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FARMERS BULLETIN No 254



CUCUMBERS



CUCUMBERS are extensively grown in many southern locations as an early crop for northern markets.

Large quantities of this vegetable are produced during early spring in coldframes. This industry is especially well developed along the Atlantic seaboard, particularly around Norfolk, Va.

The production of cucumbers for pickling is a well-developed industry in more northerly locations, particularly in the Great Lakes region.

Success with the crop is dependent upon the use of well-enriched soil of the proper physical character and upon the control of the several serious insect enemies and diseases attacking the crop.

The making of salt-pickle stock and of dill pickles is not a difficult matter. Making salt stock is entirely feasible for the average grower.

CUCUMBERS

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INTRODUCTION

Few garden plants have been known to and cultivated by man longer than the cucumber. De Candolle has proved that this plant has been in cultivation between three and four thousand years. It is not strange in view of this fact that it has become a standard garden vegetable and that numerous devices have been employed to bring it into cultivation under climatic conditions where it would not

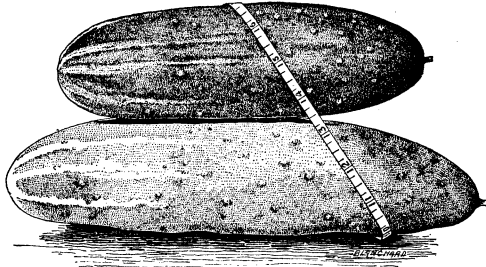


FIG. 1.—The American type of cucumber

normally thrive and at a time of year when it could not be grown in the open. As a result of these attempts to supply the table of man with this delicacy at all seasons and in varying climates, two types of cucumbers which are very distinct have been produced. One—the English or forcing type of cucumber—has been developed and is grown almost exclusively under glass. The short type of fruit, somewhat triangular in cross section, which we are pleased to call the American type, illustrated in Figure 1, is extensively grown in the field for pickling purposes and for early slicing fruits. This type is also grown in coldframes and forcing houses more extensively in the United States than is the English forcing type.

Normally the cucumber is a lover of subtropical conditions, but it will not thrive under extreme heat and it will not endure frost.

Before the danger of frost has disappeared in the spring it is necessary to give the plants protection unless planting is delayed until this danger point has passed. In order to grow the plants under glass, a summer temperature ranging from 60° at night to 70° or 75° F. during the day must be maintained.

Because the plant requires only a short period for its development there are comparatively few localities within the confines of the United States where its fruit can not be successfully brought to edible condition during the normal growing season. The character of the fruit and the condition in which it is demanded in the market enable it to be grown at a distance and shipped by rapid transportation to the point of consumption during those seasons of the year when it can not be successfully grown in the open to supply the local demand. As a result of this, an important industry with the cucumber as its foundation has been built up in each of the crop zones along the Atlantic coast from Florida to Maine, the harvest period for each of these localities being determined by market demands and the progress of the season.

GROWING CUCUMBERS FOR EARLY MARKET IN THE OPEN

From Florida northward throughout the whole trucking area along the Atlantic coast the cucumber is a staple trucking crop. In recent years it has also found a satisfactory place in the truck-crop practices of Texas, Louisiana, and other Gulf States.

SOIL

The soil best adapted to the cultivation of cucumbers in the open is a light sandy loam, one which responds quickly to temperature and fertilizer. Such soils are prepared early in the season and thrown into gentle undulations, so as to produce slight ridges upon which to plant the seed to insure good surface drainage. It is customary upon soils of this character to practice the plowing under of cowpeas or soy beans when the area is not in use for trucking purposes and to supplement this use of green manure by heavy applications of high-grade truckers' fertilizer. It is not unusual to apply from 1,000 to 2,000 pounds of high-grade fertilizer to the acre on this crop.

The turning under of heavy crops of green plants, such as cowpeas or soy beans, and the use of commercial fertilizers tend to render the soil acid. To correct this evil, the soil should be given an application of lime once in three or four years at the rate of 1,000 to 1,500 pounds per acre. This will sweeten the land and assist to liberate the plant food locked up in the soil. Lime also has a valuable mechanical action on the soil, rendering it more easily tilled.

If stable manure is available, the use of green-manuring crops can in great measure be dispensed with, but in most localities where cucumbers are extensively grown for early slicing purposes the available supply of stable manure is inadequate, and the use of green crops, lime, and commercial fertilizers must be the chief dependence. On light sandy and gravelly soils the use of green-manuring crops is of more importance than in those regions where the soil is of the prairie type and heavily charged with organic matter.

In instances where it is desirable to use stable manure and the supply is inadequate for a general application, the manure can be made to go much farther and do good duty by using it under the hills. When so used, a common practice is to throw out a furrow along the line of the row and to place a shovelful of well-rotted manure in the bottom of the furrow at the cross marks, 3, 4, or 6 feet apart. After the manure has thus been distributed the furrow is then turned back, which covers the manure and at the same time fills the trench.

PLANTING

There are almost as many methods of planting cucumbers as there are growers. Some plant in hills the standard distance of 6 feet apart each way, others plant in hills 6 feet apart in one direction and

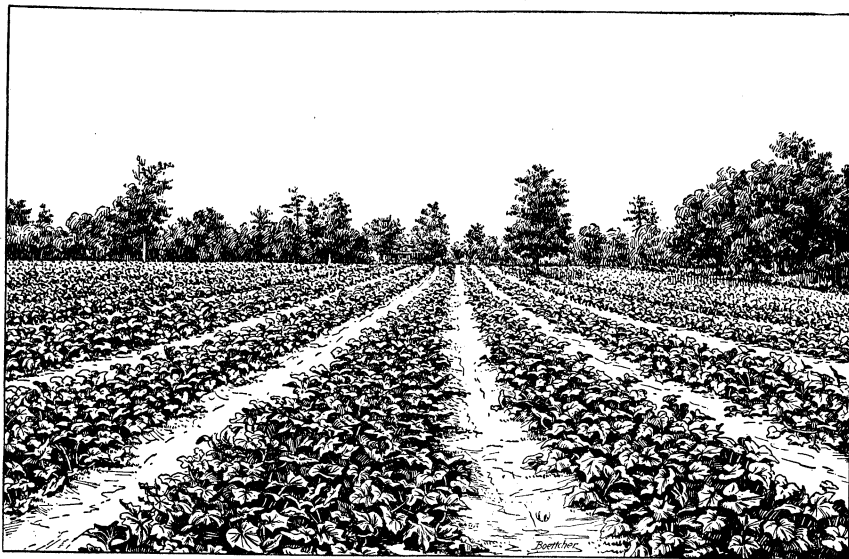


FIG. 2.—General view of a cucumber patch

2 or 3 feet apart in the row, while others plant in drills or broad belts 6 feet apart and chop out the plants to stand about a foot apart in the row after danger from insect depredation has lessened. The methods which seem most economical under the conditions at hand will, of course, be adopted by the grower.

If the plantation has been prepared by the use of well-rotted stable manure under the hills, the surface should be kept on a level with the general surface of the area and the seeds scattered so the plants will receive the advantage of the fertilized area. In any case a liberal quantity of seed should be employed. A good stand of plants is the first step in growing a profitable crop.

A successful plantation on either of the above plans should give a field of the appearance of that shown in Figure 2.

After the plants have appeared above ground, cultivation is carried on until the vines interfere to the extent of danger of injury to them, after which horse cultivation is abandoned and any weeds which appear are removed by hand.

In outdoor culture the cucumber is frequently used as a companion crop to other crops, like beans. Beans being of rapid growth "come on" quickly and form a partial protection or windbreak for the young cucumber plants. When arranged in this way, cucumbers are planted in drills or in hills 6 feet apart and a row of beans is placed between two rows of cucumbers, a method which insures a very complete and satisfactory use of the ground. The quick maturity of the beans allows them to be harvested and entirely removed from the area before it is required for the cucumbers.

An expedient which is sometimes practiced by cucumber growers in order to protect the early crop is to plant rye upon the area during the fall. Rye grows rapidly early in the season and reaches some height before it is safe to plant cucumbers in the open. As the time approaches for placing the cucumbers in the field narrow swaths are cut through the rye field corresponding to the rows of cucumbers, leaving belts of rye standing between the rows of cucumbers and at right angles to the prevailing winds. The plants for this purpose are started in strawberry boxes either in a hotbed or greenhouse, and when they have attained 8 or 10 inches in height or are about ready to vine they are removed to the open and placed in the area from which the rye has been removed. The standing rye serves as a windbreak and a protection to the young plants. As the plants grow and require the whole area the remaining portion of the rye is cut and cultivation follows to break up the stubble and to give the plants needed attention.

DISEASES

The next important step in the production of cucumbers is constant watchfulness for the appearance of blight or mildew, and immediate, thorough treatment when discovered. These diseases are of almost annual occurrence throughout the southern trucking region, and growers of cucumbers should plan to make the spraying of the plants a regular feature of their cultural work.

For details and directions in regard to cucumber diseases and their treatment, consult Farmers' Bulletin No. 1371, "Diseases and Insects of Garden Vegetables."

The subject of disease is, however, of such great moment to the truck grower that the general preventive treatment for blight and mildew should be mentioned at this point. This consists of thoroughly spraying the plants with Bordeaux mixture once in ten days or two weeks after they have begun to run. Bordeaux mixture is made by bringing together the milk of lime and a solution of copper sulphate (bluestone). For cucumbers it has been found that a mixture made from 4 pounds of copper sulphate and 4 pounds of freshly burned stone lime to 50 gallons of water makes the safest and best solution for this work.

If the patch to be sprayed is a large one and the solution is required in large quantities, the directions for preparing Bordeaux mixture given in Farmers' Bulletin No. 1371 should be consulted. The 4-4-50 formula mentioned above, however, should always be followed in preparing the mixture for cucumbers.

To make the Bordeaux mixture on a small scale, take two half-barrel tubs, one for the copper-sulphate solution and the other for the milk of lime solution. Place 4 pounds of lime in one tub and

slake this with sufficient water to thoroughly break up the lime without allowing it to burn. After the lime is thoroughly slaked, dilute it to 25 gallons. Into the other tub pour 25 gallons of water and suspend in it 4 pounds of copper sulphate in a gunny sack or other porous sack for 24 to 48 hours before the solution is required. Bordeaux mixture is then made by pouring these two solutions through a wire-cloth sieve which has about 18 to 20 meshes to the inch, equal quantities of the two solutions being poured at the same time through the strainer, which should be suspended over a barrel or other receptacle sufficiently large to hold 50 gallons of the mixture. In making this combination it is best to have two men dipping simultaneously from each receptacle and pouring the two solutions together into the strainer, as shown in Figure 3. The milk of lime solution should at all times be kept thoroughly stirred, as should also the copper-sulphate solution.

When large quantities of Bordeaux mixture are required, stock solutions are made in 50-gallon casks, the concentration of the cop-

per-sulphate solution being $\frac{1}{2}$ pound of copper sulphate for each gallon of water—that is, 25 pounds of copper sulphate to 50 gallons of water—and of the lime solution $\frac{1}{2}$ pound for each gallon of water—that is, 25 pounds of lime to 50 gallons of water. In making Bordeaux mixture 8 gallons of the copper-sulphate



FIG. 3.—Men pouring together milk of lime and bluestone to make Bordeaux mixture

solution are placed in one dilution barrel and 8 gallons of the stock solution of lime in a second dilution barrel, each barrel then being filled with sufficient water to make 25 gallons in each receptacle. These diluted solutions are then drawn or poured together, as above described, to make Bordeaux mixture. In applying the mixture to the vines the directions given in Farmers' Bulletin No. 1371 should be carefully followed.

For more complete information on diseases affecting the cucumber, see Department of Agriculture Circular No. 234, entitled "Bacterial Spot of Cucumbers," and Farmers' Bulletins Nos. 1320, "The Production of Cucumbers in Greenhouses," and 1371, "Diseases and Insects of Garden Vegetables."

ENEMIES

Everything considered, the striped cucumber beetle is the most important insect enemy of cucurbits with which the grower has to deal. Various control methods, such as the application of stomach poisons, covering the young plants with screen wire or cotton gauze to keep the beetles away from them, the planting of an excess of seed, and dusting with nicotine dust are practiced. For complete

information on this and other insects affecting the crop, see Farmers' Bulletins Nos. 1282, "Nicotine Dust for Control of Truck-Crop Insects," and 1322, "The Striped Cucumber Beetle and How to Control It."

MARKETING

As soon as the cucumbers reach marketable size—i. e., from 6 to 10 inches in length—they are picked from two to three times a week and sorted and graded so as to place all those which are perfect in shape and uniform in size in one grade, which are usually packed in baskets of the Delaware type¹ holding a bushel or a half barrel. Those fruits which are of inferior size and slightly defective in shape are packed in ventilated barrels and shipped in ventilated or refrigerator cars.

In Texas, where cucumbers are extensively grown and shipped to distant markets, they are purchased from the farmers by the bushel by jobbers or dealers, and they are shipped in standard refrigerator cars in each of which a false floor is laid over the permanent floor by placing 2 by 4 inch scantling on edge and laying a floor of 1 by 3 inch slats, with intervals of three-quarters of an inch between the slats. Another floor of similar construction is placed about halfway between the bottom of the car and the roof, uprights being set upon the floor first laid to support the second. The cucumbers are then loaded into the car in bulk, as are potatoes. About 600 bushels can be handled in this way in a single car. Refrigeration can be as perfectly accomplished in a car loaded in this manner as in a car packed with cucumbers in packages. The advantage to the shipper and grower is that there is no expense except that for flooring and decking the car, as above noted, which amounts to from \$12 to \$20, depending upon the cost of material. Very satisfactory results are reported by dealers handling cucumbers in this manner. Successful shipments have been made from Corpus Christi, Tex., to New York, Chicago, San Francisco, Boston, and Seattle, thus demonstrating the feasibility of the plan.

YIELD

The yield of cucumbers to the acre depends on the season, the variety grown, and the skill of the planter. A normal crop, however, may be placed at about 200 half-barrel baskets per acre, the price varying from 50 cents to as much as \$2 per basket.

After the fruits have been harvested and the marketing season has closed, the vines should be destroyed by gathering and burning or plowing them under, so as not to harbor or breed diseases.

GROWING CUCUMBERS FOR EARLY MARKET IN COLD-FRAMES

In certain localities along the Atlantic coast from Washington southward special types of the trucking industry have been developed. One of the most interesting phases of this development is found in the methods employed in bringing the cucumber to marketable maturity. While in most localities cucumbers can be successfully grown in the open ground, in some situations it has been found

¹ Baskets of this type are made of staves fastened to a circular board bottom and held in the middle and at the top, which is much larger than the base, by wood or wire hoops.

advantageous and very profitable to go to the expense of starting cucumbers under glass in coldframes, like those shown in Figure 4, and developing them in this situation until they fill the space covered by the frames, after which time, if weather conditions are favorable, the sash and frames are removed and the plants are allowed to occupy the entire area.

This branch of the cucumber industry is frequently combined with the cultivation of lettuce and is carried on in much the same way that the lettuce and cucumber industry is conducted in the great forcing establishments in the neighborhood of Boston and other northern cities.

Lettuce being a hardy crop can be sown in the autumn and the plants carried through the most severe portion of the winter in sash-

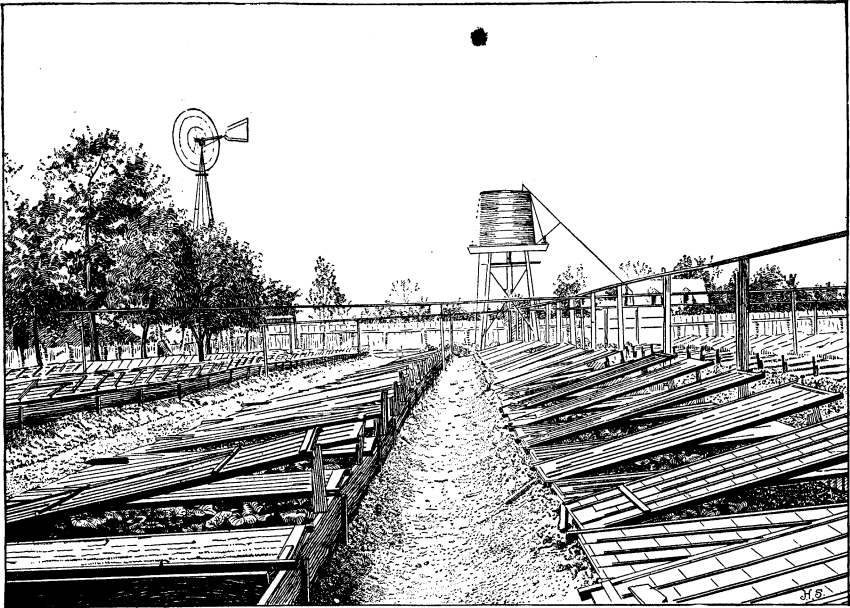


FIG. 4.—Coldframes for growing cucumbers

protected frames, or the seed can be sown early in January in frames and the plants brought to marketable maturity in that situation. In most localities as far south as Norfolk, however, it is the practice to produce a fall crop of lettuce under frames ready to go to market about the Christmas holidays, this to be followed by a second crop of lettuce on the same area, to be marketed in March or April. Before the lettuce is harvested a sufficient number of plants are removed to allow cucumber seeds to be planted in the frames at proper intervals, so as to insure a stand of cucumbers under the protection of the frames. After this second crop of lettuce goes to market the ground is given up entirely to cucumbers. In some instances the cucumber industry is the only one carried on under the frames. The planting of seeds in the latitude of Norfolk can begin about February 20 to March 1.

SOIL

Soil for use in coldframes should be a well-enriched sandy loam of the type of the Norfolk sandy loam. If it can be dark in color, this is an advantage. If normally light the color can be changed by the addition of muck or by incorporating well-decomposed stable manure with the surface soil. A dark color is of some advantage in helping to raise the temperature in the frames under the glass.

WATERING

Since the glazed sash prevent the soil beneath them being moistened by natural means—that is, by rain or dew—it is necessary that means be provided for watering or irrigating the plants. This can be done by arranging pipes upon the surface of the ground or at a convenient height overhead, so as not to interfere with cultivation, from which water can be drawn to sprinkle the surface of the beds at desired intervals and as the plants may require. The work of watering should, however, be very carefully done. The same general

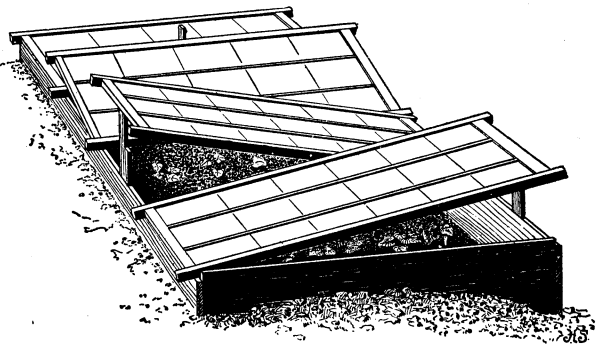


FIG. 5.—Various methods of arranging coldframe sash to secure ventilation, shade, or protection

precautions necessary for the care of plants in coldframes should be observed—that is, to do the watering in the morning on bright days only, when air can be admitted and when the sun will soon dry the moisture from the leaves of the plants. In

this way much can be done to protect the plants from injury from such diseases as the damping-off fungus and mildew.

It is the common practice to plant only a single row of cucumbers through the coldframe, placing the hills at intervals of 2 feet through the center of the continuous frame. Such frames are made of boards about 12 inches high at the back and about 8 inches high at the front side, which are held in place by stakes driven in the ground or by cleats used as guides for the sash. In length these frames are multiples of 3 feet, depending upon the area to be occupied by the coldframe.

VENTILATION

Besides the precautions to be observed in watering plants in coldframes, extreme care is necessary to give the plants sufficient air to keep them in a healthy condition. If the atmosphere is allowed to become close and very hot, the plants will be weakened and thus rendered more susceptible to the attacks of plant diseases. The various ways in which the sash may be arranged to give air, shade, or protection from drafts are suggested in Figure 5. Strong, vigorous,

rapidly growing plants, however, can be produced under these conditions by skillful management. The advantage of the frame is that the grower has under his control to a large extent the amount of water which the plants receive, the time at which it is applied, and the temperature of the surrounding air. These, as will be observed, are very important factors at a time of year when the plants can not be safely placed in the open.

In some instances where lettuce is used as a companion crop to cucumbers the cucumbers are started in a separate coldframe, hotbed, or greenhouse in quart berry boxes, and when the plants have attained a height of 8 to 12 inches and the coldframes are cleared ready for their reception the berry boxes are buried at intervals of 2 to 3 feet from one another through the center of the coldframe, the same as are the seeds when they are planted directly in the soil. This plan is economical of space in the coldframe during the early life of the cucumber plants, and if they are started in a greenhouse or hotbed it enables the grower to bring them on earlier than he normally could in the coldframe. It also allows the coldframe to be used a longer time during the season for the production of lettuce.

FERTILIZERS

The soil for cucumbers should be made very rich by the annual application of heavy dressings of stable manure to be incorporated with the soil. During the time it is not occupied by cucumbers or lettuce, cowpeas are frequently grown upon the area and turned under prior to planting a fall crop of lettuce. In addition to this, liberal applications of fertilizer carrying a considerable percentage of nitrogen are employed.

REQUIREMENTS FOR SUCCESS

The keynote to success in this work is a thorough understanding of the needs of the cucumber, good equipment as regards sash, a sufficient water supply always at one's command, and great diligence in regard to the manipulation of the sash covering the cucumbers, so as to prevent direct drafts of air upon them and to provide at all times sufficient fresh air to keep the plants in a congenial temperature, so as to induce a sturdy, rapid growth. With this treatment it is possible to bring cucumbers into fruit in the latitude of Norfolk by the middle of May.

As soon as the weather is sufficiently settled and the danger of cold waves or chilly nights is past the sash are removed and stored until needed in the autumn. The boards of the frame are stacked until required for other purposes and the cucumbers are given the entire area.

Cucumbers produced under these conditions are of necessity more expensive than those grown in the open, but since they mature several weeks in advance of the field crop they find a market in which there is little competition except from cucumbers grown in forcing houses. The result is that, as a rule, very satisfactory prices are obtained for this product.

Cucumbers grown in this way are usually marketed in boxes or half-bushel peach baskets of the Delaware type.

GROWING CUCUMBERS FOR PICKLING PURPOSES

The cultivation of cucumbers to supply the demands of the pickle trade has assumed important commercial proportions in certain sections of the United States. As a rule this industry is not of long duration in any locality. The salting stations, as they are called, which are the gathering points used by the pickle factories, are in the main of inexpensive construction, and those parts which are most durable can be moved as necessity requires. The history of the pickle industry in any particular locality does not cover a period of more than 6 to 10 years.

In general the price paid for cucumbers is remunerative, and the industry if it could be conducted on an extensive scale would be a very profitable one. The fact that only a small acreage of cucumbers can be handled by any single grower renders it a less attractive and less profitable crop in the aggregate than it would be if large acreages could be handled. The reason that only a small area can be grown by individual farmers is the great amount of hand labor required to gather the fruits. During the bearing season it is necessary to go over the patch at least three times each week in order to secure the fruits within the range of the sizes which will be accepted by the pickle factories—that is, from 2½ to 4 or 5 inches in length. Few farmers have sufficient assistance to allow them to grow more than 1 or 2 acres. If the picking of cucumbers were work which could be carried on by children it would not present so many difficulties. The fruits are heavy, and the fact that it requires experience to find them under the leaves makes it men's labor rather than that of children.

SOIL

The soil which is best adapted to the growing of cucumbers in the open ground is a sandy, gravelly, or clay loam. The sandy loams are best suited to the cultivation of cucumbers for early markets, and gravelly and clay loams are best for those intended for later harvesting, such as are demanded by the pickle factories.

The commercial cultivation of cucumbers intended for use by the pickle factories is largely confined to the higher altitudes and latitudes, the warm long season of the South not being as congenial to the growth and development of this plant as are the cooler and more retentive soils of the North. The pickle industry is, therefore, chiefly confined to latitudes north of the city of Washington.

PLANTING

After the soil has been thoroughly prepared as for the reception of any hoe crop it is usually laid off in checks 6 by 6 feet or 3 by 6 feet, or the seeds may be planted in drills 6 feet apart. The particular system employed is a matter of choice by the grower, some claiming that one system is more economical than another. In the long run, however, it is usually best to employ the check-row system, as the cost of cultivation is thereby reduced. The operation of keeping the land free from weeds when the plants are planted in check rows can be almost entirely accomplished by the use of horsepower implements, while in the case of seeds sown in drills it is almost impossible to keep

the plants free from weeds without resorting to hand weeding. When the seeds are planted in check rows a sufficient number are scattered promiscuously about over an area about a foot in circumference to secure a stand of from 4 to 6 plants to each hill, 10 or 12 seeds being planted. After all danger from injury by insects is past the plants are thinned to 5 or 6 to the hill, some growers reducing them to 3 or 4 to the hill. Clean cultivation then follows until the vines are sufficiently large to occupy the entire area.

The time for planting varies somewhat, according to the locality, but for central western New York the planting season begins about the first of June and ends about the first of July. The harvest from the early-planted seeds begins in the last part of July and continues without interruption until the vines are destroyed by frosts, unless they are seriously affected by some fungous disease, which of course is not unusual in areas where cucumbers have been grown for a number of years.

HARVESTING

Cucumbers intended for pickling purposes are harvested when they have attained a length of from $2\frac{1}{2}$ to 5 inches. Because such cucumbers are bought by weight it will readily be seen that the small-sized pickles are less profitable to the grower than are the larger ones, and in order to secure them before they have attained an unsalable size it is necessary that the picking be repeated at frequent intervals, as cucumbers grow rapidly and a delay of 24 to 48 hours in harvesting would render many of them unsalable. It is therefore necessary to have regular intervals to harvest certain areas of the patch and to continue this routine throughout the bearing season.

Another point which is of prime importance in the management of the cucumber patch is that none of the fruits be allowed to come to maturity. The ripening process, which means the development and maturing of the seeds, produces a heavy strain upon the growing plant, the life and yield of the plant being in proportion to the number of fruits which are allowed to ripen. If no fruits are allowed to come to maturity the plants will remain green and in an active vegetative condition longer and will produce a much larger aggregate number of fruits.

Cucumbers are usually pulled from the vines and placed in suitable receptacles, either baskets with handles or crates. The slat bushel crate so extensively used in harvesting potatoes and apples is employed in many localities for harvesting cucumbers. After picking, the cucumbers are hauled direct to the salting stations, where they are weighed and credited to the account of the man delivering them. The usual price paid per ton for cucumbers suitable for pickling purposes is \$15, and the crops range from 3 to 8 or 9 tons to the acre. It is not at all unusual for farmers to secure a gross return of \$100 to \$120 per acre from this crop.

The chief expense in connection with the production of this crop, as has already been mentioned, is harvesting. Several instances have come to the notice of the writer in which one-half the crop, after it has been grown, was offered by farmers in order to get it harvested, and even on these terms the offer was not quickly taken.

THE SALTING STATION

The gathering points or receiving depots maintained by pickle factories in communities where cucumbers are commercially grown are called salting stations. The equipment of the salting station consists of a long, low building provided with a large number of wooden tanks, a common size of which is 10 feet in depth and 16 feet in diameter, with a capacity of about 1,500 bushels. An ordinary salting station will contain 40 of these tanks, having a capacity of 60,000 bushels.

The cucumbers as they are received from the farmers, if of comparatively uniform size, are dumped directly from the receptacles in which they are delivered into the vats, the vats first being provided to the depth of 12 to 18 inches with 75° to 80° Baumé brine, which is made by adding 2 pounds of salt to each gallon of water. As cucumbers are added 100 pounds of salt are scattered over the fruits for each thousand pounds of cucumbers, which means approximately about 5 pounds of salt to each bushel of cucumbers. If it requires more than a single day to fill the tank a quantity of salt should be scattered over the cucumbers before suspending work at night, and if it is to be carried over Sunday or a holiday the cucumbers should be salted and pressed under the brine from time to time during the interval the work is suspended. This will keep the cucumbers from getting soft and becoming yellow. If the tank is not too large and a false head can be employed, this will serve to hold the cucumbers under the brine. In large tanks this is a troublesome process, and the customary means of protecting them is to push them under the brine with a suitable paddle.

After the tank is full of cucumbers and before the false head has been put in place, the weight of the cucumbers in the tank should be estimated and 1 pound of salt added for each hundred pounds of fruit. A part of this salt can be placed on top of the cover and the tank then filled with fresh water until the liquid stands 4 to 6 inches above the top of the cover. The salt should not be washed off the cover by pumping water on it, but the water should be pumped into a tube made of 6-inch boards long enough to reach from the top to the bottom and fitted to one side of the tank, so as to carry the fresh liquid to the bottom.

After this additional quantity of salt has been given, the brine should test between 65° and 70° on Baumé's salt scale. After the tank has stood three or four days the top brine will have lost strength until it has fallen to 35° or 40°, when 4 or 5 pounds of salt to each hundred pounds of fruit should be added. After another period of four or five days, or as soon as the brine falls to 45° or 50°, another addition of 4 pounds of salt to each hundred pounds of fruit should be made in the way above noted. After a week's time the brine should test about 55° or 60°, at which point the cucumbers should keep well, the only additional attention required being to pump the brine over by means of a pump placed in a wooden box at the side of the tank, above mentioned, every five or six days for the first month and once in three weeks or once a month thereafter as long as the pickles are held in the brine. The pumping over is for the purpose of raising to the top the heavy brine, which naturally settles to the

bottom of the tank, and to cause the contents of the tank to be more evenly salted.

During the time the tank is being filled the brine is kept deep enough to nearly cover the pickles at all times. After the tank has been entirely filled with cucumbers—that is, heaped up with cucumbers to a height of from 18 inches to 2 feet above the rim of the tank—1 pound of salt to each hundred pounds of cucumbers in the tank is placed over the top layer of cucumbers, as noted above. The false head of the tank is then put in place, stringers are laid on top of it, and the whole is weighted with barrels of salt or other material to force the cucumbers into the tank and beneath the surface of the brine.

The gathering and handling of cucumbers at the salting station involve comparatively little labor, but because the cucumbers are not used immediately by the factories it requires the capital invested to be tied up for a considerable period of time.

The fact that this salt stock can be held without material loss for several years places the pickling industry upon a comparatively safe basis. A crop failure in one locality in any particular year does not, as a rule, affect the work of the factory or change the price of fresh stock. The reserve stored stock can be drawn upon for the needs of the factory.

There is no reason why the work of salting pickle stock should not be economically and satisfactorily done on the farm. The equipment necessary for this work need not be expensive. It can be proportioned to the acreage of cucumbers grown. Instead of 1,500-bushel tanks, small tanks or large casks can be employed for salting and storing the product. The brine will not readily freeze, and for that reason the shelter of any clean, fairly tight storage building will afford sufficient protection. Those engaged in the production of cucumbers for slicing purposes should provide an equipment sufficient to enable them to care for the product of their fields at such times as the shipment of slicing fruits becomes unremunerative. Such stock has a market value and would probably find a ready sale if the practice of salting were to become an established custom among growers.

There is an alternative open to growers of cucumbers either for pickling or slicing purposes—viz, the preparation of dill pickles.

DILL PICKLES

Dill pickles, which are much prized and command the highest price among pickles, can be made from cucumbers as they come from the vines, or from vat stock which has been carried for some time at the salting station.

Dill pickles from fresh stock.—Dill pickles from fresh cucumbers are of high quality, but not quite as satisfactory keepers as when made from salt stock. In preparing fresh stock for dill purposes, fresh cucumbers as they come from the field are placed in wine casks from which one head has been removed. A layer of pickled dill herb and 1 quart of dill spice is placed at the bottom of the barrel. The cucumbers should be assorted carefully as to size, one grade of about 4 inches in length being placed in one receptacle and another grade of 5 inches in length, or approximately this length, in another barrel.

After a cask has been filled, a layer of dill is placed over the fruits before the head is replaced. After the cask has been reheaded, the commercial practice is to remove the bung and fill the cask containing cucumbers with a 45° Baumé test brine, adding 1 pound of porous alum² to each 45 gallons of brine. The cucumbers are left in this brine five days. The first brine is then replaced by a 30° brine to each 40 gallons of which one-half pound of porous alum and 4 gallons of 80-grain vinegar are added, and the whole mass is heated to 160° F. before being placed in casks.

Dill pickles from salt stock.—To make dill pickles from salt stock, the cucumbers are removed from the brine, placed in a processing tank and covered with fresh cold water, and allowed to remain 24 hours, after which the water is drawn off. The tank is then again filled with fresh water, to which are added 2 pounds of alum and 2 ounces of turmeric to each barrel of pickles in the tank. The whole mass is then heated slowly to 130° F. The fruits are allowed to stand in this cooling mixture for 12 hours, when they are sorted and packed.

Before beginning to fill the cask with cucumbers, place a layer of pickled dill herb at the bottom of the cask, fill the cask half full of processed cucumbers, and add another layer of dill herb, at the same time placing in the cask 1 quart of dill spice, consisting of the following proportions of whole spices: 4 pounds of allspice, 2 pounds of crushed black pepper, 4 pounds of coriander seed, and 1 pound of bay leaves. After adding this spice and the layer of dill herb, complete the filling of the cask, but before replacing the head of the cask scatter another layer of dill herb over the cucumbers. After being reheaded, the bung is removed and the cask filled with dill brine consisting of one-fourth barrel of dill herb, 1½ pounds of alum, and 100 gallons of 30° brine. At the time of filling the barrel 1 gallon of 50-grain vinegar is added to each 10 gallons of the brine. This brine should be allowed to stand 24 hours before using it to cover the processed cucumbers packed in barrels, as above described.

THE PRODUCTION OF CUCUMBERS IN GREENHOUSES

Within recent years this phase of the cucumber industry has received a great deal of attention, and cucumbers are now one of the three most important vegetable forcing crops. For information on this subject, see Farmers' Bulletin No. 1320, "The Production of Cucumbers in Greenhouses."

² Many hygienists and physiological chemists who are charged with the testing of foods to determine their purity and healthfulness discourage the use of alum in any form in food products, regarding it as deleterious to health. Some of the best manufacturers of pickles in this country state that they do not use alum in their preparations.