardware and drug stores. It should be applied as follows:

1. *As a spray:*

- (a) Three level teaspoonsful arsenate of lead powder to one quart of water.
- (b) If the paste form of arsenate of lead is used instead of the powder, use twice as much arsenate of lead.
- (c) When biting insects and plant diseases are both present, the plant diseases may be destroyed by adding two ounces of copper sulphate and two ounces of lump lime to the above spray mixture. Add the lime directly to the arsenate of lead mixture. The copper sulphate should be dissolved in a little of the water and then added, after which the spray mixture should be stirred until all ingredients are thoroughly mixed.

2. *As powder:*

- (a) In the early morning when the leaves are wet with dew, dry arsenate of lead powder may be applied to the plants with a powder gun or duster.

Lesson 73: DESTROYING SUCKING INSECTS.

The sucking insects do not have distinctly developed jaws like the biting insects but are provided with beak-like, sucking mouth parts. These insects insert the beak through the outside covering of the plant and suck up the sap. Aphides or plant lice, squash bugs, leaf hoppers, and scale insects are good examples of sucking insects. *As this class of insects does not eat any of the plant surface, spraying with poisons is useless.* Spray mixtures must be used that will kill the insects by coming in contact with their bodies. The gardener calls these contacts insecticides.

Nicotine sulphate is the most common remedy for sucking insects. It is sold in various strengths and under several trade names. "Black Leaf Forty" is one of the most concentrated of these. A teaspoonful of "Black Leaf Forty" to 1 gallon of water will kill plant lice. One ounce of tobacco (a 5-cent package of smoking tobacco) or 2 ounces of tobacco stems boiled in two and one-half gallons of water will make a nicotine solution strong enough to kill plant lice. Let the solution get thoroughly cold then strain through cloth and spray.

Lesson 74: STUDYING THE LIFE STORIES OF INSECTS.

In order to combat the insects of the garden intelligently a study of the life-story of each should be made. Lessons 71 and 72 describe the methods of feeding of the two groups of insects. In order to better understand the methods of feeding of each group, it is well to lead the children to learn by observation. When visiting the back yard garden call the attention of the child to a large biting insect that is eating away the edge of a leaf. If possible find a black squash bug as an example of sucking insects and observe that the sucking tube is inserted through the outer covering of the plant. In case the squash bug can not be found, plant lice may be observed in the act of sucking plant juices, by magnifying with a reading glass.

Each different kind of insect has a different life-story. Some of the insects of the garden hatch from the egg, looking like the adult, simply shedding the skin several times before becoming full grown. Other insects hatch from the egg into grubs or caterpillars that also shed their skins as they grow, but must change into a pupa or chrysalis before becoming adults.

Leaders of companies in the United States School Garden Army may help the garden soldiers understand the stories of many garden insects. Secure several lantern globes and the same number of 6-inch flower pots. Fill a flower pot with sand and place the globe upright, pressing the lower edge of the glass into the sand. Now bring an egg mass or caterpillar from the garden and place it in the globe. Cover the upper opening of the globe with cheesecloth, secured by an elastic band. Keep the sand moist and feed the insects with fresh food every day. In such a cage, the complete life-history of an insect may be studied.

Lesson 75: CABBAGE WORMS.

The cabbage worm is one of the most common and harmful insects of the garden. It feeds on cabbage, cauliflower and collards. Have the children collect several small cabbage worms and feed them in the lantern-globe-breeding cage. It will be noticed that as the worms grow they shed their skins. In from two to three weeks, the worms will stop feeding and hang themselves on the cabbage leaves or side of the cage, where they will turn into the chrysalides, the name applied to the pupa form of butterflies. In from seven to ten days each chrysalis case breaks open along the back and the white cabbage butterfly emerges. As soon as some of these butterflies have deposited eggs, the complete life-story will have been worked out. The children should make notes of the length of time the insect is in each stage of development.

CONTROL.

1. Dusting the plants with dry ashes, road dust or air-slacked lime will often prevent the butterfly from depositing eggs.
2. When the plants are young, spray with powdered arsenate of lead at the rate of one ounce to one gallon of water.
3. After cabbage has begun to head or cauliflower to form the central edible part, a spray made by adding one ounce of hebeore to 3 gallons of water should be used.

VIII. HARVESTING AND USE OF CROPS.

Lesson 76: WHEN TO GATHER YOUR VEGETABLES.

If you take good care of your garden all through the season, following the directions given in this manual, you may expect to gather a good crop. This table tells you when to gather several kinds of vegetables that you will grow.

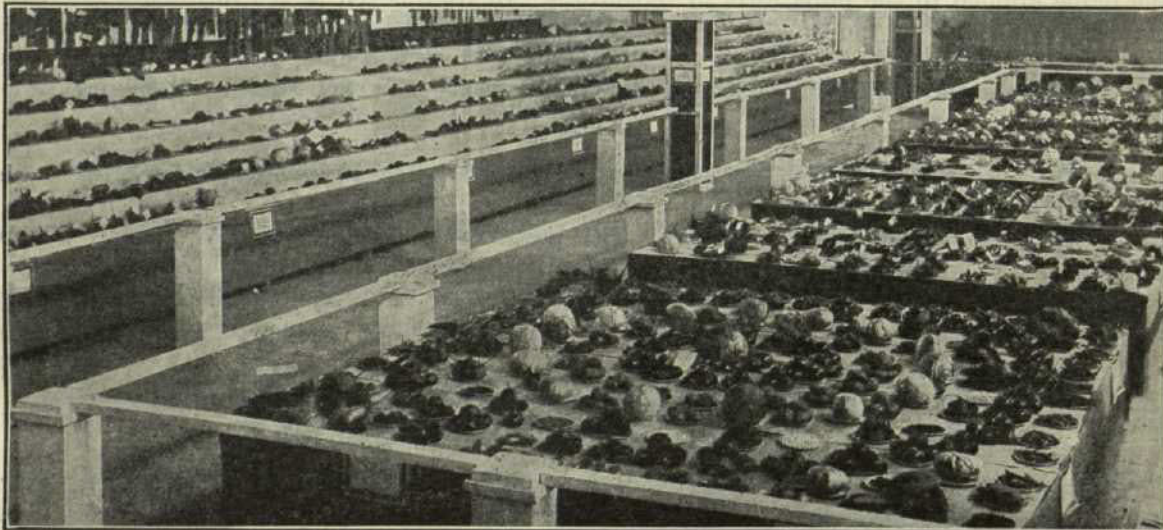
Crop.	Time to gather.	Remarks.
Beets.....	When young.....	Beet greens, when tender, make a delicious dish.
Brussels sprouts.....	After frost.....	Cold improves this vegetable.
Cabbage (early).....	When three-fourths headed.....	May be left until frost.
Carrots.....	When young.....	Should always be gathered young when used for soups.
Chard.....	When outside leaves are about 1 foot high.....	Cut lightly at first. Midribs of leaves can be used like asparagus.
Kohlrabi.....	Before skin hardens.....	The bulb should be about two-thirds as large as a baseball.
Lettuce.....	While leaves are tender.....	Small, young lettuce leaves make best salads.
Lima beans.....	While still green.....	Pods should be spongy at the tip.
Melons.....	When they crack around the stem.....	Let your melons ripen on stem if possible.
Potatoes.....	When vines are dry.....	Harvest a few at a time except at end of season.
Radishes.....	When young.....	Radishes get tough and spongy with age.
String beans.....	When they snap readily.....	Tips should be soft and easily bent or twisted.
Shell beans.....	When pods are well filled.....	Do not let them dry on vines.
Sweet corn.....	When it has just come to milk with blackened silks.	Should be used as soon as picked.

Lesson 77: SELLING YOUR VEGETABLES.

After your own home table has been supplied with all the vegetables that it needs you should sell your extra products as fast as they are ready for the market. Your home needs should be supplied first before you attempt to sell to your neighbors. If you raise enough vegetables to supply the needs of your own family, you are doing a patriotic duty, because in so doing you are making it possible for other vegetables to go to our soldier boys.

You should not only supply your family needs and pay for the cost of your garden, but you should make a neat profit on the vegetables you raise. Don't you think it would also be a fine idea to invest your vegetable profits in War Savings Stamps?

Most selling from our village or city gardens is done by peddling among our neighbors. This encourages thrift and business system on your part. It is a training that you boys and girls ought not to neglect. To sell your vegetables readily there are a few rules that should be followed.



A well-arranged garden display.

1. Gather all vegetables when they are ripe and ready for the market. Do not pick half ripe fruits; choose only those that are ready for a quick sale.
 2. Grade your vegetables according to size and quality. Do not have a mixture of large and small sizes and good and poor vegetables.
 3. Make your display of fruit attractive. Customers will buy more quickly and pay more if the goods offered for sale look neat and clean.
 4. Do not put the best vegetables on top while poorer ones are hidden beneath. It would be better to separate the kinds and sell them separately.
 5. Be honest. Do not claim for your goods what they will not show. Try to keep your customers by honest dealing.
 6. Whatever boxes or baskets are used for selling or displaying your vegetables, make them attractive.
- Build up a reputation for yourself for honesty and fair dealing.

Lesson 78: STORING YOUR VEGETABLES.

The storing of vegetables that are not used as soon as gathered is very important, as it is a fine way to lay up food for future use. It is a way to Hooverize many vegetables that you can't eat at once. Especially at this time, we must save and use every product possible, and we must not have any waste.

Potatoes, carrots, onions, beets, turnips, and many other of your garden products may be kept for winter use by storing. You will get the best results from storage if care is taken regarding the proper temperature and ventilation needed, the amount of moisture necessary, and the quality of the vegetables when first put in storage.

Some vegetables may be stored on your mother's pantry shelves while others should be put in the cellar, and still others kept in outdoor pits. Sometimes several neighbors join together and build a pit or storage cellar for their vegetables. This is known as community storage. When several gardeners do this the cost to each is small, and the vegetables can be handled more easily.

If you store your vegetables in the cellar, you must take care to see that there is enough ventilation and that the proper temperature may be easily kept. The cellar should have a good dirt floor, or, if it has a concrete floor, the floor should be covered with 3 inches of sand. This floor should be kept moist. Beets, celery, cabbage, parsnips, turnips, and potatoes may be stored in the cellar.

The best way to store vegetables outdoors is to use a pit. To build this, dig a hole in the ground 6 inches deep and as wide and long as necessary to hold the vegetables to be stored when piled up. Before putting the vegetables into the pit it should be lined with hay or straw. Cover the piled vegetables with several inches of hay or straw, and then cover the mound with 4 or 5 inches of soil. As cold weather comes on, add 10 or 12 inches of soil to the covering of the pit.

Lesson 79: TYPES OF MARKETING.

Community types:

- (a) Children's community market in an attractive central location.
- (b) Children's space in the municipal market.
- (c) Children's market at the school.

Individual types:

- (a) Children's market at home. This plan provides for sale to those who call at the home, as well as that sold to neighbors.
- (b) By use of parcel post.

Cooperative types:

- (a) Provision for sale of produce through the U. S. S. G. A. officers at central location in city, at school, or in the municipal market.

THE MARKET.

Preparation:

- (a) All produce should be in the best possible marketable state.
- (b) Produce should be graded according to size.
- (c) All produce should be clean, fresh, and crisp.
- (d) Produce should be graded according to quality.

Display of vegetables:

- (a) Make the market display attractive.
- (b) Use uniform and inexpensive containers.
- (c) See that all produce is free from defects.
- (d) Arrange the display according to types.

The following suggestions are submitted to the Board of Trustees of the University of Chicago for their consideration in the preparation of the report of the Committee on the Administration of the University for the year 1911-12.

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