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4-H GARDEN CLUB MANUAL

In addition to this circular, each club member should have Extension Circular 1274, "Garden Vegetables", Circular 1700, "Garden Windbreaks", "A Vegetable Gardener's Handbook on Insects and Diseases", Misc. Pub. No. 605 and "Suburban and Farm Vegetable Gardens", U.S.D.A. Home and Garden Series No. 10.

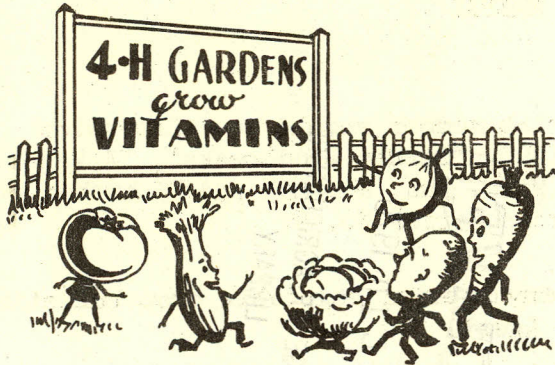
If the club member is interested in any special vegetable crop bulletins they may be obtained from the County Extension Agent.

The material for this club has been divided into convenient headings, nine in number, which will give sufficient material for at least that number of meetings. Some of these sub-divisions may be of more interest to the club so more time may be spent upon the topics of most importance to the club.

Garden tours may be the most interesting and profitable type of meetings. Meetings at a garden plot give a good opportunity for demonstrations of the principle taken up at particular meetings. A garden tour of all of the club members should be made some time during the growing season. June, July, and August all find good conditions. The discussions for meetings might readily be based on the following divisions.

- Part 1
4-H Garden for Health
- Part 2
Garden Plan, Seed
- Part 3
Windbreaks and Irrigation
- Part 4
Preparing the Seed Bed, Planting and Care
- Part 5
Fertilization
- Part 6
Insect Control (use circular 1512)
Diseases of Vegetable Crops
- Part 7
Exhibiting and Judging Vegetables
- Part 8
Harvesting and Storage
- Part 9
Fall Care of the Garden

PART 1
4-H GARDEN FOR HEALTH



One of the 4-H's in the Club Motto stands for "Health". The vegetable garden can certainly play an important part in developing a healthy body for the club member. The planting, weeding and thinning provide exercise out in the fresh air and sunshine. But more than that, the garden supplies minerals for bones and teeth, and vitamins to help regulate various functions of the body.

Practically all vegetables, even the lowly radish, contain appreciable amounts of bone building minerals like calcium and phosphorus. Growing boys and girls require more of these minerals than do adults, and vegetables will supply this need.

There are other important values in vegetables also. The leafy sorts like cabbage, lettuce, spinach, chard, beet tops, and even the dandelion are rich in vitamin A. Carrots, sweet potatoes, pumpkins and squash are also in this class. (Eggs, butter and liver of the non-vegetable foods are good sources of this vitamin.)

Vitamin A helps the mucous membranes of the nose, throat and intestines ward off infections and colds. The carotene in carrots, a form of this vitamin, helps to strengthen the eyes.

Vitamin C protects us from rickets (a disease of the joints and spine), and strengthens the walls of the veins and arteries and yet keeps them soft and pliable. This vitamin is not stored in the body and must, therefore, be taken in every day. Eggs, milk and meat (except liver and heart) have practically none of it. Therefore, we depend mainly on vegetables and fruit for our supply.

Of the vegetables, tomatoes, potatoes (both Irish and sweet), cabbage, broccoli, cauliflower, green peppers, green beans, peas, muskmelons, squash and the greens (beet tops, spinach, chard, etc.) are excellent sources of Vitamin C. Now you can see why the vegetables are called "protective" foods and why growing boys and girls should learn to eat them and like them. Some one has said, "We are what we eat." It is quite true.

Perhaps there are some kinds of vegetables that no member of the family likes. Why not try new sorts then? Asparagus is one of the perennial vegetables that is becoming more generally grown. Sweet potatoes are more easily grown than are Irish potatoes and the food chart shows that they are much richer in Vitamin A, and about 20% richer in Vitamin C.

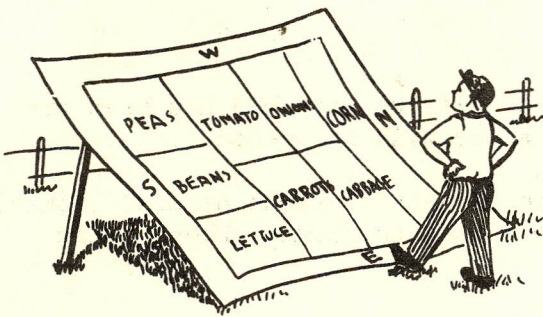
Broccoli can be grown about as easily as can cabbage, and it contains four times as much Vitamin A and about twice as much Vitamin C as does cabbage.

Medical authorities tell us that normal folks who eat meals balanced with vegetables have little or no need for Vitamin pills.

Your garden will produce much of the food your family will need. Grocery bills will be lower and at the same time the family will have a home grown supply of vitamins and minerals.

4-H Club members should study the food needed by their family. The Garden should be planned to provide these foods. Frequent reference to Extension Circular 1274 will answer many questions which might arise.

PART 2 GARDEN PLAN, SEED



In order for a garden to provide proper vegetables it must be well planned. A plan makes it possible to use the land efficiently. A plan will tell the amount of seed, material and space required. From a plan the member can budget his time. The plan should be made early. It will prevent many mistakes.

A well planned garden, well taken care of, will yield as much food on less ground and will require less time.

The first step in making the plan is to write down a list of vegetables that the family likes or should eat. The outline of the garden can then be traced on a good sized sheet of heavy paper (ordinary brown wrapping paper is very good for this purpose) and lines drawn in to show where the rows of the different vegetables are to be planted. Names and varieties may be printed on the lines, and planting distances in the row and between rows can be shown. Planting dates, depth of planting, amounts of seed, and many other useful facts may be written on the plan if desired. If the plan is drawn to scale it looks much neater and gives a better idea of what the garden is to be like.

In planning the club garden, it is well to remember that the total amount of vegetables produced on the land can be greatly increased by the use of companion and succession crops. Companion cropping is the planting of two crops in the same row at about the same time, or the planting of a small, quick growing crop between the rows of larger and slow growing crops. In either case one of the crops must be quick growing and must mature before the other is large enough to require all the space in the row or between rows. Companion cropping should not be practiced if irrigation is not available.

Succession cropping means the planting of a crop where another crop has already been grown and harvested.

The suggested garden plan on page 12 of Extension Circular 1274 is a very good arrangement of vegetables. The size may be changed to fit the needs of the club member. The type of cultivation and the amount of water available for irrigation will determine the space between the plants. If the amount of water available is limited better results will be obtained if the plants are farther apart. Plants should be spaced farther apart on light or poor soil than on good soil.

Make a plan of your garden and take it to your club meeting. Compare your plan with the other club members.

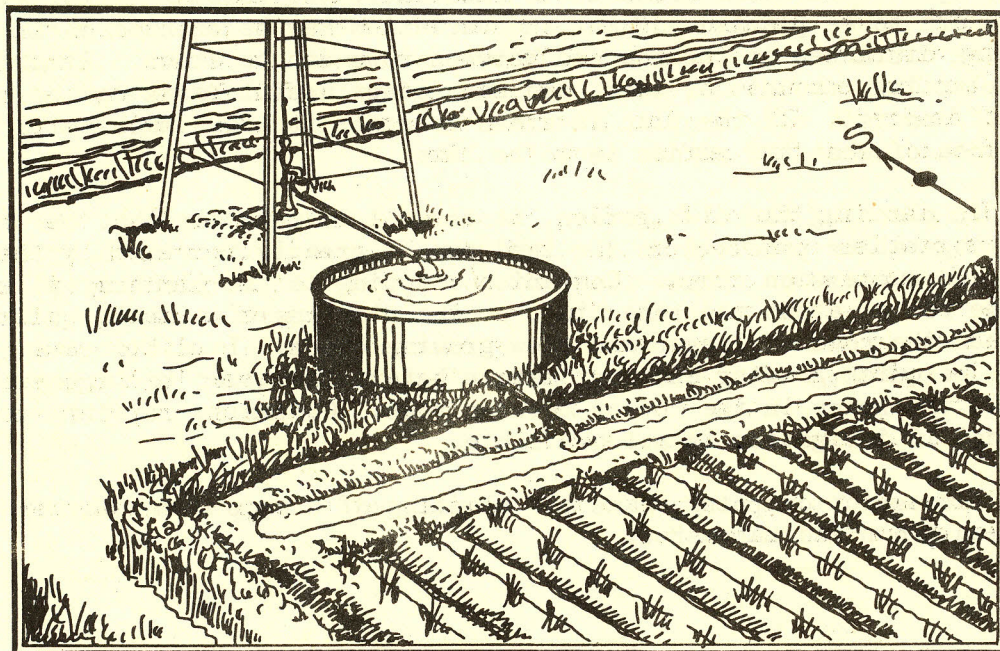
1. What is the average date of the last killing frost in the spring in your community?
2. What vegetables may be planted before the date of last killing frost?

Seed:

It is important that no seed be wasted. If the seed bed has been prepared properly and moisture is available fewer seeds will be needed.

Seed should be bought early to be sure to get the kinds needed. Consult the table in Extension Circular 1274 for how much seed to plant. When buying seed select a reputable seed house.

PART 3 GARDEN WINDBREAKS AND IRRIGATION



Few people fully appreciate the great need of some kind of protection against south and west winds in order to grow gardens most successfully in Nebraska. Winds dry out the soil quickly and hasten transpiration of moisture through the leaves, and also cause considerable mechanical injury to young plants. Hot winds too often burn and injure vegetation even though there is not a shortage of moisture in the soil.

Anything which helps to conserve soil moisture is a distinct benefit in this state where moisture is the limiting factor in crop production. Windbreaks reduce wind velocity and consequently lessen evaporation of moisture and actually make rainfall go farther. A windbreak gives good protection for a distance of approximately 10 times its height and some protection for even a greater distance. A small garden 40 or 50 feet square may be benefited materially by fastening strips of burlap to the fence or weaving cornstalks, willows or other branches close together in woven wire fence on the south and west sides of the area. A picket snow fence erected on the north and west during winter to stop snow on the garden and then extended along the south side during the spring and summer will be very beneficial.

Two or three rows of corn or Atlas Sorgo or a row of castor beans planted along the south and west sides of the garden will provide some protection during the summer. Protection early in the season is, however, important enough to justify a permanent planting of trees or shrubs for this purpose. Most large trees sap moisture to such a distance that it will be impractical to use them especially where the garden is small and ground is limited. If room permits, a single row of red cedar planted 6 to 8 feet apart will, in a few years, give splendid protection. Cedar should, however, not be planted in commercial apple growing districts. The caragana, or Siberian pea tree is one that is very good for protecting gardens. It is an upright growing tree which reaches a maximum height of about 20 feet. This tree planted 20 to 24 inches apart will, in a few years, make a dense hedge which occupies a minimum amount of ground and will not sap the soil of moisture for so great a distance as will large trees like elms, ash, and cottonwood. Peach and apricot trees might also be considered for plantings of this kind at least in the southeast quarter of the state. Their bloom adds much beauty to the surroundings, and in the more favored section may occasionally produce some fruit. They can be easily grown from seed. The pits should be planted about 2 inches deep in the fall. A single row with trees 6 to 8 feet apart headed rather low will in a few years make an attractive and an effective garden windbreak.

There are many shrubs that are hardy and will attain sufficient height to give the necessary protection. Unless one objects too strenuously to its sprouting habit, our common chokecherry will make an ideal garden windbreak. A single row planted two feet apart will in a few years, form a good barrier against damaging winds. It will not only provide wind protection but will furnish fruit for the table. Juneberry and buffaloberry are other hardy native shrubs suitable for garden windbreaks and which also produce edible fruit. A newcomer from China, called Nanking cherry, is another good shrub with edible fruit.

Other shrubs suitable for garden protection are Spirea Van Houtte, wild currant, cotoneaster, tamarix, lilac (Persian), false indigo, artemisia (old man), honey suckle and Japanese and purple leafed rose. These are attractive and hardy shrubs which are all common to the nursery trade, and, therefore, readily obtainable. A rather close spacing (3 to 5 feet in the row) is advisable for shrubs of this kind.

Transplanting of trees and shrubs should be done in the spring while the plants are still dormant. It is preferable to plow or spade the ground in the fall and then plant as soon as the ground can be worked in the spring. The trees and shrubs should be planted with the soil packed solidly about the roots and then watered well. They should be given thorough cultivation for a few years to keep out all weeds and grass and to conserve moisture.

Irrigation:

Available water supply is the most important factor in garden production in Nebraska. This is more important as one goes west across the state.

Some form of irrigation should be provided. A windmill is a good source of water. In many cases water may be taken out of a creek; however, a state permit is necessary. The garden location should depend on the water supply.

Remember that the soil will not be as wet in July and August as it is at planting time. Plant your garden so that it may be irrigated when it needs it. The success of growing a good garden will depend on the kind of work the gardener does and when it is done. Do a thorough job at the right time.

Watering:

The soil should be well filled with water before the garden is planted. This may be done by erecting a snow fence on the north side of the garden site so snow will be deposited on the garden. This may prevent the soil from warming up easily in the spring, but it is usually a profitable practice.

Practically all vegetables have been helped a great deal by irrigation during some years and some during all years. The short cool season crops that are grown in the early spring are least likely to need irrigation, but even these will frequently be greatly improved if they can be irrigated during short periods of hot, dry weather that do occur in May and June. The early crops least likely to need irrigation are radishes, leaf lettuce, peas, and green onions. Crops that may not often need it, but may be helped greatly are head lettuce, cauliflower, early cabbage, beets, carrots, spinach and kohlrabi. Early potatoes will almost always need irrigation.

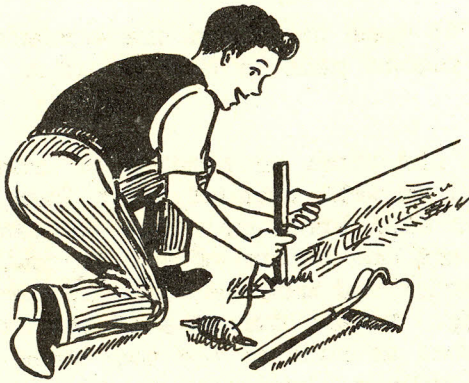
Of the crops still growing in July and August, practically all will need irrigation but onions, beans, tomatoes, egg plants, peppers, cucumbers and other vines, summer cabbage, and frequently sweet corn are likely to be most responsive. Sweet potatoes will often benefit by irrigation, but they may not need it as desperately as many other crops. Fall crops as Chinese cabbage, late cabbage, squash and turnips may need irrigation for starting the crop, and sometimes to carry the crop satisfactorily through August and September. Irrigation should always be available for celery. Irrigation for freshly seeded or transplanted vegetables may be found extremely desirable in many seasons.

In applying water it is important to understand a few general principles. First of all, water moves mostly downward in the soil. There is very

little lateral (side) movement. Hence, shallow ditches spread over the surface are better than deep ditches far apart. In heavy soils there is more lateral movement than in lighter soils but water also penetrates more slowly, hence: if using the surface or ditch system of irrigation in heavy soils, run a small stream of water for a long time in a narrow ditch, whereas, in a sandy soil it is better to run a fairly large stream in a wide shallow ditch for a relatively short time.

Second, there is nothing to be gained by supplying water beyond the water holding capacity of the upper few feet of soil or beyond the zone into which the roots of the particular crop can penetrate. In heavy soils it is desirable to apply as much water at one time as the soil can retain and then wait as long as possible until the crop needs water before irrigating again. This is to permit aeration of the soil. Very frequent shallow irrigations are undesirable. Irrigations of less than one inch of water at one time are practically never to be considered except in getting newly transplanted or seeded crops started.

PART 4 PREPARING THE SEED BED, PLANTING AND CARE



The first step in preparing the soil is, of course, to clear off all sticks, stones and rubbish of all kinds. Plowing or spading may then be done. This operation is for the purpose of loosening the soil and turning under manure, remains of old crops, cover crops, or other organic materials. It also permits air and moisture to pass around through the soil more easily. To do the most good, plowing or spading must be done well. All sections of the soil should be turned over evenly and to the same depth.

All manure and organic matter should be covered up, and the surface should have an even appearance when a good job has been done. Eight inches is usually about the right depth to turn soil.

Spading is usually the method used for turning the soil in most small gardens. This makes it necessary for the member to pay particular attention to this operation, in order to secure as good results as the plowing. In fairly mellow soil a spading fork is probably the most satisfactory tool to use. These forks are made so that they will go into the soil to about the proper depth.

The operation should be started at one corner, and an opening furrow or ditch thrown up across the end or side of the plot. After this the fork or spade should be inserted at an even distance each time from the edge of the land, the slice broken off and thrown against the preceding furrow in such a way that the top soil and materials on the surface will fall underneath, at about two-thirds of the way up the side, and roll or crumble toward the bottom.

After turning the slice over, it is well to strike it a blow with the fork in order to break it up completely, and thereby fill in all spaces at the bottom of the furrow. If the fork is inserted too far back from the edge of the land, the slice will not break off at the bottom and a spot of soil will remain unturned, which will make future planting and cultivation more difficult.

When this system of spading is learned and properly used, the results will be an evenly turned plot with all top soil and organic matter thoroughly mixed through the spaded portion. Clods and holes at the bottom of the furrow will be broken up and filled in. Organic matter and manure will be mixed through the soil and will decay more rapidly because they are not packed tightly at the bottom.

Where horse drawn or power machines are available it is, of course, better to use them for preparing the soil. A disc harrow is used to break up clods and fill in holes at the bottom of the furrows. It is especially valuable in spring plowed or fall plowed land.

Cultipackers are used to break up surface clods and firm the middle and lower parts of soils which have been plowed late in the spring. Fall plowed and early spring plowed ground is usually firmed by rains and freezing and thawing.

A spring tooth harrow or a disc harrow is used to loosen the surface of fall plowed soils. An extra fine, level seedbed can be made by the use of a meeker harrow.

It is a good practice to turn under all old vines or remains of crops and animal manure in the fall. This is beneficial on well drained, silt loam, soils. The freezing and thawing during the winter will break up clods and cause the soil to settle firmly but not too tightly toward the bottom of the furrow, leaving it in a mellow condition. The organic matter and manures will also decay more easily after a winter of freezing and thawing. A fall turned soil can be fitted much earlier in the spring and can be planted as soon as the top three inches are dry enough to work. Soils which run together, land that is too steep, or soils that are subject to blowing should not be turned in the fall.

As soon as the garden is plowed or spaded in the spring, it should be smoothed down with a garden rake or some of the larger tools mentioned above. A finely divided, smooth surface which has firm soil underneath will hold soil moisture and can be firmly pressed around the seeds. When warm, moist soil is in close contact with seeds they usually germinate quickly and send up strong healthy plants.

Planting the Garden:

See Page 11 in Extension Circular 1274, Page 18, Suburban and Farm Vegetable Gardens.

Large tomato plants will produce more fruit than will small plants. Select large plants and set them deeply in the ground. Several of the leaves may be covered. It is only necessary to have two inches or so above the surface of the soil.

Cultivation:



The primary object of cultivation should be to control weeds and to prevent cracks from forming; when this has been done further cultivation is not only a waste of time, but may be harmful to plant growth. Cultivation should not be deep for most vegetables, because they are shallow rooted and many of the feeder roots may be broken off when cultivating. All weeds which come up in the row should be pulled as soon as possible. Do not allow weeds to use the moisture that will be needed by vegetable plants.

Spacing and Thinning:

It is important that all vegetable crops have the proper amount of space in order to grow and mature in the best way. At the same time, too much space between rows and between plants will result in low yields per row. The planting table on page 31 of Extension Circular 1211 will give the most satisfactory spacing for a number of crops.

Crops that are grown from seed sown in the row are usually planted thicker than needed and then thinned to the right distance. This makes a good stand certain and helps the weak seedlings to push through the soil. Failure to properly thin plants will result in a reduced yield. It is best to thin when plants are small, so that the plants left in the row will be less disturbed by pulling out the extra ones. This will also give the right amount of space as soon as possible. If the thinning can be done as soon after a rain as the soil can be worked, less damage will be done to the plants which are left in the row.

Such crops as lettuce, chard, turnips and beets may be thinned to one-half the right distance the first time. This will allow half of the remaining plants to mature sufficiently to be used before they are removed. Total production of the garden may be increased in this way.

Protection from Late Frosts:

Tender plants such as tomatoes, egg plants, cucumber and other tender plants may be protected from late frosts by covering the plants at night with burlap sacks, old quilts, cardboard boxes, newspapers, or glass jars. If the plants are small they may be covered with a small amount of soil. The plants may be covered two or three days without injuring them.

Mulching:

Mulching means placing a covering of straw or other litter two or three inches in depth between the plants. Lawn clippings or grass may be used. The mulch will prevent the soil from drying out so quickly and discourages weed growth. Mulching is very desirable for tomatoes, egg plants, peppers and potatoes.

Saving Seeds:

4-H members can save the seed of some vegetables. This will reduce the cost of the garden the following year and help greatly in preventing a seed shortage.

Saving seed of peas and beans is done easily. Allow the vines to ripen in the field. When the vines are ripe and the pods dry pull up the vines and hang them up in bunches in a cool dry place. When seeds are dry, collect and store.

Cucumbers, melons and squash should be saved when the fruit is opened. Allow the seed to dry and place in a dry place away from insects or mice.

When saving tomato seeds several very important rules must be observed. (1) Select fruit from the most desirable plants. (2) Cut the fruits in half and squeeze out the seeds into a fruit jar. (3) Place jar containing seeds and pulp in a warm place. The mixture will ferment, seeds and pulp will separate. It is necessary that the jar be kept warm so this fermentation can take place. Do not allow seeds to remain too long in the jar or germination may be reduced. (4) Pour fermented mixture onto a piece of window screen and wash pulp from seeds. (5) Spread seeds out on blotter or cloth to dry. (6) When seeds are dry store in a dry place.

It is important that the seed and pulp be allowed to ferment. This process kills several diseases carried on the surface of the seed.

PART 5 FERTILIZING THE GARDEN

See: Page 3. Extension Circular 1274, Page 2-6 Suburban and Farm Vegetable Gardens.

The soil is made up of small particles of minerals mixed with decaying leaves, stems, and roots, and water held in a film around the soil particles. The early pioneers who came to Nebraska found the original soils very rich in the materials plants required. But as crops of grain were taken off the soil, some of the needed minerals were removed. That is particularly true following wet seasons or where gardens are irrigated since crops are larger when moisture conditions are favorable. Sooner or later some of these materials must be replaced if big annual crops are expected.

On farms where livestock is kept, manure is usually available, and this is a fine fertilizer to apply to the garden spot. It not only supplies the needed minerals and nitrates that promote luxuriant, leafy growth, but it improves the condition of the soil so it is easily worked. Such soil also takes in water more rapidly and holds more water from plant use than does unmanured soil or soil fertilized with commercial fertilizers alone.

Ordinary barnyard manure (from cattle, horses and hogs) usually contains some straw and is not as rich as are poultry droppings or sheep manure. The latter are used at the rate of a bushel for each 100 square feet (6 or 7 tons per acre). Barnyard manure can be used at twice that amount. The best time to apply manure is just before plowing or spading. A good substitute for manure is spoiled alfalfa hay.

Another method recommended in some states is to have two separate garden plots. One of these is planted to garden and the other to a legume like sweet clover, red clover, or soy beans. The legumes have nodules on their roots where bacteria live and these little fellows take nitrogen out of the air and make it over into nitrates (salts of nitrogen) which plants can use. If one uses soy beans or annual sweet clover, the plots are rotated each year. If red clover or two year (biennial) sweet clover are used, the plots are changed every two years. With this method, gardeners have very little trouble from diseases that live over in the ground. This method is adapted only to the southeastern section of the state or to irrigated areas. On western dry land, where summer fallowing is a common practice for wheat and potatoes, two separate garden sites are needed where irrigation water cannot be provided. Here it is a matter of storing water in one of the plots for use of the vegetable crops the following year in addition to the rain that falls that year.

Commercial Fertilizers. In areas where animal manures are not readily available, commercial fertilizers can be used to replace the principal mineral elements removed by crops. These are nitrogen, phosphorus and potash. There are other minerals that plants use in very small quantities such as iron, boron, copper manganese, etc. These are called trace elements because only a trace of each is needed and for garden crops. They seem to be present in Nebraska soils in sufficient quantity.

Nitrogen (N) is the element of fertility most likely to be low in supply in gardens especially if manure has not been used. It is commonly bought as ammonium sulfate (21% N) Sodium nitrate (16% N), ammonium nitrate (33% N).

Nitrogen salts are readily soluble in water. Therefore, they should not be applied to the vegetable garden in the fall in areas of the state where we have considerable rainfall. Because these materials are very soluble they might be leached out of the top soil and lost to the rather shallow rooted vegetable crops by the time the young plants are ready to use them.

Manures are different. They contain a small amount of soluble nitrogen that might be leached out by fall or early spring rains. But much of their nitrogen is tied up. Bacteria, always present in the manure itself and usually in the soil too, work on the crop residues to change them gradually into a form that plants can use (nitrates).

Therefore, when plants are fed nitrogen through commercial fertilizers, it is best to do so at several different times. An application of one pound per hundred feet of row, made at intervals of three to four weeks, would be more satisfactory than a single application of the entire amount when the plants are small.

Plants that produce fruits, like tomatoes, need nitrated most just after the first fruits have set. Some varieties like Red Cloud, Victor and Bounty tend to set so many fruits early that subsequent leaf growth is checked severely and sunburning of the fruit is likely to occur. A teaspoonful of one of the nitrates scattered around each plant will promote additional leaf growth. (Be sure not to scatter it on the plant.)

Phosphates. The need for phosphates has become apparent in a few areas of the state and as the years pass and big grain crops are removed from the soil, more such areas will appear, particularly in the irrigated sections, in the Missouri River counties and in the Platte valley. As a rule, very sandy soils will show the need for phosphorus sooner than will the heavier loams and clays.

Such garden crops as tomatoes, peppers and potatoes are among the first to show benefits from phosphate applications. Since phosphates will not leach out but are tied up in the soil, they may be applied just before or during plowing or spading at the rate of 200 pounds per acre. Better still, they may be placed in trenches after the tomato or pepper plants are set out. A trench 2 to 3 inches deep and 8 to 10 inches long can be made with a hoe on two sides of the plant. Half a tablespoonful of Treble Super phosphate is placed in the bottom of each of these trenches and covered with soil.

Mixed Fertilizers. Sometimes it is difficult to secure straight nitrate fertilizer or straight Treble Super phosphate, but perhaps a mixture of the two can be secured. Beet growers have been able to buy 10-20-0 or 8-30-0 fertilizer for use on beets or potatoes. These figures mean something very definite and all mixed fertilizers must have labels containing similar figures. The first figure always designates the amount of nitrogen a hundred pounds of the particular fertilizer contains. The second figure tells how many pounds of phosphorus it contains per hundred and the third figure, the amount of potash per 100. So 10-20-0 fertilizer contains 10 pounds of nitrogen, 20 pounds of phosphorus, and no potash. Since most Nebraska soils are well supplied with potash there is little need to buy this material. But in many states to the east and south, complete fertilizers containing potash in addition are needed and some of these are being sold in Nebraska such as 4-12-4 or 6-12-4.

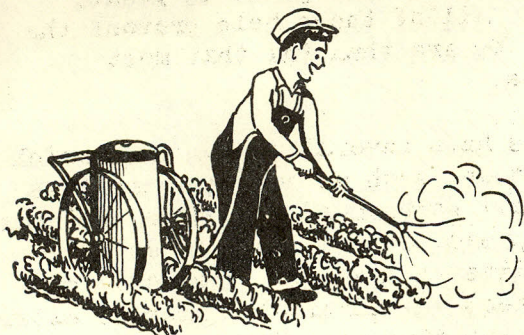
Compost. Where manure cannot be secured for the garden, it is advisable to make a compost pile to provide a substitute. Commercial fertilizers usually lack decaying vegetable matter (humus). After using them for several years without also plowing under straw, green crops, leaves or grass clippings, the soil runs together and packs easily. It becomes difficult to work and crops are not thrifty.

Instead of burning leaves, weeds, grass clippings, they should be made into compost. Here is the method to use: At one end of the garden, dig a trench 4 or 5 feet wide and 8 or 10 feet long and a foot deep, piling the soil around the edge. The leaves, lawn clippings, etc. are spread out in the trench 6 to 8 inches deep, then covered with two inches of soil to weight them down and provide bacteria to bring about decay. Then water is added to keep the pile moist, another layer of leaves, etc. is added and another layer of soil and then water, etc. Water must be added throughout the summer to keep the bacteria at work. The following fall, the compost is applied to the garden just before spading or plowing and a new compost pile made for use the following year.

PART 6

INSECT AND DISEASE CONTROL

See: Pages 7-10, Extension Circular 1274 and Misc. Pub. 605, Vegetable Gardener's Handbook on Insects and Diseases.



Practically all insects can be controlled if the proper practices are used at the right time. Learn to recognize the insects and their habits. All insects are not harmful. Learn to recognize the lady bird beetle. This insect eats plant lice and some other harmful insects. (Study Extension Circular 1512).

Most insect poisons are applied as a dust. One of the best of these is rotenone which is very effective against many garden insects but is not harmful

to humans. In using arsenicals they can be mixed with either hydrated lime, gypsum or flour.

The material may be applied by using a washed flour sack. Shake the material over the plants early in the morning. A simple duster of the plunger type is very convenient. Keep poison mixed and ready to use when insects appear.

Disease of Vegetable Crops:

Vegetables are not so much different than we are when it comes to a matter of diseases. Some of the plants have many diseases. The potatoes, the bean, and the tomato each have nearly 50 different kinds, but we are happy to say that most diseases are limited to a single vegetable. In Nebraska there are only a few diseases. There are only eight common ones on potatoes, six on tomatoes, and three on beans.

One general class of disease is the parasitic molds, or we would say little plants growing on bigger ones. This includes mildew, smut, rust and damping-off, each caused by a different mold. Another type of disease is caused by viruses and they are quite like measles, small-pox, or head colds like we have. These included the mosaics of tomatoes, potatoes and beans. Another type of disease is caused by bacteria or very tiny animal-like bodies in the plants, such as, bean blight or cucumber wilt. Plants also become diseased because of unfavorable growing conditions, from too little or too much of certain plant foods in the soil. This would correspond to our rickets, anemia, and scurvy, and is shown in plants generally by yellowing or other indications of lack of thriftiness or color.

Prevention of diseases rather than an attempt to cure should be the aim of every gardener. Some diseases are carried in the ground, others on seeds, some insects carry disease, and some are caused by the lack of plant foods. There are several ways by which diseases can be prevented or controlled. Among them are planting of disease-free seed or the disinfecting of the seed so as to kill the bacteria or mold on it. Heat is sometimes used to kill the small infections carried within the seed itself. The elimination and destruction of infected plants during the growing season and the burning of the vegetables of the preceding year destroys some. The rotation of crops that carry similar diseases is also an effective method lessening disease.

When the diseases are so widespread and common as to make previous practices unsuccessful, protective measures must be employed. Then we must use sprays or dusts, avoid working with plants when they are wet, use surface irrigation rather than sprinkling, destroy insects that move from plant to plant, rotate the crops to different parts of the field. All of these help prevent the spread of disease already present in the garden. We are thankful that most diseases are usually limited to a single vegetable.

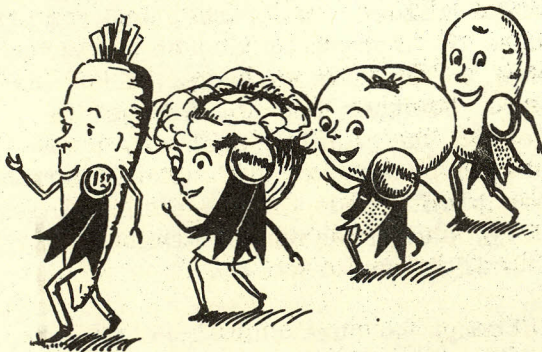
It must be remembered that most diseases have several places from which they may come. The observance of a single precaution, such as seed treatment is seldom enough. Successful control must consider all sources of infection including the possibility of seed infection, the means of spread, conditions favorable to the disease, the length of time the disease will live in the soil, the value of sprays or dusts, the variety of plants that will keep the particular disease alive, and the possibility of plants that will not carry the disease. Each plant and disease is a separate problem.

An understanding of the reasons behind the seed selection and treatment, irrigation, dusting, spraying, and handling for each disease is interesting and very valuable. Information covering the identification and control of vegetable garden diseases may be found in the bulletin entitled "Diseases of Vegetables in Nebraska".

Certain plant diseases can be controlled by treating the seed with Semesan or Red Copper Oxide (follow directions on the can). Red Copper Oxide should not be used on cabbage, brussel sprouts or onions.

Put seeds and treating material in a jar or some other tight container and shake until all seeds are coated. Screen off the excess dusting material.

PART 7 EXHIBITING AND JUDGING VEGETABLES



Selecting Vegetables for Exhibits. Vegetables are used largely for human food. Therefore, in selecting specimens for an exhibit they must have consumer appeal. They must be crisp, clean, free from insect and disease damage, not wilted, dirty, nor bruised.

Specimens of medium size should be selected; too often specimens of abnormal size are exhibited and as a rule, these are tough, woody, and of poor edible quality.

Specimens should have the correct shape and color for the variety and they should be uniform in size, shape and color. The plates or containers which hold the vegetables should be clean, attractive and uniform for any one type of vegetable. The exhibits should be neatly and correctly labelled.

If the premium list calls for a definite number or quantity of specimens, the exhibit should conform to that number or quantity. There should be neither more nor less than called for. It is a good precaution, however, to have an extra specimen or two to take care of loss or spoilage; but at judging time, the exhibit should contain only the proper number.

Judging. Exhibits of vegetables are judged on the basis of their quality and condition, their uniformity in size, shape and color, their trueness to type, their freedom from blemishes, and their size. These points are valued as follows:

Quality and condition- - - - -	20%
Uniformity in size, shape, and color - -	30%
Trueness to type - - - - -	20%
Freedom from blemishes - - - - -	20%
Size - - - - -	10%

Quality cannot always be determined by merely feeling of or looking at the specimens. The judge may cut and taste specimens of carrots, turnips, kohlrabies and rutabagas. It is also permissible for him to cut into a specimen to determine the color of the flesh. Beets with white streaks in the flesh are not as popular as those with dark flesh clear through. Carrots carry most of their Vitamin A (carotene) in the outer portion of the flesh. A specimen with a large, light colored core and a relatively narrow outer portion of orange colored flesh is not as valuable as is a specimen where the reverse is true.

If disease or insect injury occurs in the same class on different exhibits, the exhibit with diseased specimens is usually placed below the one that has insect injury.

An exhibit which contains a substitute is placed at the bottom of the class unless there are two which contain substitutes. In the latter case, these two exhibits are judged on the merits of the unsubstituted specimens.

PART 8

HARVESTING AND STORAGE

Vegetables should be harvested according to the use for which they are grown. Some vegetables are used in a green stage, others are used just before they mature, and still others when they are fully matured. Some vegetables stay in the right condition for use only for a short period of time, and therefore must be harvested and used promptly when the proper stage of ripeness is reached. Some, of course, stay in a usable stage for a longer period of time varying from a few days to several months. Vegetables that are to be shipped or stored should be picked in a different stage of maturity than when they are to be used on the home table.

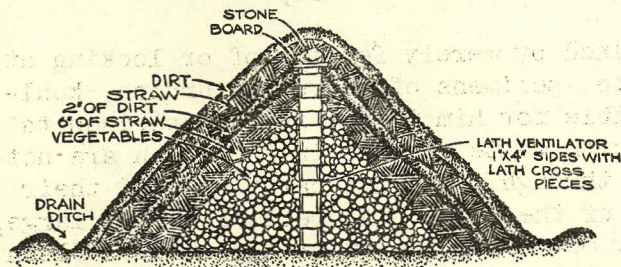
Have you ever tried to eat an old woody radish and then compared it to a young, quickly-grown one? A large amount of the food value of vegetables may be lost by allowing them to become too old. This is especially true of the root crops such as beets and carrots, which are best for both market and home use when they are well grown but still young and tender, and before they become fibrous or woody. It is also a mistake to try to produce unusually large vegetables, because large ones are likely to become either overripe and soft or tough.

When vegetables are free from insect injuries, disease spots, cracks or other blemishes; when they are of the right size, color and shape; when they have a good flavor and are tender, crisp and fresh, they are said to have high quality.

Storage:

The storing of late vegetables is an economy for those who grow them in sufficient quantity for the needs of the family. Vegetables to be put in storage should be mature but not overripe to the point where they have become woody.

To care for the surplus vegetables in many cases requires nothing more than the use of existing facilities in or near the home. Often late vegetables from a small garden may be stored with no outlay of money. Temporary outdoor pit storage is very useful.



Cross section of an outdoor storage mound.

When considerable quantities of vegetables are grown it may be advisable to construct permanent storage facilities in the form of a storage room in the basement of the dwelling or under an out-building.

Temperature and moisture are the two important factors to consider in storing vegetables; all vegetables do not require the same temperature and moisture conditions. Beets, carrots, potatoes, late cabbage, turnips and salsify should be stored in a cool, moist place. The temperature should be held between 35 and 40 degrees.

Sweet potatoes, squash and pumpkin should be held around 55 degrees F., and under fairly dry conditions. The storage room should be equipped so as to allow for ample ventilation. When the temperature is quite warm in the fall it is best to open the ventilators at night and close them in the daytime. Onions require dry, cool conditions.

Parsnips and salsify can be stored in the ground where they are grown. Freezing and thawing does not affect them. Tops should be removed an inch above the ground.

Carrots, beets and turnips can also be stored in the rows where they were grown, but must be covered. Use about six inches of straw and a layer of soil dirt over the straw from two or three inches deep. This will keep these vegetables from freezing and thawing. Freezing and thawing will cause these vegetables to become soft and unusable. Tops should be removed an inch above the ground.

PART 9
FALL CARE OF THE GARDEN



When all the valuable materials are collected, the next step is to pile up all the rubbish, such as weeds and tomato vines, and burn this material on the garden. The burning of this rubbish not only makes the garden look better, but it destroys many insects and plant diseases. When insects are not destroyed in the fall, they hide in out-of-the-way places and in the spring come out of their hiding places and soon start to damage crops and produce another brood.

When rubbish is cleaned up and burned, the next important step is to cover the ground with a good dressing of manure. The manure should be largely of solid matter free from straw or hay. Now plow or spade up the garden. The manure turned under and thoroughly mixed with the soil will rot during the winter and be ready as plant food for your early crops in the spring. The ground left with the clods unbroken and unraked during the fall and winter will collect a supply of water which is valuable for early crops. In addition to retaining more water, fall plowing helps to destroy insects. When the insects are distributed by fall spading, many of them are killed and, therefore, the damage to next year's crop is reduced. The freezing and thawing action of the soil during the winter will cause the large lumps to crumble into fine soil. Fall plowing has the added advantage of permitting earlier planting in the spring, because the soil can usually be prepared sooner.

It is often advisable to irrigate the garden site in the fall and winter. At this time of the year the water is not needed so badly for other purposes; the water will be stored in the soil for a depth of four feet.

COMPLETE RECORD

The garden record should be kept throughout the growing season. Compare your record with other club members. Study your record and see where you could have done better. Make a list of good varieties of vegetables for another year.

In selecting vegetables for market or for exhibit it should be remembered that uniformity and quality are the two most important things for which to look. A medium size with each fruit or root the same in size, shape, color, and degree of ripeness is good standard to use. This gives uniformity.

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