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THE CULTURE OF VEGETABLE CROPS IN THE MARKET AND HOME GARDENS.

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NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION.

HORTICULTURAL DEPARTMENT.

Compliments of W. F. MASSEY, Horticulturist.

THE BULLETIN

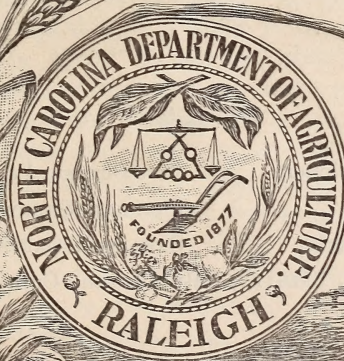
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RALEIGH, NOVEMBER, 1903.

THE CULTURE OF VEGETABLE CROPS IN THE MARKET AND HOME GARDENS.

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ESPECIALLY ADAPTED TO THE NEEDS OF NORTH CAROLINA CULTIVATORS.

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BY W. F. MASSEY, HORTICULTURIST.

— INTRODUCTION.

Before the introduction of commercial fertilizers, and the completion of railroads North and South, the market gardening or trucking business of the South could never have been developed. Forty years ago no one thought of growing vegetables for market away from the immediate vicinity of a large town, where a plentiful supply of stable manure could be always obtained. Even after the use of artificial fertilizers had become common among farmers, and their use had developed the cultivation of some of the varieties of vegetables, such as peas and potatoes, on cheaper lands away from the immediate neighborhood of the large cities, the gardeners in those places could not be brought to believe that as good results could be had from the use of fertilizers as with stable manures. And so until a very recent period the gardeners around the large cities thought that for their use stable manure was essential. But even these men have found out that the same results can be had more cheaply by the use of commercial fertilizers, in connection with a leguminous crop buried in the soil, to take the place of the organic matter in the stable manure.

The rapid growth of our cities long ago demonstrated that the little gardens on their outskirts could not produce the needed supply. As transportation facilities increased, the production of early vege-

tables naturally moved southward, and their production had already assumed quite respectable proportions around Norfolk before the war. The abolition of slavery made it possible to hire large numbers of laborers in the vicinity of the Southern coast towns, where the freed negroes congregated, and with an abundance of cheap labor, quick transportation, an abundance of fertilizing materials, and a favorable climate and soil, it is no wonder that the business of market gardening has made wonderful progress in the South, and particularly in the Southern Atlantic States. North Carolina has by no means lagged in the development, and our trucking interest has become one of the leading agricultural interests.

Many men have gone into the business of growing vegetables who have had no special training as market gardeners, and many of these have been successful with the crops they have grown, while others, failing to realize the great difference between gardening and farming, have failed to get paying crops, because they did not understand the business, and tried to garden an area too large for the capital employed on it. The late Peter Henderson laid down as a rule, in cultivating the high-priced garden lands around New York City, that a man, to be successful, must have cash capital, outside his land, of \$300 per acre. This was, of course, for places where labor was expensive and rent so high that every foot of land was in close crop, taking much hand labor.

While, of course, the Southern gardener, with his cheaper soil, cheaper labor, and more extensive use of horse power in his work, does not need to have as large a capital as this, it is nevertheless true that in market gardening, as in farming, our people are inclined to spread over too large an area for their capital. The trucker who starts with a cash capital of less than \$100 for each acre he cultivates in vegetables will be taking a serious risk of failure. If his crops are as good as his neighbor's with means, his margin will be smaller if he buys on credit, and the failure of one of his crops will be a more serious matter to him. There is no kind of soil culture in which a man needs ready cash so much as in trucking, and none in which a skilled man can use so much money profitably. It is with the hope that we can aid some of our people in acquiring this skill that this bulletin has been prepared. The writer has had the advantage of a long and varied experience in all the departments of practical horticulture, and believes that he can make suggestions of value to those already engaged in market gardening, as well as to those who desire to engage in it.

SOILS FOR TRUCKING.

The coastal plain of North Carolina is naturally the best region for the cultivation of the market gardener's crops, aside from the earliness of its climate and the facilities for water transportation.

A truck farm must of necessity be on land level, or nearly so, for ease of cultivation and retention of fertility. It needs, too, a mellow, sandy loam for the greater part of the crops, and one abounding in decomposed vegetable matter.

These conditions are found nowhere else in the State to the same extent as they are on the eastern coast. The light clay loam ridges, level, sandy flats, and black peaty bottoms, which are all found there, often all on the same farm, offer a variety of soil for the best successes of different garden crops. The man who will start a market garden on steep clay uplands or on a cold clay flat would be simply inviting failure. There are, of course, limited areas of fine garden land in the upland section of the State, but for extensive market garden operations, the business, at least so far as early vegetables are concerned, must always be limited to the level, sandy plain of eastern and southeastern North Carolina. On this plain, too, the cow-pea, on which the market gardener of the South must in a large measure rely for the humus to supplement his commercial fertilizers, grows to a perfection not known elsewhere.

But while the eastern coast is the natural locality for the gardener who seeks to supply the early Northern demand, there are other sections of the State which have adaptations for certain crops, for the growth of which the eastern section is to a great extent unfit. These are the fall and winter crops of cabbage, the main late summer crop of Irish potatoes, and the celery crop. For these the upper Piedmont and the mountain sections are especially adapted, though skilled gardeners will be able to produce them fairly well in the east.

PREPARATION OF LAND FOR TRUCKING.

There is no one point upon which our people most commonly err than in supposing that any piece of mellow land, suited to trucking, but not rich, can be made at once to produce a paying crop of vegetables of all kinds by the excessive use of fertilizers upon it. While such crops as the English peas may be produced on such land, the man who would undertake to grow a crop of early cabbage on it would be pretty certain to fail to get a paying crop. No matter how good the soil is for the ordinary farm crops, it will not be in condition to give the best results in garden vegetables until after several years of good culture and heavy fertilization. And while the commercial fertilizers contain all the elements of plant food that stable manure has, and in better proportion, the vegetable matter in the manure not only has a good mechanical effect on the land, but it keeps up the formation of nitrates in the soil. The commercial fertilizers lack this, and the lack must be supplied if we keep up the productiveness of the land. Decomposed vegetable matter from the forest will do this, but this is an expensive thing to collect and haul.

The most rapid and economical way in which the vegetable matter can be gotten into the land is by the growth of some leguminous crop on the land. For this purpose there is no crop in this latitude equal to the Southern field or cow-pea. This plant, in common with all the pea family, has the power of capturing the nitrogen from the air and fixing it into the soil for the succeeding crop. Its heavy growth above ground, the greater part of which, too, comes from the air, furnishes a larger amount of vegetable matter than would be gotten in the heaviest dressing of stable manure.

The field pea gives the Southern gardener a great advantage over those in a Northern climate, because it can be grown after his early crops are shipped, as a preparation for his winter ones, and he can thus do as much in the way of supplying his soil with organic matter and nitrogen in one season as the other man can do in two, and can at the same time raise a valuable forage crop, for as the soil becomes well stored with vegetable matter we do not think that it is advisable or economical to bury the whole growth. The growth of tops will be of more value for feeding stock, and by careful saving of the manure he can return to the soil nearly as much of manurial value in a much more available condition. The keeping of dairy cattle in connection with market gardening is thus made practicable and profitable. The manure thus made is also a great help in the saving of commercial fertilizers. On highly manured truck lands the growth of crab grass, which comes on naturally after the removal of crops late in the summer, is another valuable aid in the feeding of stock. Whenever there is a ready sale for dairy products it will always pay to keep cows for the consumption of the forage that can be grown so heavily on these lands, and to use the utmost care in the saving of all the manure.

MANURES AND FERTILIZERS.

While it is doubtless true that for most vegetable crops the manure of the stable and barnyard is the best possible, few gardeners, particularly the Southern truck gardeners, are so situated as to get all that they need, and in some places it commands a price that makes it a less economical manure than the commercial fertilizers. Then, too, there are some crops that are actually better grown with commercial fertilizers, as the Irish potato, for instance, with which the use of the manure of cattle is apt to encourage the growth of the fungus causing "scab." But, as suggested above, every truck grower should endeavor to make all the manure he can by the profitable feeding of stock.

When fertilizers are depended upon exclusively, the green manuring with the cow-pea becomes of the utmost importance, and until the soil is well filled with humus, it will pay to plow them under. When

a heavy growth of pea-vines is to be plowed under, they should always be allowed to get their full growth and die upon the land before plowing them down. They have then done all that they can for the soil, and in dying there is no loss of any appreciable fertilizing value, since they part with the water only. There is then, too, no risk of a dangerous fermentation, as when a heavy green growth is plowed under in hot weather.

In using the manure from the stable or barn yard, the truck gardener needs to have them piled and reduced to a fine condition by slow fermentation. Coarse and fresh manure that a farmer can use on a grass sod profitably will not do for him. Thorough decomposition is essential to get the mass in a state in which it will give up its plant food most readily. Piling and composting, while seldom profitable for the grain farmer, is of importance to the gardener. Those who are so situated as to be able to get the sweepings from paved streets can profitably use this material for composting with their stable manure, and the black mold from the forest can also be used to advantage. These materials should be put in thick layers with the manure in a broad, flat-topped pile, which should be chopped down perpendicularly, and thoroughly mixed by turning several times before using. The object is to keep up a slow fermentation and to check injurious heating, thus getting the pile into the condition of a black moist mold, suited for use in the hill or broadcast, as occasion may dictate.

ARTIFICIAL FERTILIZERS.

Mixtures almost innumerable are now offered by the manufacturers of commercial fertilizers, each claiming special qualities and advantages for different crops. Some go to the extent of offering a special brand for each different vegetable crop. This is largely unnecessary, though some variations of the different elements of plant food is desirable for different crops. The potato crop, for instance, demands more potash than the cabbage crop, and less nitrogen, and the same rule will apply to most garden crops, according to their growth below or above the ground. The three elements of plant food which plants get by means of their roots, and which are most apt to be deficient in cultivated soils, are nitrogen, potassium and phosphorus.

LIME AND ITS USES.

Lime is one of the essential elements of plant food which must be in the soil to enable any plant to grow. But for all the purposes of plant food many of our arable soils contain an almost inexhaustible supply. But lime has been found to have a value in the soil apart from its use by the plant as food direct. The chief of these uses, in a soil well stored with decomposing vegetable matter, is

in promoting the growth of the nitric ferment organisms that change parts of this organic matter into nitrates, and thus makes the nitrogen of organic matter available as food for plants. Lime also corrects injurious acidity in soils, aids in the breaking up of insoluble compounds of potash, thus rendering that base available to complete the work of the nitric ferments, and also has an important mechanical effect in the soil, making a clay soil more mellow and a sandy one more compact. On lands cultivated in trucking crops and heavily fertilized, and with frequent green manure crops buried in it, an occasional liming has a very beneficial effect. This will be particularly noticeable in the cabbage crop. While shell marl will to some extent have the same action, the insoluble form of the lime, as it exists in the marl, renders its action less marked and immediate than that of freshly water-slaked lime.

LAND PLASTER OR GYPSUM (SULPHATE OF LIME).

The action of plaster on any given soil can only be learned by trial. On sandy soils near the coast it is seldom so beneficial in its action as upon the clay soils of the interior. We have seen very decided benefit, on some soils, from the use of plaster as a top dressing on the crop of early "snap" or string beans. It is also sometimes very efficient in promoting the growth of clover or peas. But as there are many soils on which plaster seems to have no effect whatever, nothing but experiment can determine its value on a given soil.

COMMERCIAL FERTILIZERS.

As we have stated, the three constituents of plant food that are most generally deficient in our old soils are nitrogen, potash and phosphoric acid. In ordinary farm crops it is practicable, by the use of the leguminous crops, like clover and peas, to get a sufficient amount of nitrogen from the air, but this, while a valuable help, will not supply it in sufficient amount for immediate use for the purpose of growing the early vegetable crops of the Southern market gardener. For many of his crops an artificial combination of nitrogen, in a readily available form, is of the greatest importance. In the absence, then, of a plentiful supply of well-rotted stable manure, he must resort to some commercial source of nitrogen. While the nitrogen in commercial nitrate of soda is in the most readily available form, it is evanescent, and in practice it is found better to mix with it some slowly available form, as in organic matters like fish scrap and cotton-seed meal, to keep up the supply through the season of growth. Cotton-seed meal also carries supplies of potash and phosphoric acid. The common source of this last is the phosphate rock of North and South Carolina and other States.

This is changed into a soluble state by being dissolved in sulphuric acid, making what is commonly called "acid phosphate." This is probably the cheapest form in which phosphoric acid can be had in the South.

Potash exists in a very soluble form in hard-wood ashes, and the ashes of cotton-seed hulls are particularly rich in it. Where these last can be had they furnish the best possible source of potash. But as they can seldom be bought by the gardener in sufficient quantity, he is compelled to resort to some other combination. The great source of potash now is found in the various potash salts mined in Germany and imported here under the names of kainit, sylvinite, muriate and sulphate of potash. The crude form of the salts is seldom available for the use of the market gardener on account of the large proportion of common salt which they contain. This prevents the heavy application of the crude article, as we would thus get for most crops an injurious amount of the salt. The concentrated forms of the muriate or sulphate of potash are the forms in which gardeners use the potash salts, except for asparagus, on which the kainit does as well. For most garden crops the muriate of potash will usually be found the best.

MIXING COMMERCIAL FERTILIZERS.

There are innumerable brands of mixed fertilizers offered by the men who make a business of preparing these in different proportions for various crops. But oftentimes it will be found easier and more economical to mix the ingredients, which can be purchased for this purpose, bearing in mind that the more concentrated form in which one can get these, generally the cheaper, he will get the essential constituents, potash, phosphoric acid, and ammonia (or nitrogen). Most manufacturers of fertilizers always give the percentage of nitrogen in a mixture as ammonia, as this custom has grown universal from early practices. Ammonia is a compound of nitrogen and hydrogen, which has the properties of an alkaline base, and unites with acids to form salts. Sulphate of ammonia and nitrate of soda are the two most concentrated forms in which we can get nitrogen, and they are valuable forms for the truck gardener's use. A highly concentrated form makes a great saving at times in freight and handling. The farmers of North Carolina are far more secure in buying the commercial fertilizers already prepared than are the farmers of many other States, owing to the strict inspection laws, which are rigidly enforced by the Agricultural Department, and the constant and accurate analysis that are made of every sample offered for sale in the State.

There are many advantages in mixing the constituents at home, as in that way particular ingredients can be used for special crops, or advantage be taken in using local supplies. The purity of these

ingredients can be ascertained by analysis, and their proportion in the mixture can be altered to secure any desired percentage. When buying the ingredients they should always be purchased on a special guarantee. When mixing at home the materials should be as dry and fine as possible, and should some be lumpy, as in the case of the potash salts or nitrate of soda, the lumps should be mashed before attempting to mix. A clean floor should be used for the mixing, and the ingredients, weighed out in proper amounts, should be poured on top of each other in alternate layers. Two hands, with hoes, on opposite sides of the heap, can mix the layers rapidly, at a cost not to exceed fifty cents per ton. When mixing a small quantity a wagon body is very convenient to use. Where large quantities of fertilizers are used, and sufficient power can be had, it will pay the grower to provide the necessary machinery for mixing the ingredients.

ROTATION OF CROPS.

While there are some crops, like onions and Lima beans, that seem to do as well or better by being grown continuously on the same land year after year, the systematic rotation of crops is, as a rule, as important in the garden as on the farm. While no excretory process has been discovered in plant life, it is nevertheless true that, though kept supplied with all needed plant food, plants of some kinds will not continue to give the best results year after year on the same land. They seem averse to feeding on the refuse of their own growth that inevitably accumulates from the harvesting of a crop.

Then, too, the different crops require the elements of plant food in varying proportions. Some require large proportions of potash in comparison to the nitrogen than others, and we can make our fertilization more economical by a rotation, for the potash is not going to leave us, like the nitrogen does, and we can take advantage of this to some extent in the following crop. Soils differ, too, in their capacity for retaining manures. Clay soils have a much greater power for absorbing and retaining plant food than sandy soils. Unless the sandy soil is immediately underlaid by a retentive clay subsoil, its lower absorptive power will cause it more rapidly to part with the plant food by leaching. It will be found, therefore, to be much more important to keep up a rapid and regular rotation on crops on sandy soils, which, from their nature, are better adapted to early vegetable crops than on a clay soil. While the experiments at Rothamsted have shown that a crop like wheat may be continuously grown on a clay soil without deterioration, the fact has been well settled by experience that with most truck crops a change of soil is of vital importance. We very much doubt that in our climate there is any soil that would give the same results that were obtained in the moist climate of England.

Dr. A. Oemler of Georgia, in his valuable book, "Truck Farming in the South," gives the following points on a rotation of crops that we heartily approve:

"First. To have a crop which succeeds another as dissimilar in composition and the demands it makes upon the soil as possible. Second. Never to have plants of the same family succeed each other; for instance, melons should not follow cucumbers, tomatoes should not follow egg-plants or Irish potatoes, beans should not succeed peas, or *vice versa*. Third. Tuberos plants should not be allowed to follow plants of the same character. Fourth. Root should not succeed root crops, as turnips, beets, etc. Fifth. Deep or tap-root plants should not succeed others of similar growth. Sixth. To make the heaviest application of manure to such crops as require most, as cabbage, onions, etc., and to have other crops succeed these requiring less, as tomatoes, egg-plants, etc., so that the whole farm may be brought to the same degree of fertility."

As has been frequently noticed by practical gardeners, there is often as much need for a rotation of manures as of crops. A piece of land that has been continuously dressed with stable manure will be benefited by a change to commercial fertilizers, and *vice versa*.

SEEDS AND SEED SOWING.

There is no point in horticulture in which so great an improvement has been made in this country as in the quality of the seeds offered for sale to the gardener. The art of seed-growing is better understood, and the requirements of our climate have been studied by practical men. The writer can well remember when dealers prided themselves on the fact that the seeds they offered were "English" seeds, not knowing that with many plants American-grown seeds are infinitely superior for our use. In the days of the old "Early York" cabbage we remember with how much of uncertainty the seed were sown, not knowing whether any of them would make a solid head. And not until the "Early Jersey Wakefield" cabbage was developed from the English Wakefield, by continuous selection in our climate, did growers fully realize that for certainty of crop it was necessary that cabbage seed for American use must be grown in America.

The question of climate in its relation to production has been more closely studied of late years, and no well-informed gardener now supposes that all the seeds he needs can best be grown in one climate. The fact that many sorts of garden seeds are better for the production of the earliest crops, when grown in a high latitude, lead to the notion that all seed produced in a northern latitude are necessarily superior to those grown in the South. There is no greater error in horticulture. There are many seeds that do not reach their best development, as crop-producers, in any given locality, when they

are grown far north or south of the latitude where they are to be sown. While the market gardener can seldom afford to grow his own seed, there are many which he can generally produce to advantage, if unable to get them from a reliable grower in his own latitude and elevation, for elevation above the sea has the same effect on many crops as a high latitude. In this class should be placed such seed as those of Indian corn, egg-plants, tomatoes, Lima beans, okra, cucumbers, melons and a few others. It is also a well established fact that the late fall-grown crop of Irish potatoes produced in the South makes far better tubers for growing the early spring crop from than those produced in a northern latitude, a fact that is rapidly revolutionizing the practice of gardeners, not only in the South but in the North as well.

One of the chief reasons for the common failure to grow good crops of sweet corn for table use in the South has been the fact that our people so commonly get the Northern-grown seed for planting. Indian corn, more than most other plants, fails to do its best far south or north of the place where the seed is grown. Indian sweet corn, grown and carefully selected for seed in our latitude, will produce far better results here than any seed we can get from the North. Garden peas, snap beans and some other seed had always better be of Northern growth. The radish seed sold by our best seedsmen are produced in France, experience having proved that they can be better grown there than here. But there is one point in regard to seeds that is not sufficiently understood by our gardeners generally. This is what we may call "pedigree." Thorough-bred seeds are of as much importance to the gardener as thorough-bred horses are to the race-course. It takes a long course of skilled culture to establish a race in plants that will, with certainty, reproduce itself. There is a constant tendency in all plants to revert to an original, and, generally, an inferior type. Hence the necessity for skill and care on the part of the seed-grower. Experienced planters understand this so well that they are more concerned about the strain from which their seeds come than about the relative percentage of vitality even, though both are of importance. No class of business men are so minutely careful as our well-known seedsmen to guard to the purity and vitality of the stock they offer. The sharp competition between them to get and keep the best strains of the various garden seeds, and to retain the trade that they could only have acquired by such care, is the best guaranty that the gardener can have. The dealer who gets and keeps the trade of a large number of market gardeners around him must of necessity sell a good article. Experienced gardeners will often be found buying a certain strain of a common vegetable from a certain stock, and from no other, though they may possess the same vitality, because they know the value of pedigree. All the little extra early garden peas, for instance, are

the same kind of pea, though branded with various names by the dealers; but the stock of some are more sought for by market gardeners, because they have found them to be more carefully kept to the true type than some others, or better "rogued," as the term is; that is, the plants that show a tendency to revert to the inferior type are kept pulled out of the crop. The stock from which our leading seedsmen get their seed are nowadays of such general purity that any one can usually get just what he wants if he deals with a man of reputation. In most things it costs a Southern market gardener too much to attempt to save seeds, but if he grows nothing else he should always grow his own seed potatoes, and, in fact, should usually grow a surplus, as there is always a demand for them at planting time.

DURATION OF VITALITY IN SEEDS.

There is a great difference in different plants in this respect. Some seeds quickly lose their vitality, while some retain the power to germinate for a very long time. Lettuce seeds are not usually ranked among those which retain their vitality many years, but when well kept they may be trusted for several years. Beet seed will retain their germinating power for at least ten years, under favorable conditions; cabbage, kale, radish, tomato, spinach, turnip, asparagus, broccli, cauliflower, beans and peas, are all good for four years or more; while pumpkin, cucumber and melon seed will keep for ten years. Onion and leek seed are not to be relied upon after the second year, and their vitality is much weaker even the second. But it must be born in mind that these figures refer to seeds that are kept under the most favorable conditions. In the moist climate of our Southern coast the duration of vitality will usually be found to be shorter, and no one could trust onion seed here after the lapse of a year in our climate. Melon and cucumber seeds are more fruitful when two or three years old than when perfectly fresh, but make a less vigorous growth of vine. In all other cases perfectly fresh seed should be preferred. In all cases get seeds from a seedsman of established reputation, and do not trust the seeds put out on commission at country stores.

TIME FOR SOWING.

All seeds usually sown in the open ground vary in their requirements for growth. The vital principle in seed requires three conditions to induce germination—moisture, a proper degree of heat and access of the oxygen of the air. They all have a minimum temperature at which they will start into growth, some at a much lower point than others. Onions and English peas will germinate at a temperature but little above the freezing point, while the seed of corn, cucumbers and other tender plants will rot if exposed to moisture at

such a temperature. It is evident, then, that care must be used in sowing seed at the time when the temperature is suitable to the nature of the plant. The practice of soaking seed in water to hasten germination is seldom advisable, for unless the soil is in exactly the proper state of warmth and moisture at sowing, more harm than good will be done. If, at the time of sowing, the soil is dry it is always better to compact it over the seed, either by tramping with the foot on a row after sowing (as Mr. Peter Henderson used to insist upon), or by rolling. But if the soil is moist either of these practices will do more harm than good.

As a rule, all garden seeds should be sown in drills and not broadcast. Exceptions to this will sometimes be found profitable, as I have found it profitable to sow an early crop of strap-leaf turnips broadcast, and at times to scatter seeds of radishes among other slow-growing crops. But the rule holds good that the best crops are to be looked for from sowing in rows, careful thinning and clean cultivation.

No market gardener should ever sow seed by hand. There are now several effective garden seed drills, and no one can afford to sow seed by hand. The depth at which seeds are sown is governed by the character of the soil, the time of the year, and the moisture present. In a general way it may be said that the size of the seed should govern the depth of planting, but there are exceptions even to this, for seed of the Lima bean, one of the largest seeds sown, should be put barely stuck in the soil, eye down. The old rule is to cover the seed about three times its thickness with the fine mellow soil, but in many light soils this will hardly be sufficient for many things. Seeds need deeper covering in sandy than in heavy soils, and the soil over all seeds should be made as fine as possible.

QUANTITIES OF SEED PER ACRE.

Books on gardening give tables of quantities of seed necessary to sow per acre. These are usually only approximate and in most books the quantities named are excessive. But it is far better to err on that side than to use an insufficient amount. Some seeds germinate with very feeble shoots, and it is important to have the seeds thick, so that they may be able to force their way out of the soil. The quantity to be used will vary, of course, with the distance the rows or hills are apart. There are 43,560 square feet in an acre, and the number of hills can readily be ascertained by multiplying the number of feet the hills are apart each way to get the number of square feet for a hill, and divide the number of square feet in an acre by this to get the number of hills in an acre.

The following figures given by Mr. Peter Henderson, will be found useful as a guide, but few growers ever use so large quanti-

ties: Beets, 5 to 6 lbs. per acre; snap beans, 2 bushels; cabbage, one ounce for 2,000 plants; cucumbers, in hills, 2 to 3 lbs.; kale, 2 to 3 lbs.; watermelons, 4 to 5 lbs.; onions, 5 to 6 lbs.; onions, for sets, 30 lbs.; onion sets, 6 to 12 bushels; peas, 2 bushels; potatoes, 10 to 12 bushels; radishes, 8 to 10 lbs.; spinach, 10 to 12 lbs.; tomatoes, one ounce for 1,000 plants; turnips, 1 to 2 lbs.

THE USE OF GLASS IN TRUCKING AND MARKET GARDENING.

There is no point in gardening in which our growers are so deficient as in the skillful use of glass. They are too much addicted to the use of substitutes, in the shape of plant cloth, under the impression that it is cheaper. I have had a wide experience in the use of glass, and have tested the so-called substitutes, and know that they are not only less effective than glass, but in the long run far more costly. It is hard to understand the tardiness of the Southern gardeners to appreciate the use of glass, since they are usually wide awake to any improvement. Some seem to imagine that glass is only useful in the more severe climate of the Northern and Middle States. But a little experience of the great advantages to be attained by a skilled use of glass would soon satisfy any progressive Southern gardener that glass can be made as profitable in all parts of the South as in the North.

COLD FRAMES AND HOTBEDS.

The most common use of glass in the garden is in the construction of cold frames and hotbeds. The difference between a cold frame and hotbed is that the cold frame is merely a frame to hold the glass sashes over a rich bed of soil, for the protection of some plants in winter and for the hardening off of tender plants that have been started in a hotbed or greenhouse. The hotbed, on the other hand, is provided with some means of artificial heat, usually an excavation for holding a mass of fermenting manure, though sometimes a furnace is placed at one end and a flue run through a hot-air chamber under it, making what is known as a fire hotbed. This last is but a poor compromise for a greenhouse, which can be built nearly as cheap, and is vastly better. In fact, the small, narrow greenhouse has now almost superseded the hotbed of any kind for all the purposes for which a hotbed can be used, being much more convenient and effective.

To construct a cold frame we use glass sashes made for the purpose, three feet wide by six feet long, in which the glass is placed lapped like the shingles on a roof. These sashes can be had in Norfolk, without glass, at about \$1.00 each, and if carefully handled and kept painted can be used for years, and in the long run will be

found far cheaper than the plant cloth, and at the same time will be vastly better than cloth for all the purposes of the gardener.

For these sashes we construct a frame of boards. The one at the back or north side is 12 to 14 inches wide and the one in front 10 inches, so as to give a slope to the glass so as to carry off water in time of rain. The frame should face south or southeast. The frame may be as long as desired, but, for convenience, it is best, perhaps, to put not more than 25 sashes in one frame, though I have used 1,000 sashes in lines of fifty on a frame, with a cart road between each line of frames, always using, as will be explained later, twice the area of frames that I had of sashes. Some gardeners simply get the sides of the frames in line by nailing the boards to a line of posts, and use no cross-bars; but a frame so constructed, while convenient to spade up and prepare, is a very inconvenient one to manage. By far the best plan is to dovetail a strip, three inches wide, into the front and rear board every three feet of the length of the frame, but do not nail it fast. It can then be readily knocked out when preparing the soil in the frame. In the center of this rafter a strip of the same thickness as the sash should be nailed so as to form a slide for the sashes to slide up and down for airing the frames, it being, of course, understood that the sashes are laid across the frame the six-foot way. This will give us a bed nearly six feet wide and as long as convenient.

The frame-yard should be in a well-sheltered place, and if not naturally well sheltered, should have a high board fence or some other protection, not only as a protection from cold, but from high winds of any sort, for nothing is so provoking as to have a sash blow away in a wind-storm. In windy localities, near the coast, I have found it necessary to run a narrow strip midway the entire length of the frames, under which the sashes could slide, to prevent their being blown away. To make a hotbed of the frame, all that is necessary is to dig out the interior into a pit two feet deep in which to place the fermenting manure. This manure should be fresh horse manure mixed with plenty of leaves or straw, and should be piled and turned daily for a week or more before using, and then be packed two feet deep in the pit and well trodden all over, so as to have a uniform heating, and should be covered with four inches of light, rich soil, in which the seeds are to be sown when the first rank heat is over. But the hotbed is an inconvenient, troublesome and expensive structure, in the long run, as compared with the cheap, narrow, fire-heated greenhouses, which have now so largely taken its place with all progressive gardeners.

Plenty of sashes in cold frames are indispensable in a well ordered market garden, both for growing some crops under for winter market, and for hardening off plants like tomatoes, egg-plants, etc., that have been started in the greenhouses; but for all purposes for which

the hotbed can be used, the greenhouse is far better and more convenient, and in a series of years will be found cheaper. Of the management of frames and greenhouses we will treat when treating of the culture of the various crops that require their help.

HOW TO MAKE A CHEAP GREENHOUSE.

The most economical greenhouse for truckers is probably the low, narrow house recommended many years ago by the late Peter Henderson. This kind of a greenhouse is made with the same sashes that are used in the construction of the cold frames. The house is made by setting posts in line, four feet apart, to make the side walls. These side walls are four feet high and ten feet apart, this being the width of the house. The tops of the posts should be cut to the slope of the roof, and a plate nailed thereon, on which the sashes are to rest. This plate should project inside and out so as to allow of a gutter being formed on its outer edge, for it is desirable to have a tank inside to catch the rain-water from the roof for watering purposes. The ridge pole for the roof should be cut so that the ends of the sashes which are to form the roof will rest on the shoulders and come flush with the top. Each alternate pair of sashes is screwed fast to the ridgepole at the top and to plate at the side walls, thus forming rafters for the support of the ridgepole. The other pair are to be hinged to the plate at the bottom and held in place at the top by a hook, or by an iron strap punched with holes to catch on a pin on the ridgepole, so that they can be propped open to admit air to the house. If the house is to be heated by an ordinary brick flue it should not be more than 40 to 50 feet long. A door wide enough to admit a wheelbarrow should be at each end, and a walk through the center under the ridgepole. Benches are to be made on each side for holding soil or for placing flower pots or boxes. These benches and the whole house can be constructed of rough lumber, with the cracks battened. The house should run north and south, and at the north end a shed should be made for a work room, and into which the furnace door is to open, so as to keep the smoke and dust from the house. The furnace is made of brick, in a pit four feet below the level of the house. The furnace should have an ordinary cast-iron door and ash pit, and the grate surface should be 18 by 30 inches. An arch is turned over the fire-box and the flue is built from the rear end on a sharp ascent to the level of the floor of the house. It should then be built along under the side benches, on a slight ascent, the whole length of the house, across the further end and back to the chimney at the same end it started at. The first ten or fifteen feet should always be made of brick, the remainder of six-inch terra-cotta pipe. The furnace should never be made smaller than this, so as to hold a good body of coal to keep

up a slow and steady fire during the night without attention. The furnace may be made to burn wood, and in that case no grate-bars will be needed, as the fire can be entirely regulated by a draft hole in the door. But a coal-burning furnace is far better, where convenient. For seed-sowing purposes it is better to have the flue entirely boxed in under the benches, but in this case hinged doors should be made along the walk, so as to let more heat out into the house when needed.

A house of this description can be built here now, all complete, 10 by 50 feet, for less than \$200, and no market garden is complete without some such structure. Where a large business is done, and means are at hand, it will be better to build larger houses, in a more permanent manner, and have more than one, so that different temperatures can be maintained for the requirements of the different plants. In this case it will be best to heat the houses with a boiler and the circulation of hot water or steam in iron pipes. For large houses this will be more economical in the end than the smoke flue, but much more costly at the start. But the heat is much more congenial from hot-water pipes or steam than from a flue and is better distributed.

Northern gardeners use hot-water and steam-heated houses now on a very large scale for forcing vegetables and fruits under glass in winter, and their products bring a much higher price than the same products from the open air in the far south at the same time. Last spring cucumbers from the arctic climate of Vermont sold for more money than the same vegetable did from the open ground in Southern Louisiana. The Vermont growers are about as far off from the New York market as the North Carolina growers, and must use much more expensively built houses than our growers would have to use and vastly more fuel to keep up the same temperature. We are very strongly of the opinion that in this part of the South the methods used so profitably in the North now for the production of the various vegetable and fruit crops out of season could be adopted with far greater profit than there. But skill in greenhouse management, and particularly in winter-forcing, is only to be obtained by long experience, and no one can hope to succeed at it until they have attained this experience, or have the aid of trained men.

In our climate we can produce some things, like lettuce, for instance, in winter, by the aid of the simple cold frame, which the Northern gardeners grow much more expensively in fire-heated houses. Of this we will treat in the chapter on the crop. Our New Bern and other gardeners make it pay to ship lettuce from the open ground in spring, but they now make it much more profitable to ship in winter. The market as far South as Baltimore and Washington is largely supplied in winter with lettuce from the Boston greenhouses, which our growers can supply at a much better

profit. I have dwelt thus largely upon the use of glass because, from an experience of more than thirty years in handling all sorts of glass structures for the cultivation of plants, I am satisfied that there is no line of work in horticulture which offers so great prospect of profit to the growers in the upper South. Profit is always greater in those lines that require special skill and capital, and, therefore, the work is rarely overdone. There are many things in the line of floriculture which a gardener of skill could add to his work and thus increase his profits and keep his houses always at work. The limits of this bulletin will not allow me to enter into the details of greenhouse management, but we hope to make this the subject of another of our educational bulletins at some future date. This bulletin is to be devoted to the methods of culture of various crops which engage the attention of market gardeners here. The insects that attack them might well be included, as well as the diseases that afflict them, but this would increase its bulk too largely. The Station has already issued bulletins on the subject, and to these I must refer.

VARIETIES OF VEGETABLES AND THEIR CULTURE.

It is the purpose of this bulletin to treat more fully of those garden vegetables which can be most profitably produced in the South for shipment to the Northern markets, but at the same time we will give attention to the needs of the home gardener and of those in the more elevated regions of the State who are building up a trade in late vegetables for the coast country of the lower South. Therefore, we propose to make this bulletin far more general in its teachings than the former editions of our bulletin entitled "Trucking in the South," which were mainly intended for the use of the market gardeners in the warmer sections of the State. The supply of the home markets of the State is becoming annually of more importance, with the great increase of cotton mills, with their villages of employees, which are to be fed from the farms around. Hence we will endeavor to make the directions for cultivation suited to the various sections. The various vegetable products will be treated in alphabetical order.

ARTICHOKE.

The plant commonly known here as artichoke is a species of sunflower (*Helianthus tuberosus*), or Jerusalem artichoke. It produces tubers on the roots somewhat similar to the Irish potato in appearance, and is seldom grown as a garden vegetable, though at times used for the making of pickles. Of late years there has been a great deal of interest in this plant as a food for hogs, and it is being largely grown for this purpose in some sections. The true or French artichoke is a very different plant from the Jerusalem artichoke. It

produces no tubers on the roots, but is grown for the large, fleshy involucre around the flower heads. The plant varies greatly when grown from seed, and it is a common practice now to propagate the valuable varieties from division of the plant. Of course any superior sort produced from seeds may be increased in this way. The Globe or French artichoke is perfectly hardy in any part of the State, and it is rather surprising that the plant has not been grown here to any extent. The plants should be set in deep, moist and rich soil, about three feet apart. In the colder sections of the State it may be best to cover the roots in the winter with forest leaves as a protection to the crowns, but in the warmer parts of the State no protection will be needed. The plants will produce good crowns for four years or more, and then should be divided and reset. The Large Green is about the best variety. The botanical name of the plant is *Cynara scolymus*; the name *Cynara* is said to be derived from *cinere*, ashes, since the old Romans thought that ashes were a special manure for artichokes. The undeveloped flower heads are the part eaten, and they are similar in appearance to a very small pineapple, and the thick scales are the parts eaten. These heads sell well in the larger cities where there is a large foreign population who have become accustomed to the use of the plant at home. To grow the plant from seeds the seed should be sown in early spring, in rich soil, and transplanted when of proper size to their permanent quarters, or if properly thinned, the plants may remain in the seed-bed till fall, and then transplanted with more certainty. In the fall give the plantation a heavy dressing of manure after cutting the old stems away. The heads are sometimes pickled, but are generally used as a salad, with the usual salad dressings of oil, salt and pepper.

ASPARAGUS.

Asparagus is one of the oldest of cultivated garden plants, having been largely cultivated by the ancient Greeks and Romans, and it is still one of the most popular and profitable vegetables grown for the market. In the warmer sections of the State asparagus is largely grown for shipping to the Northern markets, and is uniformly profitable. The local markets throughout the State are but poorly supplied with this vegetable so far as we have observed, and its culture may be made a source of profit, even where it cannot be produced early enough to compete with the coast region in the Northern markets. Asparagus is found growing wild on all the seacoast of Europe, and it has become naturalized on the shores of the Chesapeake Bay, where it is found everywhere along high water mark. The fact that asparagus is found growing wild along the salt water has probably led to the notion that salt is a special manure for it. The fact probably is that asparagus can endure more salt than most plants, and a

dose of salt that will kill the weeds among it will not hurt the asparagus. To this extent salt may be useful. But that it helps the asparagus as a manure is more than doubtful.

The catalogues give a number of varieties, but there is really very little difference in them except in the color of the shoots. Recently there has been introduced a variety which makes snow white shoots and is slow in turning green. This is called the Columbian asparagus, and is desirable where a white asparagus is wanted.

There is no plant grown the quality and perfection of which depends so much on the richness of the soil as asparagus. Seed gathered from the wild asparagus along the shores, which seldom makes shoots stouter than a goose-quill, can be made in rich soil to produce shoots as large and fine as any of the so-called varieties, and any variety can be made fine by liberal feeding. Methods of culture will vary with the demands of the market to be supplied. In most cities the demand is for the bleached article produced by planting the roots very deeply and cutting them under ground. But in some markets the people are finding out that these white shoots are always tough, and are now seeking the more tender green shoots cut above ground. The new Columbian asparagus, which is white above ground, may soon take a prominent place in the markets. There is a great disadvantage in the South in the deep planting and cutting under ground, as the shoots are later in appearing in the spring. With the roots near the surface, where the sun warms them early, a much earlier cutting may be had, and as the earliest asparagus commands the best price, it will be well to consider the different modes of producing the crop.

The general advice is to plant two-year-old roots in deep trenches, in heavily manured land, and the statement is general that no cutting should be made till the third year: All of which is needless. We have cut fine asparagus the second spring from the sowing of the seed, and for the best and most profitable results we would sow the seed right in the rows where we expect to grow the crop, thinning and transplanting the plants when the size of a knitting needle, which can be done as easily as with any other garden plants.

For the best results with asparagus the soil should be of a light, sandy or mellow nature, and the first preparation must be of the most thorough character, for the crop is to last many years. The more manure you stuff into the ground the better asparagus you will get and the sooner you will get it. Deep plowing, heavy manuring and good preparation are all essential to the formation of a productive asparagus plantation. Of course, where the ordinary bleached stems are wanted, the plants must be set in trenches. But this need not interfere with the transplanting of the young seedlings, instead of waiting one or two years for the roots and getting poorer results. The trenches may be prepared and well manured, and the plants may be grown in a seed bed like cabbage plants and set in the trenches

as soon as large enough to handle. Then, as they grow, the earth can be gradually drawn to them so that by autumn the land will be level and the roots where you want them, and in far better shape than if let remain in the plant bed and then torn up after the roots get large. Young plants from seed sown in February, in the warmer parts of the State, or in March and April in colder sections, can in this way be grown so that a very fair cutting or two can be made the next spring, which would be entirely out of the question if the roots were set in the fall, after growing in the seed bed all summer. But the earliest asparagus will be produced when the roots are set on or near the level surface. A few rows will produce plants enough to set a large area when thinned, as they should be, to two feet in the row, the rows being four feet apart. Almost every writer on gardening says that the roots should remain in the seed bed till they are two years old before setting in the permanent bed. I had rather have seed to start with than two-year-old roots, and can get good asparagus more quickly from the seed than from the two-year roots, if the proper treatment is given. There has been a great deal of nonsense printed in regard to the cultivation of asparagus, and people have been taught that it is a very costly plant to grow, for, in private gardens, years ago, I have known people to dig out the asparagus bed two feet or more deep, and pave the bottom with bricks, as they had been told that this was necessary to keep the roots from running into the subsoil, when in fact their tendency is to increase upward. The deep trenching of the ground and the heavy manuring were all right, and can well be done on a small garden plot. But the deep planting is wholly needless, and worse than needless, for when grown for family use we always want the tender, green tips, and not the tough under-ground white parts. In the preparation of an asparagus plantation, whether for home or market, we would prepare the soil as deeply and thoroughly as possible, and apply as heavy a dressing of manure as practicable, and if manure is not available, would use not less than half a ton per acre of a high-grade commercial fertilizer, strong in nitrogen. I would select the warmest and lightest soil at hand, since earliness is a prime object. I would sow the seeds as early as the ground could be prepared in spring, in rows four feet apart, and would scatter the seed thinly in shallow trenches and cover about one to two inches deep. Only a portion of the ground need be sown, as we have remarked that in thinning there will be plants for a great deal more land. Thin to two feet, and set the young plants thinned out in other rows at the same distance. As soon as the plants start to grow again mulch between the rows with fine stable manure, if possible, and cultivate shallowly during the summer, so as to keep this manure near the surface to preserve the moisture. In the fall cut off the dead tops and give the plot a dressing of kainit at a rate of 500 pounds per acre. This will give

all the salt any one would apply and will furnish potash at a season when the kainit will not interfere with the earliness of the crop, as it will if applied in spring. In the spring give a heavy coat of stable manure or half a ton of complete fertilizer. Under these conditions and with this treatment very good shoots can be cut the next season after the sowing of the seed, and the roots being near the surface, will shoot earlier. This is just what we have done, and what any one can do, and the waiting three years for asparagus is simply because people have not learned that they can get it much sooner.

As we have said, this same method can be adapted to the trench system by having the trenches prepared and heavily manured so that the plants can be set in them as thinned. In either method we have learned the uselessness of waiting a year or two to get roots for setting. Those who do not care to go to the trouble of growing the plants from seed can buy the one-year-old roots in the fall from nurserymen.

In the private garden it will pay well to go to extra pains and expense in the preparation of the soil for an asparagus bed, particularly where the soil is heavy clay loam. A bed of very moderate size will supply a large family with this vegetable, if well grown. A bed six feet wide and fifty feet long will suffice for most families. If the soil is heavy and the subsoil clay, I would dig this bed out two feet deep and replace the natural soil with a compost prepared beforehand of black earth from the woods, stable manure and sand. Make the compost heap in the fall and turn it repeatedly during the winter to get it fine and well mixed, and fill the place of the soil removed with this compost. Now sow the seed and thin after a stand is secured to two feet apart each way. With a bed of this size it will be easy to set boards on edge around it and cover it with cheese cloth, like a tobacco plant bed, or even to set frames and glass sashes on it and thus get the shoots extra early.

When our market gardeners fully realize the value of glass in the forwarding of their crops, we will find them planting asparagus closely in beds that can be covered with sashes. The price that good asparagus commands in February and March will pay for a great deal of extra expense in getting the early crop. With intensive work on small areas we can often make greater profits than from large areas treated in the usual manner. Our natural climate gives us an advantage over those north of us, but it takes skill and glass to enable us to compete with those south of us, and this is what the North Carolina trucker should learn to do.

If one-year roots are used in setting an asparagus plantation, and it is desired to cut the shoots under ground, the roots must be set in deep trenches, but must not be covered deeply all at once, for the slender shoots will not penetrate a very heavy cover. Cover very lightly till the growth begins and then gradually earth up till level.

But if the plan of growing from seed where the crop is produced is once tried, it will always be used. There are several so-called varieties of asparagus. Conover's Colossal has been very popular, but is now second in popularity to the variety known as the Palmetto. The Columbian is of more recent introduction, and is distinct from the others in making white shoots above ground, and very slowly turning green. Any variety may be made colossal by liberal manuring.

In the local markets we often see asparagus offered for sale of a very inferior character—small, short shoots, tied in little bunches of various sizes, such as could not be sold at all in the markets of the large cities. Market growers should always use the regular bunching machines, which enable the grower to have his bunches of uniform size, and these should be properly tied with two ties of raffia fibre, and not with strips of old rags, as we have seen. To succeed in market gardening one must learn market methods in the putting up of vegetables for sale, and must produce that which his market wants.

BEANS.

Under the general name of beans we have a number of plants belonging to a variety of botanical genera, and differing greatly in their appearance and quality. The bean of the English gardens, *Vicia Faba*, or broad bean, is little cultivated in this country. The bean of most interest to our Southern market growers is what we generally know as the snap or string bean, which is very largely grown for shipping green. The Lima beans are being more largely grown for shipping in the dry state.

ENGLISH BROAD BEANS.

These have been but little grown in this country. Being a bean, people generally look upon them as tender, and hence plant them in late spring, and our hot suns soon kill them. In the warmer parts of the State, east of the mountains, these beans can be planted in November or December and will then come into use green along with the green peas in May. In the mountain country they should not be planted till February. They do not mind pretty hard freezing. In fact, I have had them frozen stiff when in bloom without being hurt. The best varieties are Broad Windsor and Mazagan. They are not worth growing for market in this country, but make a pleasant variety for the family table, if cooked when green.

SNAP OR STRING BEANS.

These are among the most important of the early crops grown by the truckers of Eastern North Carolina for Northern shipment. Snaps need the warmest and lightest soils and the most sheltered expo-

sure. As the crop is sold green and early growth is important, they should have a fairly liberal fertilization, though not near so heavy as some other market crops. About 400 pounds per acre in the furrow, under the rows, will suffice of a complete fertilizer. The catalogues list a great many varieties, but the Southern trucker sticks closely to a few sorts that pay him best. The crop is planted in rows, about three feet apart and the beans are dropped moderately thick in the rows and cultivated several times. The flea beetle is sometimes very troublesome by eating the leaves full of holes. The best preventive is dusting the plants over freely with tobacco dust, which will also help the plants as a fertilizer. The disease known as *anthracnose* is at times troublesome, especially on the yellow-podded or wax beans. The only preventive is to use beans for seed that have come from a healthy stock, and to spray freely with Bordeaux mixture.

Varieties.

Early Mohawk.—This variety is largely grown by our market gardeners because of its hardy nature, enabling it to withstand a slight frost. It is a good cropper and early.

Early Valentine is probably the best early bean. It has round pods and is very productive, and continues stringless longer than most varieties. It follows the Mohawk and sells better by reason of better quality.

Dutch Caseknife.—This is a flat-podded bean, good as a snap bean, and good also as a dried bean, and is common in the South under the name of "cornfield snap," because it is frequently planted with corn and allowed to run on the stalks. It is not worth planting for shipment, but is good for home use, and can be grown in any quantity in the corn field.

Black Seeded Wax.—This is the most commonly planted of the yellow-podded or wax beans, though peculiarly liable to rust and *anthracnose*.

Brown Speckled Wax.—This is far better in quality than the black seeded, and should be planted in the home garden where a wax bean is wanted.

White Seeded Wax.—This is a pretty bean, with pure white seed, like a Navy bean. We have grown it this year for the first time and consider it a very promising variety, as the beans are useful both as a snap and as dry beans to take the place of the Navy bean.

LIMA BEANS.

There are two general classes of Lima beans, the small and the large Lima. The small Lima, or Seewee bean, is more commonly planted in the South than the large Lima, which is generally unproductive in the South.

There are a number of varieties of each class. Of the large Lima we have the following

Varieties.

Large White Lima.—Of this variety the seedsmen have made a number of specially selected sorts, each bearing a special name. There is really very little difference between them. All are rank climbers and need tall poles. They should be planted around the poles, which are set, when the ground is prepared, four feet apart each way. The large beans are barely stuck in the ground around the pole, with the eye down, for if covered deeply there will be difficulty in their getting up. We plant four beans to a pole and thin to two. The same remarks will apply to all the pole Limas.

Dreer's Lima or Potato Bean.—This is a thick-seeded sort, as its name would indicate. It is smaller when dry than the regular large Lima, but very large when green, and it is far more productive in the South than the large flat Lima. Of the Seewee or small Lima class we have the following among the climbers:

Small Lima, or Butter Bean, as it is commonly called here. This is the most productive of the pole Lima beans. It is much smaller than the large Lima, but of far better quality, in our opinion.

Willow Leaf.—This is a variety of the butter bean, distinguished mainly by its narrow, willow-like leaf. In other respects it is very similar to the small Lima.

Speckled Lima.—This is another small Lima, the distinguishing feature of which is its purple spotted leaf. It cooks so dark as to be rather uninviting and is in no respect better than the common butter bean.

BUSH LIMA BEANS.

A number of dwarf-growing varieties of the Lima bean have been produced of late years, which can be grown in rows like the snap beans. The first of these was:

Henderson's Bush Lima.—This is a variety of the Seewee or butter bean, which made its appearance in Cambell county, Virginia, about fifteen years ago and got into the hands of a Virginia seedsman, who sold the stock to the late Peter Henderson, who introduced it to the trade. It is earlier than the pole Limas of any sort, and is a very productive and good bean.

Wood's Bush Lima.—This seems to be a selection from the Henderson, of rather larger size seed, and wonderfully productive. I regard it as about the best of the bush Limas.

Burpee's Bush Lima.—This is a dwarf variety of the large flat Lima, and with us has the same defect as the pole Lima, in being unproductive. The beans are as large as the large Lima and are of fine quality.

Dreer's Bush Lima.—This is a dwarf variety of the potato or thick-seeded Lima, and is an excellent sort. A sub-variety has been introduced under the name of

Dreer's Wonder Bush Lima.—This is claimed to be the earliest of all the bush Lima beans, but, as I am growing it this season for the first time, I cannot say what it will turn out yet. The plants are very promising. Later.—A first-class bean.

Lima beans differ from other legumes in the fact that they make no nodules with bacteria on the roots, which enable other legumes to get nitrogen from the air. Hence they need heavy manuring, and thrive only when liberally treated with food. Like onions, they can be grown with better results if kept on the same land year after year, if the soil is heavily enriched. It is useless to try to grow Lima beans on poor soil. On well-enriched land the bush Lima can be made a very profitable crop in the South for the dry beans. They sell for better prices than the Navy beans and are better suited to our climate than these. All the beans, except the English Broad beans, are tender and should not be planted till the soil is warm and frost over. Truckers commonly take some risk in this matter so as to be among the earliest, and hence the common use of the Mohawk bean for the snap market, as it stands more cold than any other variety. The small Limas, like Henderson's and Wood's, are rather more hardy than the large Lima, and can be planted earlier with safety. All the Limas, however, should have the seeds merely stuck in the ground, eye down, for the best germination.

NAVY BEANS.

A great many people, seeing the Navy beans at the stores and noting that they bring good prices, write asking for methods of culture. We always advise our people to go very slowly in growing Navy beans in the South. They are far better suited to the climate of the Northern States, where the summer rainfall is not so heavy. Grown here, the percentage of damaged beans will make them a very expensive crop to clean for market, and there is little chance for their being profitable here.

BEETS.

Some writers suppose that because the beet is a native of the sea-shore in the south of Europe that salt is a valuable manure for it. The plant may be able to use some soda, since analysis shows that it contains soda, but it can be as easily and well grown without it as with it. It needs a deep soil for its tap-root, and a mellow one, easily penetrated, especially with the late and long-rooted varieties. A good application of a complete fertilizer, high in nitrogen and potash, should be used in the furrow. Two furrows lapped over this to form

a slight ridge, which is to be rolled nearly flat, and you are ready for planting. It is hard to get any of the garden drills to sow beet seed regularly, and one of the best contrivances I have ever seen for the purpose is a light wooden wheel with rounded pegs an inch long around its circumference, three inches apart. These pegs make small hollows in the smooth ground, and a seed is dropped in each and covered. This seems slow, but the seeds are then placed so that the thinning is easy, and it really takes less labor than sowing in continuous row and thinning afterwards. As the extra early beets are the only ones of interest to the market gardener, they should be sown as early in February as the ground can be worked in good order, in the warmer part of the State, the date being made later as we go westward, till the last of March is as early as safe in the high mountain country. Beets are easily killed by frost as they germinate, but will stand quite a frost after they are well up and the leaves developing, and the trucker who wishes to get his crops into market at the earliest date always takes some risk. The earliest beets are now grown in heavily fertilized frames, under the protection of glass sashes or cloth. Glass is far better than cloth. In the frames the seed may be planted in rows across the width of the frame, about eight inches apart, and should be thinned to three inches. We sow them in frames in January, and protect the glass with mats on very cold nights, and in this way we can get beets of a marketable size about the time they will be just getting above ground when sown outside. The frames should be heavily manured with well-rotted manure, and about one-fourth of a pound of a high-grade fertilizer added to each 3x6-foot sash, and well mixed in the soil. After they are up their growth may be much accelerated by a dressing of nitrate of soda, applied carefully between the rows, so as not to touch the foliage. Early beets should be tied in bunches and packed in barrels for shipment, four to six being put in a bunch, and the tops slightly trimmed. Scarlet turnip radishes may be sown in the beet rows outside, to come up quickly and mark the rows, and to be pulled out before the beets need all the room. When grown in frames, under glass, beets need close attention to airing, and in all warm and sunny weather should have the sashes pulled down, and even when cold, if the sun is shining, the sashes should be slid down slightly to prevent too much heat.

EARLY BEETS.

The following are the best of the early varieties:

Extra Early Bassano.—This is now little grown by market gardeners because of its light color and large top, which makes it unhandy to bunch. But for the home garden it is a far better quality than the other extra early sorts, and while it is not of so dark a red when cooked, it is far better in quality than others.

Early Egyptian.—This is a very dark red beet, almost as flat in shape as a flat turnip, and is a very early sort, with a small top, and hence have been a favorite sort with truckers. It is fairly good when quite young, but rapidly loses quality as it grows older, and hence has been largely superseded by the

Early Eclipse.—This is rounder in shape than the Egyptian, of a brighter red color, and fine quality, and makes a heavier crop and is of greatly better quality.

LATE BEETS.

These are of little interest to the Southern market gardener, but are of value in the home garden. The seed should be sown in July or August, and can well take the space from which early crops have been gathered. The following are the leading varieties:

Long Blood.—Every seedsman has his special strain of the Long Blood beet; some, perhaps, a little better than others. It needs a deeply prepared soil and a rich one. When hard frosts threaten plow furrows over the rows, completely burying them, and they will keep well during the winter. In the cold, elevated sections they should be lifted and stored like turnips.

Half Long Blood.—This is a better sort for shallow soils, and is a fine cropper and of good quality and keeps well in winter.

Sugar Beet.—There are several varieties of this beet grown for the manufacture of sugar, but for this purpose our climate is not favorable. But as a table vegetable for winter use we consider the sugar beet better than any other, though some may object to the white color, as they always think a beet should be red.

Swiss Chard or Silver Beet.—This is a vegetable seldom grown in the South, but one which should be more largely grown for family use. The plant makes a large top with leaf stalks of silvery whiteness in the common variety, though there is a variety with golden yellow leaf stalks. The leaf stalks and the midrib of the leaf are the parts eaten, as the root is worthless. The outer leaves are pulled off as they develop and the stalks are cooked and served like asparagus, and when once enjoyed the vegetable is sure to have a place in the family garden. The seeds are sown like other beets, in April or May, and thinned to stand about four inches apart in the rows. The leaves can be pulled all summer, as new ones are constantly produced as the outer ones are removed.

The Mangel Wurzels are immense beets that are sometimes grown for cattle food to give the stock a succulent feed in winter. But they are less grown of late years since the development of the silo, which has supplied in a cheaper way all that the Mangels did.

BORECOLE OR KALE.

Kale is largely grown in the South for shipment North during the winter and early spring. In hard winters, when the Northern crop is killed, the crop is at times quite a profitable one, but often is hardly worth the shipping. The variety most commonly sown is the Dwarf Green Curled Scotch. About Norfolk the variety known as Tait's Favorite is largely taking the place of this, as it is very hardy and slow to run to seed. The Scotch kale is sometimes sown in beds like late cabbage and set out later in the same way as cabbage. Grown in this way it is a very fine vegetable after frost has touched it. The seed is sown in drills from middle of August to last of September. The rows are made two feet apart and thinned to six or eight inches apart. It needs heavy manuring, and is greatly benefited by dressings of nitrate of soda between the rows while it is growing. Truckers sow 5 to 7 pounds per acre, so as to be sure of a stand, as the flea beetle is often a serious enemy. Dusting with fine tobacco dust is the best preventive.

BRUSSELS SPROUTS.

This is a vegetable seldom grown in the South, but which should have a place in every family garden. The seed should be sown early in the spring, and set in rows, precisely as the collard is planted. The plant makes a tall stem with a spreading head like a collard, and the stem is covered with little heads the size of walnuts throughout its whole length. They can be laid down and covered with straw in winter, and are ready for the table after frost. The top can be eaten like a collard, but the best edible parts are the little heads on the stem, which are much improved by frost, and should not be protected till towards Christmas. The best variety is the Roseberry.

CABBAGES.

There is no crop grown that is of more general importance than the cabbage crop. The early cabbages are one of the most generally profitable crops with the truckers of Eastern North Carolina, while the late fall crop is of equal importance to the growers in the mountain section, who aim to supply the markets of the lower southern coast, where it is a difficult matter to grow late cabbage. The same is true of a large part of the warmer section of North Carolina, and the difficulty in getting good winter and fall cabbages is such that the private gardens seldom show any late cabbages at all, but only the collard, which seems here to be the survival of the fittest, as it will flourish under climatic conditions that forbid the growing of winter cabbages. But good late cabbages can be grown in all sections of the State, as we will endeavor to show.

EARLY CABBAGES.

Seed for the early crop should be sown at intervals from the middle of September till the middle of October. The early sown ones may get too large in the fall, if the season is late, and will be apt to run to seed in the spring without heading. Therefore it is always best to make several sowings, so as to have plants of fair size to winter over—neither too large nor too small. In the eastern coastal plain the plants can be set in November on the south side of sharp ridges running east and west, setting the plants somewhat thicker than they are wanted to stand, so as to make up for some winter loss. About ten inches apart will be a good distance, and if too thick in the spring they can be cut out for greens. In setting the plants they should be put in the sides of the ridges, so as to be on the level when the ridge is worked down, and deep enough to entirely cover the stem, which is the tender part.

Though cabbage plants usually stand the winter on ridges as far north as Baltimore, we find that in all the upland country of North Carolina they are apt to be killed in February. The warm spells we are apt to have in winter start the plants into a tender growth, and then the severe cold we are almost certain to have about the middle of February will kill them. Therefore, I have found it better here to sow the seed about the first of October, and later on to transplant them about two or three inches apart in cold frames. No protection is given to the frames except when the weather threatens to be very cold, and then cloth can be drawn over the plants at night and left on till the plants are thawed out the next day, for the sudden exposure to the sun will often do more harm than the degree of cold. These plants are transplanted to the open ground the latter part of February or early in March in land that has been heavily manured with stable manure and fertilizer, for we have found that while good cabbages may be grown with commercial fertilizers alone, the best results are always had when some manure is used in connection with the fertilizer.

The greatest manurial needs of the cabbage family are for nitrogen and phosphoric acid. It is one crop with which deep working is far better than shallow. A skeleton cabbage plow without mould-board, run deeply between the rows up to heading time, will be a great advantage. The soil cannot be too heavily fertilized for cabbages, as they are gross feeders and their success depends largely on the amount of available plant food at hand in the soil. Hence, in addition to a good dressing of well-fined stable manure, I would apply 1,000 pounds of a high-grade fertilizer. After the plants have started well to growing, a dressing alongside the rows of nitrate of soda, at the rate of 100 pounds per acre, will hasten the earliness of the crop very materially. Earliness is the great characteristic sought, and hence few varieties

are grown by the market gardeners. The following are the varieties most commonly grown:

Tait's Extra Early Pilot.—This is the earliest cabbage to make a fair marketable head, being several weeks ahead of the Early Wakefield, which has long been the standard early cabbage. While not making so hard a head as the Wakefield, it makes a head that enables the grower to sell it before the Wakefield comes in, and thus to get a larger price. It should be grown to a limited extent for market and also for the family garden. A sub-variety of this is offered under the name of New American Hard Head Pilot, which is said to be a cross between the Extra Early Pilot and the Early Wakefield, and, while later than the Pilot, is earlier than the Wakefield.

Extra Early Jersey Wakefield.—Every seedsman claims to have a specially pure stock of this popular variety, and there is a great competition among them in getting the best seed, for the Wakefield is more generally grown by market gardeners than any other early cabbage. The true Jersey Wakefield has a sharply conical head, and heads very hard, while there are some stocks that are badly mixed with rounded and flat-headed varieties which are later than the true shape.

Charleston, or Large Wakefield.—This is a selection from the Extra Early Jersey Wakefield, and is of larger size and has a very compact head. It is about ten days later than the Extra Early Wakefield, and usually sells well.

Henderson's Summer.—This is a second early cabbage, selected from the Wakefield, and is the same as the round-headed variety often found mixed with the stocks of Early Wakefield. It comes in very handily in the family garden, and with the next variety will fill the place of summer cabbages as late as they can usually be grown in the warmer parts of the State.

Succession.—This is a large, round-headed cabbage, similar to what has long been known as Fottler's Brunswick. It makes larger and later heads than the Early Summer and can be had in perfection here till early in July. Valuable for the home garden. The seed of the Early Summer and Succession should be sown in cold frames in February, since if sown in the fall they are apt to run to seed without heading.

LATE CABBAGES.

In all the warmer parts of the State there is a real difficulty in getting good late cabbage. Hence, it has become the general practice to depend on the collard for late greens. In the warmer sections of the State it is useless to try to head cabbages in the early fall, as is done in the high mountain region, where the crop is largely grown to supply the markets of South Georgia and Florida in August and September. There the growers practice the same methods that are suc-

cessful in the North, sowing the seed in the early spring and transplanting to the field later and growing them through the summer. East of the upper Piedmont and mountain sections we cannot adopt the Northern plan with success, for the plants carried through our long summers will utterly fail of success. Late cabbages, like the early ones, need a heavily enriched soil, but, being grown at a season when we are apt to have dry weather, water is the most important thing for them. For winter cabbages in the central and eastern parts of the State, the seed should not be sown till the first of August. The seed bed should be made convenient to water and should never be allowed to suffer in the slightest degree for lack of moisture. Daily waterings—soakings, not sprinklings—are essential to the getting of strong plants for setting in September. The plants should be set three feet apart each way in level and naturally moist soil, and if means are at hand for irrigation in dry weather, all the better. The object is to keep the plants growing rapidly all the time from the time they appear above the ground. If the land is heavily manured and the plants well cultivated and never allowed to suffer from drought, we can make as good cabbage in the warmer parts of the State as anywhere. Even the collard will do better in this way than the usual method of sowing in spring and carrying the plants through the summer to get long-legged. There is a notion among some that the collards must never be cultivated in “dog days,” and it is only the power the plant has to resist climatic conditions that enables it to survive such treatment. But, well treated, we can get good, well-headed cabbages just as easy as we can get the inferior collard. The cabbages sown and treated in this way will make their best growth during late October and November and will be ready to head in December, which is as early as we should have them to keep in winter.

KEEPING WINTER CABBAGES.

A great many plans have been proposed for the keeping of winter cabbages. In the North the common plan is to take them up when cold weather threatens and turn them upside down in trenches and cover with earth. Here the best method east of the mountains, if the land is not wanted at once for other crops, is to turn the cabbages over where they grow, with the head to the north, and then cover the stem and lower part of the head thickly with soil, leaving the top exposed. But, being turned away from the winter sun, it will not be damaged, for the sunshine in winter does more harm to frozen vegetation than the degree of cold. If it is desirable to remove the cabbages from the ground, the next best plan is to plow out deep furrows in a well-drained spot and set the cabbages in the trench as closely as they can be packed, and fill the earth back up to the top of the heads

and then throw a little straw thinly over the rows to shade them. Collards turned down in the patch and covered in the way advised for cabbages will be bleached and made far more tender in winter.

The catalogues give long lists of varieties, but for general purposes the variety known as Premium Late Flat Dutch is as good as needed. In fact, it is stated on good authority that one seed grower on Long Island furnishes fourteen varieties of cabbages to seedsmen, who give them special names, while all are from the same lot of Flat Dutch cabbage seed. The Flat Dutch is a large, short-stemmed cabbage and a very sure header and good keeper. For the family garden, where quality should rule, we prefer the following:

Drumhead Savoy.—This is the largest and latest of the Savoy class, which are all distinguished from other cabbages by their closely wrinkled leaves, and are said to resist the ravages of the cabbage worms better than other cabbages, while they are of greatly superior quality.

Of late years, in central and eastern North Carolina the summer cabbages have been attacked by a disease popularly called "Yellow Side" and "Yellow Fever." This is caused by a minute fungus, known botanically as a *Fusarium*, and is near akin to the fungus that causes the cotton to wilt in some parts of the South. No remedy has been discovered for it, and all we can advise is to avoid land where cabbages, turnips or radishes have recently been grown, and to burn over carefully the seed bed in which the seeds are sown. Liming the land seems to have some effect in prevention.

The cabbage is also subject to insect depredations. Among the worst are the so-called cabbage worms and the terrapin bugs. There are two species of the cabbage worm, both of them the larvæ of butterflies. One is striped and the other plain green. The green ones are the larvæ of a white butterfly with black spots on its wings, which can be seen hovering around and laying eggs. The early cabbages are seldom attacked by them, but the late ones are often completely riddled and spoiled. Air-slaked lime, in which a very small portion of salt has been mixed, is one of the best things to destroy them. Pyrethrum, or fly powder, if fresh, is also effective.

For the terrapin bugs, which are sucking insects and cannot be killed by the ordinary poisons, the best remedy is to sow mustard between the cabbage rows. They are fond of mustard, and when gathered on the plants can be destroyed by spraying with kerosene. Those on the cabbage leaves can be shaken off into a pan of water covered with kerosene.

CELERY.

There is no market-garden crop in which there has been a greater development of late years than in the celery crop. Formerly it was little grown in the South, except in private gardens, with a great deal

of needless work and expense. Many still practice the old method of digging deep trenches for each row, and there is no doubt that good celery is produced in this way, but at a great cost of labor. The great difficulty with celery in the South, as with some other garden crops, has been the following of Northern methods rather than adopting those better suited to a Southern climate. It is useless here to try to get early celery except in the cool mountain climate. In the fertile and moist bottom lands west of the Blue Ridge the Northern methods may be practiced with success and celery produced in the early fall months, while in the warmer parts of the State, Christmas is as early as we can hope to get good celery, for it is a cool-climate plant and will not thrive in our long, hot summers. In fact, in the warmer parts of the State it is better to get the plants from the North when time for setting comes than to try to carry them through the summer here. The plant is a cool-climate plant and the growers North now make a specialty of supplying late plants in quantity at low prices for Southern planting. The plants can be laid down here for about three dollars per thousand, and this is less than it would cost to grow and carry them through the summer here. Formerly nearly all the celery sold in the Southern markets was sent from the North, and the early celery, from July till November, is still brought from Kalamazoo, Michigan, where Holland growers have settled and are producing the crop on low, peaty swamp lands. The Kalamazoo celery is large and fine-looking, but far inferior in quality to celery grown on good, moist clay soil. Following climatic indications, growers have of late years found out that in the South the finest of celery can be grown if we no longer endeavor to compete at the same season with the North; and now, after the Northern crop is over, the finest of celery comes in during the winter and early spring from Florida, and fine-looking celery is also brought from California, though, like many other California products, the quality does not keep pace with the looks.

There are thousands of acres of swamp lands in eastern North Carolina where celery could be produced in as fine quality as the Florida product, and during the winter season. To produce the plants we need a piece of moist and fertile soil for the seed bed. This is put in the finest possible order, and lines are marked out on the surface, very shallow, in which the seed are sown rather thinly. After sowing, merely beat the seed down with the back of a shovel, and then cover the bed with burlaps or old fertilizer sacks to prevent the surface drying. If the weather continues dry, water on the sacking with a fine rose till the seed begin to germinate; then gradually lift the sacking from them and prop it up, and finally remove entirely as the plants get stronger. The sowing should be done about the last of April. Now, never let the plants suffer for lack of water, but keep the ground always moist. When the plants are two inches high, pre-

pare a frame which you can cover with cloth, and transplant the celery two inches apart in rows across the bed wide enough to clean with a narrow hoe. In transplanting, nip the ends of the tap roots. Shade at once with cloth, after giving a good watering, and then never allow the plants to suffer for lack of water. During the summer the plants will have to be sheared from time to time, and when they gain strength from the transplanting remove the cloth and expose them to the sun gradually. From the middle of August to September is early enough for the final transplanting. Bottom land of a moist, clayey nature is the best land for celery of fine quality, but very good celery may be grown on moist, black, peaty soil. Moisture is essential, and it is useless to try to grow celery in our climate on dry uplands unless means are at hand for copious watering. The best growth will not be made until the nights grow cool and the dews are heavy, and no attempt at earthing should be made until the cool weather of late fall comes, as it will not endure earthing in our hot September weather. In the North celery is commonly planted in single rows about four feet apart, and is slightly earthed up in the rows and later taken up and stored in narrow trenches. But in the South it is not necessary to lift it, and the plants are best grown in beds, since it is as easy to earth up a bed as to earth up a single row. In setting celery we make the beds five feet wide and as long as needed, leaving a space of eight feet between the beds for earthing purposes. We make a setting-board a foot wide and six feet long. Notches are cut, beginning six inches from the end of the board on each edge, and the ends of the board are made perfectly square. There will thus be eleven notches on each side of the board. To set the plants, a line is stretched taut on one side of the space where a bed is to be planted. Beginning at one end, the setting-board is placed with its end perfectly square with the line. The planter stands on the board and sets a plant at each notch. It is then moved and the notches on the other side made to correspond with the plants set, and another row is planted at the notches on the other side. Proceeding in this way, we finally have a bed set perfectly uniform with rows a foot apart and plants six inches in the row. The bed is well soaked after planting, and nothing further is needed except to keep the beds clean and cultivated till the time comes for the earthing. The beds should never be worked when the plants are wet with dew or rain, as this favors the rust. When the stalks grow large and liable to fall over on the ground they should have the first slight earthing or handling, just enough to keep them upright. To do this, we use two cords with pointed pegs in each end and a foot or two longer than the width of the bed. Beginning with the first row, we stick a peg in the ground near the end of the row, and then take a turn of the cord around each plant, and at the other end of the row stick the other peg far enough off to draw the string tight and keep the leaves erect. With the other cord and pegs the

second row is treated in the same way. Earth from the eight-foot spaces is now shoveled in between the rows in a ridge, and then is drawn by hand down around each plant tight enough to hold it erect after the string is removed. The strings are then taken off and transferred to the next two rows, till the whole bed is handled up. The earthing proper should be delayed till about the first of November; then the cords and pegs come in again to keep the stems of the leaves close together and prevent earth getting into the hearts of the plants. The earth is again drawn to the plants closely by hand, and enough earth is put in to just keep the growing tips above the soil. At each end of the row the earth is carried up six inches beyond the ends of the rows, so that when the whole bed is earthed up it will be six feet wide instead of five. The eight-foot spaces between the beds must be kept plowed and cultivated, so as to furnish at all times mellow soil for the earthing. When the tops grow a few inches above the first earthing, another layer is added in the same way. Finally, along in December, when the weather threatens to turn to hard freezing, we cover the entire bed with soil six inches deep, and then cover the whole with pine straw or other forest leaves and lay corn stalks on to keep the cover from blowing off. The celery is dug from the beds as needed during the winter, and, if for market, must be trimmed, washed and bunched. The roots are trimmed off and one tie placed around just above the root and another to include the tops. Celery grown and kept in this way is far more crisp and of better quality than that which has been lifted and stored, and there is no crop that helps so much to deepen the soil, since the earthing will usually go into the clay below.

Since the introduction of the self-blanching varieties of celery, there has grown up a practice of planting the celery thickly in beds surrounded by boards, depending on the crowding for the blanching. Celery grown in this way will look white and pretty, but will be hardly worth eating. In fact, no celery is of the best quality unless grown on a moist clay loam and blanched by earthing.

An ounce of celery seed should produce from 7,000 to 8,000 plants. Where grown on a large scale for market, and the grower has the means at hand for summering the plants, he will, of course, grow his own plants. But where one needs only a few hundred or a thousand plants, it is better and cheaper to get them from the Northern growers in late July, transplant to frames for establishing, and then have them at hand when setting time comes. The hot weather of late June and early July is the most trying time on celery plants here.

The following are the leading sorts:

White Plume.—This was the first of the self-blanching sorts introduced, and is still as good as any of them. A few of the self-blanching celery may be useful as early fall celery or for the market crop, where appearance often counts for more than quality.

Golden Self-blanching.—This is claimed to be superior to the White Plume, and as golden celeries are usually of better quality than the white, this may be true.

Schmucker.—This is probably the best of the newer varieties. The stalks are very solid and of a handsome golden hue, and the heart is large. Probably one of the best for market.

Dreer's Monarch.—This is another new celery with golden heart, and is claimed to stand at the head of the list. We have never grown it, but its claims are such that it is deserving of trial.

Boston Market.—This was the first of the dwarf varieties brought out years ago. In our experience there has been none better introduced for family use. It is not a tall celery, but has more white heart stalks than most of the tall varieties. For growing in beds as we advise it is one of the best, though the market grower may prefer one with taller stalks.

Golden Half Dwarf.—This is one of the best of the golden celeries. It is very solid, a good keeper and of fine quality. Good either for home or market.

CAULIFLOWER.

This is the most delicious vegetable of the cabbage class. It has not been grown in the South to the extent it should be grown, because efforts were formerly made to grow it in the same way that it is grown in the North, and our hot weather soon makes it useless. If the plants are sown in late September and merely wintered over, with protection of cloth in severe weather, so as to have the plants ready for setting the last of February, fine cauliflower can be produced in May. In the North cauliflower is grown largely for the fall market, just as late cabbage is, but in the South the plants cannot be carried through the summer. Fine cauliflowers are now produced in Florida during the winter from late-sown seed, and they are now brought from there in large quantities in the late winter and early spring. For the best early crop here, the best plan is to grow them in frames under glass. Set six cauliflower plants to each 3x6-foot sash and fill in with lettuce. By the time the lettuce is cut out in February the cauliflower will be pushing up against the glass, and the sashes can be gradually removed and used for the later lettuce on other frames or for the protection of tomato and other plants started in the greenhouse. These plants will head in late March and April, and usually sell well, though the price is not now so good as it was before the Florida crop came on the market. Like all others of the cabbage family, cauliflowers need the richest of soil, and are much helped during their growth by dressings of nitrate of soda alongside the plants.

Early Snowball.—This is a selection from the old Early Dwarf Erfurt, and there are a number of names given to about the same.

strain by different seedsmen. A good strain of this, no matter what the particular name given, is about all that we need in the way of cauliflowers, for the taller and later ones are useless in the South.

CARROT.

The same treatment advised for the early beet crop will apply equally well to the carrot. They are little grown in the South for Northern shipment, but a few of the early ones may be made profitable to ship along with the beets grown in frames.

Early Scarlet Horn.—This is the best variety to sow in cold frames for early use. It is small and will bunch as easily as the early radishes.

New Oxheart.—This is one of the best for the outdoor garden, being earlier than the long-rooted sorts and better adapted to heavy soils.

Long Orange.—This is the largest sort, with very long roots, and a good keeper in winter. It is better adapted to stock-feeding than to the table, though grown largely for this purpose.

GARDEN CORN.

The extra early varieties of sugar corn are useless in the Southern climate. Hence Southern market gardeners have very generally adopted for the early crop early Dent corn, which, while not so sweet, has the stamina to endure the Southern conditions and to make an early crop. This early Dent is grown under various names, and special varieties have been selected. Being of rather dwarf stature it can be planted a great deal closer than field corn is commonly planted, and is grown in the same way. In the warmer parts of the State these early Dent varieties can be planted in March, at a time when the wrinkled sugar corns would be certain to rot.

Tait's Norfolk Market.—This is the best of the extra early Dent varieties, and is of better quality than the early Adams. The ears are longer than the Adams Extra Early and the plant is a stronger grower. It is rapidly taking the place of the other early Dents.

Adams' Extra Early.—Another of the early Dents. Very dwarf in growth and requires the richest of soil to make a crop. Ears very short. Its earliness is its only merit, and it is no earlier than the first named.

Adams' Early.—This has long been the standard sort of the early Dent corns, but is rapidly being superseded by the Norfolk Market.

SUGAR CORNS.

The following are the best varieties of sugar corn for the South:
Country Gentleman.—This is an improved variety of the Shoe-peg

sugar corn, and is characterized by its irregular rows of narrow grains, apparently distributed at random over the cob. It is the earliest sugar corn that will succeed in the South, and it is well to say that all of them need the richest of soil, heavy manuring and good culture for success.

Egyptian.—Why called Egyptian we cannot understand, for it is a selection of American sugar corn of the class of the Mammoth. It is one of the largest-eared and strongest growers of all the sugar corns, making ears as large as field corn. It is largely grown in Maryland for canning purposes, the man who first introduced it growing about 300 acres of it annually for canning and for market. He supplies hotels and clubs in Baltimore at fancy prices. It is not an early corn, but is better suited to the Southern climate than any other. We rely on it for the main crop.

Stowell's Evergreen.—This is one of the latest and sweetest. Not so large as the Egyptian, but keeps in eating condition longer than most corn.

Late Mammoth.—The largest of the sugar corns and of very good quality. Its size sells it as soon as it appears in market, and for a succession to the Egyptian planted at the same time it is valuable.

We once spent seven years at the North Carolina Station in breeding up a sweet corn for Southern use. It was a cross between the Leaming, a western field corn, and the Mammoth sugar corn. It was finally fixed in type as a wrinkled yellow corn, and was of fine quality, and did well in our climate. We developed it in a locality at Southern Pines, isolated from all other corn, but on coming back to the Station farm at Raleigh, with other corn all around us, we concluded that we could not keep it pure. We therefore sent out a large quantity to all parts of the State under the name of North Carolina Station corn, and asked the recipients to take care of it, as we would grow no more. So far as we have been able to learn not one did so, and we suppose that the variety on which we spent seven years of effort is now entirely lost to cultivation. Had we placed it in the trade it would probably now be a standard sort for the South.

One reason why sugar corn so uniformly fails in the South is because we depend entirely on seed brought from the North, which is not acclimated. If we want to have a sugar corn that will uniformly do well in the South, we must breed it here. Not by taking merely the ears that get too old for the table, but by planting some especially for seed, and then selecting seed from the most vigorous and productive plants, taking into consideration the whole plant, and thus get a sweet corn that will uniformly thrive in our climate. Even the extra earlies might in this way be bred up to greater stamina and be brought to a condition to compete with the extra early Dents, while exceeding them in quality. We hope yet to do some-

thing in this line. But the greatest results are to be hoped for from the Egyptian, as that variety has been bred south of Mason and Dixon's line.

CUCUMBERS.

The cucumber is one of the most important market crops of the Southern trucker. To get them extra early it is worth while to go to some trouble and expense. Those who are well supplied with cold frames can use them profitably in forwarding the plants for setting in the open ground. For this purpose we use flower-pots of the four-inch size. These are filled with a rich compost of rotted sods and manure that has been piled and turned for several months in advance. We make the compost of two-thirds sods and one-third stable manure, pile in layers and chopped down and mixed several times, till it becomes well decayed and incorporated. The pots are packed closely together in the frames and seed are planted on each, and fine soil is then sifted over the whole, and the pots are then watered with a fine rose and protected either by cloth, or better by glass. The seed is sown the last week in March, and as the plants grow they are thinned to three in a pot. When the soil is warm, and frost over, they are knocked out and the unbroken balls set in well-manured hills, setting them deeper than they grew in the pots. We have set them when the vines were a foot or more long, and had cucumbers far earlier than is possible from seed planted in the open ground. The pots can now be bought so cheaply and are so convenient for forwarding plants that we no longer attempt the old plan of planting seed on inverted sods, and once in stock the pots will last many years, if taken care of. Every gardener should have a supply of small pots for various plants, as they make the final transplanting so easy and certain.

For starting in the open ground we do not make hills for the cucumbers, as was formerly the practice, but run out deep furrows and fill them with well-rotted manure, or manure composted for some time with black earth from the forest. A good sprinkling of a high-grade commercial fertilizer is added, and a furrow is thrown over the first furrow from each side, forming a ridge. This is then flattened with a roller, and the seeds are drilled on the bed thus formed. Plenty of seed is used, so as to be sure of a stand, and when the stand is assured and the plants have formed rough leaves, they are thinned to a foot apart and cultivated till the vines interfere with it. The planting should be as early as it is safe from frosts. Well grown cucumbers should make 1,000 bushels per acre of shipping "cukes." All the early cucumbers grown for market are either the White Spine or selections from this variety. One of the best of this strain is

Tait's New Model.—This is claimed to be the best of all the White Spine varieties, and is a favorite with market growers.

Japanese Climbing.—In our home garden we have found this variety a very productive and valuable sort. It is a strong climber, and can be planted by a wire fence on which to run, and can thus be made to occupy little space and give a large supply of fine cucumbers. There are many named varieties of the White Spine cucumber, all of which are very similar.

FORCING CUCUMBERS.

The time is near at hand when the market gardeners of the upper South will be compelled to adopt the intensive methods of plant culture that have been found so profitable in the North. And they have the great advantage over the Northern gardeners in their milder and more sunny climate. Sunshine is of more importance under glass than fire-heat, and no amount of artificial heat will make up for the absence of sunlight. In the South we have far more of winter sunlight than in the North, and seldom have the long, dark spells in winter that so annoy and damage the Northern gardener. With the rapid transportation now at hand winter forcing will become very profitable in the South, and of all the crops forced in heated houses in winter there is none more generally profitable than the cucumber. But before attempting winter forcing on a large scale the novice should gain experience in a small way at first, till he fully understands the conditions needed for success. There are valuable books published on this subject, two of the best are "The Forcing Book," by L. H. Bailey, and "Greenhouse Management," by Professor Taft. With these books, and a determination to succeed, the gardener may soon become expert in winter forcing.

For the general market the White Spine varieties are the ones forced in winter, but where a grower has a critical market and one willing to pay fancy prices, the long English cucumbers can be made very profitable. If one intends to go into greenhouse forcing he should have houses expressly adapted to the plants he intends to grow. There are now a number of firms engaged in the construction of greenhouses, and the heating of them as well, and commercial florists and gardeners now find that it is better to have their houses constructed by men who fully understand the work and know the needs of different crops than to try to get them built more cheaply, perhaps, by local builders, who do not understand these matters. A house for forcing cucumbers must have means at hand for maintaining the proper temperature, such as is needed by tender plants like cucumbers, tomatoes and beans. The proper temperature is about 65 degrees at night and ten to fifteen degrees higher in daytime and sunlight. The plants are grown in beds made of rich compost on the benches of the house, over the heating pipes. The soil in the benches is made six inches deep, and the benches are built

to allow drainage, a layer of clinkers being laid over the cracks in the boards to prevent the soil sifting through. The plants are started in four-inch pots filled with the same compost already advised. The pots are filled only about half full and the seed planted and covered lightly. When two rough leaves have developed the pot is filled up. When the pots are well filled with roots the plants are knocked out in balls and set in the soil on the benches, setting the balls rather deeper than in the pots. An abundance of plants should be grown, so that only the most vigorous ones need be used, for there is no plant forced that is liable to so many diseases and insects as the cucumber. The plants are set along the front of the bench and are trained upon wires under the glass. Formerly it was the practice to take the pollen from the male flowers and set the fruits on the female flowers, but it has been found that with most cucumbers this is not necessary, as they grow equally well without pollination, and as seeds are not desirable, it does not matter if none are formed. The plant louse, or aphid, is sometimes troublesome, but they can easily be kept down by covering the beds with tobacco stems before any appear. In houses that are let get too cold the mildew is apt to be troublesome, but if close attention is given to the ventilation and heating, and the plants are not over-watered, there will be little trouble from this disease. Forced cucumbers usually bring during the winter \$3 per dozen and upwards.

EGG PLANTS.

The egg plant is not very largely grown in North Carolina, either in private gardens or the market gardens. If gotten into market very early, they sometimes bring profitable prices, but later the price rules too low for profit on a bulky article. For the best results with egg plants the market gardener needs to have greenhouses and frames with glass sashes in abundance, for the plants must be started early and grown on rapidly under glass till the ground outside is permanently warm. We can gradually harden off the tomato plants to withstand a very considerable amount of chilly weather, but any attempt to harden the egg plant to a moderately low temperature will only result in stunting it and making a poor crop. We sow the seeds in flats in the greenhouse in February, and as soon as the plants are large enough to handle they are potted in three-inch pots filled with rich compost. When these pots are filled with roots they are shifted into four-inch pots and the houses are never allowed to get lower than 65 degrees at night and ten degrees higher in day time. In the four-inch pots the plants can be grown to a large size, and when the ground is warm and the weather settled they can be knocked out of the pots and set in their permanent quarters, three feet apart each way. The soil cannot be made too rich, and a mellow-sandy soil is best. Those who have a large number of frames and glass sashes

in which lettuce has been grown during the winter, and the tomato plants hardened off in the spring, can make a very profitable use of the frames after the tomato plants are out by setting two of these large pot-grown egg plants to each sash. Then keep the glass over them at night so long as the nights are cool, and forward them by watering and top-dressings of nitrate of soda. In this way years ago in Northern Maryland, having nearly 1,000 sashes empty after the tomatoes were set out, I set them in egg plants that had been developed in pots to a large size, and had the fruit ready for market as early as the Charleston growers. Herein consists the great value of the glass sashes. They enable us to compete on somewhat equal terms with growers far south of us. Our market gardeners have too long depended on the advantage their climate gives them in competing with the growers north of them. The rise of the lettuce culture in winter has shown them the value of intensive work in the forwarding of plants to compete with those south of us, and it is to this intensive culture that the gardener of the upper South must turn his attention for the best results. Egg plants put on the market the last of June or early July will be profitable, while those in August meet too many competitors.

The best variety of egg plant for market purposes is the one known as

New York Improved Purple.—Various strains of this are offered by different seedsmen, who claim special breeding and selection for their strain. One of the best of these selections, which has been recognized as such by truckers, is

Tait's Purple Perfection.—This variety has been used and commended by the market gardeners around Norfolk, and is probably one of the purest strains of the round purple egg plant in the trade.

Black Pekin.—This is rather earlier than the New York Improved. It is a very productive variety of a very dark purple color and handsome, round fruits. But in size it is inferior to the other and is not so largely grown for market. In our experience it is more resistant to the "Southern blight," which attacks both egg plants and tomatoes in the South, and will sometimes make a crop where the New York Improved fails. The Colorado potato beetle is just as fond of egg plants as it is of potatoes, and the same means of spraying with Paris green is necessary. With the egg plant, however, we prefer to mix the Paris green with tobacco dust, one part of the green to 75 parts of the dust and apply it with a powder bellows made for the purpose. The tobacco dust makes the mixture equally effective against the flea beetle, that is very troublesome. No remedy has been found for the Southern blight, and all we can say is to avoid land where tomatoes or egg plants have been lately grown. Egg plants can be grown well with a heavy application of a complete fer-

tilizer, rich in nitrogen, but some stable manure added to the fertilizer will always produce the best results.

LETTUCE.

Lettuce has of late years become the most important crop of the North Carolina truckers for shipping in fall, winter and early spring to the Northern markets. The best means for producing the best crops is, therefore, of increasing interest to our growers. The production of lettuce for market during the winter and spring forms the beginning of intensive culture with our truckers, and will lead eventually to still more intensive work in forcing under glass. Lettuce is very largely grown, from the open ground in Florida to the heated greenhouses of the North, during the winter months. It is an article with which the market is seldom glutted, and the slight protection needed in our climate for the production of good lettuce gives the North Carolina grower a great advantage over the Northern grower, who has to use expensively built and heated houses. Our growers have gone far enough to put their lettuce on a par with the Florida lettuce in winter, but not far enough to enable them to compete with the superior quality grown in the Northern greenhouses. Hence we find in the market reports separate quotations for Southern lettuce and hot-house lettuce, as the Southern lettuce, owing to the way in which it is grown is apt to be either frost-bitten or less brittle and tender than the hothouse article. There will always be this difference, so long as our growers adhere to the method of growing the lettuce under cloth instead of using glass for the crop in winter. With glass, and mats to cover the glass in extremely cold weather, and thus to completely exclude the frost, and shipping the crop in carriers, like the hothouse crop, we can produce fully as good lettuce as is grown in the heated houses North, and thus get a better price for it. The objection urged when I have urged our growers to use glass is simply that the glass costs so much. It costs far more in the North to build lettuce houses and heat them with costly hot water or steam apparatus, and yet the growers there keep on building these houses and making them profitable. But the fact is that frames with glass sashes cost less in the long run than the cloth-covered frames, now so largely used by our lettuce growers. The first cost will be four times as much as the cloth, but if the sashes are taken care of and kept painted they are good for at least twenty years, while the cloth is often mildewed and worthless after one season's wear, and always so in two seasons. Then, when we consider the superiority of the product, its safety from disaster, and the better price obtainable for it, the glass will not be long in paying for its extra cost. The mats needed are easily made at home from broomsedge or rye straw. The rye straw mats are lighter to handle, but the broomsedge mats are more lasting. I have now mats made of broomsedge that have

been used for three winters and seem still as good as ever. To make these mats we have a frame seven feet long and four feet wide. Six strands of tarred twine are stretched lengthwise the frame. The frame is placed on carpenters' tressels, and beginning at the lower end we lay small handfuls of the broomsedge, with the tops lapping in the middle and the butts at the sides. With more tarred twine in balls we take a turn over the straw and around the stretched twine and draw it down tight, and proceed in the same way to the top of the frame, when the ends of the twine are made secure and the mat is cut from the frame, edges trimmed straight and all loose strands removed. It is now easily rolled up and stored ready for use, and being slightly larger than the 3x6 foot sashes, the mat will cover all cracks, and if the frames are properly made and banked outside with earth, the mats will exclude any frost we are apt to have, even in the dead of winter. In fact, I have flowers of various sorts blooming in such frames all winter perfectly. The cloth frames are useful for the first fall crop, when little protection is needed. They are also useful merely to keep over winter late sown plants, covered only in severe weather, for heading in the spring in the open air. But for winter work the cloth frame can never compete with the glass-covered frame in the production of fine lettuce.

GROWING FRAME LETTUCE.

In the culture of winter lettuce, the first consideration must be the soil. After years of experience in the production of this crop, I have found that some stable manure is essential to the production of the best lettuce. But stable manure alone or commercial fertilizers alone will not furnish the finest lettuce. Both are needed by the lettuce grower. The same fact has been demonstrated in the experiments made at other Experiment Stations. It is also necessary either to entirely renew the soil in the frames annually or to move them to a new spot. A soil in texture between a sandy and clayey loam is the best. Too light a soil makes light lettuce, and too heavy a one keeps the crop back. My practice is to begin in the early spring and get together sods from a loamy piece of land, cut about two inches thick. These are laid grass side down and a light layer of manure spread over each layer of sod. If the sod is from heavy soil, I add some wash sand to lighten it. Good, rich, black earth from the forest can be used in place of sods, if these are not available. The heap is made broad and flat, and every two or three weeks during the summer is chopped down and mixed thoroughly, so that by fall it is a black, mellow compost, and the best possible soil for the frames. This compost is put into the frames, after taking out the old soil, to a depth of six inches. Some weeks before planting I add half a pound of a high-grade commercial fertilizer, in which there is about five per cent. of potash and about the same of organic nitrogen, with a due amount

of phosphoric acid, say about seven per cent. to each 18 square feet. This is well mixed with the compost and allowed to stand a week or two, till the potash gets less caustic, for the muriate of potash is apt to burn the roots if freshly applied in such a large amount.

Arrangements are made for the production of four successive crops. For the first crop we sow seed of the Big Boston lettuce the last week in August. I scatter the seeds thinly broadcast, sowing enough to make three times as many plants as I will probably need, so that single standing and stout plants can be selected for transplanting, as these always do better than plants that have been crowded, and if sown in rows in beds, we are apt to have the plants crowded. These plants are set in the frames, to be protected later with cloth, if needed, but often, as in the last autumn, the crop is made without any protection. This variety of lettuce is set a foot apart each way, and with slight protection after the nights grow frosty, it will run through the latter part of November and up to Christmas.

Seed of the same variety of lettuce is sown about the middle of September, or even later, if the weather is unfavorable earlier. These plants are set in frames that are to be covered with glass at the same distance in October, and if properly protected with the sashes when the nights grow cold will immediately follow the Christmas crop and run through February. When the glass is on care must be taken to air the frames well in all mild weather, so that the lettuce does not grow too tender and flabby. We give some air in the frames by slipping the sashes down more or less whenever the sun shines, even if below the freezing point, and whenever the mercury is above freezing and the sun shines we strip the sashes down entirely. When the nights promise to be very cold the mats are brought into use and the sashes covered by sundown.

For the March and April crop we sow seed about the first week in October, still using the Big Boston. These are set in the frames in November, and kept as cool as practicable during the winter by only slipping the sashes over them when the nights threaten to be quite cold. Up to the time when the heads form lettuce is very hardy and will stand a considerable amount of freezing, but once headed it is easily scorched by frost, and as the sun gets higher in February, the same care is given this crop as that which is headed during January and February. This crop needs more attention to airing than the winter crop, as the sun is continually getting higher, and by the middle of March the sashes can be left off entirely, except when a sudden reverse threatens.

For the fourth crop we use seed of the Wonderful lettuce. This is a remarkably large-growing lettuce of the Curled India type. It makes immense and hard heads, but does not head till spring, and hence is useless for the winter crop. Have since found the Wonderful

fine for winter use, and it will supersede the Big Boston. We sow the seed of this any time in October and set the plants rather thickly in frames, to be protected in very cold weather with cloth, the object being simply to keep them alive during the winter and not to grow them much. Hence no protection is given them till it threatens to go down to ten or fifteen degrees above zero. By the middle to the last of March these plants are set in the open ground in heavily manured soil, a foot apart each way, and due attention given to their cultivation. In fact, we should have said that this same care in cultivation is given to all the crops in the frames. This crop will begin to head in April and will run well into May, and often pays better than any other, as the heads are usually large, and come into market at a time when lettuce is in great demand and the Florida crop is no more, while the outdoor crop North has not come in. Some of our growers say that it is useless for us to attempt the midwinter crop, as Florida has the run of the market then. But the crop grown under glass sashes is so superior to the Florida crop that there is no danger that it will not sell well. In fact we have found it better paying than the Christmas crop, while the lettuce that goes to market in March and April and May always brings the best price of the season. I have tried to treat this important crop fully, as its importance demands. I have named the two varieties best suited to the market grower. There are some others that will be of interest to the home gardener, and of these we will now speak.

All the Year Round.—This is the quickest-heading lettuce we have grown. The heads are not of large size, and the plants can be set in frames six inches apart each way, and, of course, a great many more can be grown in the same space than of the larger heading sorts.

Boston Market.—Another early heading variety of better quality than the first named. It is largely grown North in houses, but our growers prefer the Big Boston, which was selected from this variety. It is very similar to the Big Boston, except in size.

California Cream Butter.—This is a close competitor with the Big Boston as a winter lettuce. It is a little longer in heading, but is more compact in its growth and less wide-spread in its outer leaves, which allows it to be planted a little closer than the Big Boston, while the heads are fully as large. In some soils it may prove better for market than the Big Boston.

Grand Rapids.—This is the great forcing lettuce in the west. But our eastern markets demand a cabbage lettuce, while the western cities prefer the loose, curled lettuces, of which the Grand Rapids is the best. We think that the western people are right, and for family use we greatly prefer the Grand Rapids, as it is far more delicate and tender than the Big Boston. But when growing for the markets of New York and Philadelphia it is useless to plant the loose-heading varieties.

Hanson.—This is a variety of the Curled India type which was grown by the late Colonel George Hanson of Maryland. There have been several special strains of it developed, the best of which, in our experience, is Maule's Improved Hanson. This is a lighter green than the Wonderful, which it otherwise closely resembles. For a spring crop the Hanson is excellent, but not suited to the winter crop.

There are long lists of lettuces in the catalogues, but the above list covers all of real value to the Southern trucker, so far as our experience goes, and many in the lists are merely duplicates. There are a number of lettuces specially recommended as hot-weather lettuces, but in our experience none of them are worth growing here, for when the weather gets warm no lettuce is fit to eat, and May will usually wind up the crop with us after full six months use of it. Few other vegetable crops have so long a season, and we can well dispense with lettuce during the other six months, when the garden abounds with other vegetables.

We have said nothing about the greenhouse forcing of lettuce, because it is of no interest in this climate, unless it be in the mountain section, where the winters are colder. But even there the bright sun of the South prevails, and a greenhouse will be apt to be too warm for the growing of any but the Grand Rapids, and even in the mountain country good lettuce can be produced in cold frames in winter if the frames are sunken and banked to the top on the outside and mats are used on the glass. I have grown it in this way in a very cold locality in northern Maryland, near the Pennsylvania line, where we had the mercury below zero every winter, and my frame lettuce was as fine as any product of a Northern hothouse. I have grown frame lettuce with success for market in a warmer section of Northern Maryland, and have grown it with great success in Southeast Virginia and here in North Carolina, and what I have written is the result of a long experience of about 40 years in growing frame lettuce, added to experiments made here more recently.

MUSKMELONS.

The muskmelon, or cantaloupe, as it is commonly called, is a very important crop with the Southern market gardener, so far as the early varieties are concerned. Early melons of small size are more profitable than larger and later ones, and are more desirable to consumers. Very large melons are apt to be of inferior quality, like the immense late melon known as Montreal Market, which, however it may suit the growers North, is, in our experience, of too poor a quality to make it desirable to grow in the South, and it is too large and late for any but a local market where size counts for more than quality.

The soil for melons should be a warm loam, neither too sandy nor heavy. Private growers usually plant them in hills about five feet apart each way, but we prefer to grow them in rows. The land should be thoroughly and deeply prepared, and deep furrows run out five feet apart, running the plow twice in the furrow. A compost of black earth from the forest and cow manure mixed, two-thirds of the first and one-third of the manure, should be prepared some months ahead and made fine by repeated turning and mixing. The furrows are filled with this compost and a liberal addition is made of a high-grade complete fertilizer. Two furrows are then lapped over the manure, making a ridge. This ridge is then rolled nearly flat and the seed drilled in on the bed, thus made plentifully. As soon as the plants are well established they are thinned to a foot apart in the rows, and are kept cleanly cultivated till the vines run and interfere with cultivation. Cow-peas are then sown all over the ground, so that by the time the melons ripen there is a slight shade, and after the crop is gathered the peas can be allowed to grow and make a hay crop. For the market garden few varieties are used, and these only of the earliest. The following will comprise all of special value to the trucker:

Early Jenny Lind.—This is an early, small and productive melon, much flattened at the ends, and packs easily in crates for shipment. It has long been the favorite variety with the truck-growers of Eastern North Carolina, but there is some prospect that it may be superseded by the market demand for

Rocky Ford.—This melon has acquired this name from its being so largely and successfully grown at Rocky Ford, Colorado. It is really an old variety, the *Netted Gem*, but the name *Rocky Ford* has now gotten so attached to it, and has attained such importance as a market brand, that it will probably take the place of its former name. It is a very productive melon, of small size and round shape, not flattened at the ends like the *Jenny Lind*. In quality it ranks among the best. These two varieties will be all that the Southern shipper needs.

The following are fine for private gardens and are also grown to some extent for market, especially the local markets here and in the North:

Emerald Gem.—This is about the best of the yellow-fleshed melons. It is medium early, has very thick flesh and on the outside is green with faint white stripes. It is grown to some extent for shipping, and is one of the finest for family use.

Tail's Ideal.—This is a fair-sized melon of great productiveness and high quality. Skin is well netted and the flesh is reddish-orange in color and very aromatic. It succeeds best on high sandy soil.

Acme or Baltimore Market.—This is a nutmeg-shaped melon of

fine quality and productiveness, grown largely about Baltimore, and well suited to a local market.

Banana.—This differs from all other melons in shape. The melons are smooth-skinned and more the shape of a Mammoth cucumber than a melon. I have grown them over three feet long. The flesh is yellow, and at times a specimen will be of very fine flavor, but usually they are of very poor quality. Grown mainly as a curiosity.

Hackensack.—A fine melon with green flesh and round shape, well-netted skin and medium to rather large size. Generally of good quality, but variable. Popular in New York market when grown near by. For family use in the South it is worth growing, as it is very productive and generally good here.

Of course the catalogues give a much longer list of varieties, but the above will leave little to desire.

MELON (WATER).

The watermelon is a very important crop in the South, more as a farm crop than with the regular market gardener, and is usually a specialty with those who grow them as their sole market garden crop. Most of the varieties in use have been developed in the South, and the trade is entirely supplied with Southern-grown seed, since the sun and long season of the South are better suited to the perfecting of the melons than a Northern climate is. To grow watermelons to perfection one must have a high, warm, sandy soil. While they may be grown in a different soil they never reach the same size and perfection which they attain on the sand. The old practice in growing watermelons was to check off the land, after plowing, about ten feet apart each way. At the crossing of the checks wide holes are cleaned out and a shovelful or two of the compost named for muskmelons put in each hill or hole, fertilizer sprinkled over and then covered and the seed planted. I have found that the following plan gives better success: Plow the land in lands twelve feet wide. Plow out the dead furrows clean, and if there is a clay subsoil run a subsoil plow in the dead furrows to loosen it. Fill the cleaned out dead furrows with the compost. Scatter a good dressing of high-grade complete fertilizer on this and then throw furrows from each side to make a ridge. Drill the seed along this bed after flattening it. When the plants are established thin out to three feet apart. Now work the soil to the rows as the plants grow, till, when the crop is laid by, the plants are on top, the land and the dead furrows are between the rows. By throwing the earth to the plants in this way we get the roots deep in the ground and in more moist soil, and are less troubled with borers in the stem. I have had far greater success in this way than in hills, though fine crops may be grown either way. Cow manure is always better for making compost for melons than horse stable manure.

The varieties of watermelons grown for shipping and those grown for private use will always differ, since in the shipping melon handsome appearance and toughness of rind are the qualities most sought, and these are not always or generally associated with high quality. Hence the grower for home use seldom plants the same varieties which the shipper must use. The most popular shipping melon is

Kolb's Gem.—This is a round and compact melon of fair size, with mottled stripes of light and dark green on the outside. It stands shipping better, probably, than any other, and when cut the flesh shows a beautiful ruby-crimson. It is not, however, of the best flavor, and the flesh is rather stringy, but its beauty and shipping toughness render it the favorite for shipment in cars and steamers.

Cuban Queen.—This variety is valued by those who wish to grow immense melons. It is similar in outer color to Kolb's Gem, but longer in shape, and grows to a great size. The rind is thick and will bear shipping, and the flesh is of better quality than Kolb's Gem. It may be grown to 70 to 100 pounds weight.

Scaly Bark.—A melon with a mottled surface and medium size. It has a very tough rind and is said to ship well.

Duke Jones.—An immense round melon with very dark green skin, thin rind and flesh of the highest quality. It is one of the most prolific melons grown. I have seen a vine bearing 36 melons, several of them of very large size, and 50 to 75 pound specimens are common. It is rather brittle for long shipment, but for home use is hard to beat.

Southern Triumph.—This is claimed to be the finest and largest of all watermelons, averaging heavier than any other and often weighing 80 pounds. The flesh is bright red and of fine quality.

McIver or Sugar Melon.—In point of quality we consider this the best of all watermelons. It is similar in general appearance to the Cuban Queen, but longer and not so thick. The rind is remarkably thin, and it has the fine quality of never getting hollow in the center in wet weather as most melons are apt to do. In beauty and tenderness of flesh and high, sweet quality, I have never seen its superior, and it can be grown to a very large size. I have seen a field of this melon where it originated, in South Carolina, where one could almost step from melon to melon over the field. It is also quite early.

Muskile.—This is a melon very popular with the growers on the eastern shore of Virginia, and they guard the seed so carefully that it is almost impossible to get them. It is a melon of high quality, with a very thin and brittle rind, and not suited to distant shipment, except by water.

There are many other varieties in the trade, but the above will include the most valuable ones for home or market. The growing of watermelons for the North is rapidly increasing in North Caro-

lina, and while they can be grown in all parts of the State, the largest and finest are grown only in the sandy lands of the warmer and eastern sections, the mountain melons never comparing in size or quality with those in the warmer sections. Watermelons are shipped usually in slatted cars, the number in a car varying with the weight.

MUSHROOMS.

No mushrooms are produced for market in North Carolina, but as some may wish to know how to grow them for home use, we give the following directions, promising that we have never known any one to succeed in the first effort, as they are apt to omit some little matter that is important but looks trifling to them. When one "gets the hang of it" mushroom-growing is easy. They can be grown anywhere, in outhouses or cellars, or even in the open ground in the fall. Some of the finest we have ever grown were produced in a compost pile we were preparing for the lettuce frames in the fall. Fresh horse manure, free from straw, is needed. If this is not plentiful it can be spread out under cover, so that it will not heat till enough is collected. Then mix it in equal parts with sods from an old pasture and pile to heat under shelter. Turn it two or three times till rank heat is over, and then pack into beds about four feet wide and two feet deep. If the compost is dry, water with water just hot enough to bear the hand in. Now put in a thermometer and watch the bed as the heat rises. When it has reached its highest and has begun to subside to about 85 or 90 degrees, have some bricks of spawn, which can be bought from the seedsmen, and chop them into pieces the size of a hickory nut. Stick these in the compost all over the bed about six or eight inches apart and then scatter the finer part over all. Cover the bed with straw and watch it closely. When you can see the mycelium running like a spider web through the compost, and not before, cover the bed with an inch or two of fine garden loam and return the straw. If the bed gets very dry water over the straw with water at about 100 degrees temperature, and if all goes right the mushrooms should appear in five or six weeks, and the bed will be productive for an equal time if the mushrooms are taken out as they form. Take them entirely out and leave no broken pieces to decay in the bed. The building where they are grown should not have a temperature lower than 55 degrees and not much higher than 65. Near a city where there is a demand for mushrooms they may be made quite profitable.

OKRA.

This is a common vegetable for soups in Southern gardens, as gumbo soup is a popular dish. The crop is grown for market to a limited extent, but is of minor importance. Many varieties have been

offered by seedsmen, and a few years ago we tested several varieties from Algiers, from seed collected by the Department of Agriculture, but none of them proved of any value here compared with the

White Velvet.—This variety has been long grown in the South, but has only in recent years been introduced to the seed trade of the Northern States. The pods are long and smooth and of a very light greenish color. It is so far superior to all others tried that we can see no need for describing other sorts. It is taller in growth than the Dwarf okra, but begins to bear early and is very productive, while its freedom from the stinging hairs on the green-podded sorts is a great advantage to the one gathering the pods.

ONIONS.

There is no vegetable more generally grown, both in market and private gardens, than the onion. While the onion will thrive in good culture on almost any soil, if well enriched, it is at its best only in a mellow soil inclining to sand. Well-drained, swampy land, like the black swamp land of our eastern coast, is pre-eminently the onion land in the North and West, where the culture of onions is carried on on a large scale. But for the early green crop to go to market, in February, March and April, the warmest sandy soil at hand is the best, since in such a dry soil the sets will winter better than in low ground or on a clay soil. It was formerly the notion that good, ripe onions could not be grown in one season from the seed anywhere south of the Potomac, and hence, formerly, all onions were grown in the South from sets or from top "buttons." Now we have found that by early planting it is as easy to grow fine, ripe onions in the South as elsewhere, and sets are now used only for the production of early onions, for bunching green in the early spring and for the growing of the Potato onions, which increase only by bulbs and never make seed. The different purposes for which onions are grown necessitate different methods of cropping. We will, therefore, speak of these in detail.

EARLY GREEN ONIONS.

To produce the crop of early onions for bunching and shipping in a green state, in the early spring, we use seed of the Early White Queen, which is also, but erroneously, called Pearl. This is a different onion from the one usually catalogued as New Queen, and is finer and of a larger size and one of the mildest of onions. The seed is sown in April in soil of fair fertility, but not heavily enriched. The soil is made very fine and the seed sown very thickly in rows, using fully 50 pounds of seed to an acre, the object being to crowd the young seedlings, so as to produce a great quantity of sets, no larger than a small marble when mature. The seed bed must be kept

scrupulously clean and the sets will be ripe in July. They are then lifted and cured with the tops on them and are stored in this way in a cool, dry place. They begin to sprout very quickly after the tops are removed, but with the tops on they lie lightly and keep far better. These sets are cleaned and planted early in September for the spring crop. The soil in which they are planted should be clean and very mellow. I prefer to use commercial fertilizer only for the onion crop, as there will be less trouble from weeds. Hard-wood ashes, spread broadcast, are also excellent. Onions are one of the few crops in which it is more profitable, and economical as well, to use the fertilizer in the furrow, under the rows. Having prepared the soil in the most thorough manner, I would use about 700 to 1,000 pounds per acre of the following mixture to make a ton:

Acid Phosphate	900 pounds.
Cotton-seed Meal	600 pounds.
Nitrate of Soda.....	100 pounds.
Muriate of Potash.....	400 pounds.

Run out furrows wide enough apart to admit of mule culture, or in gardens with the wheel cultivator. In the furrow scatter the fertilizer, and throw a furrow from each side, making a ridge over the row. Flatten this slightly and draw shallow furrows on the bed thus made. Plant the sets deeply, so that they will rest on the general level surface of the ground when the earth is pulled from the rows in the spring, and cover them. We set them thus deeply in the beds as a winter protection. They are merely kept free from weeds in the fall. After the severe cold we are apt to have about the middle of February, draw the soil from the rows, so as to leave the onion on the surface to bulb, and they will shortly be large enough to bunch. They are tied in bunches with strings of raffia fibre, the number in a bunch varying as the onions grow larger, all being bunched and sold by the time they are half grown. This crop is useless for ripe onions, since, if left to ripen, a large part of them will run to seed and spoil.

Sets of Yellow and White Potato onions can be used for the same purpose, and are planted in the same way, but the Queen is far superior for this crop. The Yellow Potato onion sets will make a fine early ripe crop if sold as soon as ripe, in late June, but they must be disposed of early, as they will not keep and are only in demand when the market is bare of ripe onions, before the Northern crop comes in.

GROWING ONIONS FOR THE RIPE CROP.

There are two ways in which this can be done. First, by sowing seed in the open ground very early in the season, and secondly, by

sowing seeds in frames under glass in January and transplanting them later to the open ground when about the size of a lead pencil. The transplanting method is of value only with the Italian and Spanish varieties, which, in this way, can be made to grow to a very large size. The American varieties, which are the only ones that can be grown here to keep without sprouting, should always be sown where the crop is to be grown. The time for sowing will vary in different parts of the State. In the eastern section as early in February as the soil can be worked to advantage, and westwardly just as early as the soil is in the same proper condition. I prepare the soil just as for the fall crop of sets, but in this case rake the beds down nearly level after putting the fertilizer in. Then, with a garden-seed drill, drill the seed in on the beds. The fertilizer will then be right under them, and as onions roots do not ramble far the fertilization in the furrow is sufficient. There is no crop grown in gardens that requires more careful preparation of the soil or more thorough and constant cultivation. As soon as the young plants are well established they should be thinned to stand fully three inches apart, and the cultivation should be rapid and shallow, and all weeds must be removed from the rows by hand. The man who grows onions must get down to it, for they will not tolerate weeds nor laziness. As the bulbs begin to form the soil must be pulled away from them, so as to leave the bulbs on top of the ground. When the tops turn yellow and ripen the onions are pulled and left in heaps to cure, but must not be exposed to rain. The best place for the final curing is a loft of a barn or outbuilding, near the roof, where it is very hot. Spread them out in such a place, leaving the tops on. When the tops are dry, and the onions fairly cured, they can be removed to a cooler place in a basement, if dry, and spread rather thinly, still leaving the tops on, for they should never be removed till the onions are to be used or sold, as they keep far better with the tops on. Slight freezing in winter will not hurt them if not handled when frozen, and a cold place is better than a warm one. I have kept onions all winter on an open barn floor without a sprout showing, and sold them in the spring.

For this crop we have tested a great many varieties and find that the following are the best:

Southport White Globe.—This is a handsome white onion, almost as round as a base ball, very solid and one of the best, if not the very best, keepers of the white onions.

Yellow Globe Danvers.—This is a very large and fine onion of a pale yellow color. It is a good keeper, but in our experience not so good as the first named. The globe onions always measure up better than the flat ones, and hence make larger crops.

Tait's New Opal.—This is the best keeper of all onions. Grown in a cooler climate, it has been kept for two years sound. It is simi-

lar in color to the Yellow Globe Danvers, but slightly flatter in shape. For a ripe market onion it is hard to excel.

Large Red Wethersfield.—This is a large and dark red onion, very strong in flavor, but popular in the market, especially with those who want to take them to sea for sailors' use. They are among the best of croppers and keepers, and make a crop with as much certainty as any.

Prizetaker.—This is the largest of all onions. Pale yellow in color and of a mild flavor. It has been grown to weigh four pounds, and while some consider it a good keeper, we have found it only moderately good for this purpose, as it sprouts with us easily in winter. It should always be grown by the transplanting method. I sow the seed in a cold frame in January and gradually harden them off and transplant to the permanent rows early in March. In strong, mellow soil, heavily fertilized, they will grow to an immense size. These are the great yellow onions frequently seen in boxes in the stores imported from Spain, as it is a Spanish onion, but they have been grown in this State fully as large as the imported ones, particularly about Asheville, on mellow, rich bottom land, which suits the onion crop finely. Some seedsmen catalogue this as the Spanish King.

White and Red Bermuda.—These are frequently grown for early onions, either for bunching or for the early ripe market. Good crops of the ripe ones can be made in the same way as advised for the American varieties, and if the fall season is moist enough to get the seed well started the finest crops of green bunch onions can be made from these by sowing the seed the last of August or early September and getting them large enough to winter well. The seed used in Bermuda is said to be grown in Teneriffe.

The growing of sets of the Early Queen for sale can be made a profitable part of the business here, for there is always a brisk demand for the sets, and most of the sets used here are brought from the North, being largely grown in New Jersey and New York State by those who make a business of growing sets only. There is no reason why the crop should not be as profitable here as there, if the right seed are used. The bottom lands in the mountain section and elsewhere, and the black, peaty soils of the coast country will make the finest of lands for the ripe onion crop, and in any section early sowing of the seed in well-enriched soil will produce the crop the same season from the seed, and a far better crop than can be made from sets. It may be remarked here that while we have said nothing about the long series of Italian onions listed in the catalogues, that any of these can be grown in the same way advised for the Prizetaker, but all are poor keepers.

PARSLEY.

This is of no particular value in the South as a market garden crop, but every garden needs a bed of parsley for garnishing. For winter use we sow in the fall in a cold frame along with lettuce, using seed of the Moss Curled variety, and in spring we sow a bed as early as possible in rows, wide enough for cultivation. Later in the season we select a few plants of the best curled ones, from which to save seed for the following season. Parsley is quite hardy, and fall-sown plants will winter well, but the foliage is far more handsome when grown under protection. We grow mint in the same way in frames for early use.

PARSNIP.

The parsnip is seldom grown for shipping in the South, and is in little demand in the home markets, largely because it is seldom seen. Failure with the parsnip in the South is largely due to following the directions of the books for the North. The books generally advise the sowing of parsnip and salsify seed among the earliest things planted in the garden, mainly because they are very hardy. But sown here very early in the spring, both of these are apt to run to seed and get woody and worthless about midsummer. Hence we always defer the sowing till late June, both of parsnip and salsify, as they then make their best growth during the late fall in cooler and more suitable weather, and both will grow more or less all winter through. We have made good salsify sown as late as last of July, and as neither of these roots are wanted till winter, it is useless to sow them early. These roots need a deep soil, deeply worked, and should not have stable manure freshly applied to them, as this is apt to make the roots grow forked. They can well follow a crop of early cabbages which has been well manured. The best variety, and, in fact, the only one commonly cultivated is the

Hollow Crown.—A selection from this called the Student is, perhaps, the best strain of the Hollow Crown parsnip, and of salsify the Sandwich Islands is the best.

PEAS.

English or garden peas are very largely grown in the South for Northern shipment, and the crop is one in which earliness is of the greatest importance. Hence there is a difference between the peas that will be grown by the trucker and those desirable in the family garden. The market gardener wants a pea that is early, productive and gives its entire crop at once, so that the whole can be shipped while the price is good. Quality is of secondary importance to him. On the other hand, the private gardener, while wanting to be in among the earliest, wants a pea of fine quality and one that will not throw

its entire crop on him at once, but will continue to supply the table for a time, till a succession variety comes in. Every seedsman has his special extra early pea, but they differ from each other usually only in the care with which the seed stock has been grown and rogued free from inferior types, for nearly all the extra earlies are merely selections from the old Kentish type, or Daniel O'Rourke, and a well-grown stock of Daniel O'Rourke is as good as any of the type. There is another type of extra early peas distinguished from the Daniel O'Rourke type by the small round and greenish color of the peas. These, of which Tait's Nonpareil may be taken as the type, have been in our trials the earliest in cultivation and better in table quality than the Daniel O'Rourke type.

The soil for peas should be moderately fertile and light and warm. Fresh stable manure should not be used, as it tends more to a rank growth of vine than for fruitfulness. Still, though the garden pea is a legume, and forms nodules on its roots which acquire nitrogen from the air, it is of advantage to give the crop some nitrogenous fertilizer to encourage an early growth. A fertilizer with a moderate percentage of nitrogen and full percentage of phosphoric acid and potash is best for the crop, and 300 pounds per acre in the furrows is sufficient. In field culture no support is used for the vines, except for the tall-growing Marrowfats, which are commonly planted alongside the dead stalks in a cotton field, and though planted much earlier than the extra earlies, come into market later, and sell by reason of their quality.

From one to one and a half bushels of seed are used per acre in field culture, as the peas are scattered quite thickly in broad rows, so as to stand up better and give a larger crop. The rows should be about three feet apart, and the sowing is done as soon after New Year's day as the ground can be worked in good condition. In the colder sections of the State the sowing must, of course, be deferred till February or March. In the private garden a few of the extra earlies should be sown, as the wrinkled peas of higher quality are apt to rot in the ground if sown too early. We usually plant some extra earlies in our home garden in January, and in February follow with the wrinkled peas that will come in succession one after the other, sown at the same time, and as late as the first of April we make a third planting of some quick-growing dwarf pea, to complete the season. Good crops of the wrinkled dwarf peas, like the Premium Gem, can be made by sowing the last of August in a moist soil, planting the peas in a deep furrow and working the soil to them as they grow, and then cultivating flat, so as to preserve the moisture. If the fall is dry and hot the mildew may make the crop a failure, but in a favorable season the fall crop just before frost may be made quite a profitable one, and the vines may be plowed under on the land where the early cabbage crop is to be set later. We have never failed to

make a good fall crop sown in late August, but failed when later sowing was attempted in the dry weather we usually have in September. For a late crop, then, always take advantage of the late August rains.

MARKET PEAS.

First of All, Earliest of All, and sundry other special names are, as we have said, all special selections from the

Daniel O'Rourke.—This represents an old and fixed type of early garden peas, and the various stocks of the seedsmen vary only with the care devoted to the keeping of them pure and free from rogues or sports, that is, plants that break away from the type into a ranker and later growth.

Extra Early Nonpareil.—This is the best and earliest of the greenish-seeded type, and the stock we have used is one of remarkable purity. In a row of these we grew the present season a line stretched along the top would touch every plant in the row at the top, showing a very uniform growth.

Extra Early Despot.—This is similar but not quite as early as the Nonpareil. The two last varieties have been especially recommended for the fall crop, but we have found that some of the wrinkled sorts not commonly grown in spring by market gardeners give a good fall crop, the Premium Gem and Heroine especially.

Alaska.—This is an extra early pea, of better table quality than most of the extra earlies, and has of late years been largely planted. There are some very poor strains on the market, and in getting the Alaska growers should deal with the most reliable parties who will guarantee their stock pure.

Tom Thumb.—This is an extra early and very dwarf-growing pea, as the vines rarely exceed eight or nine inches in height, thus allowing it to be grown in very close rows or between other crops that require the whole ground later. It is also grown largely for the canning factories, as it is a profuse cropper.

Improved White Marrowfat.—A great improvement on the old White Marrowfat, and earlier than the Black Eye Marrowfat. It is a tall-growing pea and needs some support. The seed are sown in November in the eastern part of the State, and commonly in a cotton field alongside the dead stalks for a support. Being later, they come in after the extra earlies planted in January. They are very hardy, but are sometimes injured in severe winters and are not so largely grown as the extra early peas.

PEAS FOR THE HOME GARDEN.

For the home garden and the home market we need peas of a higher table quality than the extra earlies. While we usually plant a few

of these in January, and often have good success with them sown at that time, early planting is not always certain if severe weather follows. Hence, while planting a few, we make the main planting here in February and March. In any section of the State the garden pea should be among the earliest things planted, as moderate freezing after they are well started seldom does any harm.

Harbinger.—This is a new pea which we have grown for the first time this year. It is a very dwarf pea. Our plants, in rich soil, did not average over six inches high, but were loaded with large pods of fine peas. It is a fine early pea for small gardens, as the rows may be made but a foot wide, and a large crop can be had from a small area. From a limited trial, we are very much impressed with the value of this pea for the home garden.

McLean's Premium Gem.—This is one of the standard wrinkled peas, growing from twelve to fifteen inches high, and can be planted as early as any. We planted them in January last, and they came on at the same time as the extra earlies planted ten days later, as the weather checked the planting after we got these in. We have also found them the best for planting in late August for the fall crop.

Heroine.—This is a taller grower than the Gem, and a fine cropper, of very large pods of very large and fine quality peas.

Champion of England.—In quality the finest of peas, but a tall, rank grower. It gives a heavy crop and is still worth growing among all the new varieties that have been produced. It will grow over four feet tall, and of course must be supported. Of this we will speak later.

Yorkshire Hero.—This is our favorite among the wrinkled peas. It is earlier than Champion of England and comes in nicely between the Premium Gem and the Champion, planted at the same time.

Edible Podded Sugar Pea.—There are several varieties of these, all very similar in our experience. They differ from other peas in the fact that the whole pod is cooked like snap beans. They are tall growers and, in our experience, rather poor croppers.

In the home garden we give support to all peas except the Tom Thumb and Harbinger. Even the Premium Gem is better for being kept erect. We use for this purpose the wire netting now so commonly sold in the hardware stores. For the Gem we use the netting only a foot wide, and for taller peas vary it with the height of the vines. The netting is tied to stakes stuck along the rows as soon as the peas show signs of running, and adds greatly to the neatness of the garden and is by far the cheapest support that can be had. We have netting that has been in use for fourteen years and still seems as good as new. In one experiment we put the netting to part of the rows, and for the others sent a wagon to the woods and had the old-fashioned pea-brush cut for the remainder. Keeping an accurate account of the cost of men and team, we found that the pea-brush

cost more than the netting and was unsightly and useful but for one season. When the peas no longer need the netting it is either rolled up and stored or some of it is used for the running-beans, like the Limas, or for tomato plants. A lot of this netting of various widths comes in very handy in a garden all summer.

PEPPER.

The only peppers grown to any extent for market purposes are the large ones of the Bull Nose type, which are used for making the stuffed Mango pickles. They are more largely grown by those who supply the pickle factories than by the market gardeners proper. Not much attention is given to getting them very early, as they are wanted in the green state in the fall. The seed are sown in a frame in March, or in the open ground in April, and transplanted when large enough to their permanent location in rows three feet apart and two feet in the row, and are cultivated just as the farmers do cotton. They need a strong soil, and agree well with liberal manuring.

Bell or Bull Nose.—This is still the favorite with those who grow for the picklers, though of smaller size than some of the newer ones. It is fleshy and of mild flavor.

Ruby King.—This is much larger than the Bull Nose, and its fine appearance will recommend it to the market grower and the home garden. It is usually of very mild flavor, but last year we planted it in a row alongside the Tobasco and the hot little peppers seemed to affect it and the pickles were unusually hot. We advise keeping it away from the very hot varieties, as the crossing of the blossoms will certainly affect the quality.

Mammoth Chinese.—This is the largest of all peppers, but so far, in our experience, is a poorer grower and cropper than the Ruby King, which is large enough for any. Its shape is better, being broader than Ruby King, and we are now trying to cross the two to get an intermediate type.

Tobasco.—Where a pepper is wanted for pepper sauce this is the one to grow. It is enormously productive of little pods about an inch long. The plants in good soil will grow six feet high and should be planted two feet at least in the row and three to four feet between the rows. There is nothing hotter in the pepper tribe. It is a variety of the Small Chili.

POTATO (IRISH).

There is no truck crop of more importance and more largely grown in the South than the Irish potato. The production of early potatoes for the Northern market probably occupies more space and attention in the market gardens than any other early crop, except, perhaps, the early cabbage. Like all the early market crops, the potato has had

its fluctuations; in some seasons being so plentiful and low as to hardly pay for the digging, and then perhaps the very next season being in great demand at very remunerative prices. Seasons when any particular market crop fails to pay well, it is very apt to be the case that that particular crop will pay well the next season, because the growers of inferior products who have glutted the market will be discouraged and leave the crop to those who keep at their business in a uniform manner and never lose their heads. The gardener who regularly plants his uniform area is always more likely to succeed than the one who rushes in and out of any particular crop, as it may pay or not in a particular season.

As with other early crops, the early potato crop thrives best on a light and warm soil, and is always better on a soil well filled with vegetable decay. Hence, as a preparatory crop for the potato crop, there is nothing better than the cow-pea of the South. A heavy growth of pea-vines allowed to die on the land and remain during the winter for plowing under for the potatoes will insure freedom of the crop from scab, as the decaying mass will produce an acidity inimical to the scab fungus. Then, if the crop is liberally supplied with commercial fertilizer suited to it, very heavy crops of clean, smooth potatoes may be grown. There are few sections in the whole country which produce larger crops of Irish potatoes than the coast country of Eastern North Carolina. Heavy fertilization of the soil is needed for the best results in early vegetables, and the potato is no exception to this rule. We have often heard people say that their gardens are too rich for Irish potatoes, and that they make great tops and small potatoes. The fact is, that these old gardens have, year after year, been supplied with stable manure, and the decay of the organic matter contained in this manure supplied the soil well with humus and nitrogen, while it is deficient in phosphoric acid and potash, which most garden crops use freely. There is nothing that so increases the productiveness of an old garden which has long had its annual dressing of stable manure than to change for a season or two to commercial fertilizers. The old garden soil fails to make potatoes, because there is in it an excess of nitrogenous matter in proportion to the mineral plant food it contains. Therefore, in such a garden a liberal application of acid phosphate and potash to the potato crop will work wonders in the crop, and while large vines may still be produced they will be accompanied by a similarly large crop of tubers, since the food for their production is at hand. On most of the land devoted to the production of the early potato crops by our truck growers heavy applications of a complete fertilizer have been found necessary and profitable. I have found the following a good fertilizer mixture for the early potato crop:

Acid Phosphate	1,000 pounds.
Dried Blood	500 pounds.
Nitrate of Soda.....	100 pounds.
Muriate of Potash.....	400 pounds.

To make a ton, use from 700 to 1,000 pounds per acre, partly in the furrow and partly alongside the rows, after the potatoes start. In fact, all the nitrate of soda may be used in this way. Thorough preparation of the land is essential, and early planting. In the trucking section of the eastern part of the State the planting time is in February or early March, as the season permits, and in the western and colder sections as early as the condition of the soil will allow its preparation. We have tried fall planting here, but the results were too early starting and frosting of the tops. This, however, may happen even with spring planting, and it is worth while to test the late fall planting further, since the crop is very sensibly increased in earliness. I would suggest in this section of the State planting in December and covering six inches deep with pine straw, after covering the potatoes in the soil in the usual manner; then in spring remove the straw and cultivate the crop as usual. Potatoes treated in this way the present season were several weeks earlier than those planted in the spring, as the wet weather then delayed the planting beyond the usual time. Northern seed potatoes are now seldom used by the market growers of the South Atlantic States, since it has been found that potatoes grown here late in the fall from seed of the early crop make far better seed for the early planting than the Northern potatoes. They can be kept, too, for summer planting better than the Northern-grown potatoes, and for table use it is best to use the potatoes of the previous fall for planting in June and July, as they will produce a larger and more mature crop than the seed of the same season, since they start earlier.

THE EARLY CROP OF POTATOES.

The land should be thoroughly and deeply plowed, and harrowed fine. Lay off furrows two and a half to three feet apart, and scatter the fertilizer in the furrows and on both sides of the furrow. Lap two furrows over the first, and then open the beds again with the plow, and drop the potatoes, cut to two eyes, about a foot to fifteen inches apart, and throw two furrows over them. In this way the heavy application of fertilizer is well mixed in the soil and will not interfere with the growing of the potatoes. The crop can be much forwarded if, instead of planting so early that there will be danger that they will get above ground while frosts are imminent, they are spread in a place where they can be kept in the light and kept warm till they show sprouts before cutting. An unoccupied frame with

glass sashes is a good place to sprout them. We planted some treated in this way this spring in the frames from which the lettuce had been cut, and had perfectly ripe potatoes the 14th of May. Of course, this is earlier than they could have been had in the open ground, and it may not pay as a market crop to grow potatoes in frames under glass, but for family use it is very nice to have a few well-matured potatoes in May. Another season I propose to test this on a larger scale, to prove the availability of such intensive culture for market purposes. So far as it went, my crop this spring was a remarkably fine one, and large potatoes that would not slip the skin in the middle of May ought to bring a fancy price. In the cultivation of the early potato crop, the cultivator should be used, after the smoothing harrow has been run over, just as the plants appear above ground, and the final working should be with the turning-plow, throwing earth to the rows, for at this early season the ridges get the warmth of the sun better than the flat surface. With late potatoes we prefer perfectly flat cultivation. Where one has a weeder there is nothing better for the early cultivation till the tops get six inches high. Then one working with the cultivator and hilling will finish the crop. The ridges made in covering the potatoes are, of course, harrowed down before the potatoes appear.

SECOND CROP POTATOES.

For growing the second crop for seed, let the potatoes get completely ripe and the tops dead. Dig and spread them in the light, but not in full sun, to green slightly; then cut the potatoes simply in halves; spread in a single layer on the ground in any convenient place and cover with pine straw. When they show sprouts, plant them. This will be about the first week in August. In planting these we prefer to make deep furrows and plant in land that has been well manured for some early crop. Cover lightly till the leaves appear, and then work the soil to them till level, and cultivate shallow and level to retain the moisture. Some plant the potatoes as they are dug, and this may do in the more level and moist soils of the eastern part of the State, but in our dry soil in the upland sections it is better to cut and sprout them. We cut before sprouting, as they sprout more readily after cutting than before. These potatoes grow till the frost kills the tops, and are dug so late and kept so short a time before planting again that they do not sprout in winter as the Northern potatoes do, so that when they grow it is with the strong terminal bud, and a stronger plant is the result.

LATE POTATOES FOR TABLE USE.

For growing a crop of well-matured late potatoes for table use we prefer to use the second crop seed of the previous year. These are kept in a cool, dark place till they begin to show sign of sprouting. They are then spread out in a single layer on a barn floor, in full light, so as to keep the sprouts short, and are planted in the same way and with the same fertilization as the early crop, and cultivated in the same way. The middle of June or the first week in July will be the proper time for the planting. This crop should be cultivated shallow, rapidly and perfectly level, and no hilling done, as the object then is to conserve the moisture in the soil. This crop will mature before frost, and will make the best of potatoes for winter use or the local market.

In the western mountain country of the State it might be well for the growers to get the second crop seed from the eastern part of the State for the late planting.

Varieties.

The varieties of potatoes are now almost innumerable, and new ones are being introduced annually. It is always well for a grower to test annually a few of the new ones, but for a crop he should always depend on the standard varieties which have long been grown and proved. With many growers the

Early Rose still maintains the place it won many years ago as the standard early potato. A selected variety grown at Houlton, Maine, and known as the Houlton Rose, is highly esteemed. But other varieties are rapidly superseding the Rose with many growers.

Early Ohio.—This is similar in appearance to the Early Rose, but is rather earlier. It is a good, smooth and productive variety.

Bliss's Triumph.—This variety has largely superseded the Rose with many. It is a round potato with a red skin, and is very early and productive. A variety has been selected from it under the name of the White Skinned Bliss, which is now more largely grown than the red-skinned variety. With us it makes a good crop of uniformly good-sized potatoes, with very few small ones.

Maule's Early Thoroughbred.—Our experiments with this potato show that it is as early as any and remarkably productive. It is a large white oval-shaped potato, very smooth-skinned and with shallow eyes. Lighter in color than the Early Rose and uniformly larger. In table quality they are among the best.

Junior Pride.—A round potato, similar to the White Skin Bliss. Very productive, early and of good quality.

Freeman.—In quality and handsome appearance one of the best, but it has always been with us later than those mentioned above and very unproductive.

Early Bovee.—In our trials last year this was the leading early potato in crop. It is about the earliest in the lot, and is of good quality. It is a long oval potato with a pinkish skin, and is well worth testing by market growers.

Eureka.—This is the whitest and prettiest potato we ever grew. It is similar in shape to the Bliss, but far whiter than the White Bliss; in fact, the whitest of white potatoes. We are very much pleased with it from one trial this season. It was the Eureka which gave us ripe potatoes May 14th, when grown in a frame. For this purpose we expect to try it again. Its attractive appearance should make it a good seller.

Sir Walter Raleigh.—This is probably the best of the later varieties. It is a good cropper, and if kept in cold storage from the Northern-grown crop and planted here in June or July, will make a fine later crop.

We have tested other varieties, but the above are about the choice.

RADISHES.

When produced early the radish crop is of some importance to the market grower. It is one of the crops that we can profitably use glass sashes for in the early spring. Sown under glass in January or February in heavily fertilized soil, the early round and oval-shaped radishes can be made a fairly profitable crop, just as early beets may be under the same conditions. They need a light and warm soil and an abundance of nitrogenous fertilizer. The catalogues list numerous varieties, but for early use we have found nothing better than a good strain of the

French Breakfast.—This is an olive-shaped variety, of red color and early. But its defect is getting pithy as soon as of full size.

Tail's Favorite Forcing Radish.—This is probably the best for forcing for market in frames.

Long Scarlet Short Top.—This is more largely grown for market in the open ground than any other, but is not so good for frames as the short varieties. It makes long and handsome roots that bunch prettily and sell well.

Early radishes are often sown in the rows with beets to mark the rows early, as they come up quickly, and can be taken out by the time the beets need all the room.

WINTER RADISHES.

The only winter radish we have as yet found worth cultivating is the

Chinese Rose-colored Winter Radish.—This is, as the name indicates, a rose-colored radish. It grows to a large size and rather club-

shaped, or larger below just above the stump-root, than at the top. It is a very hardy radish, and we here sow it in rows a foot apart in late September and October. The first sowing being for use up to Christmas. The October sowing is slightly protected with rough manure, and the radishes are pulled all through the winter till March. Those who are fond of radishes will find this among the best. In the colder section of the State they can be lifted and stored like turnips, in the fall.

Radishes of the early varieties are sometimes forced in winter in cool greenhouses, and where there is a market that demands such products at that time they may be made profitable. But they are so easily grown in all the warmer parts of the State in simple frames, like lettuce, that it would hardly pay here to use greenhouses for the purpose.

HORSE RADISH.

The horse radish is a native of Europe. It needs a deep and very rich soil, and good roots cannot be grown in a thin or poor soil. It is a crop that can be produced profitably for market if grown right. It is propagated by making cuttings of the roots about three inches long. These should be planted here in the fall. They can be set between the early cabbages by making deep holes with a crowbar and dropping the cuttings into these, taking care not to put them upside down. They will make little growth till after the cabbages are off in the spring and can then be cultivated for the rest of the season, and the crop can be harvested in the fall and the roots trimmed for market and the new sets planted for another season. On good soil several tons per acre of the roots should be produced, and there is always an active demand for them.

SWEET POTATOES.

The sweet potato is generally regarded in the South more as a farm than a garden crop. It is a crop peculiarly adapted to the lighter soils and the Southern climate, and if the varieties popular in the North are grown the crop can be made a profitable one for Northern shipment. In the South we generally prefer the sweet and soft yam varieties, while in the North the dry Nansemond and similar sorts are preferred. Therefore, while we may not esteem these, if we are growing for market we must grow what the market wants. Every one in the South thinks he knows all about sweet potatoes, but we have seen a great deal of needless work applied to the crop, and a few hints in regard to the culture may not come amiss. This is one crop in which we have found shallow plowing an advantage, and shallow hilling, too. As frequently grown in the South with very high hills, the potatoes grow too long and misshapen. A sandy soil of but

moderate fertility is best for the potato. We would prefer to plant on a pea stubble, which will give all the nitrogen needed by the crop, and in a better shape than in a readily available commercial fertilizer. Having such a stubble I would plow it early in the spring not over four inches deep. In the absence of a pea stubble cover the land over with rakings from a pine woods and turn it under in February, and then by repeated harrowings mix it well with the soil.

PRODUCING THE PLANTS.

In the North a hotbed is necessary for the production of the sprouts for setting, but here I prefer a simple cold frame covered with a glass sash. In this frame I place about three inches of sand, and on this place the potatoes just so as not to touch each other, and then cover with a couple of inches of clean sand, and put the glass on and keep it close till the sprouts appear, after which plenty of air must be given whenever the sun shines. Of course due attention must be given to the watering of the bed as needed. Some bed in rich soil, with heating manure, but I have found that there is far less danger of disease by bedding in sand, and the plants are better rooted. The best potatoes for bedding are produced by making cuttings of the vines in August and setting them closely in rows and cultivating as the general crop. These cuttings should be made of the tips of the vines and about a yard long. Coil the cutting around the hand and set the coil in the hill so that only the tip is above the ground. Every joint then will make a bunch of little potatoes, which will keep easily in winter, and be far better for bedding than small potatoes selected from the main crop. Cloth will answer to cover the plant bed, but the plants will not be so early as under glass.

PLANTING THE CROP.

Run out furrows three feet apart, and in these furrows apply the fertilizer. If on a pea stubble or with a good dressing of woods trash, no ammoniated fertilizer will be needed, but in the absence of these a small percentage of ammonia is needed, and the ordinary 8-2-2 fertilizer sold for cotton will answer, though a larger percentage of potash will be better. When on a pea stubble or with a good application of leaf mold I would mix to make a ton 1,800 pounds of acid phosphate and 200 pounds of high-grade sulphate of potash, and would use of this about 400 pounds per acre in the furrows. After applying the fertilizer, draw the plants and set them as drawn in a tub of water, so that they can be set dripping. Throw a furrow from either side over the fertilized furrow and set the plants about fifteen inches apart in the rows, putting them deeply in the earth, so that only the tip is above the ground. Before doing this I should

have said that the top of the ridge formed by the two furrows should be flattened. Cultivation with the ordinary small-tooth cultivator begins as soon as the plants have taken root, and is kept up till the vines run in the way. The last working is done by throwing the vines over into the adjoining space and plowing the earth to the plants in each alternate row. Then, throwing the vines back, plow out the other rows, and the work is done.

THE LATE CROP.

While the sets raised from the bedded potatoes are best for the early planting, the crop for keeping in the winter is better grown from cuttings. Make cuttings of the tips of the vines early in July and set them in rows just before a rain, in the same way as the early plants. They take root readily and the crop produced will be later and will keep far better in winter than that from the spring plants. Later, in August, as we have already suggested, long cuttings are made for the production of seed potatoes for the next spring's bedding.

HARVESTING AND KEEPING SWEET POTATOES.

The crop for the early market is, of course, dug as soon as the tubers are of a marketable size, but the crop for winter keeping should be allowed to grow as long as the weather will permit. When frost has blackened the tops lose no time in getting the vines off, for if left after they are killed they will communicate a decay to the roots. Therefore, take off the tops at once, though digging may be deferred. Endeavor to dig the crop in dry and sunny weather. In taking them from the ground use every care to avoid bruising, and never allow the potatoes to be thrown in heaps, but let them lie in the sun along the rows as dug. Take them up in baskets or boxes, never in sacks or dumped into a wagon body, for the success in keeping depends largely on the care with which they are handled.

Sweet potatoes may be kept in this climate in heaps or banks if properly handled, but where a large crop is grown it will pay to build a regular potato house, which I will describe further on. If they are to be kept in banks a good supply of pine straw should be provided sometime beforehand and put under cover, so as to have it perfectly dry. Select a high spot where no water can run to the heaps. Put down a layer of the pine straw a foot deep, and pile the potatoes carefully in conical heaps, not more than twenty-five bushels in a heap. Then cover a foot deep with the pine straw and build a rough shed over the heaps. Let them remain in this way till they have passed through the sweat which they always have after storing. As the weather gets colder cover the heaps with dry soil, and later on increase its thickness. The roof over the heaps is important, for dry

earth will keep out far more cold than wet earth. I have kept them in this way till June without loss.

But by far the best way to keep sweet potatoes is in a house made for the purpose. A tobacco barn with furnace and flues can be utilized in the absence of a regular potato house, by putting slatted shelving in it on which to place the potatoes, and then start the fire and keep up a temperature of 90 degrees till they have sweated and dried. After this, if care is taken that the temperature does not fall lower than 45 degrees, they will keep easily. The drying off at a high temperature when first stored is the important point.

A sweet potato house should be made about ten feet wide and as long as needed. The walls should be doubled and packed with dry sawdust, and the ceiling packed in the same way. A ventilator should be placed in the roof and the doors should be doubled and about six inches between them. Make a furnace at one end, like that in a tobacco barn, and take a flue straight through overhead. Make slatted shelves on each side on which to store the potatoes so that they need not be more than a foot deep on the shelves. Fire up to 90 degrees when first stored and dry off the potatoes completely, keeping the ventilator open slightly to let the vapor pass off. When dry, close up and keep cool and there will be little rotting if care is taken to start a little fire in very cold spells to keep the temperature up to 45 or 50 degrees. In such a house it is easy to keep potatoes till the new crop comes in.

VARIETIES OF SWEET POTATOES.

Nansemond.—This is the most popular yellow potato in the Northern markets. It is smooth and handsome and a fairly good cropper, but is too dry and lacks sweetness for the Southern taste.

Red Nose.—This is a yellow potato, somewhat similar to the Nansemond, but usually averages larger in size. It sells on the Northern markets as Nansemond, but is rather a heavier cropper.

Barbadoes.—There are two varieties known here as Barbadoes or "Bayduses," as they are commonly called. One has white flesh and one yellow. Both are of fine quality and have the soft sugary sweetness popular with the Southern people. In yield they are hardly equal to some others.

Norton Yam.—This is one of the dark yellow or pumpkin-colored class, similar to the Pumpkin Yam of Georgia. It is one of the most popular potatoes in this State, and is as largely grown as any other. We have seen it sporting into a bush form, and by proper selection a vineless variety could be easily produced.

Vineless Yam.—This is distinguished by the tops of the plants assuming a bush-like form instead of running flat on the ground.

From a single season, in growing it, I have not formed a very favorable opinion of its quality.

Jewell Yam.—This is a local variety, grown to some extent in Wake county. It is a long-yellow-bark potato, intermediate between the yellow Nansemond and the yam class. It is sweet and good and a good cropper.

Negro Choker.—This is a long-growing potato, with a purplish red skin and snow-white flesh. It belongs to the dry class and would suit the Northern taste. It is a good cropper and would probably take well North, but is too dry for the home market.

Peabody.—This is probably the largest potato and heaviest cropper grown. Dug when half grown it may pay for the early market. It has yellow flesh and a pink skin. When fully grown it is almost worthless for the table, but is valuable as a food for hogs to gather for themselves. No other potato will make as many bushels per acre.

Southern Queen or Hayman.—This is a large, roundish potato, which was brought by Captain Hayman to North Carolina from Brazil, and which was later brought out by a New York seedsman under the name of Southern Queen. It is the earliest sweet potato grown, and the easiest one to keep in winter, as it will keep well in any ordinary dry cellar. Next to the Peabody, it is the heaviest cropper. Its faults are a tendency to grow too large, and in quality it is intermediate between the yam class and the Nansemond class. It is common in the Northern markets under the name of yam. The flesh is yellow and the skin is lighter colored. It will make a better crop on clay loam than most other potatoes.

Little has been done in the way of growing improved varieties of the sweet potato. Some years ago we grew from seed brought from Florida, for while some varieties bloom here we have never seen any seed perfected in this climate. Unfortunately, our crop from these seeds was lost in the following winter by dry rot, and we have never had an opportunity to try the seed again. The sweet potato is a member of the morning glory family, and grows easily from the seed when they can be procured, and it would seem that in some of the tropical islands we now possess seed could be produced that would give us improved varieties, and we hope that the new Experiment Stations started in Porto Rico and elsewhere will give some attention to this crop.

SALSIFY.

This is a hardy, tap-rooted plant of the composite order, commonly known as vegetable oyster plant, as the roots when boiled and mashed and fried in batter very closely resemble fried oysters. As salsify makes a long tap-root it is essential that it have a deep and mellow soil. In the North it is one of the earliest vegetables planted, but

in the South, if planted early, it is apt to run to seed at midsummer and to get woody and worthless. Since it will grow all through our winters, early sowing is not necessary, and the best time to sow the seed is about the first of July. The seed germinate poorly in a loose soil, and hence should be sown rather thickly and the row tramped over after sowing. When a good stand is had the plants can be thinned to about three inches apart, and should be worked clean and rapidly and perfectly level. No protection is needed in winter, as the plants will make their best growth here during December.

The only variety worth growing is the one known as Sandwich Island. For market the roots must be trimmed and washed and tied in bunches of half a dozen or more, using one tie around the tops, which should be shortened, and another around the ends of the roots.

SPINACH.

This plant is very largely grown by Southern market gardeners, especially about Norfolk, Va., for a winter greens, and hundreds of acres are annually devoted to it. In hard winters, when the crop North is apt to be killed, the Southern crop pays well, but often the price is very low. The crop needs a fertile soil or one that has been heavily fertilized for a summer crop. Sow the seeds rather thickly in rows far enough apart for cultivation early in September or late August, and make another sowing about the first of October. A fertilizer high in ammonia is best for this crop.

There are a number of varieties, and the books by Northern writers always advise the sowing of the prickly-seeded sort in the fall and the smooth-seeded in the spring, while market gardeners invariably do the reverse, and, in fact, seldom sow any but the smooth-seeded sorts. The best of these and the only variety I use is Tait's Improved Curled Savoy.

SQUASH.

Summer squashes are commonly called cymblings in the South. They are grown in the same way as cucumbers and muskmelons. The Bush Pattypan is the variety commonly used, but there are a number of others, and the Summer Crookneck is of better quality for home use than the Pattypan, but not so good for market, as it does not crate easily. There are a number of winter varieties which are but little grown in the South. In the North they are baked and take the place of our sweet potato, but here the sweet potato can entirely take the place of the winter squash.

TOMATO.

No vegetable is more largely grown in summer than the tomato, and none has received more attention from the plant improver. Hence the varieties are almost endless, and new ones are continually being introduced. The tomato is so easily bred into better shape and so quickly deteriorates from neglect, that many of the varieties that have been in the catalogues for many years are no longer what they were, but have either been selected into better shapes or allowed to deteriorate. The crop is now very largely grown as a field crop by farmers in Maryland and elsewhere in the Middle States for the canning factories. As a market crop the profit depends on the getting of the crop early, for only the earliest will pay for shipment from the South. Therefore, especial pains must be taken in forwarding the plants for setting. Every market gardener should have at least a small greenhouse and plenty of frames covered with sashes. These are indispensable in getting an early crop of tomatoes, for plants sown thickly in a hotbed and transplanted directly to the field are seldom any earlier than plants grown from seed in the open ground. The seed should be sown in the greenhouse in shallow boxes or flats, about ten weeks before it will be safe to plant in the field in the locality. As soon as the plants are well up we transplant them to other boxes and give them about two inches space each way. They are then kept in a house that has a night temperature of about 45 degrees at night, so as to grow slowly. By the first week in March they can be transplanted to the cold frames and set about four or five inches apart each way for hardening off. If very cold weather should occur after they are in the frames the glass should be protected at night with straw mats. Air should be given in the frames at every opportunity, and the plants gradually inured to the open air, and finally the glass should be left off at night before setting them. This method will give stout and hardy plants, and the earlier they can be gotten into the field and live the earlier the crop will be. In this locality we can usually set them the last of the first week in April. The plants are lifted from the frames with a garden trowel and carried in flats to the field with the mass of earth adhering to the roots. If the soil is dry we pour water in the holes, set the plant and pull dry earth around the roots, and in this way seldom have a plant wilt. In field culture we set the plants four feet apart each way and merely cultivate clean and let them grow as they will and tumble on the ground. In garden culture we plant in rows four feet a part and set the plants two feet apart in the rows, and place a strong stake to each, to which it is trained with a single stem and all side shoots kept nipped off. This gives the earliest crop, but not so large a one as where the plants grow at will. In this part of the State the growing of tomatoes is far more difficult than in the western

section or northward. The early plants are usually exhausted by the last of July, and hence the need for growing a second crop to follow these. For this crop we sow seed in the open ground about the last of May and transplant them in spots where some early crop has been taken off. These plants will furnish fruit till frost. When frost nips the vines we gather all the green tomatoes and wrap each one separately in old newspaper, pack them in crates and put into a cool, dark basement or cellar. We try to keep them as cool as practicable not to be in danger of freezing, and bring a few into a warm room at a time to ripen up. In this way we have tomatoes for slicing till after Christmas.

The great difficulty in the growing of tomatoes here is the bacterial wilt disease, which takes off the plants suddenly when just full of green fruit. We have found that an application of lime to the land will temporarily check the disease, but the best thing that can be done is to avoid repeating the crop on the same land for several years. It is well also to sterilize the soil used in the seed boxes by heating it, before filling the boxes, to about 200 degrees. Spraying with the Bordeaux mixture will have little or no influence on this Southern blight, as it is called, but the spraying should be done while the plants are in the frames, and after they are set out, at intervals till the fruit is half grown. This is used as a preventive of the rotting of the fruit.

Varieties of Tomatoes.

These are now so numerous that a complete list of the varieties offered by the seedsmen would tend more to confuse the inexperienced gardener than to help him. Therefore we give merely a selected list, which we have tested and approved more or less. The rule that increase of size in fruits is always accompanied by a decrease in number of fruits holds good with the tomato. The little currant, cherry and plum-shaped tomatoes produce a greater number of fruits than the larger ones. Hence we have found that for general purposes a fairly medium-sized tomato is more satisfactory than an enormously large one. This is true, not only for those used at home, but for the crop intended for market or canning. The canning houses do not want the over-large tomatoes and the buyer in the city market will take the smooth, medium-sized ones in preference to extra large ones. It is found that the small pear and plum-shaped tomatoes resist the Southern bacterial blight, and it is to be hoped that through crossing these with the larger sorts we may develop a variety of good quality that will be resistant. A tomato that is early, of good, smooth character and productive is the great desideratum for the Southern market grower. Most of the early varieties have been defective in shape, or hollow and otherwise objectionable.

If the following variety comes up to the claims made for it by Messrs. George Tait & Sons of Norfolk, Va., who introduced it this season, it will be a valuable variety for the South. This is

Hawkins' Sunrise.—This tomato has been produced by a Norfolk truck grower, and with him has for two years beaten every other variety shipped from Norfolk. It is a brilliant red tomato, very thick and symmetrical, and beautifully smooth from first to last. Its greatest claims are its extraordinary combination of size with earliness, and its apparent exemption from disease. We have not yet grown this variety, but give the description of the introducers, in whose statements we have confidence, and believe it worthy of trial by our market growers.

Sparks' Earliana.—This has of late been one of the leading extra early varieties, but the first named is claimed to be larger and of better quality, and fully as early. Earliana is certainly one of the earliest we have tried, but in quality is not first class.

Maule's Earliest.—This is about as early as any, and is the most prolific tomato we have ever grown. It is bright red in color and of large size. Its fault is that many of the fruits come very much distorted in shape. If it can be bred into a smooth shape there will be little left to desire in an extra early tomato. If Hawkins' Sunrise is all that is claimed for it, it will probably become the standard early tomato in the South.

Beauty.—This is one of the best of the many tomatoes produced by the late Mr. Livingston of Ohio. It is large, solid and smooth, and of a rich, reddish purple color. Of late it has been more subject to disease than others, and is declining in popularity. Where it thrives there are few better tomatoes.

Success.—This tomato, introduced by W. H. Maule of Philadelphia, we have found the best main crop tomato we have ever grown. Its brilliant red color, solidity and smoothness, combined with great productiveness and a size large enough for general purposes, have made it a favorite with us and with all who have grown it. We regard it as the standard tomato of to-day for the general crop.

Ponderosa.—Probably the largest tomato grown. It is very solid and of good quality, but entirely too large and unproductive for general use. Its value is mainly for the production of a few immense fruits for exhibition. It often comes in a very rough shape, though generally rather smooth. It is more of a curiosity than a general cropper.

Of course there are many other varieties of tomatoes listed in the catalogues. Most of the extra early ones are defective in shape and solidity, and are rapidly being dropped by growers, and many of the later ones, while large and heavy, are of irregular shape. Therefore, we have endeavored to give a list of a few that are the most promising. Tomatoes can, of course, be grown well with com-

mercial fertilizers, but we have found that a combination of stable manure broadcast with a little high-grade fertilizers applied around the plants after setting, will give better results. Where only fertilizers are used the crop deteriorates more rapidly as the season advances, and lasts a shorter time. With a broadcast application of stable manure we have had the early plants to run through the entire season, while they always fail soon after midsummer with fertilizers alone. An application of nitrate of soda around the plants when the fruit first forms is a decided advantage to the crop. The tomato is one of the crops which the Southern grower should always devote attention to saving seed for his own use. Care in the selection of seed can be made the means of greatly improving the crop in quality and earliness. If a plant is found of remarkably good qualities among a lot of others not so good, do not save seed from it at once, but make cuttings of it and root them in the greenhouse and carry over winter, just as geraniums and other flowering plants, and increase the number, so that in the spring you may have a number of plants of this identical tomato, which can be planted away from other sorts, and from which you can save seed with some certainty of getting the same sort. Then a few years' selection will enable you to establish it as a variety that will come true to type from seed.

TURNIPS.

Turnips are more of a farm crop in the South than a garden crop. But in some seasons the sowing of the Purple Top Strap Leaf turnip in the early spring for shipment North will prove profitable. In past years I have made this spring crop quite profitable by using a piece of light sandy soil and giving a heavy application of high-grade fertilizer rich in nitrogen or ammonia. Harrow this in well and sow the seed broadcast thinly. The crop is quickly grown, and I have at times received \$3 per barrel for them in the spring. For this crop it is probable that the newer variety known as the Extra Early White Milan or the Purple Top Milan will be better than the old Purple Top Strap Leaved, as it grows as quickly as a radish. The Seven Top turnip is popular in the South for greens, as it grows well all winter and furnishes an abundance of sprouts for boiling. The larger turnips are mainly of use to the farmer and stock grower. The extra early varieties can be sown here as late as October and make a crop. For family use in winter, we have found the Long White French turnip best. It is a long tap-rooted variety, near akin to the ruta бага. The seed should be sown early in August for the best results, and as it is perfectly hardy it can be left where it grows all winter and seldom becomes pithy. In the colder parts of the State it is best to plow a furrow to each side of the rows late in the fall

as a protection. It is the sweetest turnip we have ever grown, but needs a longer season than others.

PACKING AND SHIPPING VEGETABLES.

It is of the greatest importance that the products of the market garden should be put into an attractive shape for market. Green onions, beets and other crops that are sold in bunches should be properly washed and neatly tied in bunches with strings of raffia and packed in barrels. Asparagus must be bunched in the regular buncher and the bunches made of the regulation size. Asparagus is shipped in flat crates, just high enough to admit of the bunches being stood on end on a layer of damp moss and covered with another layer, the bunches being set in so closely that they cannot jostle and get out of place. Cabbages are shipped in barrel crates with a partition in the middle. Beans and peas and lettuce in bushel baskets with a cover held tight with wire hooks. If lettuce is grown of fine quality under glass it will pay to ship in the Southern carriers holding about two dozen heads. These will sell in direct competition with the hothouse lettuce of the North, and will bring more money than lettuce grown under cloth and shipped in baskets or barrels. A neat and attractive package always pays, and an honestly packed package will always tend to make a reputation for the grower, while a poorly culled sample and dishonest packing will always give the grower a bad name and a lower price for his articles. Never ship culls of any sort unless the market is very high and culls can be shipped as culls and pay. Muskmelons are shipped in crates, and they, too, should be rigidly culled and no over-ripe or green specimens sent. The grower who always sends a good article, well-packed in neat packages, will always make better prices than the man who tries to work off an inferior article by hiding it in a package, surrounded by good specimens, for the only man he cheats will be himself with this last sort of packing. Always ship to a commission merchant who has made a reputation for fair dealing, and who has a good bank standing rather than an unknown party. While there are rogues in the commission business, there are honorable and responsible men, and these you should find out and stick to.

