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The Practical Farm Library

MAKING SPECIAL CROPS PAY

By Delbert Utter

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FINE CELERY BOXED FOR EXHIBITION

Celery is a special crop that brings much profit to those who have suitable soil and have learned how to grow and market it. It needs rich, moist ground, and thrives particularly well in reclaimed swamps and on peaty or mucky bottoms. Much hand labor is required in growing, blanching and preparing the crop for market, but well-grown, well-blanching, crisp, solid, tender heads always command a good price. Celery is essentially a crop for the skillful grower

THE KIND THAT TOPS THE MARKET

MAKING SPECIAL CROPS PAY

By
DELBERT UTTER

||

The author is a very successful Wisconsin farmer who formerly conducted a general farm, with grain the chief crop. He saw the need of growing other crops to increase the income, and from a small beginning with a half-acre of sweet corn, he has built up a large business growing a few special crops for a market 20 miles away

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CHAPTER I

Introductory Remarks by the Author

Looking for the "pot of gold" at the foot of the rainbow, we often fail to grasp opportunities that lie within the easy reach of our hands.

Among us farmers this foot of the rainbow sometimes seems to rest in the Everglades of Florida; again in the Panhandle of Texas; still again in the orchard country of the irrigated districts of the mountain regions or in the great Northwest, where wheat is grown by the section, instead of by the acre.

Many of our farmers are moving to these lands of promise, or are sending their good money there for investment. Alluring announcements of agents who are promoting the sale of lands owned by speculators paint word pictures that coax the money away from many who are anxious to better their financial condition.

I do not question that good opportunities are to be found in the West, providing good judgment is used in selecting the right kind of soil, in the right place. However, too many times the buyer finds out, when it is too late, that the promoter, not the investor, is holding the pot of gold.

The same investment in developing the waste acres of our home farms by the young farmers who are looking for a new country might often make a greater profit, at the same time allowing the farmers to remain in a country where social and educational conditions are established and favorable. Their sons and daughters would enjoy advantages that will be possible only for the second generation in a new country.

The waste acres to which I refer may be acres on

the average farm that can be made more productive by more intensive methods of cultivation, or by breeding a better grade of live stock. "*Fewer acres and more per acre*" is a good motto to hang on the wall.

Extensive farming has always best suited the American farmer. He has inclined toward big fields, sulky plows and riding cultivators, and he is slow in adopting new methods, or in growing other than staple crops.

However, the farmers' sons of today realize that the opportunities of acquiring large farms are few and far between, and that if they wish to remain on the land and prosper they must adopt some system of small crop farming.

Many years ago, through the division of the home farm, I came into possession of 80 acres, after having been trained in growing grain and breeding sheep for wool production. I was forced to adopt intensive methods, and grow crops that would produce more income than ordinary farm crops.

My soil being well adapted to producing early potatoes and sweet corn, I began in a small way to grow a few acres of each as a side line. After a few years the truck crops were the headliners, the dairy and other crops becoming of secondary importance.

There are today many young men in the farm homes of the middle west who are in the same position that I was in 40 years ago. To them I trust my experience will be of interest and value.

CHAPTER II

Growing Truck Crops for Profit

Truck farming is a business to grow into, not simply to "go into." The truck farmer, growing his great variety of garden crops, must acquire more knowledge and give his crops more care and attention than does the general farmer who plants only staple crops. Success depends primarily upon location. The profitable truck farm must be near a good market, or where the best of shipping facilities can be secured.

IDEAL SOIL FOR TRUCK GROWING

The ideal truck soil is a mellow, sandy loam, lying nearly level. Under such conditions cultivation is more effective and there is little loss of fertility and washing out or covering of plants during heavy rains. A liberal amount of fertility must be applied. A large portion of this should be stable manure, since it is of the utmost importance that the soil be supplied with a large amount of organic matter to keep it in the proper mechanical condition.

HUMUS FOR THE SOIL

When the land is cropped every year, as it must be in growing vegetables, conditions are different than when a rotation is followed, as in general farming. Humus or decaying vegetable matter must be supplied, both by the use of stable manure and by growing cover crops. When possible, it is best to grow for this purpose leguminous crops—clover, cowpeas, soy beans, vetches—which will add fertility to the soil by taking

nitrogen from the air. Decomposition is more rapid in sandy soils than in heavier soils. There is, therefore, a greater loss of soil fertility unless we keep a crop growing continuously during the growing season.

It is often said that any fertile soil will produce good garden crops. This may be true to the extent of growing vegetables for family use, but to succeed in market gardening a garden soil must be selected.

For early vegetables and for tomatoes and melons, a rich sandy loam, with a porous subsoil that is underlaid with a bed of clay at a depth of five or six feet, is ideal. An abundance of manure must be supplied to provide humus as well as the necessary elements of fertility. Such a soil, handled with intelligence, will be in the best condition to make use of the plant food, moisture, heat and air that work together to produce a good crop.

For the late crops and for cabbage, cauliflower and celery, a dark-colored loam soil should be selected. Much of the reclaimed swamp land makes the very best place to grow these crops.

When we say a place is suitable for growing vegetables, we mean particularly that the physical conditions are good. When well drained such soil as above described is capable of conserving the proper amount of moisture, and when well cultivated will admit the needed amount of heat. Vegetables will then grow that are of good form and quality.

All soils with a retentive subsoil should be tile-drained, the work being perfectly planned and executed. Should water stand for even a few hours on the land, a season's crop may be lost. Soil that is well drained allows heat and air to penetrate to a greater depth and withstands drought better than when drainage is lacking or imperfect.

PREPARATION OF THE SOIL

The ground should be thoroughly cultivated before planting. Disk before plowing, thereby mixing manure with the soil, then plow as deep as the nature of soil will permit. Follow this with the leveler, disk, roller and smoothing harrow, until the soil is in the finest tilth and so firm that a horse will sink only to half the depth of his hoofs.

USE OF FERTILIZERS

While we may apply the most liberal amount of fertility in the form of manure, yet, early in the season, before there is enough heat to unlock and make available the elements of fertility already in the soil, the plants make little growth. An application of some kind of soluble nitrogen may be needed at this time to give the plant a good start. Nitrate of soda used at this period at the rate of 100 to 200 pounds to the acre will prove very beneficial. Potash also very often can be used profitably for crops that take a large amount of that element.

Success in market gardening depends upon keeping the soil supplied with an abundance of plant food.

SEED SELECTION IS IMPORTANT

No seed but the very best is profitable. Grow the varieties that mature perfectly on your own ground and purchase others from dealers and growers that have a reputation for reliability.

No gardener should risk his crop without testing his seed, unless he has implicit confidence in the source from which it came. Seeds of all vine crops are better if not used until the second or third season after saving. Such seed can be tried for quality by purchasing

enough for two seasons, planting a part of the crop from new seed and noting results.

The price of seed is of the least importance, yet a high-priced seed does not necessarily signify good quality. A single pound of seed sometimes produces \$1,000 worth of produce; consequently it means everything to have the best seeds.

CULTIVATION FOR CROP GROWTH

Cultivation should be frequent and thorough. Begin as soon as possible after planting. Shallow work after plants have made much root growth should be insisted upon, using an attachment on the cultivator to adjust it at the proper depth, which should not exceed two inches. The tools used should be the best of their kind and should be kept bright and sharp. A file should be carried to the field and cultivator and hoes sharpened often. The necessary tools are a steel plow, disk, fine-tooth harrow, leveler, roller, horse weeder and cultivator, wheel and hand hoes, adjustable marker, seeder, planter, rakes, spade and spading fork.

SOME PROFIT-PAYING VARIETIES

Choose your varieties according to the demand of the market in which you sell your products, at the same time considering their adaptability to your soil and their yielding capacity. It is better to cater to the tastes of your customers than to try to educate their tastes to the kinds you may think are best.

No list of varieties can be recommended for all markets and all localities, yet there are standard varieties that yield well and are popular in most markets. The partial list given here has proved good in my own gardens, or in the gardens of growers with whom I am acquainted.

Asparagus: Palmetto and Early Argenteuil.

Bush beans: Golden Wax, Curriers' Rust-Proof Wax, Stringless Green Pod, Refugee.

Lima beans: Siebert's Early, for pole; Thorburn's Bush Lima.

Cabbage: Early Jersey Wakefield, Premium Flat Dutch, Mammoth Rock Red, Danish Ball Head.

Beets: Egyptian, Early Blood Turnip, Eclipse.

Cauliflower: Extra Early Erfurt, Early Snowball.

Carrots: Half Short Oxheart, Half Long Danvers.

Celery: Improved White Plume, Golden Self-Blanching, Giant Golden Heart.

Sweet corn: Golden Bantam, Mammoth White Cory, Premo, Country Gentleman, Chicago Market, Crosby, Early Evergreen, Stowell's Evergreen.

Cucumber: White Spine, Improved Long Green.

Eggplant: New York, Early Dwarf Purple.

Lettuce: Improved Hanson, Grand Rapids, Deacon, New York.

Muskmelon: Emerald Gem, Rocky Ford, Osage, Tip Top.

Watermelon: Phiney's Early, Kolb's Gem, Early Jumbo.

Onion: White, Early Barletta; yellow, Globe Danvers; red, Large Wethersfield, Large Globe.

Peas: Extra Early Alaska, Gradus, Nott's Excelsior, Telephone, Juno, Market Master.

Potatoes: Early Ohio, Rural New Yorker, Carman.

Squash: Giant Golden Summer, Crookneck, Hubbard.

Turnip: Early Milan Purple Crown, Red Top Globe-Shaped, Purple Top White Globe.

Tomatoes: Beauty, Dwarf Stone, Dwarf Champion.

Radish: Early Scarlet Globe, Early Scarlet Olive Shaped, Improved Chartier.

MONEY MAKERS IN THE GARDEN

Along with a variety of crops, certain specialties often pay well. These should be the products best adapted to your soil and in best demand in your markets. The perishable vegetables and those known as delicacies are the most profitable if they can be delivered in perfect condition.

EARLY MARKETS MOST PROFITABLE

Early stuff in the home market is what makes the most profit. Make every effort therefore to forward the crops to early maturity. This is accomplished by preparing the soil in the best possible manner, using good seed and cultivating the crop thoroughly at every stage of its growth. Many crops can be forwarded by starting plants in greenhouse or hotbed; these plants should be transplanted several times and well hardened before planting in the open ground.

USING THE HOTBED

As soon as the seeds are planted glass is put on and the bed is allowed to heat up to 100 degrees during the day, and should not drop below 60 degrees at night. When the plants are up, which is in about four days, the sashes are raised during the hottest part of the day. If half cloth sashes are used, there is less danger of injury from too much heat. The cloth should be treated with a coating made of boiled linseed oil and eggs, mixed thoroughly, using two eggs to each pint of oil.

As the plants grow, thin them so as to insure for each one plenty of room for maximum growth. After

STRAWBERRIES ARE A GOOD CROP IN A YOUNG ORCHARD

A GOOD MULCH KEEPS THE BERRIES CLEAN

the fourth week the plants should be gradually hardened off and when weather conditions warrant, transplanted to the field. The earth removed with the roots in transplanting should be saturated with water, thus enabling the plants to withstand a period of drought.

The ground should be plowed early in spring and disked and harrowed several times at intervals of a week or 10 days. This preparation puts the soil in the finest tilth. Make the rows six feet each way and place the surface of the mat of earth or sod adhering to the roots so that it will be covered an inch deep.

SOME GOOD GARDEN TOOLS

There has been as great improvement in tools for the gardener as for the farmer, with the exception that the gardener usually walks. The first requisite in a tool is that with it perfect work can be performed, not that it has a comfortable seat and canopy top.

Seeders and planters are easily adjusted to use the required amount of seed, dropping it at an even depth and firming the soil so that rapid germination results. The plow should throw the soil and mix it, in place of turning it over completely. The disk is the most important tool for preparing the soil for a crop. It is a pulverizer and a mixer, working the soil into proper condition for good germination and mixing the manure thoroughly. By its use the plant food is well prepared for the use of the young plants.

The leveler, roller and smoothing harrow are used as finishers. The harrow and horse weeder are used to kill the weeds and form a dust mulch on crops that will stand the treatment and until the plants have made considerable growth. How much and how long the weeder may be used depends on condition of soil and plants.

Follow the cultivator with the weeder; this levels the ground and breaks up the space left by the cultivator. Success in using this tool depends on using it before weeds have made their appearance above ground.

A steel frame horse cultivator with seven teeth, each $1\frac{1}{4}$ inches wide, is useful when plants are small. It is made with adjustments for gauging the depth and does excellent work. There are also hoe attachments and sweeps, which are used later in the season for shallow cultivation. Thorough work is assured if the tool is in the hands of a competent man. Proper adjustment has much to do with the efficiency of these implements.

Such smaller tools as the wheel hoe, spade, rake and hand hoe, with horse and hand markers, about complete the list of tools required, except special tools for special crops. Less work is performed with the hand hoe than formerly, yet it has its place, and it should be kept bright and sharp.

HARVESTING AND MARKETING

Successful production avails but little unless the crop is properly harvested and profitably marketed. Perishable products must be prepared for market and sold just as soon as they are fit. Secure enough help to keep up with the work, if possible, so that no over-ripe stock will be left on hand.

In delivering to a nearby market, return crates may be used. Much of our produce, however, is sold in gift packages. It pays to use the style of crate most popular in the market to which you ship. Your name on crates should be a trademark that means good quality, just as good at the bottom as at the top. Some growers place a card in the package in such position as to be easily seen, bearing some such message as, "U see one, U see all." This pays handsomely in the

end, providing it is always true. It costs time and money to acquire a reputation for fair dealing, and after once acquired it pays to live up to it.

Blight and insect crop pests keep the gardener on the edge of despair. To see a crop destroyed after incurring the expense of growing it until nearly ready for market is, to say the least, discouraging. Each year adds to our long list of troubles before we have learned to overcome the old ones. From all the experiments with sprays and insecticides and the scores of bulletins written upon these subjects, the gardener has gained little aid that is new during the last decade. The orchardist has fared better, for spraying is his salvation.

Insects and worms that eat are easily poisoned with paris green, and I know of no better treatment. Those that suck the sap of plants are, of course, not affected by poison. Their control presents a serious problem. These suckers in the garden abound like the human variety of the same species when a glib-tongued mining stock agent comes to town. They can only be scared off—you cannot kill them. Make them uncomfortable by tangling their legs with land plaster, road dust or coal ashes. Sulphur, tobacco, kerosene—something that has a disagreeable odor—will also hinder their ravages. Carbon bisulphid is being used to exterminate the worms and insects that work underground.

The remedies recommended for blight and fungous diseases contain copper sulphate in combination with quicklime, ammonia, or caustic soda, and are used to protect the plant from the attack of the various diseases. It is applied as a preventive, and the foliage must be kept covered continually with the solution. This demands eternal vigilance. The time may be near when it will be as necessary for the gardener to spray

as thoroughly as does the successful orchardist at the present time.

It is best first to experiment in a small way so as to become familiar with the methods of mixing and applying these fungicides and watch results. From my own experience, and from what I have learned from the experience of others, I believe that much may be accomplished to prevent the ravages of these pests by practicing a regular rotation of crops, using all the fertility possible, using only the best seed and strongest plants, and giving the very best culture. The weakest plants, like weak and badly nourished animals, are usually the first to succumb to disease.

THE MAN BEHIND THE HOE

Granting all desired in the way of soil, favorable location, good seed and best methods of culture, success still depends upon the man. The successful market gardener must be a business man. He must be alive to the possibilities of his occupation, ready to take advantage of every opportunity possible to increase his sales. By correspondence, use of the telephone and personal inquiry, he must be able to place his products where he will receive the best price.

He must be able to handle men, for he must employ much help. The proper management of labor is very essential. He needs to be a hustler, for his crops must be marketed at the right time and at the right place. The best customers will expect prompt delivery and will insist that the product be in good condition. Regular customers can be held only by fair dealing. They want prompt delivery of the best that can be grown, put up in an attractive manner and so good that the consumer will think that no other grower can furnish products of quite as good quality.

CHAPTER III

Maintaining Plant Food Supply

Every successful market gardener fully understands that he must provide and apply a much greater amount of stable manure and commercial fertilizer than does the grain farmer. A rotation of crops cannot be practiced so completely as in general farming. The humus content of the soil, therefore, must be kept up by the use of stable manure and cover crops.

During my early experience in growing truck crops I found that I was obliged to apply what seemed to me at that time an extravagant amount of manure to produce a large crop and insure early maturity. I also noted that the market gardeners located near my market city and owning 20 or more acres kept a team hauling manure from the city stables nearly every day during a good portion of the year.

At this time we knew very little about commercial fertilizers and cared less, as stable manure could be procured free by the gardeners living near the city, and often they were paid for carting it away.

My farm is located 20 miles from the city, and as I was keeping a herd of dairy cows, I used all the manure they produced on the few acres of truck crops. I soon became convinced that I was robbing three acres of my farm to provide fertilizer for one. I was doing what many farmers were doing and are doing now—taking what belongs to all the acres to grow a few acres of tobacco, sugar beets, potatoes and other special money crops that leave no residue to furnish plant food or humus.

I increased my truck acreage year by year and

was soon obliged to purchase stable refuse and stock yard manure from Chicago and the sheep-feeding yards at the feeding stations. For a few years I was able to procure first-class material for the nominal price of loading the cars and a low flat freight rate. Even with a two-mile haul from the station I was well satisfied, as I was able to procure my supply during the season the teams were idle.

These conditions soon changed, however. Prices doubled, delivery became uncertain, and I was obliged to supplement my supply of farm manure with commercial fertilizers. I had been experimenting in a small way with several brands of fertilizers. I had been led to believe that some particular brand, named, perhaps, the "Red Chief" or the "Three Star," contained some element of mysterious power and virtue.

However, I began to study soil conditions on my own farm and also learned something about plant food. I learned that to get best results from the use of fertilizers I must keep up the humus content in the soil. I also learned that it was quite as necessary to furnish a well-balanced plant food for the best growth and maturity of my crops as it was for the dairyman to furnish his cows with a well-balanced ration.

I learned also that there are three elements used to make up a complete fertilizer, namely, nitrogen, phosphoric acid, and potash, and that the value of a ton of commercial fertilizer depends upon the number of pounds of these several elements it contains.

HIGH-GRADE FERTILIZERS THE CHEAPEST

A low-grade fertilizer can be sold at an exorbitant price per pound for the plant food contained, and yet sold at a less price per ton than a high-grade fertilizer which is sold at a low price per pound for the plant

food contained. This low price per ton catches the eye of many farmers.

It would be just as sensible to go to the grocer and have him make vinegar half water and then pay for the mixture three-fourths the price of strong vinegar as to buy the average low-grade fertilizer. The economical thing to do is to buy high-grade fertilizer and use less per acre.

To those who have used fertilizers extensively in growing truck crops this advice may seem superfluous. However, far too much is being paid in freight bills for worthless filler and the extra labor in hauling and distributing these materials after they are delivered at the railway station. After several years of experience, my practice in using fertilizer has resolved itself into the use of a certain number of pounds of nitrogen, phosphoric acid and potash per acre. The amount depends on the crop to which it is applied, the condition of the soil and the amount of stable manure used in connection with it.

As to the amount applied per acre, my rule is very much like the reply of a successful gardener who was asked how much stable manure he applied to his crops. "I use all I can save, buy, beg or borrow," he said.

I apply all that I can afford to buy. My fields have a dressing of stable manure once in three years, and my standard for fertilizing is 150 pounds nitrate of soda, 700 pounds 14 per cent acid phosphate, and 200 pounds muriate of potash per acre. More potash is applied to the potato crop than to corn. The amount of phosphoric acid and potash is cut to half for melons, depending on the residual effect from the preceding year to furnish part of the plant food. I believe this practice insures fruit of firmer texture and higher quality than is possible when large applications of manure and fertilizers are used during the season of planting.

VEGETABLE MATTER FIRST SOIL NEED

Owing to the nitrogen it contains, humus is of great value to soils chemically. Under a slow process of decomposition the nitrogen is continually converted into an available state, and this furnishes the plants with one of the most important plant foods. Humus is of value because it enables soils to hold moisture. A soil with a high percentage of humus is able to absorb, retain and eventually supply the plants with more moisture than can a similar soil containing a lower percentage of humus. Humus also improves the mechanical condition of heavy soils, making them more friable and easier to cultivate.

The problem of supplying enough organic matter to provide humus has kept me busy. As I am unable to grow legumes for a cover crop, I have to depend upon rye and oats. I try to grow some cover crop after all early harvested crops and to sow rye between the rows of corn at time of last cultivation.

With the stable manure made on the place I have been able to keep my soil in good physical condition. Where cowpeas or other legume crops can be grown nitrogen can be secured, as this class of plants has the property of taking nitrogen from the air and storing it in the roots of the plants, where it becomes available plant food for succeeding crops.

I hear many farmers say that commercial fertilizers injure the soil. This is true to the extent that any system of culture that does not provide for the keeping up of the supply of humus causes injury to the soil. The first principle in successful agriculture is to provide organic matter in some form to keep up the humus supply to a point that the soil is in a good physical condition.

GOLDEN BANTAM SWEET CORN

Considered by many the finest variety grown. It has won its way to popularity on its merits. A medium early variety, with short ears of golden yellow grains.

THE PACKING SHED IS BUILT IN THE STRAWBERRY FIELD

WHAT ANALYSIS TELLS US

The idea that the chemical analysis of soil gives an accurate showing as to its needs for fertilization has long since been shown by scientists to be far from true.

The chemist is able to tell us the amount of nitrogen, phosphorus and potassium our soil contains, but he cannot tell us how much of these several elements are in an available condition for plant food. Consequently, we can learn what our individual soil needs only by field tests.

Science and general experience teach us that the only reliable method by which we can ascertain the needs of a soil is carrying out suitable practical manual experiments. By making the latter as simple and exact as possible, the farmer is sure to attain the desired knowledge regarding his soil within a reasonable time and will thus receive ample reward for his trouble.

A good experiment field, embodying five plots, of equal size, is suitable. These plots should be separated by paths four feet wide in order to prevent roots of the plants of one plot from feeding on the fertilizer supplied to the adjoining plot. All of the plots must be treated alike in every respect, except with regard to the amount and kind of fertilizer applied. It is best to have the plots long and narrow, because they will thus average up for unevenness of soil. Arrange them so that practically the same number of plants are grown on each.

The size of the plots must depend somewhat on local conditions and the kind of crop to be grown. A very convenient size is 1-10 of an acre. A strip 93 1-3 feet long by 46 2-3 feet wide represents 1-10 acre in convenient shape. However, it may be best to arrange

differently if the above size is not convenient. Each plot should be numbered separately.

PLAN FOR FERTILIZER TEST

The fertilizing of the individual plots would be as follows:

Plot 1, unfertilized.

Plot 2, nitrogen, potash, phosphoric acid, complete fertilizing.

Plot 3, nitrogen, phosphoric acid, without potash.

Plot 4, nitrogen, potash, without phosphoric acid.

Plot 5, potash, phosphoric acid, without nitrogen.

If it is desired to determine the effect of lime applied along with the other manurial constituents, we must include a sixth plot and give it an application of lime in addition to a complete fertilizing.

FIVE PLOTS, EACH 1-10 ACRE IN SIZE

(93 1-3 x 46 2-3 FEET)

No fertilizer	1
50 pounds acid phosphate (14%) 20 pounds muriate of potash 20 pounds nitrate of soda	2
50 pounds acid phosphate (14%) 20 pounds nitrate of soda	3
20 pounds muriate of potash 20 pounds nitrate of soda	4
50 pounds phosphoric acid 20 pounds muriate of potash	5

SOURCES OF FERTILIZING MATERIAL

There still remains, however, the question of the most economical source of fertilizing materials. There is more range in the choice of nitrogen supply than in the other two elements, and I am naming those that are in most common use.

Nitrogen may be derived, in the form of ammonia, from nitrate of soda, sulphate of ammonia, cyanamid and tankage. Nitrate of soda is obtained from the dry plateau regions of Chile. It occurs as an impure mineral called "Caliche." This mineral is ground and dissolved in boiling water, the impure minerals extracted and separated out. As put upon the market it is 95 to 96 per cent pure and contains about 16 per cent nitrogen.

Nitrate of soda is the most immediately available of all nitrogen fertilizers for growing early crops and serves directly as a plant food. It acts more rapidly than nitrogenous manures of organic origin, as these latter are dependent upon undergoing decomposition and nitrification.

SULPHATE OF AMMONIA

Ammonium sulphate contains about 20 per cent nitrogen and is obtained as a by-product in the manufacture of coke and coal gas. It is soluble in water and stands next to nitrate of soda in ease of solubility.

CYANAMID

Cyanamid is a comparatively new product that bids fair to become popular as a nitrogenous fertilizer material. Cyanamid is the invention of two German chemists and the process of manufacture consists in artificially fixing atmospheric nitrogen. The manufac-

ture of cyanamid depends upon the simple chemical fact that calcium carbide at a white heat absorbs atmospheric nitrogen and becomes calcium cyanamid.

Nitrogen is separated from the oxygen in the air by liquefying the air, and then allowing only pure nitrogen to evaporate, leaving the oxygen in the liquid. The carbide is placed in ovens heated by electricity to a white heat, and the nitrogen is pumped into the ovens, and is there sucked up by the carbide, forming calcium cyanamid.

The crude material is ground and put through a mechanical process of granulation. It is bluish black in color, and analyzes 18 to 19 per cent nitrogen. Cyanamid dissolves very readily in the soil water solution, and the nature of its decomposition places it in the same class as the organic fertilizers. Wherever a slow, steady growth is desired this material will produce satisfactory results.

The air being composed of four-fifths nitrogen, and electric power derived from the big waterfalls of Niagara and other rivers being inexhaustible, the production of nitrogen in the form of cyanamid is practically unlimited.

TANKAGE

Tankage is a packing house product. The refuse parts of the carcass are put in tanks and cooked by steam to extract the grease. The remaining scrap is pressed and dried. It may contain 4 to 9 per cent nitrogen and a small per cent of phosphoric acid.

The large packing house companies have fertilizer departments, and they use most of their tankage in manufacturing mixed fertilizers.

PHOSPHORIC ACID

Sufficient raw material for the manufacture of

this exists in the phosphatic rocks distributed throughout the states of South Carolina, Tennessee, Florida, Utah, Idaho and Wyoming to last, it is estimated, for centuries. The deposits vary in thickness from one to 20 feet and average from 20 to 40 per cent phosphoric acid. Raw phosphate rock ground to a fine powder is called "floats." Floats are sometimes applied to the soil with good results when rotation of crops is practiced, as in general stock farming, but have no place in growing truck crops.

SUPERPHOSPHATES

Phosphate rock acidulated with sulphuric acid forms superphosphate, or soluble phosphates. The rock is ground to a fine powder and mixed with an equal amount of sulphuric acid, which changes the insoluble phosphoric acid to the soluble form. Superphosphate is a term applied to any material containing soluble phosphoric acid as its chief constituent. Soluble phosphoric acid readily distributes itself in the soil and goes to the roots of plants.

It should be remembered that phosphoric acid is not washed from the soil, though in a soluble form, since it is finally "fixed" by coming in contact with lime, iron, and other mineral substances usually present in good soils. Acid phosphate, made by treating phosphate rock with sulphuric acid, contains from 14 to 16 per cent available phosphoric acid.

Other sources of phosphate are raw and steamed bone, which is ground and usually used in the natural state, and is sometimes preferred to other forms of phosphates by orchardists. Bone black is the spent bone black from sugar refineries. It is usually acidulated and used by fertilizer factories.

THOMAS PHOSPHATE POWDER

This product, sometimes called Thomas slag, is a by-product of the basic process of refining steel. It contains 16 to 18 per cent phosphoric acid and is in combination with four parts lime. This form of phosphate is said to be very beneficial on soils inclined to be sour. It is a by-product of the furnaces of Europe, therefore it can be used to best advantage by farmers living near the coast.

Scientists tell us that soluble acid phosphate is of the same value as a plant food whatever may be its source. Therefore the farmer makes no mistake when he buys any phosphate on a basis of the per cent of available phosphoric acid it contains.

POTASH

The only modern source of potash is the German deposits. The United States government, through the Geological Survey and the Department of Agriculture, is making a systematic search over several of the western states in order to discover possible sources of this substance. Whether or not any commercial sources are opened in America, we need have no fear of scarcity, as an ample supply is assured for generations to come from the inexhaustible deposits of potash salts in Germany.

The most important of the potash salts are sulphate of potash, muriate of potash, and kainit. The former two contain about 50 per cent pure potash and kainit about $12\frac{1}{2}$ per cent.

Sulphate of potash is best for tobacco, potatoes, sugar beets and some other specialties. Muriate of potash is somewhat cheaper than the sulphate and is useful for most crops, and is most generally used in

mixed fertilizers. Kainit in addition to its effect as a potash fertilizer is useful in killing grub worms, cutworms and other insects living in the soil and is a remedy against many plant blights.

Wood ashes are also a source of potash, containing from 2 to 7 per cent pure potash. Their composition is varied and uncertain and the supply very limited.

LIME

The frequent need for lime should not be overlooked. Lime is especially useful to some soils. It corrects acidity, promotes the formation of nitrates and aids in improving the physical condition of soil. Soil that turns blue litmus paper red when applied moist is sour and needs lime. Lime in some form is the corrective. The litmus paper test costs but a nickel.

HOW TO APPLY FERTILIZERS

Fertilizers and fertilizer materials—that is, chemicals containing nitrogen, phosphoric acid, and potash—are applied broadcast to be harrowed or plowed under, as top dressing, in the hill, or with the drill. Each method has its preference in certain cases.

Applying fertilizer in the hill is the least effective in yields, although striking in forcing early growth. For truck growing and when heavy applications of fertilizers are to be made, there can be no question that the best method is to apply broadcast, and work it well into the soil with a harrow or disk.

When unmixed fertilizers are used, it is best to apply the mineral fertilizers—that is, those containing phosphoric acid and potash—previous to planting. In this case there will be time for them to become well mixed with the soil. Materials containing nitrogen are

used at the time of planting or soon afterwards as a top dressing.

FERTILIZER DISTRIBUTORS

As is well known to all users of commercial fertilizer and lime, it has been extremely difficult to obtain a fertilizer distributor that would evenly and in definite amounts distribute these materials under all conditions.

The truck grower demands a distributor that will drill or broadcast lime, mixed fertilizer, acid phosphate, potash, kainit, nitrate of soda, or any other kind of fertilizer at the rate of from 100 pounds to one ton to the acre. He demands a distributor made of the best material, provided with large hopper capacity, with low-down construction to enable easy filling of the hopper. The wheels should have a wide tire and the discharge opening should be within a foot of the ground. The material as it falls should scatter evenly, and a shield should be provided to prevent interference of the wind. Several manufacturers have placed upon the market machines with special features which have proved very satisfactory to the purchasers.

CULTIVATING POTATOES WITH THE WEEDER
A good tool when properly handled.

EARLY OHIO—THE BEST EARLY POTATO FOR MARKET

CHAPTER IV

Making Money from Cantaloupes

No fruit grown is in greater demand and none is deemed a greater luxury as a breakfast delicacy than a perfect cantaloupe. No fruit or vegetable in our market is so difficult to obtain in perfect condition as to quality and ripeness.

Like the strawberry, the cantaloupe deteriorates very rapidly after being taken from the vine. The local grower is able to place his product on the market so that it will reach the consumer within 48 hours from the time it is picked. He, therefore, has the advantage of the grower who is far from market and must harvest his crop before it is ripe in order to ship it hundreds and sometimes thousands of miles.

It is generally supposed that the cantaloupe grows best in southern latitudes, where climatic conditions are naturally most favorable. While this is true to a degree, it is also true that the best cantaloupes in this country and in Europe are produced by artificial forcing or forwarding, making use of the greenhouse, hot-bed or cold frame.

I have prefaced to this extent that you may accept without prejudice the statement that I grow as good cantaloupes in Wisconsin as are grown anywhere. I will try to tell you how I do it and how I established a reputation for growing the best, that others may succeed as well.

GOOD VARIETY ESSENTIAL TO PROFIT

My success became possible when I acquired a variety of local origin that has more than a local repu-

tation. Epicures, as well as the ordinary consumer who simply likes something good to eat, pronounce it perfect in flavor.

For a few years after this melon was introduced it was kept in the hands of a few growers who, like all monopolists, adopted all manner of schemes to keep a good thing to themselves. At present, however, its distribution is quite general.

Several growers have, by selection, obtained superior strains of the variety, yet the general type remains the same. In size, shape and color, it resembles the Tip Top, being light green, slightly ribbed and well netted. It has a very thick meat of salmon color, very fine in texture. It will not stand long shipment, a characteristic of most delicately flavored fruits. In this respect, the local grower has a big point in his favor.

The second factor in my success was in overcoming the handicap of a short season by forwarding the crop through a system of starting plants in hotbeds or greenhouses. Some form of artificial heat is necessary, and the hotbed is in most general use.

MAKING THE HOTBEDS

Experienced gardeners are, of course, familiar with the construction of hotbeds. Many of my readers that may be most interested, however, have probably had but little experience. I will give, therefore, a detailed description of my methods. Close attention to details often makes the difference between success and failure. While many growers use plant boxes, and claim them to be superior to any other plan, I have had excellent success in using sods from a sandy loam soil.

My beds are made and seed planted the last week in April. They are well protected from wind by

hedges. I make the frame 6 feet wide and 60 feet long, using 3 x 6 hotbed sash. I have three such beds which will contain about 4,500 plants, and will provide enough plants for four and a half to five acres. The frames are 30 inches deep on the north and 24 on the south side.

I use horse manure containing a large proportion of litter that has been repled and is in a well-fermented condition. This is placed in the beds and packed evenly about a foot deep. I am careful to have the surface perfectly level when finished, because water will settle in any depressions left and there will be danger of the plants damping off while small or later developing blight.

Sods are taken from a selected plot of a blue grass pasture that has been fertilized the preceding season with well-rotted stable manure, with an addition of acid phosphate and potash. This is distributed evenly, and in early spring is gone over with harrow or garden rake. The sod is cut with sword-shaped hay knives, using a 10-inch plank for a guide, each piece of sod being 10 x 17 inches in area and 3½ inches thick. They are removed with a sharp spade. This is a convenient size to handle, and when placed in the bed with the grass side down, the bed should be as level as a floor.

After the bed is filled, each sod is cut into six pieces. Six seeds are planted about an inch deep in the center of each piece, using a knife or other instrument to make an opening. The seed is covered and well firmed with the hand. The whole bed is leveled, using the back of the garden rake. The bed is then well watered, using a sprinkler with a fine spray.

CARE OF HOTBED

The temperature should not be lower than 60 degrees at night, and may go to 110 in the daytime while

the seeds are germinating. After the plants are up, 90 degrees is about the maximum heat desired. The temperature rises very rapidly from 10 o'clock until 2, and the sashes should be raised, or cloth used for shade. During germination, it is better to depend upon protection from excessive heat by shading. When the plants are well up, then give them some air.

It is most important to maintain an even temperature as continuously as possible during germination, since success depends upon an even growth of plants. Plants should break through in four or five days and all should be up in seven days. A moderate amount of water is used, with care not to have the beds wet during a period of cloudy weather.

In two weeks the plants should be thinned to four to a sod and at the same time the soil should be loosened with a hand weeder. The soil around the plant is kept in a loose friable condition. Plants will make a very rapid growth, and sufficient air must be given to produce hardy plants. During the third or fourth week part of the glass may be removed and a cloth sash substituted, gradually removing all covering for a part of the day until the plants are perfectly hardy. Hot-house cantaloupe plants are perfectly hardened when they will not wilt if left unprotected. Plants should be well grown in five weeks from date of planting.

SOIL FOR THE CANTALOUPE

Cantaloupes grow best on land that is so rolling that surface drainage is perfect. A sandy or gravelly loam with an open subsoil is best.

Sandy soils produce cantaloupes of best quality, and are in the best physical condition for the ripening of the fruit. Such soils remain warm during the night, and the fruit ripens more evenly than on heavier soils.

Many of the melons in our markets show their inferiority by the immature or flattened appearance of the part of the fruit that was in contact with the ground.

I plant cantaloupes on land that has been cropped with early potatoes or sweet corn the previous year with cover crop of oats after the potatoes were harvested, and rye in the sweet corn at the last cultivation. These crops are fertilized with a moderate application of stable manure, and 1,000 pounds acid phosphate, and 300 pounds muriate of potash per acre. I depend on the residual effect of this liberal supply of mineral fertilizers on the preceding crop to furnish most of the plant food for the melon crop. I believe that a liberal use of potash insures high quality of fruit, and more even size and better keeping qualities than when the potash supply is limited.

MAKING THE LAND READY

The ground is plowed early in spring and the harrow used at intervals of a week or 10 days to kill weeds and to conserve moisture. On my Wisconsin truck farm I apply, at the time of plowing, 400 pounds acid phosphate and 100 pounds sulphate of potash per acre. I sow it broadcast and work it in with the disk.

If weather conditions are right, I transplant during the first week in June. My field is then in fine tilth from the several cultivations, and it takes but little extra work to put it in condition for transplanting. The rows are made six feet apart, except that one way I leave a space of nine feet between each two rows. This wide row is for picking and carrying out fruit. This plan lessens the injury to the vines in harvest. The crop season often is shortened and the quality of the fruit injured by careless pickers.

TRANSPLANTING

Before the plants are taken from the beds they are thoroughly soaked. The sod pieces will absorb and hold enough moisture to enable the plants to thrive even if there is a lack of rain. They are placed in fresh made holes about an inch deeper than the thickness of the sod, and the soil is well firmed around the plants.

Shallow but thorough cultivation should follow and be kept up until the vines spread so that further work with the horse would injure them. From this time on the hoe should be used and sometimes it will be necessary to pull the remaining weeds. Clean culture is essential to securing best results.

PICKING, GRADING AND CRATING

With many crops my work is nearly done when the crop matures, but not so with cantaloupes. My profit on cantaloupes depends to a great extent upon the methods of picking, grading, crating and marketing. I pick the ripe fruit every day and market it as soon as possible.

The cantaloupe is ready to pick just as soon as the stem will slip. Considerable experience is needed to become an expert in this work. Many melons sold in our markets are picked when they reach a certain size, by the same rule that lemons are gathered. This practice may do for the grower who ships his crop, but never for the grower who meets his customers face to face. The grower who has an established reputation for honest goods, and wishes to maintain it must use the utmost care in grading and crating his crop.

A neat, strong crate holding 12 or 16 even-sized melons is the most satisfactory size. A dozen cantaloupes of the most popular size will fill a crate 20 inches long with 12-inch ends.

MARKETING THE PRODUCT

The growers in my district are located within a limit of 25 miles of the market center and delivery is made by wagon. Many of these growers sell direct to grocers, hotels and dealers. Profitable methods of marketing are determined by the size of crop and the ability and disposition of the grower. The nearer the grower can get to the consumer the greater the profit. If his product has quality, the satisfaction of all parties concerned gives him an incentive for continued effort to grow better crops.

The prices that buyers for clubs, high-class hotels and cafes are willing to pay for cantaloupes of the best quality are often surprising to growers not familiar with city markets. This trade is worth a special effort to secure. However, the larger the city the more difficult it is for producer to reach consumer. The larger the city, the more middlemen there are to share the consumer's dollar. This is a natural result of the congested conditions of traffic that cause the extraordinary expense of distribution.

CHAPTER V

Strawberries for Every Garden

Great big red, juicy strawberries look good to everybody, and everybody should have them in abundance. They thrive on all kinds of soil, in nearly all climates, and should be grown in every garden in village and country.

As a market crop, the strawberry can be grown with profit by the owner of a small garden, and sold fresh picked to his neighbors. The market gardener may devote any fraction of an acre to this crop and sell to grocers, or at the public market. The commercial grower need limit his number of acres only by his ability to procure labor that will be dependable and always on the job.

When we discuss growing any garden crop from a commercial standpoint, a great many different factors become pertinent. These pertain to location, market and shipping facilities, soil fertilizers and labor. Executive ability and a good bank account are also necessary requisites.

WHERE THEY GROW BEST

The possibilities of growing strawberries under ideal conditions are almost limitless. A thoroughly congenial soil is a prime consideration. To be congenial to the growth of strawberries, a soil must contain enough humus, or vegetable matter, to make its physical condition perfect. Closely connected with this vital supply of vegetable matter is a sufficient amount of plant food, in an available form, and containing the three elements—nitrogen, phosphoric acid,

A YIELD OF FOUR HUNDRED BUSHELS PER ACRE

PUTTING PARIS GREEN ON POTATOES WITH THE BLOW GUN

and potash—in the proportions needed by the plants for the highest degree of fruiting excellence.

The soil should be naturally well drained, and nearly level. However, surface drainage must be perfect, as standing water in summer or ice in winter is destructive to this crop.

Strawberries always should be grown in rotation, and follow some cultivated crop that has been heavily fertilized with stable manure and well cultivated to kill weeds. Corn, potatoes or melons are the crops that precede my berry crop.

An application of stable manure is made in the fall or during the winter, the quantity depending upon the amount of commercial fertilizers used. If no commercial fertilizer is used, a liberal application is needed. My practice has been to apply about 10 loads to the acre of well-rotted manure with 200 pounds muriate of potash and 600 pounds acid phosphate worked into the soil as early in the spring as possible.

We should remember that in the preparation of the strawberry field, we must provide for three seasons' growth and two crops. We can well afford to be liberal in appropriating time and money to this work of preparation.

PREPARATION AND PLANTING

Heavy soil should be plowed in the fall and then plowed again in the spring. Light soil should be plowed in early spring to a depth of 8 to 10 inches, and should be harrowed at once. No tool is better than the disk for fitting land for the strawberry crop. Follow it with a smoothing harrow, leveler, roller, and horse weeder. This thorough preparation saves labor in transplanting, and assures a better growth and a perfect stand of thrifty plants.

SETTING THE PLANTS

I plant as early as the land is in good condition. Rows are made four feet apart with a marker that will make as shallow a mark as possible. Freshly dug plants that have been well grown the previous season are selected.

Plants are spaced 18 to 24 inches apart in the row, depending on the variety. A good opening is made with a spade, so that the roots will get down into the soil straight. One man can make the openings for the two men that follow, placing the plants in the freshly made holes, and firming the soil around them. I would emphasize the importance of this careful attention to details in planting, as one of the factors of profit in growing this crop is a perfect stand.

No list of varieties can be named that will be best for all sections, or all markets. The best advice is to plant varieties that have proved best in the experience of the most successful growers in your locality.

My experience in testing new varieties has been very disappointing. My advice is to "let George do it," and don't always believe what George says about it.

The varieties that have succeeded best with me, are the Bederwood, Warfield, Senator Dunlap, Sample, Gandy, and Brandywine. These varieties are nearly standard. The Dunlap, Warfield and Gandy have proved to be moneymakers from North Dakota to the Ohio river.

Senator Dunlap and Miss Warfield have been wedded these many years, and seem to have proved a very congenial pair. They have traveled together everywhere, remaining long in many places, to the satisfaction of those who have entertained them with a lavish hand.

The only objection I find to each of these two

varieties is that they make too many plants. However, this fault can be overcome by keeping them in hedge-rows, or in narrow matted rows where with liberal fertilizing their vigor and push will develop enormous crowns that will be loaded down with the finest fruit. The size, shape, color, texture and quality are all that can be desired.

MANAGING GROWTH OF PLANTS

Cultivation should begin soon after planting, and continue until the ground freezes in the fall. A narrow-tooth cultivator which will not throw the dirt but will leave the soil level is best for this work. It can be run close to the row until the new plants become rooted. Later the distance is regulated to form rows 16 to 18 inches wide. A horse weeder can be used to advantage while plants are small, and after they have become well rooted in the soil. The hand hoe must be used often, and if weeds are killed when just starting this work is not laborious nor expensive.

WINTER PROTECTION

Late in the fall, after growth has ceased, and the ground begins to freeze, I put on a covering of marsh hay. Freezing and thawing at this season is as injurious to the plants as it is in the winter or spring. About two tons to the acre are needed and all the ground should be covered evenly. Often hay that has become unmerchantable can be bought cheaply. The cost of covering is becoming a greater item of expense each year. Other materials than hay may be used, but none is as satisfactory.

WHAT TO DO IN SPRING

As soon as the danger of heavy frost is over in

spring and growth commences, the covering is removed to the spaces between the rows, and left there to protect the fruit, and to act as mulch to the plants during the fruiting season. All weeds that start should be pulled out by hand; and the amount of this work depends on how well it has been done the previous season.

SELLING THE PRODUCT

The most expensive items in berry production are picking and marketing the fruit. Much of this work, such as securing pickers, preparing packing shed and making crates and boxes, can be done before the picking season opens, as there is little time for this work when the rush is on. Even if it is possible to secure an army of pickers, it is no easy matter to select those who will work well. This requires the discipline of an army officer, combined with the tact of a first-class school teacher. Some boys are excellent pickers, but girls and women are usually the most dependable.

Remember that while you would like to formulate some very rigid rules to regulate this little army, enlisted for only a few days or a few weeks, you will succeed best if you will but remember your own capacity and disposition for work under the same conditions when you were a boy.

Certain rules must be observed, however. Only a specified number of empty boxes should be taken by each picker, and the filled boxes brought at once to the packing shed and inspected. Each picker should be furnished a card with name or number marked plainly thereon, and fastened to the picker, not to the carrier. The carrier should not hold more than four boxes, and enough of these should be provided so that the picker may have an empty in place of one brought to the shed.

The manner and tact of the one who takes the filled boxes from the pickers mean much in the dis-

cipline of the little army. The boxes should be crated as fast as inspected, the covers nailed on, and the filled crates placed in as cool and dry a place as can be provided. If 20 or more pickers are employed, one person should superintend the picking, watching the work, instructing and encouraging the pickers, and occasionally reprimanding the careless.

To the largest growers the marketing is often the most simple, as the buyer purchases his crop at the packing shed. Some buyers remain at the shipping points and pay a price that is fixed for them at the destination point, sometimes hundreds of miles away. The greatest number of growers, however, are situated very much as I am and are obliged to ship or drive to a city market and consign to a commission firm, or be their own salesman. In 20 years' experience in growing from one to three acres of berries, I have marketed my own crop, selling to grocers and marketmen. The best way to dispose of the crop must be determined by each individual grower for himself.

However and wherever your product is sold, place your trademark on every box. You will profit or lose according to the quality and condition of your goods.

COSTS AND PROFITS

Strawberry growing is a gamble if engaged in only at intervals or in a desultory manner. However, if grown for a period of 10 years the balance on the profit side is as good as from any, and better than that from most special crops.

Drouth and low prices often cut the profits down to a few dollars per acre, while again in an extra favorable season the profits mount up into the three-figure column. The subject of the cost and profit of this and other crops will be treated at length in a special chapter.

CHAPTER VI

The Succulent Sweet Corn

In favorable seasons it is possible for the truck farmer to have sweet corn to sell every market day for a period of 90 days, and in the average season at least 75 days.

This long period of production is made possible by selecting the very early, the intermediate and the late varieties, planting them in succession from the last days in April to the middle of June.

There is no vegetable in our markets that is in better demand and none that is a greater delicacy than sweet corn in prime condition. However, careless methods in handling from the time it is taken from the field to the time it reaches the consumer's table often change what was a sweet, juicy and appetizing article of food to one less palatable than corn bought in the can.

In many large cities the truck farmers drive with their loads of vegetables to the commission houses, passing on their way the large retail grocers located in the suburbs and outlying districts of the city. The next morning the buyers from these stores drive several miles to the commission houses and often purchase the same vegetables that had passed their store.

These products have been stored in the heated rooms of the commission houses, have been carted miles, reloaded and handled several times. This is called "modern merchandizing."

LESSONS OF THIRTY YEARS' WORK

After 30 years of experience in growing sweet corn for the Milwaukee market I would say that my

success has come from growing the best varieties, selecting and marketing the product when in prime condition, and delivering regularly to the best class of trade obtainable—hotels, restaurants and first-class grocers.

It has been my policy to get as near the consumer as possible. I realize, however, that as cities increase in size marketing and delivery become more difficult, and I have been obliged to depend upon the public market in place of delivering to regular customers. These markets are becoming more popular each year and are very satisfactory.

A sandy or gravelly loam soil is best for growing early sweet corn of quality. The greatest profit is made from very early crops. To secure an early crop the very best seed must be secured. Planting must be done at a season when the very highest standard of vitality is necessary to obtain a good stand. Home-saved seed is most reliable.

The most popular varieties in our market are early White Cory, Mammoth White Cory, Chicago Market, Crosby, Cosmopolitan, early and late Evergreen. There is sometimes a local demand for Yellow Bantam and blue corn, or other special varieties. However, I have succeeded best by selecting the best white varieties that have 12 or more rows of small kernels and thin hulls.

PLANTING AND TENDING

I plant in check rows, the early varieties three feet and the late $3\frac{1}{2}$ feet apart. Great care is given to the planting of the early crop. From four to five seeds are planted in each hill, at a depth not to exceed two inches.

The harrow is used one or more times before the crop is up, and the horse cultivator, weeder and hand hoe are used from the time the rows can be followed

until the corn is too large to be worked without injury. At the time of the first cultivation the man with the hoe is, indeed, an important personage. His effective work at this time means more dollars of profit to the grower.

There is no crop that will return more profit for a liberal application of fertilizer than early sweet corn, and none that will suffer more for lack of it. During my first years of experience in growing early sweet corn and early potatoes I was impressed by the fact that excessive amounts of stable manure are required to grow maximum crops—much more than enough to supply plant food for crops that have the whole season for growth and maturity. From this early experience I learned, what is common knowledge now, that only a small part of the plant food in stable manure is in an available condition early in the season on account of a lack of bacterial growth which becomes present in the soil through the aid of heat and moisture as the season advances.

Finding it also more difficult and expensive each season to procure stable manure, I have been supplementing the manure with nitrate of soda, acid phosphate and muriate of potash. About 10 loads per acre of stable manure are applied during the winter or early spring. Cover crops are grown with preceding crops to add to the supply of humus so necessary to keep up the proper physical condition of the soil. The land is plowed as early as conditions permit, five to seven inches deep. Five hundred pounds acid phosphate and 150 pounds muriate of potash are sown broadcast and harrowed or disked in. It is immaterial whether the materials are mixed or applied separately. Nitrate of soda at the rate of 100 pounds per acre is sown broadcast about the time corn is coming up and is harrowed in.

MUSKMELONS OF GOOD SIZE AND HIGH QUALITY

MAKING UP THE HOTBEDS FOR CANTALOUPE

A GOOD TOUGH SOD SHOULD BE CHOSEN

No crop that I have grown has given me greater profit or satisfaction than has my sweet corn. I venture the statement that the right kind of a man, with the right kind of soil, the right kind of seed, and the right kind of culture and within 20 miles of a good market can be assured of an average annual income of at least \$1,200 from 16 acres and will have left enough product in the form of first-class fodder to pay for the fertilizer.

CHAPTER VII

Some Special Crops

EARLY POTATOES

A fertile soil, thick planting, thorough culture, and seed of best vitality, are the essential factors in producing a large yield of early potatoes.

SOIL AND LOCATION

The ideal soil is deep, friable and naturally drained. A sandy loam with an open subsoil comes the nearest to this standard.

The land should lie high enough to be well air drained, in order to have minimum danger of frost damage. Under these conditions, early planting is safe.

ENRICHING THE SOIL

Fresh stable manure tends to produce such diseases as scab, rot and blight. It is, therefore, best to apply stable manure to the preceding crop. From this is derived the residual effect of the plant food left in the soil, while the physical condition of the land is immensely benefited through the addition of the organic matter.

Early potatoes need an abundance of available plant food of the right kind, in the right place, at the right time. This means some form of commercial fertilizer. I have increased my production and improved the quality of my crop by this means.

After several years' experience I have concluded that my best results were secured by sowing broadcast

at the time of plowing 200 pounds muriate of potash and 600 pounds acid phosphate to the acre, working it into the soil at once. About the time the plants come up I usually apply 100 pounds per acre nitrate of soda, sown broadcast, and harrowed or cultivated in.

MAKING THE SEED BED READY

The ground is plowed as deeply as the nature of the soil will permit and as early as it is in condition. It is harrowed and pulverized in a thorough manner. I am not content with stirring and leveling the surface only, but use the disk and such harrows as will work deep and leave the soil in the best condition to receive the seed.

Only seed of the strongest vitality and the best type of the variety selected should be planted. Remember that this crop is wanted *early* and give it every chance to gain a day or two on Father Time. For many years I have planted seed grown on reclaimed marsh soil. These seed potatoes, planted late in June, ripen in October, and are in as good condition at planting time the next spring as when taken from the ground. They make a vigorous growth, and are less subject to scab or blight than potatoes that ripen early.

After testing many varieties, I am still growing the early Ohio, and am securing as large yields as when it was first introduced. This can be said of but few varieties of potatoes. Every grower must decide what variety best suits his soil and market.

PLANTING THE CROP

Planting begins as soon as the land is prepared. In southern Wisconsin the planting season is during the first two weeks of April. I use a horse planter. The

rows are $2\frac{1}{2}$ feet apart, and the seed placed 13 inches apart in the rows.

The seed is cut to one or two eyes, and to as uniform size as possible. Depth of covering depends upon the condition of the soil. Three to four inches prove most satisfactory under the conditions found on my farm.

WHEN AND HOW TO CULTIVATE

Cultivation begins soon after planting by harrowing several times before the plants come up. The horse cultivator should be run quite deep for the first cultivation, after which all operations should be shallow. Deep cultivation after root growth has become well established injures the feeding roots in the top soil.

The horse weeder is used after each cultivation, and continued as long as the size of the plants will admit. The cultivator and weeder should be used after every rain to prevent crusting of the surface of the soil, and to conserve moisture. If cultivation is thorough, and at the right time, very little hand hoeing is necessary.

LEVEL CULTURE FOR LIGHT SOILS

Level culture is continued until the last cultivation, which is as late as it is possible to cultivate without injury to the vines. The wing hoes are then put on the horse hoe, and the rows are hilled slightly. No definite rule can be given as to hilling, as seasonable conditions regulate this phase of cultivation.

BUGS AND DISEASES

The Colorado potato beetle, or ordinary potato bug, is always with us, but it is less a menace than in

former years. With the powder gun or the improved spraying implements, we are able to successfully cope with this once formidable enemy of the potato grower. The powder gun is the most convenient, is always loaded, and does quick work. For several years I have used it with the greatest satisfaction. When spraying machines are used to prevent blight, then insecticides can be used with the bordeaux mixture with economy of labor.

I have succeeded in the prevention of scab and blight in my early potato fields by crop rotation and seed selection to such an extent that I have had very little loss for several years. Early blight appears at a rainy season and very frequent applications of bordeaux mixture are necessary to prevent loss if spraying is practiced.

HARVESTING AND MARKETING

I begin to dig the crop as early as the tubers are of marketable size. They are put upon the market as soon as possible after digging, and as rapidly as men and teams can do the work.

A two-horse digger is used, and the pickers follow the digger. For convenience in handling I use bags holding one bushel. The bags are loaded directly on market wagons and delivered to the grocer or marketman.

ASPARAGUS FOR MARKET

Asparagus is a popular vegetable and has a long season. It thrives best in sandy loam or well-drained muck soil. A field that has been cultivated and manured heavily the previous year is preferred. At no period of its growth should it lack for liberal manuring.

It is a heavy feeder, and demands its food in large quantities.

For planting asparagus, furrows should be plowed five feet apart and eight inches deep and cleaned out to even depth with a spade. The plants, which should be a year old, are set with roots spread out in a natural position and 18 inches apart in the row. Be careful to cover the crown not more than two inches at first, gradually filling the furrows as the shoots advance in growth.

Thorough, clean culture at all times is essential. As the crowns of the plants are several inches below the surface, disking and harrowing is practical after the stalks are cut in fall and before growth begins in early spring.

After the principal stalk growth is over and before the seed matures, mow off and remove the tops and burn them. Maturing seed is said to be the most exhaustive effort of plant life, and volunteer seedlings are as bad as weeds.

Not until the third year should marketing be allowed. Care must be taken in cutting the sprouts; run the knife below the surface and avoid injury to the other shoots. Palmetto and Argenteuil will prove the best varieties for almost any market.

TOMATOES REQUIRE EARLY ATTENTION

Tomato plants are started in hotbeds. Seed should be sown about the first of March in boxes or flats, which may be made three or four inches deep and of such width and length as may be the most convenient to handle. The boxes are placed on soil in hotbeds, which should be filled so that the boxes come close to glass.

As soon as the plants have made the second leaves,

they are transplanted to other boxes and planted two inches apart. Two more transplantings should be made, the last time to cold frames and the plants well hardened off before setting in the field.

The soil should have been plowed and harrowed some time before, and then disked and harrowed at the time of planting. Set tomato plants in checks six feet apart each way. Avoid planting on land that has raised tomatoes or potatoes during several preceding years, as there is danger of infection from blight.

SPECIALTIES ARE FOR SPECIALISTS

Celery and cauliflower are usually grown as specialties by men who have learned how to handle these crops. They require close attention to details, both as to culture and preparing for market. A deep, moist, black loam soil is needed. It must be well drained and a liberal amount of manure supplied and well mixed with the soil. Frequent and thorough cultivation is essential, particularly after each rain, to conserve moisture and encourage rapid growth.

CHAPTER VIII

Shall We Irrigate?

Irrigation of arid land has been employed from time immemorial and in practically every recorded instance the results have been successful to a degree almost beyond belief. Only within recent years, however, has irrigation been practiced to any extent in the humid sections of the United States.

Nevertheless, commercial growers of fruit and vegetables in nearly every part of the country realize that there are periods in nearly every growing season when a crop could be saved or its value doubled could they but call down from the skies a soft gentle rain of sufficient duration to abundantly water the crop.

After having provided all the other factors that go to assure maximum yields—good soil, pure seed and expensive fertilization, followed by thorough cultivation and often by several applications of spraying materials—we see our crops reduced to a minimum yield for the lack of the water when nature fails to supply it in sufficient quantity at the right time.

Like many other ambitious truck growers, I have considered and planned or dreamed of a system of irrigation that would provide for a few acres of berries, cantaloupes and other crops that produce high acre values. Truck growers whose lands are favorably located near streams or surface springs have been successful in furnishing water for small areas by installing a gasoline engine and laying pipe under or on the surface and extending through the fields. The water runs direct from the pipes or through hose attachments.

THE HOTBEDS ARE FILLED CLOSELY WITH SODS

THE PLANTS SHOULD STAND SIX INCHES APART

LOAD THE SEEDLINGS CAREFULLY ON FLAT WAGONS

THE PLANTS ARE SET IN HILLS

This process has proved profitable, in spite of the excessive waste of water and the labor expense.

The success of this crude system has led to an investigation of the possibilities of a practical and economical system of irrigation that can be installed at moderate expense and operated at a low cost.

From these investigations certain underlying principles have been evolved the practice of which has

A FIELD PIPED FOR THE OVERHEAD SPRAYING SYSTEM

enormously increased the yield of crops as compared with the cruder practices of irrigation. A considerable amount of this study has been performed in the eastern half of the United States, which is not usually considered susceptible of irrigation. It has been demonstrated, however, beyond possibility of doubt, that profitable crop increases can be produced under mod-

ern and scientific irrigation, even in the so-called rain belt.

TYPES OF IRRIGATION

To one familiar with irrigation development in the eastern half of the United States, the practice existing under some of the vast irrigation enterprises in the West presents something of an incongruity. Anyone accustomed to the careful, painstaking methods of watering employed in sections of this country is impressed with the gross lack of efficiency in those portions of the Southwest where water is secured only after the expenditure of millions of dollars in vast engineering undertakings, only to be irregularly and wastefully distributed over the field by an ignorant and careless Mexican peon, whose most efficient implement is a hoe. In some of these localities modern irrigation methods have been tried alongside those of the cruder nature, with the result that the yield has almost invariably been doubled.

One of the essentials of effective watering is an absolute uniformity in distribution, so that each plant in the field will receive its proper amount of water. The result of irregular watering is shown on one hand in a field of ragged growth. In contrast with this a field of uniform and maximum development in every plant is secured under a proper and uniform water distribution.

OVER-WATERING HARMS PLANT GROWTH

It is equally essential that plants receive no more water than they require. The practice of over-watering some portions of the field in order that the plants in a more remote locality may receive water in a sufficient

amount for their full development has repeatedly demonstrated its fallacy. Innumerable experiments and investigations have proved that over-watering is even more injurious than under-watering.

Growers are beginning to discover also that the effects on the soil resulting from the various methods of watering are of vast importance to plant growth. A soil which is puddled and caked yields far less returns than a soil which remains open and free. Also the

THE SPRAYING SYSTEM AT WORK

reduced temperature of the soil through over-watering has been seen to retard plant growth. With all other conditions equal, various methods of watering will sometimes produce as much as four weeks' difference in the maturity of a crop, so that in addition to other advantages, a proper method of irrigation brings the crop into the market under early periods of high prices.

Such are only a few of the underlying principles which must be reckoned with in considering the problem of irrigation, and various methods and devices are employed to accomplish results which prove beneficial.

THE SKINNER SYSTEM

Probably the system of irrigation which has most fully demonstrated its merits for eastern conditions is known as the overhead spraying system. In a general way this system, which is commonly known as the Skinner system, consists of a series of lateral pipes parallel with the ground and parallel with each other. These pipes are placed approximately 50 feet apart in the field, and along each line are inserted a row of small nozzles, the construction of which is the result of careful and studious development. These nozzles are placed in a straight line, and from three to four feet apart, and are so constructed that they will throw a fine stream a distance of approximately 25 or 30 feet. The character of the stream is such that it is diffused in small drops before reaching the ground, duplicating a fine, gentle rain. Each pipe line is oscillated on its axis in order to cover the ground uniformly and thoroughly.

For many years growers have in a small way sprinkled through lateral perforated pipes, but it has only been within recent years that the disadvantages of this method have been eliminated and the benefits developed until this system became commercially feasible. The idea and devices of the system are protected by patents. It has been widely distributed, being in use in every state, and has demonstrated its practicability under the widest variety of conditions and on almost every crop. A thorough study of irrigation leads to the conclusion that a light, gentle rainfall offers the most advantageous method of watering and this comparatively simple system duplicates nature's way in supplying moisture to the crop.

COST AND PERFORMANCE

The usual installation will distribute about 40 gal-

lons of water a minute per acre, equivalent to an inch of rainfall in 11 hours. The cost of the system, exclusive of the pumping plant, is about \$150 an acre. It is easy to operate, even in its cheapest form, but it has been developed to a point whereby all the lines are oscillated automatically from the pumping engine and a uniform water distribution is secured thereby, without any hand labor whatever. The system can also be used for spraying and for protection against frost, and provides what is probably the most satisfactory method of watering yet developed.

It is the only device which produces an absolutely uniform water distribution which is partially or entirely automatic in its operation and which permits a water distribution intelligently and under the command of the user. Numerous articles by scientific users of the system have begun to indicate the benefits which can be secured by the correct application of water. The mere fact that a grower can arrive at exact knowledge as to what he is doing in his water distribution opens up a field of experiment and developments which has heretofore been impossible. The system is in use in units ranging from very small garden equipments to installations of 100 acres, and it is practically the universal verdict that it will pay in increased returns every year an amount equivalent to the entire cost of the equipment. In taking this statement in consideration it should be recognized that most of the systems in use are on intensive growing, and while it is valuable on ordinary farm crops, yet the installation of this equipment invariably tends to the policy of growing crops which bring large money returns per acre.

Numerous other methods have been employed to accomplish the results secured by the system above described, but up to this there has not come to the writer's notice any equipment which, for the same cost of in-

stallation, will produce the uniform growth and development of the crop which can be secured from the above described equipment.

When it is recognized that at least 500 pounds of water is required by the growing plants to add 1 pound of solid matter to its structure, one can begin to realize the importance of the proper application of water and can understand the reason for the enormous yields which have been produced under the most improved irrigation methods.

CHAPTER IX

Reclaim the Marsh Lands

There are millions of acres of reclaimable swamp lands in the east central states that may be made to produce abundant crops. These lands can be drained and brought into a good state of cultivation with less labor than was employed by our forefathers in clearing the lands which now command prices so high as to discourage the present generation from buying farms.

There are tens of thousands of these acres located near the best markets in the world, and this class of land is adapted to the growing of truck crops that may be sold in these cities, as well as to profitable dairy farming.

The profits from 10 acres of such land planted to celery, onions, potatoes, cabbage, cauliflower and other garden crops often make the sales from the average quarter section of the Northwest look small. Truck farming a few acres of this reclaimed swamp land can be made profitable. The labor can be performed by the farmer's family. But a small initial investment is required for the land and a moderate amount for horses and tools. To the man ambitious to do things in a big way growing the several varieties of vegetables and selling in car lots offers a field of limitless opportunity. He has an unlimited market in the nearby cities and the southwestern states. There are, of course, seasons when some one crop may be grown at a loss. Growing a variety of products, however, insures almost certain success.

There is no class of soil that will produce as much feed per acre in the form of corn for silage, or as much

timothy and alsike, as these swamp lands. Their value has been demonstrated, and with the organization of drainage districts by men who are competent for this work large areas are being reclaimed.

The work should not only be thorough, but a fund for maintenance should be provided. Subdrainage by the use of tiles should be supervised by an expert, and every detail of the work well done. Trying to save a few dollars per acre on this part of the work is poor economy.

In the cultivation and fertilization of this class of soil, our methods are the reverse of those followed in treating upland soils. The uplands lack organic matter and need barnyard manure and crop rotation to keep up the humus content and to supply nitrogen. Marsh soils contain a superabundance of organic matter, often 80 per cent, but are very deficient in the mineral elements.

Marsh lands in the limestone sections of the east central states are usually well supplied with lime, and are not acid. The decomposition of the organic matter, if drainage is thorough, provides an abundance of nitrogen. The phosphoric acid content is usually high. After heavy cropping exhausts the supply this element can be supplied with profit in the form of rock phosphate or acid phosphate.

Marsh soils are almost invariably deficient in potash. However, this can be supplied at a minimum cost per acre in the form of muriate or sulphate of potash. With the knowledge we have acquired through the demonstrations made by the state experiment stations, I consider it a wasteful practice to apply either farm manure or a complete fertilizer to this class of soils. When we supply the one element, potash, we insure maximum crops.

A GOOD CABBAGE FIELD IS AN ATTRACTIVE SIGHT

CABBAGE PLANTS ARE SET IN THE FIELD WITH A PLANTER

CHAPTER X

Costs and Profits

In estimating the profits secured from our crops, we are quite likely to select some certain season that has been exceedingly favorable and when unusual market prices prevailed.

It is well, perhaps, to remember the fat years and forget the lean ones. However, to be of any value, data must be secured from the records of several consecutive seasons.

The following tables have been formulated from records of production covering periods of seven to 10 years and from crops in which I have specialized for more than a score of years. In making up the tables, I have made the unit one acre.

The acreage of the several crops has been as follows: Strawberries, two acres; melons, four and one-half acres; potatoes, five acres; sweet corn, 10 acres.

The products have been hauled to market by my own teams and sold from the wagon; consequently, there is no charge for freight or commission. There has also been a saving in cost of crates, as some are returned or purchased for much less than the price of new ones.

In going over my records, I note a large increase in the cost of labor, fertilizers, crate material, horses, wagons and travel expense. I estimate an average advance on these several items of expense to be at least 25 per cent within the last 10 years.

In growing strawberries, my practice has been to keep the fields in bearing two years. Therefore, three years of labor, including the year of planting, will pro-

duce two crops, and I have charged half the cost for three years to one crop, also one and one-half years' rent to each crop. Strawberries are marketed in 16-quart cases. The cost for crates, picking, marketing and miscellaneous expense comes very close to three cents a quart, while the cost of producing is only two cents.

STRAWBERRIES

Gross Receipts

266 cases, at -----	\$1.28	\$340.48
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Cost

Labor -----	\$48.00	
Fertilizers -----	15.00	
Mulching -----	14.00	
Rent -----	15.00	
Picking and marketing -----	120.00	\$212.00

Profit-----	\$128.48
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MELONS

Gross Receipts

185 crates, at -----	\$1.30	\$240.50
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Cost

Preparing hotbeds -----	\$8.00
Cutting sods and planting -----	4.00
Care of hotbeds -----	4.00
Transplanting -----	5.00
Preparing land -----	4.50
Cultivating and hoeing -----	8.50
Crates -----	13.00
Picking and crating -----	9.00
Marketing -----	22.00
Fertilizers -----	8.00
Rent -----	10.00

Total costs -----	\$96.00
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Profit-----	\$144.50
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POTATOES

<i>Gross Receipts</i>		
162 bushels, at -----	\$0.77	\$124.74
<i>Cost</i>		
Plowing -----	\$2.00	
Harrowing -----	1.00	
Planting -----	1.00	
Cultivation -----	4.00	
Digging -----	2.00	
Picking and sacking -----	3.50	
Marketing -----	16.00	
Fertilizer -----	13.00	
Seed -----	6.00	
Paris green -----	1.50	
Rent -----	10.00	\$60.00
	Profit-----	\$64.74

CORN

<i>Gross Receipts</i>		
8,750, at \$0.82 per hundred -----		\$71.75
Corn fodder -----		8.00
		<hr/> \$79.75
<i>Cost</i>		
Plowing -----	\$2.00	
Harrowing and marking -----	1.50	
Planting -----	.50	
Cultivation -----	3.00	
Hand hoeing -----	2.00	
Fertilizer -----	11.00	
Picking and marketing -----	14.00	
Rent -----	10.00	\$44.00
	Profit-----	\$35.75

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