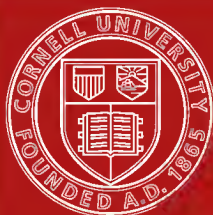


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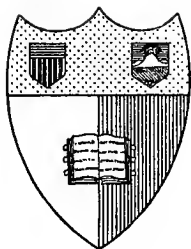
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Vegetable Gardening



Charles Johnson

THE
SEED GROWER.

A Practical Treatise on
Growing Vegetable and Flower Seeds and
Bulbs for the Market.

BY
CHARLES JOHNSON,
AUTHOR OF THE SEEDSMAN'S ASSISTANT.

MARIETTA, PA.
1906.

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BY

CHARLES JOHNSON.

WICKERSHAM PRINTING CO.,
Printers and Binders,
LANCASTER, PA.

AUTHOR'S PREFACE.

SEED-GROWING properly pertains to an agricultural country, such as is the United States. It is a business in which the profits are large and one which to supply our needs in full affords great opportunity for much enlargement in this country. It is also an industry that could be built up here for export trade, which at present amounts to comparatively nothing.

In all candor it must be said, we do not stand in the front rank before the world as seed-growers. For, while the past quarter of a century has seen much progress here in seed-growing, the industry with us is still in a stage of infancy and much remains to be done. As evidenced by the following pages, we still depend to a large extent on European growers for the best grown seeds of many varieties, particularly of beet, cabbage, carrot, cauliflower, kale, kohl rabi, leek, onion (a few kinds), parsley, parsnip, radish, spinach, turnip, the choicer grades of flower seeds and all our Fall planting bulbs. The exceptions to these, however, namely, peas, beans, celery, cucumber, lettuce, melon, tomato, certain kinds of onion, we no longer import, for we have demonstrated our ability to grow the finest seeds of these ourselves more cheaply than can be done in Europe. Therefore what we are doing with these we can also do in producing commercially all other seeds required for the garden.

Why should we not lead the world in the production

of all kinds of seeds? With agricultural resources and facilities practically unlimited, we lead and excel in farm products generally. We not only produce all the seeds of grains and grasses (introduced here from abroad) required by ourselves, but also ship great quantities to Foreign countries, owing to our producing them so cheaply. We have cheaper and better land than has Europe, and a greater diversity of climate and soil. And besides all these advantages we have what goes without saying, an abundance of American intelligence, energy, application and pride to enable us to produce at lesser cost than in Europe, and at a good profit to ourselves, the very highest grades of all varieties of seeds for the vegetable and flower garden, for our own use and the outside world as well. But after all the plain truth of the matter is, what is really required to promote the seed-growing industry in our nation is simply a display of American enterprise and knowing how.

In seed-growing as in every other art, it is attention to a particular line—specialization—that insures success. The misfit, the visionary and the “all-around man” are all too likely to fall into the same class when results are under consideration. But the specialist “gets there.” Be a specialist!

It is to stimulate in our farming community the spirit just named, that this work, believed to be the first published, in any country, treating especially of seed-growing for commercial purposes, has mainly been prompted, and in the hope that it will furnish the information required for the occasion the volume is launched upon its career.

THE AUTHOR.

Marietta, Pa., October 1, 1905.

THE SEED-GROWER.

INTRODUCTORY.

Suggestions to Beginners.—The beginner who is without previous experience is advised in growing seed for commercial purposes to proceed slowly and not attempt too much at the outset. It is better to feel your way, with your first year's operations on a limited scale, rather in the nature of an experiment to see what can be done with profit and with success.

Endeavor to make your first customers in nearby towns and cities; strive, by growing only the highest standard seeds, to create a reputation for the quality of what you grow. This latter, naturally, is a matter that must be left to the results of one or two season's trial of your products by your customers. Once having given satisfaction, the way should be clear thereafter; one satisfied customer is usually the means of securing others.

Because your acquaintance with seedsmen in the country at large is limited to the few (enterprising though they be) who make a practice of advertising extensively in magazines, do not imagine that these few comprise the seed trade in its full strength and entirety. The fact of the matter is, there are many hundreds of other large firms dealing in seeds exclusively, located in every town and city of importance in the Union, who sell locally, in a quieter sort of way, large quanti-

ties of seeds. And, besides these who handle nothing but seeds, there are thousands of merchants in smaller towns who combine seeds with their other lines, all of which constitutes a broad field for exploitation by the seed-grower.

The Store-house or Barn of a seed-grower should be a well-constructed, dry, properly ventilated building, containing plenty of loft-room for the drying of seeds, and an apartment for thrashing and cleaning; and this building must be kept free from rats, mice, and vermin, for these will do serious damage to seeds, if allowed to exist where seeds are stored.

Stock Seeds.—The preparation of the soil for growing a seed-crop, sowing of seed, and method of cultivation are much the same as in ordinary garden practice. But what is of particular importance at the start, as being very much essential to success, is that the grower should be provided with an ample supply of pure stock, planting, or breeding-seed, of the varieties which are purposed to be grown. This stock-seed should have been grown carefully by the operator or grower himself, obviously the better plan, or it may sometimes be procured from the seed dealer for whom the crop is to be grown. It must, however, be remembered that by stock-seed is not meant commercial seed, as it is termed, or that seed which is sold by the dealer to his general trade. Stock seed, if the dealer should happen to have it, is seed which has been specially grown for him in the usual course prescribed for raising stock seed, by careful selection, etc., and is kept on hand to supply to growers with whom he makes contracts for commercial seed; not every seedsman, though, makes a practice of carrying stock-seeds.

Harvesting, etc.—The operations for harvesting

and cleaning will be found given for most varieties as they are severally treated upon, under their respective headings, but it may further matters to present some of these in a general way, in advance herewith.

Threshing.—The operation of threshing most seeds, not of a pulpy character, may be done, either with a flail, a roller drawn by horses, or a threshing machine. One of the most popular threshing machines on the market, designed for many varieties of vegetable seed, is made by the Bidwell Co., at Batavia, N. Y.

When threshing is done with a flail, do so lightly to avoid breaking of seed, particularly if it is of a soft, oily nature. By threshing on a cloth, seed is better saved, and is not so liable to get broken as when the work is done on the bare floor. The threshing cloth may be made of canvas or cotton cloth.

Cleaning.—After threshing, the stalks and chaff are raked away and seed is run through the machine called a fan-mill or a seed cleaner. This machine is indispensable for the proper cleaning of every kind of seed, and may be purchased through any dealer in agricultural machinery.

It is important here to call attention to the fact that even farm seeds, such as wheat, oats, barley, timothy, clover, millet, etc., should not be sown without having been given a thorough cleaning in a fan-mill, to remove weed-seeds, and light, immature seeds. Tests which were made for a number of years at several of our experiment stations, have demonstrated that the removal of small, immature, and damaged seeds, results in better yields, both as to quality and quantity, the increase of same amounting to twenty to twenty-five per cent.

Some kinds of seed are not always thoroughly cleaned

by the seed-cleaner, and it may be necessary to finish the operation with a hand-sieve. Hand-sieves will answer for cleaning small quantities in case the grower does not own a machine seed-cleaner.

Cleaning by Fermentation.—This is a necessary process for cleansing seeds like egg plant, cucumber, melon, pumpkin, squash and tomato, which are covered with a sticky pulp. The souring loosens this pulp, and then by a rinsing in water, or washing as it is termed, the pulp is removed entirely, and the seed rendered nice and clean. Some judgment must be used in fermentation; the liquid should be given an occasional stirring, and while no injury to seeds will result as far as germination is concerned, so long as they remain in the natural juice, yet if permitted to stay in it longer than is required to loosen the pulp, they are likely to become blackened or discolored. One may know whether fermentation has gone far enough by taking up a handful of the pulp and squeezing it. If on opening the hand the seed is free from pulp, it is ready for washing, but if the pulp still sticks to it, more fermentation is necessary.

Washing.—Seeds which have undergone fermentation are washed in clear water in a tank, which is made to allow the pulp to be poured, floated or drawn off. A small quantity may be washed in a bucket, a tub or a tight barrel.

Onion seeds will be found directed to be cleaned by washing. This is done simply to relieve them from light, immature seeds and portions of pods, no fermentation being necessary.

Drying.—After washing, seeds should be drained of surplus water and then spread on screens or drying frames, which are placed in the sun and air to dry.

These screens are three feet wide by twelve to fourteen feet in length, made of burlap or muslin, with frames of three by four scantling.

After cleaning, all seeds, as a rule, should be spread thinly on cloth, in the loft or drying room, and allowed to remain till thoroughly dry; while they are thus drying, they should be stirred over frequently by raking.

No seeds should be stored in bulk until in perfectly dry condition. Sugar corn, in particular, holds moisture for a long time, and it is likely to mould if piled in bulk or stored in sacks too soon.

Marketable Condition.—To be in prime, marketable condition seeds must be bright in appearance, free from discoloration, free from foreign seeds, from dust, chaff, sticks, and light, immature, and broken grains.

Labeling.—In storing, great care must be taken to label varieties properly. A tag or a label bearing the name of the variety, and the year of the crop, should be attached to the outside of the sack, and a duplicate of same placed inside. The worst kinds of errors are likely to ensue if some system of labeling is not adopted. An instance in point may be related of a certain establishment, the proprietor of which was an unmethodical person who trusted everything to his memory.

The hundreds of sacks of various kinds of seed as they lay piled in view in his warehouse, did not bear a single outside label, nor any mark to denote their contents. The proprietor in question (one of those who know everything) would say that he knew the contents of every sack, its particular location, and could lay his hands at once on a sack containing any special variety wanted. His few employees were obliged to run to him for consultation (at a loss of their time; he did

not consider this) when they would desire a certain variety. We all are aware what tricks memory will play, if we depend upon it entirely. And no one was surprised when this individual one day had to encounter a heavy law-suit for damages, resulting from a mistake which was made in giving the wrong variety, and which would have been prevented by labeling.

The moral point desired to be impressed is, you cannot be too methodical, too particular, in the care of seeds in warehouse or store.

Contract Forms.—Some forms of contracts as differently made by growers with dealers, which will be found given, will render aid to the novice in formulating a contract. No seed-grower should undertake a crop for any one without first securing a written contract at the time arrangements are concluded. A signed contract affords protection against possible contingencies, and it is now a custom that is closely followed by all established growers in this and other countries.

Synonyms.—In the description of varieties, there will be found, properly arranged, the various synonyms in vogue up to date, which it is hoped will render service not only to the seed-grower, but to both the family and the market gardener.

Explanation of the origin of this multiplicity of new names for many staple varieties is to be found in the chapter on "Origination of new Varieties," in what is said relating to the seed trade offering the greatest stimulus for production of new sorts.

Trial Grounds.—While every seedsman or dealer should have a trial grounds in which to test for himself all seeds sold by him, so should every seed-grower have one in which to test all novelties as they are pre-

sented from time to time by the different seedsmen. The few suggestions therefore for detail work in trial grounds are deemed not inappropriate.

Cultural Directions, Time of Maturity, etc.—

These should prove convenient for reference, not only by the grower, but more especially by all seed dealers, as an aid to their salespeople in supplying information to inquiring customers.

Growers' Prices.—The prices which have been given in these pages are those obtained by the principal or main grower, who, however, frequently sublets portions of his contracts at lower figures.

In cases of importation, duty and freight to New York have been included.

SEED-SAVING METHODS, WITH YIELDS PER ACRE, GROWERS' PRICES, MARKET STATUS.

ARTICHOKE.

Artichoke proper is hereof treated, the sort cultivated in the kitchen garden for its flower-heads or buds as well as for portions of the leaf-stalk.

It is a perennial of hardy nature, which gives in the first year but few flower-heads or seed, a growth of two years being necessary for the production of a full seed crop.

To insure the finest and purest seeds, the better plan is to plant slips or suckers taken from established plants which have borne flower-heads possessing the characteristics of the variety. These slips should be taken off late in spring, or in extreme southern sections in October, when they are of a height of six inches or so, and transplanted about four inches deep, in rows four feet apart, two feet in the row. Cultivate the crop and keep the soil loose and free from weeds.

But when suckers are not to be had, then plants must be obtained from seed, which is sown early in spring, in drills one foot apart, seeds being covered one inch deep. When plants are several inches high, transplant in rows same as directed for slips. These plants in the second year should be gone over carefully, and only those which have given large flower-heads true to variety must be allowed to remain for seed.

In the rigorous winters of the Northern States, artichoke requires protection with a covering of straw or stable litter, but in the warmer climates of the Southern and Pacific Coast sections this is not necessary.

Seed may be shelled by hand, or thrashed out on a floor, with a flail, running seed through a fan mill for cleaning.

Market.—While the more general cultivation of this vegetable in the United States is confined to the South and to the Pacific Coast, it is also grown with success, but on a lesser scale, in Northern sections.

All seedsmen have a moderate demand for artichoke seed; it is mostly imported from Europe, at price laid down in New York of about \$1.00 per pound.

In a favorable season, a yield is about 300 pounds per acre.

✓ ASPARAGUS.

Asparagus reaches full growth generally in the second year. On its numerous branches there are borne a great profusion of bright-scarlet berries, which contain the seeds, several in each berry. When these berries are soft-ripe seeds are sufficiently matured for saving. The stalks are then cut and taken to the barn or shed for extraction of seed.

Extracting and Drying Seed.—The first operation is to separate the berries from the stalks, which may be done by stripping them off by hand, or by threshing them out on a cloth spread on the floor.

Then to extract the seed, the berries are first mashed or crushed in a tub or a barrel, using for the purpose a wooden pounder; next, they are washed to clean the shells from the seed, which may be done in the same tub or barrel. The vessel used is filled two-thirds with water, the berries are poured in, and then the whole is

vigorously stirred, which motion will cause the seeds to become loosened and fall to the bottom, while the shells will float and are slowly poured off with the water.

In fresh water the seeds are given another washing, and if this does not render them thoroughly clean, it should be repeated.

Seeds are then spread on smooth boards or on cloth screens and set in the sun for a day to dry. This is hastened and more properly done by giving the seeds an occasional stirring or turning over while they are thus spread out. They are then removed to a drying loft or room and spread thinly on a cloth and left to remain until they have become thoroughly dry, when they may be cleaned in the seed-cleaner and afterwards stored in sacks.

Saving Seeds for Private Use.—Select the largest and finest berries, dry and preserve them. In their dried shells, seeds keep better and retain their vitality longer.

Market.—Asparagus seed is handled by all seed dealers, its aggregate yearly consumption in the United States being upwards of 75,000 pounds, nearly all of which is produced here.

In a favorable season, a yield ranges from 1,000 to 1,200 pounds per acre, at a price usually of ten cents per pound to the grower.

BEAN.

For a seed crop of beans, either a good clay loam or a fertile sandy loam is desirable; the richer the land, the better and bigger the crop; stable manure when to be had is the best fertilizer.

Beans do not readily cross, and different varieties may be planted near each other without mixture, but

the seed used for planting must be pure and true to variety. Planting is usually made in northern latitudes about June 1st, at the rate of one bushel per acre, in single rows three feet apart, beans being dropped two to three inches apart in the row. Some few growers plant in hills ten inches apart, two or three beans in a hill; but the former is the preferable way.

Cultivation should be begun two or three days after seeding, and should be kept up continuously throughout the season. The early cultivation destroys the weeds that first start before the seeds are up. A drag-tooth cultivator with five teeth is generally used for this purpose, so that the earth is thrown against the rows. Sometimes, when grass is starting in the crop, a point that presents a cutting edge in front, is attached to the cultivator, but this is only used in case the grass has obtained quite a start.

In the Middle West harvest begins about September 1st, varying, according to the season, from September 1st to 15th. A bean crop is expected to mature in about one hundred days. Except that a rain, which may damage the color or brightness of the seed, must be avoided on the crop after it is gathered, there is no waiting for favorable weather; when the crop is sufficiently matured it must be taken in. This is known when the bulk of the pods are ripe. If it is awaited until all are ripe, loss by shelling in handling would be too great. The method of taking out the crop is to pull up the plants with a machine called a bean puller. Several such machines are on the market; one that is, perhaps, the most popular is the Bidwell, made at Batavia, N. Y.

When the bean-puller has pulled several rows, the beans are forked into one row and allowed to lie in the large row until quite dry, when they are hauled to the

barn and stacked up loosely, to become more thoroughly dry, and await threshing. In hauling, they are loaded up on wagons like hay.

Threshing and Cleaning.—In the drier climate of California, threshing is performed in the open field. But it is rarely, if ever, when this may be done in the variable climate of the Atlantic section, the practice there being to do the threshing in the barn.

The best bean thresher in present use is the Bidwell (Batavia, N. Y.); an ordinary threshing machine is too hard on beans, causing too great a loss by splitting. After threshing, it is not usual to clean at once, but the beans are generally stored in sacks or in bins, for cleaning later on. Should the beans not be well enough dried after threshing, they may be dried more thoroughly by being spread on the floor an inch or two deep, and raking them over from time to time.

A fan-mill or a seed-cleaner is used for cleaning. One cleaning usually suffices; though sometimes two or three are necessary, depending on the amount of impurities to be removed. The beans then undergo picking, either by hand or on a bean-picking machine. The latter apparatus is about the size of an ordinary sewing machine. The beans pass through a hopper and drop on an endless belt that carries them to the girl or boy doing the picking; as the impure beans are picked out, the perfect ones are conveyed along and fall into a tub or bin. After being hand-picked, the stock will be in marketable condition.

To Save Finest Seed for Private Use.—To have the finest, plumpest, and best matured seed, leave on the plants all pods which are the earliest to mature, and which present the most perfect shape and size, and are true to type; pick off all other pods as they show themselves.

By preserving seeds in their dry pods instead of shelling, vitality is retained longer, and by growing a sufficiency at the time, it will be unnecessary to save seeds of the same variety every year.

Market.—Seed beans form an important item in all seedsmen's transactions; this has reference only to garden varieties. Made up in numerous small sales, many of the larger seed-houses will handle car-loads of seed-beans in course of a single season. Some idea of the consumption in the country may be formed when it is stated that one locality in Michigan alone produces from 50,000 to 75,000 bushels of seed garden-beans annually, mostly bush varieties.

Western New York and Central Michigan constitute at present the principal garden bean-growing sections of the United States, for bush varieties; California for pole or climbing sorts. But seed-beans are also grown to a more or less extent in other States, and may be grown to advantage in almost every part of the country.

Owing to cheapness of production in California, due to running varieties doing well in that dry climate without the necessity of poles, as is required for growing them successfully in the east, almost all seed of Lima varieties now handled by the trade, is grown in that State; this may also be said of most other climbing sorts. In fact, before California took up production, growers' prices for Lima Beans ranged usually from six to eight dollars per bushel. Then most of the crop was grown in New Jersey. Now, California Lima bean seed, equal to the New Jersey grown, is laid down in New York at prices averaging from \$2.50 to \$3.00 per bushel.

The yield of seed beans for all varieties ranges, according to the season, from 15 to 30 bushels per acre;

in California as high as 40 bushels of bush sorts have been known.

Growers' prices for beans fluctuate with the season. During the past few years, owing to unfavorable previous seasons, prices asked by growers before undertaking a crop, have ruled higher than for a long time, ranging from \$1.50 to \$2.50 per bushel for the green-pod bush varieties; \$2.00 to \$2.75 for wax-pod; \$1.75 to \$2.50 (in California) for Lima and other pole varieties. The cheaper prices have been for staple varieties, such as Red Valentine, Mohawk, Refugee, Yellow Six Weeks, Black Wax, Golden Wax, Lima, Kentucky Wonder, White Dutch, Crease Back, etc. The newer the variety, the higher the price; though, as a rule, a grower does not charge much or any difference for growing a new variety unless it happens to be the first season for it, and conditions warrant a higher charge. It is the seed-dealer proper who usually secures the high prices we see asked from the consumer for seed of a new variety.

BEET.

The soil in which beet succeeds best is a deep, light, well-enriched, sandy loam. Two seasons from sowing are necessary for the production of marketable beet seed. First, are grown the roots which are wintered over in pits or silos or in cellars; these, being planted out the next spring, yield the seed. Beet seed should not be gathered from plants which run to flower the first season.

Sowing for a commercial seed crop is made in the usual manner as for garden culture, but should be made somewhat later than when the roots are intended for table use. The growing crop of roots should be rogued

as far as possible by the aid of the foliage, pulling up and destroying all plants which are not true to type. The dark-red varieties possess dark-red leaves; the pink sorts pale-red or mixed red and green leaves; the white-fleshed kinds, pale-green leaves. And before storing for winter, complete the roguing by sorting the roots carefully, throwing out all which show the least impurity as to type; to ascertain color of flesh, cut the root slightly with a knife and lift a small portion of the skin.

European Method of Production.—In Europe for production of beet seed on a large scale, more especially of Sugar beet, crops are usually grown from small roots which measure $\frac{1}{2}$ inch to $1\frac{1}{2}$ inches in diameter.

Seed so produced gives the very best results, and there is an economical advantage in it by the saving that is obtained, not only in the area necessary for the production of a great quantity of roots to plant large acreages for seeds, but in the lesser room that is also secured in silos or pits for wintering over small roots weighing but a few ounces, as compared with the space that would be required for large roots weighing several pounds or more. Moreover, the small roots which are obtained by the special method applied for their production, ripen earlier and become hardened before frost, so that they keep better over winter than do full-grown roots. One acre of small roots will be sufficient to plant ten acres for commercial seed.

Seed used for production of small roots is carefully saved in the usual manner from full-grown roots which were true to variety. It is sown in spring, very thinly, in broad rows, 12 to 18 inches apart, at the rate of 20

to 25 pounds of seed per acre. By broad rows there is a greater crop of roots per acre, as two or three roots may be grown side by side. The seedlings are thinned to 1 inch apart in the row; this close thinning dwarfs the roots and causes the earlier ripening and hardening before frost previously alluded to.

When taken up for winter storage, the small roots are carefully sorted over, all being rejected which display any impurity as to type. These small roots are planted out the same distance apart as for large roots.

In growing small roots of Sugar beet seed, the course is in the first year to select for seed a dozen large roots which have best stood a test made from a great number of large roots by chemical analysis of the properties of each root. These roots are planted next Spring and should yield about one pound of seed to each root. The seed from each root is then saved separately, each lot being numbered 1, 2, 3, 4, &c. The next spring these seeds are sown in separate fields to produce small roots (sowing thinly, etc., as directed above), the fields being numbered to correspond respectively with the various lots of seed. A small sample of each lot of seed is also sown in separate rows to produce large roots for chemical test as before. Then in accordance with the result of the tests made from these large roots, the different lots of small roots produced in the fields are accepted or rejected, those lots of course being rejected whose large roots failed to stand the test. The small roots in the fields accepted are then dug up and wintered over in silos, to be planted out in due course next spring for production of commercial seed.

Wintering Roots.—Storing of roots over winter is done in pits or silos, made 12 feet or more long, 18 inches deep, 3 feet wide, being covered with six

inches or so of straw, and then six inches of earth, increased to eighteen as winter sets in, packed firmly and ridged so as to turn off water. Roots may also be kept in a cool cellar, piled in heaps and covered with turf.

When storing in pits, the tops of the large roots should be cut off, doing it carefully so as not to injure the centre germ; but in the case of small roots it is customary to allow the tops and leaves to remain on. The small roots may be placed in hollow, tapering piles, with an air chamber about one foot wide at the bottom, made extending the length of the pit. This is formed by piling the roots with the tops the same distance apart on the floor of the pit and drawing them together as other roots are laid in.

Planting Roots.—The roots should be planted out in spring as soon as all danger from frost is past. Set them in rows three feet apart, eighteen inches in the row. Exercise care not to break the main or tap root, nor the young sprouts which grew during winter. Holes for planting large roots may be made for the round varieties with a dibble, for the long sorts with a crowbar. Press earth firmly around the tap root, and cover evenly with the surface of the ground. Cultivate thoroughly; keep free and clean from weeds; hoe the earth to the roots.

Harvesting.—Seeds are produced along the stem, pinching the tips of which as seed begins to develop, will improve its size, but this may be omitted in growing seed on a large scale. Seed ripening is indicated by fruit turning brown, and when bulk of the crop is at this stage, harvest may be begun, with an ordinary sickle or reaping-hook.

Seed is always fully matured before the stalks have become dry, but if they are allowed to become too

dry before cutting, a great deal of seed may be lost. The stalks may be laid in rows, the heads one way, or they may be tied into bundles and stacked vertically on the field and left to dry. Harvesting should be done in dry weather, and the cutting should not be permitted to get wet.

Threshing, Cleaning.—Threshing may be done with a flail, on a cloth spread on the floor. In Europe the method is to draw the stalks through two jaws with saw-like teeth, prior to which the stalks are usually given a preliminary threshing on the floor. Another method in Europe is to separate seed from the stems by the use of an endless oscillating apron from a hopper. The seeds roll off, while the other matter adheres to the apron, and is thrown out at the other end of the machine.

After seed has been threshed, it should be spread thinly and allowed to remain until it has become thoroughly dry, which may take several weeks; then it may be run through the fan-mill or seed-cleaner one or more times. Pieces of sticks that remain may be hand-picked. After cleaning, seed may be stored in barrels. Before shipping, run through the seed-cleaner again to remove the dust.

To Save the Finest Seed for Private Use.—Select the finest and handsomest roots, true to variety, and save only the larger and earliest matured seeds which form on their plants at the base of the branches on the main stalk, clipping off the remainder. Take up the stalks with the roots attached and hang in a loft or garret to dry, spreading a cloth beneath for seeds to drop to. Vegetation keeps up for quite a while, and will ripen the immature seed. Seed in such small quantity may be shaken out, or stripped between the hands, and cleaned in a hand sieve.

Market.—Beet seed is handled extensively by the trade. Some estimate of its consumption in the entire country may be formed when it is stated that upwards of 150,000 pounds of seed of the staple table varieties are now sold annually by the combined trade in the four large cities of New York, Chicago, Philadelphia and Detroit; considerable quantities are also handled by seed houses in other large centres, such as Boston, Baltimore, Cincinnati, St. Louis, San Francisco, etc.

The greater portion of the beet seed used in the United States comes from Europe. Not that the climate and soil over there are better suited for its production than is the case in this country, but because there are comparatively few growing establishments here as yet and their operations are not extensive. This European beet seed is of high standard, but seed equally as good is produced in the United States, and there should be no occasion for importation of a single pound. Wherever its production has been undertaken in such sections as the Connecticut valley, Eastern Washington, and Northern California, most excellent seed, fully up to the standard of European production, has been obtained; and it has cost no more to grow than it does in Europe.

In a favorable season, a yield of table varieties of beet seed is from 1,000 to 1,200 pounds per acre; in Europe, for the field sorts, namely, Sugar beet and Mangold Wurtzel, from 2,000 to 2,500 pounds per acre have been produced.

In prices, European grown seed of table varieties, such as Egyptian, Blood Turnip, Long Blood, is laid down in New York at eleven to thirteen cents per pound; field varieties, at five to eight cents per pound,

BORECOLE OR KALE.

This is a member of the cabbage family and method of cultivation is similar to that for cabbage. The different varieties of borecole readily mix and care must be exercised in growing a seed-crop to keep them far apart from each other. In fact, even cabbage itself or any of its sub-varieties, should not be permitted to flower in the vicinity of a crop of borecole, as mixture may result from pollen being carried from one variety to another by bees, flies or the wind.

Stock-seed, or seed used for growing the main seed-crop, should be perfectly true. While this is important, the careful grower does not depend altogether on his stock-seed, but examines the growing crop and rogues it carefully before blossoming time, removing all plants which show impurity; also pulling up and destroying all which display single leaves, for the best kale should have leaves which are as curled as possible.

Make sowing of seed late in the summer or about August 20th, according to climate or latitude. The rows should be made three to four feet apart, plants being thinned to two feet apart. As borecole is hardy, the crop is allowed to remain over winter in the field where it is grown. In spring the soil about the plants should be loosened with a hoe or a cultivator, which will be about all the cultivation necessary.

Harvest when the bulk of the seed-pods have turned yellow, but they should not be allowed to become too dry, or seed may spill out. The cutting should be done on a clear, dry day, early in the forenoon, or when the dew is on; it should be done by hand, using a long, heavy-bladed knife for the purpose. The stalks are gathered in small heaps, the heads laid one way; they

are left to remain for a week or so to become dry. A cloth to catch loose seeds should be placed in the wagon used for hauling to the barn.

Threshing, Cleaning.—Threshing may be done in the threshing machine, or with a flail on a cloth spread on the floor. In using the machine, it should be previously examined to see if free from seeds, which may have lodged in cracks, shelves, etc., from previous crops. Clean by running through the fan-mill; after which spread seed on a cloth in the drying-room, and leave for several weeks or longer to become thoroughly dry. It may then be run through the seed-cleaner again for final cleaning, and afterwards stored in sacks.

Market.—The demand for kale seed is extremely heavy, more especially among those seed-dealers located in New York, Philadelphia, Baltimore, Richmond, Norfolk, and Charleston, who supply truckers or farm gardeners in the South, where this vegetable is grown extensively as a farm crop for Northern markets. Upwards of 200,000 pounds of seed are used annually by the trade, most of which is imported from Europe; the balance is produced mainly on Long Island, New York, of quality equal to best European. There is no necessity for importation whatever, as all the kale seed in demand in the United States may be grown at home at as low cost of production as foreign seed.

In good seasons, a seed-crop is from 750 to 1,000 pounds per acre. European seed is laid down in New York at from fifteen to twenty cents per pound.

BROCCOLI.

The same cultivation answers for broccoli as is necessary for cabbage, it being a member of the same family. broccoli is hardier than cauliflower, which it closely

resembles in form, appearance and flavor, and seems to require a moist, cool climate to meet with success.

For a seed crop, the plants are not allowed to form full heads, but sowing is made later than when such is the purpose, usually in northern latitudes in July. Tendency to head may be retarded when it shows by transplanting at once in fresh soil. On approach of winter, the plant with the root entire is taken up and stored in a trench, after the manner hereafter described for wintering over cabbage. If but a small quantity of seed is to be saved, plants may be kept over winter in a cold frame, or in a cellar.

As soon as the ground can be worked in spring, plants are set out in rows three feet apart, two feet in the row. Draw up earth well about plants, repeating as they advance in growth. Cultivate thoroughly and keep down weeds. Rogue by pulling up those plants which produce large, coarse and wavy leaves, and manifest impurity as respects color of flower.

Harvesting, threshing and cleaning are similar to borecole.

Market.—Every seedsman keeps broccoli in stock, although sale of seed is somewhat limited as compared with many other varieties. But little seed is grown here, importation from Europe being depended upon.

In a good season, seed yield is 250 to 300 pounds per acre; imported seed is laid down in New York at from \$1.50 to \$2.00 per pound.

BRUSSELS SPROUTS.

Also a member of the cabbage family, diminutive sprouts or heads being formed along the stalks in the axils of the leaves. It is hardier than ordinary cabbage.

For a seed-crop, seed is sown in northern States in August, the plant not being allowed to become fully developed. In latitudes where the climate is not too rigorous, plants may be left in the field undisturbed over winter, but where it is too severe as in the northern Atlantic States, they should be dug up entire and stored either in a trench or in a sheltered place, covered lightly with coarse litter, or in a cellar, the plants being packed closely with soil. In spring they should be set out two feet apart, in rows three feet apart.

Cultivation, harvesting, threshing, cleaning, etc., are similar to what has been given in preceding pages for borecole.

Market.—The quantity of Brussels sprouts seed consumed in the United States is upwards of 10,000 pounds annually. The greater portion of this is imported from Europe, from whence it is laid down in New York at about fifty cents per pound; the remainder is raised mostly on Long Island, New York, and is equal to the imported in quality. A yield of seed in a favorable season is from 400 to 500 pounds per acre.

CABBAGE.

While this vegetable thrives best in a cool, moist atmosphere, or where the nights are uniformly cool, it succeeds well in almost any section of the United States. It will grow in any soil from a light sandy to a heavy loam, but is a gross feeder and requires heavy manuring, either well-rotted stable manure or a commercial fertilizer made up to contain about seven parts of nitrogen to eight of available phosphoric acid and about six of potash. The soil should be well harrowed and made into fine tilth.

For the seed bed, the soil should not be too rich ;

while it should be well prepared, no manure of any kind should be used; it induces weakling plants. Some sow seed directly in the field where the plants are to remain, considering it more expeditious and satisfactory, as there is no check in growth as in transplanting. By sowing with a drill to drop seed about as far apart as plants should stand, but little thinning will be necessary. In thinning, pull the rankest growing plants, reserving those possessing fine mid-ribs and general sturdiness. Good cultivation is necessary for a full crop of cabbage seed from the time of sowing till final stage of seeding. Cabbage for seed should not be grown oftener than twice in the same ground without rotation of crops, one season for production of plants and one for seed.

Cabbage seed may be produced by three methods, from solid or perfectly developed heads, from partially or half-formed heads, and from stumps from which solid heads have been removed for use. By either process, excellent seed answering for all practical gardening purposes may be obtained.

The First Method: From Solid Heads.—This is practiced for obtaining extra-selected stock-seed, or seed to be used for growing a commercial or field crop. It enables roguing to be critically performed, as only extra-choice heads must be selected to produce stock seed.

Second Method.—With stock seed produced as above for starting the crop, a crop of commercial seed may be raised by the second method, from partially developed heads, although the experienced grower continues roguing with this crop, as mixtures and inferior plants are readily detected by him in a field of half-formed heads; and providing care is thus observed in throwing out all impure plants, seed produced by the

second method gives the best results and is otherwise satisfactory. This is the method pursued by the leading commercial seed-growers; the economical advantage of it being later sowing, and such plants winter better than do solid heads; while the older and more experienced growers contend that there is a bigger scope for selection of plants for stock-seed in a large field of partial heads, than there is in a small field of solid ones.

Sowing of seed for this crop is to be timed so that the plants will be just coming to a partial heading stage when it will be necessary either to take them up for winter storage or to cover them up in the field in such climates where they can safely remain in the field over winter.

On Long Island, New York, this sowing is done for Early Jersey Wakefield about July 5th; for Early Flat Dutch and such varieties about June 20th; for Late Flat Dutch and other late varieties, about June 5th, transplanting early varieties from August 15th to August 30th; late sorts, from July 15th to July 31st. In this locality, cabbage seed is usually harvested during the last week in July of the following year.

Along the Puget Sound in Washington, sowing is done of early varieties about June 20th; late kinds about May 20th; transplanting of the former to the field is done about July 25th; the latter about July 5th. Medium early varieties are sown about ten days later than the late sorts.

Sowing is first made in seed-bed, in rows ten inches apart, and when plants are of sufficient size, they are transferred to rows two feet apart, sixteen inches in the row; about November 10th (on Long Island) they are taken up for winter storage.

In Washington the plants are transplanted from seed

bed to rows 4 feet apart, 18 inches in the row for extra early varieties, 3 feet for later kinds. In that climate plants are not removed in the fall for winter storage, but are simply covered with earth where they stand in the field, a plow being used for the purpose.

Stock-seeds.—When the purpose is to raise well-formed heads for stock-seed, seed is sown at the usual time in spring for table use, or much earlier than for the main crop of half-formed heads. Prior to being stored for winter, these heads undergo critical selection. Only those are selected and preserved, which, besides being true to variety, are also uniform as to shape, having a short stem, thick, smooth and handsome outside leaves but not too leafy, and with the body of the plant in general looking vigorous and healthy. Enough should be taken to secure sufficient stock-seed to last for several years' seeding. In fact, it is known by all experienced gardeners that cabbage seed three years' old produces better-formed heads than does perfectly fresh seed.

In the case of solid heads, the seed shoots may be assisted to come through by carefully separating the outer leaves; some make two cross cuts carefully with a knife to open the head, so as to let the seed stalk break through.

When dependence has to be placed on stock-seed obtained from a seed-dealer, or other outside source, the safer plan is to sow a small quantity of same in advance of sowing of the main crop, which will enable the grower to judge of the purity of seed from solid heads so produced.

Wintering Plants in Trenches.—In the northern Atlantic cabbage-growing sections, the winters are too severe to allow cabbage plants to remain safely in the open over winter. The general practice in these localities is to dig up the plants entire on the approach of

winter and store them in trenches made by a plow going and returning in the same place. The manner of this is, a cabbage plow is run close to the edge of a row of plants, loosening and lifting them. The plants are laid in the spaces between the rows. Every eighth or tenth vacant row is then made into a trench to receive the plants which were taken out of eight or ten rows. The trench is made wide and deep enough for plants to be packed in two or three rows closely therein, roots down, slightly slanting; the tops of the heads being but a trifle above the level of the ground when placed in the trench.

These trenches are covered with about one foot of earth, formed by a large plow throwing large furrows on each side; this covering then by use of an asparagus ridger is dressed up to a sharp ridge to keep water off and prevent too hard freezing.

The trenches are uncovered in spring by running a plow as closely as possible to the buried plants, the furrow being turned away so that only the earth is left that is over the plants. This remaining earth is now removed with a large, wide hoe, and plants are then ready to be taken out.

Setting Out in Spring.—In spring, as soon as the soil can be worked, the plants are set out in rows or furrows, which may be made in the same field, plowing and harrowing for the purpose the spaces between the trenches and then marking out the furrows. These furrows are made with a medium-sized plow, going and returning in the same place, making a clean smooth furrow the width of the plow and as deep as you would commonly plow; the furrows are made four feet apart for early varieties, five feet for late.

The plants are laid two feet apart, flat in the rows, the

roots parallel with the row; the head will raise the plant so that it will be on an angle of about 45 degrees. The soil is drawn up well about the stalk, and for support this is kept up as the plants advance in growth.

In sections of Europe like England, where cabbage withstands the winter in the open, the method practiced for raising cabbage seed is similar to the usage on the northern Pacific Coast. The plants are allowed to remain over winter where they are grown; transplanting being done in autumn so as to toughen the tissues and enable the plants to withstand the rigor of winter, but this is not done in Oregon or Washington.

Wintering Plants in the Open in Northern Atlantic States.—Those who care to take the risk of wintering plants in the field may do so after the following method. Sometimes nearly all the plants will winter through safely, but then again, as most frequently happens, but fifty to seventy-five per cent. of them will survive. It will hardly answer for crops on a large scale, owing to leaving so many open spaces for weeds to grow, but may do for market gardeners who save their own seeds.

The plants are transplanted late in the fall, say about November 1st, to the place in the field in which they are to produce seed. As has been directed for setting out in spring, this is done by plowing deep furrows four feet apart for early varieties, five feet for late, and laying the plants therein two feet apart, with the roots parallel with the furrow. The earth is then thrown in and pressed over the root and stalk; the leaves are partially covered, these being gathered about and over the head. Toward the end of the month, or on approach of winter, with plow and hoe, the plants are covered completely with earth, sufficiently to protect the heads

from alternate freezing and thawing, the soil being pressed firmly thereon.

As soon as the ground can be worked in spring, the covering is removed with plow and hoe, and the outer leaves are separated to allow the seed shoots to come through.

Seed from Stumps.—In England, in raising seed from stumps, the practice is to sow seed for the crop in May or June; the plants thus forming heads in early autumn. These heads are then cut and the stumps after being permitted to produce some new growth, are transplanted or allowed to remain where they are. The following spring, the growths produce flower stems and seed in due course.

Another method in England which is practiced by some market gardeners who grow the heads for market, is to sow in August, the plants being left in the field where they stand over winter and heading in spring; the heads are then cut and the stumps produce side growths immediately, and subsequently flower stems and seed.

In the United States the stumps are wintered over in the same manner as has been directed for plants with heads.

This practice of raising seed from stumps will answer particularly for private use, especially when the heads that are cut are extra choice.

Harvesting, Threshing, Cleaning.—As has been given for borecole, the operations for harvesting, threshing, and cleaning cabbage, are similarly performed.

Market.—The consumption of cabbage seed in the United States is exceedingly large, approximating 1,000,000 pounds yearly; as besides being found in every

private garden, this vegetable is grown extensively by market gardeners. Less than one-half of this seed is imported from Europe, consisting mostly of early kinds; the remainder (equal to the best of Europe) is grown in this country, being produced on Long Island, New York, in Rhode Island, Connecticut, Pennsylvania, Eastern Virginia, Washington, and in some few of the Middle Western States. It is an industry that has made considerable progress in recent years along the Puget Sound in northwestern Washington, the production of cabbage seed there now reaching 150,000 pounds annually. The climate of that locality suits cabbage for seed; winters being milder and moister, while summers are cooler and drier than in the same latitude on the Atlantic side. However, with care and proper attention, no one need fear failure in growing excellent cabbage seed almost anywhere in the United States.

In Europe, a yield of seed ranges from 600 to 1,000 pounds per acre, at from thirty to forty cents per pound, laid down in New York; on Long Island, from 400 to 500 pounds per acre, at from thirty-five to forty cents per pound; in Washington, from 700 to 1,000 pounds per acre, at from twenty-five to thirty cents per pound; occasionally 1,500 pounds per acre have resulted in the latter section.

CARROT.

For a crop of carrot seed, the same general directions will apply that have been given for beet, to which refer. Wild carrot will mix and ruin seed if allowed in the vicinity of a seed crop.

In sorting over roots to be planted, select only the handsomest shaped specimens, which show no impurity as to variety. These are topped and wintered over same

as for beets, and are set out as soon as heavy frost is over in the spring, being placed with the crowns even with the surface, in rows three feet apart, six inches in the row. As required with all planting, the earth should be pressed firmly about the roots. Cultivate thoroughly and keep down weeds.

In California, wintering of roots is done somewhat differently from the practice on the Atlantic side as above stated. There the roots which are ploughed up in the fall, instead of being stored in pits as in the East, are topped, and then put into sacks, which are simply kept stored in sheds or out of doors until wanted for planting in January or February.

Carrot seed forms in umbels or clusters, and when bulk of the crop is ripe, indicated by the stalks becoming dry, and the umbels turning brown, harvest is in order. Cutting is usually done by hand.

Threshing and Cleaning.—When seed is thoroughly dry, thresh lightly with a flail on a cloth spread on the floor, for if the stalks are broken too much, it will render seed more difficult to clean.

In Europe, cleaning is done in a special machine made with a wooden cylinder having steel teeth, for the purpose of taking out the beard and small splinters. Without this machine, seed is cleaned with hand sieves, using first, one with a coarse mesh to remove the pieces of stalks; next, one with a finer mesh, in which seed is rubbed by hand to remove the beard. Seed is then spread on a cloth and left in the sun for a day or so to dry. It is again cleaned in the sieve, hand rubbing being repeated and sticks picked out. The next day, another cleaning is given, and finally seed is passed through the fan mill. It will then be ready for storing in sacks.

To Save Seed for Private Use.—Select a few of the finest roots and hang same with plant entire to a rafter, in a loft, and when seeds are wanted, they may be rubbed out between the hands.

Market.—Carrot seed follows beet in order of consumption. The bulk of seed used in this country is imported from France and Germany; European growers having created a high standard for the quality of their carrot seed, due to painstaking methods.

In some of the New England States carrot seed is grown equal to the best European seed. There is also a considerable production of carrot seed in Central California, but for some reason or other, most of it so far, has not proved to be as satisfactory as New England or European seed. This is properly considered to be due to faultiness in method, and not owing to climatic conditions in that State affecting the nature of the carrot, as is by some thought to be the cause.

In a favorable season, a yield of seed is from 500 to 600 pounds per acre; prices paid to growers range from sixteen to twenty cents per pound.

CAULIFLOWER.

This vegetable is successfully grown in our country, more especially in the sections bordering on the coast, both on the Atlantic and the Pacific. In the former section, however, there has been some difficulty heretofore in raising seed, owing to rot affecting the seed stalk at a certain stage in its growth, and the plant sometimes being attacked by an insect which injures the fertilizing part of the seed flower; these difficulties have not been met with in seed production on the Northern Pacific Coast.

Cauliflower does well in either a heavy loam or a

light, sandy soil, but a moist, saline atmosphere appears to be necessary for the successful development of the flower or head. This statement, however, will bear contradiction, when it is considered that cauliflower superior to most of what is produced on the Atlantic side, is successfully grown in the dry atmosphere of California.

For a seed-crop, being provided with choice stock-seed, make sowing, in the northern Atlantic section, in July, and in autumn store the partially formed heads with their roots entire, over winter in a trench, a vacant cold frame, or in a cellar packed closely together with soil. In spring, set them out and cultivate, harvest, etc., same as for a crop of cabbage.

On the Pacific coast, along Puget Sound, there are two methods in practice. Some growers sow seed in hotbeds early in February; then as soon as plants are large enough they are transferred to cold frames, in which they are allowed to remain until about May 1st, or until plants are large enough and the weather is favorable, when they are transplanted to open field, in rows 4 feet apart, 3 feet in the row. Other growers sow seed in the fall, about September 1st, wintering their plants in cold frames; and as soon as weather conditions will warrant it next spring, say April 1st, plants are set out in the open field. By either method, seed ripens in October.

In northern Europe the practice is to sow seed for a seed-crop in cold frame early in September. Early in the following spring the plants are transferred to hot beds for the purpose of starting them into growth. As spring advances, they are again transplanted, this time to the open field, in rich, loose soil. Seed ripens early in fall, when the stalks are cut and hung up in an airy

room until the seeds are thoroughly matured and dry enough for threshing.

For stock-seed, sowing should be made in northern latitudes in spring or earlier than when partially formed heads are wanted, and late in autumn selections are made of those plants having short, thick stalks, with firm heads of a fine, white color, and particularly the earliest formed heads which show no indication of shooting to seed. These selected plants are taken up and stored over winter in the same way as given on the preceding page for partially headed plants.

Market.—Upwards of 10,000 pounds is considered the present annual consumption of cauliflower seed in the United States. The best of this seed is imported from Denmark; in fact, nearly all used here at present is imported from Europe. Danish seed is notably preferred throughout Europe. Perhaps the most suitable climate in America, approaching nearest to that of Denmark, for the growing of cauliflower seed, is that previously spoken of in the chapter on cabbage, namely, along the Puget Sound, in Washington. Cauliflower seed which has given most excellent satisfaction, is now grown in that quarter, but the industry there is, as yet, practically in its infancy. Considering the soil and climatic conditions of this Puget Sound country, it is regarded safe to predict that that section will, in time, be headquarters for the best cauliflower seed for the entire country.

In Denmark, in a favorable season, a yield of seed is about 250 pounds per acre, at prices to the grower of \$2.50 to \$5.00 per pound, according to variety.

CELERY.

For raising celery seed, the course to be pursued is

same as for a garden crop for culinary use, observing that plants destined for seed must undergo critical selection when they are taken up in the fall for winter storage. That is, only those plants are to be chosen which possess all the distinctness of their variety; if the variety be dwarf, those plants that are dwarfest, and so on; furthermore, only those are to be selected which are perfectly solid in the stems, and have an abundance of solid heart-leaves. In fact, this matter of selection regarding solidity is important to be kept in mind when raising high-grade celery seed.

In the usual manner as practiced in the Northern States for storing celery for table use, plants for seed are wintered over in trenches, care being taken that it is so done that they will be kept as dry as possible until time to set out in spring; in the mild climate of California, where considerable celery seed is raised, wintering over of plants in this manner is not necessary.

About May 1st, depending on the climate and latitude, these plants are set out in rows four feet apart, eighteen inches in the row, with the heart of plant left exposed. Cultivate and keep free from weeds, drawing earth up about the plants as they progress in growth.

Seed is produced in clusters and ripens unevenly. When bulk of it is well browned, stalks should be cut at the base or root, and laid on cloths, to be left exposed to the sun for a few days if the weather be dry and clear, or are taken at once to the barn or shed, to undergo drying.

When seed has become dry, threshing may be done either in a threshing machine or with a flail on a cloth on the floor. Seed is then spread on a cloth and allowed to remain for several weeks to become perfectly dry. For final cleaning, seed is run twice through the fan mill.

Market.—Celery is an important item in the seed trade. At present, most of the seed used in the United States is grown here; nine-tenths of it being produced more cheaply in central California than elsewhere, though seed of first quality is also grown in the Atlantic Coast section.

The annual California production approximates 25,-000 pounds. In a favorable season, a seed yield is from 400 to 500 pounds per acre; prices paid to growers range from twenty to thirty cents per pound.

Seed of certain sorts is imported from Europe; this applies particularly to the variety known as Paris Golden Self-Blanching. French growers are paid from fifty to sixty cents per pound for this seed. Even California market growers of celery of this variety prefer French seed; the crop resulting therefrom proving more satisfactory than when grown from domestic seed.

CORN.

That which is of first importance when growing seed corn is, to exercise the greatest care to avoid mixture of crop. Sugar corn must not be grown near field corn, and to keep a variety strictly pure, one kind of sugar or field corn must not be planted near another kind, nor in an adjoining field. Neither should corn be planted on land upon which any variety of corn was raised the year previous, to prevent mixture from "volunteer plants."

Stock-seed should have been carefully selected from stalks whose habit of growth was characteristic of the variety, and from the earliest, largest, and finest ears, which in their shape and size, color and formation of grain, and time of maturity, were distinctly true to variety. This method is also particularly recommended when saving seed for private use.

General culture for seed corn is the same as for a crop of corn for ordinary purposes.

In northern Atlantic latitudes, early sugar corn is sown from May 10th to 30th; late varieties, from May 1st to 15th; field sorts from May 1st to 20th. Sugar corn should not be planted over one-half to two-thirds the depth required for field corn.

In harvesting both sugar and field corn, the cut stalks are bound in small shocks. But it is not really necessary to do this with sugar corn, unless shocks are made very small with an open space in the centre, formed by tying the tops of four hills together and then shocking around them. It is better not to cut sugar corn too green, but ears should be allowed to mature fully on the stalk. Sorting should be done carefully at time of husking, rejecting ears which are imperfect or impure.

Drying and Shelling.—Drying should be done naturally, never artificially. The usual manner is on barn scaffolds, which are made of narrow boards placed as far apart as possible; these scaffolds being arranged in tiers, one above another, with as much air as possible given through open doors and windows. With some growers the practice is to bring the corn from the field in one-bushel crates; a rope with two hooks being let down to the wagon and the crate drawn up to the scaffold by men.

The time required for drying varies much, as in some seasons stalks are greener than in others; some autumns being damper than others.

Shelling is not done until corn is dry enough to store and keep in bulk. Those who grow for commercial trade shell the ears without taking any grains from butt or tip; shelling by machine just as grown, except that black

kernels are previously taken out by hand with a husking peg.

The shelled product is run through a fanning mill, which blows out all light and chaffy stuff, and screens out the small kernels; the quantity that is thus blown and screened out being about one bushel in fifty.

Sugar corn must not be stored in sacks too soon, nor kept in them too long, as it retains moisture a considerable time and is likely to mould. Neither should it be piled in bulk until thoroughly dry, but should be spread out thinly and raked over from time to time.

To Save for Private Use.—The best way to save sugar corn for one's own use, is to break off the finest ears, leaving the outer husk attached. Hang up the unhusked ears, several tied together, until they are wanted for use, in a dry, airy room or garret where they will become perfectly dry.

Market.—Seed-corn, both field and sugar, is handled in enormous quantities by all seed dealers. Not so many years ago the bulk of seed sugar corn used by the trade was produced in Connecticut. In fact, Connecticut seed-corn was for a long time considered the standard in the market, and it was generally supposed that no other so good could be raised elsewhere. But all this has greatly changed, and to-day Connecticut supplies but a small portion of the seed sugar corn that the country consumes. Seed-corn fully equal to Connecticut grown, is now produced elsewhere, especially in Ohio, Iowa, and Nebraska, where there are quite a number of well-established, large, reputable growers, who, competing with Connecticut, supply the trade from the Atlantic to the Pacific.

A brief narration of the operations of one prominent grower in Huron County, Ohio, will suffice for them all.

This grower began in an humble way in 1878, at the age of eighteen, on one acre of rented land and a capital of five dollars, which went for the purchase of stock-seed. His first year's crop of sugar corn realized the small sum of eighteen dollars, and was shelled by hand and cleaned by dropping the seed from a hog-house door to a blanket spread upon the ground beneath. Now to such proportions has his business grown that in a single season his shipments will amount to about 175,000 bushels of shelled seed corn and 3,000 barrels on ears, requiring four large power shellers and cleaners, besides acres of floor space, and thousands of feet of bin room for storage. His main warehouse is one hundred and sixty feet long by thirty feet wide, and two stories in height. None of his output is sold at retail, all being disposed of to seedsmen or seed-dealers.

A crop of sugar corn in a favorable season is from 40 to 50 bushels of shelled seed per acre, for the early dwarf varieties; from 50 to 60 bushels for the tall, late sorts. Prices paid to growers range from \$1.00 to \$1.25 per bushel; the cheaper price being for Stowell's Evergreen and other late sorts; prices to sub-growers range from 65 to 80 cents per bushel for sugar corn. For field corn prices rule from 45 to 60 cents per bushel, according to variety.

CORN SALAD.

A seed-crop is matured quickly in one season. Seed is sown early in spring, in rows two feet apart, plants being thinned to four inches apart. Ripening of seed occurs unevenly; but when the bulk has ripened, the crop may be mowed, or plants may be pulled and laid on cloths, and left to dry in the sun a few days. In the barn or drying room stalks should be spread out

on cloths, as seed sheds easily. Seed should not be threshed until it is thoroughly dry ; it may be done with a flail or in the machine. Clean in a fan mill and store in sacks.

To Save for Private Use.—Select the best-looking plants, mark them by driving a stake alongside and allow to run to seed. Spread a cloth under plants as seeds ripen, and as the seed successively matures, shake plants repeatedly.

Market.—Handled by all seedsmen, but is usually imported, comparatively little seed being produced in America. Average yield in a favorable season is upwards of 1,000 pounds per acre, at price to the grower of about ten cents per pound.

CRESS.

This is a quick-growing annual, and seed-crop is easily raised. Apply same directions as given for corn salad; harvesting, threshing, and cleaning are likewise similar as for that variety.

Demand for seed is quite large, being sold by all seed dealers; it is partly imported and partly produced here. Yield and prices are about the same as for corn salad.

CUCUMBER.

In growing a seed-crop of cucumber, care must be exercised to avoid mixture of varieties. No two kinds should be planted near each other, but they must be kept widely separated, at least forty rods apart. If Kaffir corn is planted between, distance may be shortened to twenty rods, but not less. Cucumber also mixes with Vegetable peach, West India gherkin, Snake cucumber, and pomegranate. Care must be used to destroy any stray plant that may appear within mixing distance.

Any soil considered good for corn will answer for cucumber. In the Middle and Western States, seed is sown about June 1st. It is planted in hills three feet apart each way, ten to fifteen seeds to a hill, thinning to three or four plants in a hill when they are about six inches in height. Cultivate continuously and keep free from weeds. The hoe may be used for this purpose after the vines run out.

To Save Seeds for Private Use or Stock-Seed.—Select the earliest and handsomest fruit possessing distinctness of variety.

Harvest and Cleaning.—Harvest is dependent upon maturity of the crop and time of frost. The usual period in northern sections is from September 15th to October 1st. In case a severe frost occurs, the crop must be gathered at once, otherwise fruit may rot from effect of the frost. Seed is considered fully ripe when fruit has changed color entirely, showing not even a tinge of green; when gathering, reject fruit which is not characteristic of the variety.

Taking out seed: in simple practice, the cucumbers may be sliced lengthwise and seeds scraped out into a bucket or a tub, and then poured into a tight barrel, to undergo fermentation, which is to release the mucilaginous covering from the seeds.

When the field is two or three acres in extent, slicing may be done by using an upright knife set in the bottom of a small wooden trough held in place by a cross-piece. This trough may be mounted on a bench. The cucumbers are laid in it one at a time, and sliced open by being forced against the knife by a wooden plunger fitted to the inside of the trough. The split fruit is allowed to fall into a tub or a box. Seed is then removed by using a small circular iron knife sharpened on one

edge; with one sweep of the hand the knife performs the operation, the cut pulp passing into a pail, from which it is emptied into a barrel placed conveniently in the field, to undergo fermentation.

For larger fields, it will be necessary to expedite the removal of the seed pulp by the use of a machine. There are two kinds in general use, both constructed specially for extracting cucumber, melon and tomato seeds. One, run by horse-power, is fashioned so that fruit being poured into a hopper, is crushed between a revolving wooden roller and an adjustable crushing board, and then is passed into a long reel made of wire netting, which revolves and separates the seed.

The other machine, which is run by steam power or by a gasoline motor, is called a Cucumber, Melon and Tomato Seed-separator. It is six feet long, and is operated by a crank on each side. The fruit is conveyed by an elevator into a hopper, and thence to two revolving rollers, which crush it and pass it to a revolving screen, four feet in length, having two canes on the end of a shaft forming a beater, which separates the seed. Under the screen, a pan is set to receive the seed as it falls.

This latter machine will extract 1,000 pounds of cucumber seed in a day. When in use, it is mounted on a low wagon built with a platform. A two-horse steam engine is placed facing it at the front end. Drawn by two horses, the wagon makes the round of the field. Fourteen rows are taken at a time, six on one side, six on the other, the wagon going through the two rows between. These two rows are picked ahead of the wagon, far enough to bring the elevator of the machine even with the pickers on either side. Large tin pails are used for picking. Twelve men are kept

busy picking the ripe fruit and emptying on the elevator. As the fruit is crushed, the skins or rinds are ejected at the rear end, and left in the field in rows as the wagon is drawn through, and are afterwards scattered as fertilizer. Following this wagon is another loaded with barrels which are distributed, and to which the seed is transferred from the receiving pan. These barrels are filled two-thirds, and are hauled six at a time in another wagon to the fermenting house.

If more than one variety is grown, it is very important that the machine used for mashing fruit or for washing, and the fermenting tank or barrel should be carefully washed immediately after use, so as to remove any seeds which may have lodged in same, and thereby prevent mixture of seed when using the apparatus or vessel for another variety.

Fermentation or Souring.—This process is necessary with all kinds of vine seeds, excepting winter squash and pumpkin, in order to separate the seeds from the surrounding pulp. The time required for fermentation varies from several days to a week, according to weather.

On a small scale, tight barrels will answer for fermentation; but for large acreages, it is better to build a tank, which may be erected either in the field or in the seed house; this must be made perfectly tight.

The pulp is poured into the barrel or tank, but not filled quite full to allow for expansion in bulk from fermentation. The liquor must be stirred thoroughly every day, to keep seed in contact with it, and to prevent the seed on top from becoming blackened. Provided it is thus constantly stirred, seed may remain in it for several weeks without injury. One may determine whether seed has undergone sufficient fermenta-

tion by taking up a handful and squeezing it. If on opening the hand seed appears entirely free of pulp, it is ready for washing.

Washing.—This may be done in a tub, a barrel, a large box, or in a machine. When using a tub or a barrel, pour in a quantity of the seed pulp, and add several pails of water. The liquor is then stirred violently with a stick until the pulp is loosened. More water is now poured in, and stirring is again done, this time with a circular motion, which will cause the water to run around in the vessel. This motion holds the separated pulp suspended, while seed sinks to the bottom. The water is then poured off, which will carry the pulp with it, and leave seed at the bottom. The operation is to be repeated several times, with clear water, until seed is considered clean.

The box method, as performed by some growers, is practicable only where there is a stream of water. A box is made with the sides and ends about eighteen inches in height, and six or seven feet in length. The bottom is fitted with heavy wire screen, eight meshes to the inch. A platform is built on the bank, extending out into the stream several feet to where a swift current may be reached. Four posts are driven, one at each corner of the washing box, and cross-pieces nailed between each pair of end posts. One end of the box is then fastened to one of these cross-pieces, at such height as to keep the top of that end above water. The other end is made fast to the other two posts by means of an adjustable strap or rope, in such manner as to allow it to be raised or lowered at will. Then the down-stream end of the box is carefully lowered into the water, until about three-fourths of the entire box is submerged. The action of the water in going through the meshes of

the screen serves to wash the pulp from the seed and carry it away. The operation is assisted by stirring seed with a stick or a rake. As the force of the water will carry seed towards the end of the box, seed must constantly be put back to the upper end. When seed is considered clean, it is scooped out into barrels preparatory to drying.

Seed may also be washed in a machine, which may be readily made by a carpenter. One that is used by a large grower is made out of a disused fanning-mill. This has been covered with zinc and punched full of holes. At one side, opposite the crank, is the spout; from which the washed seed passes into a box fitted with handles on each side. Four large pails of pulp are poured into the washer at a time. While one person turns the crank, another pours in clear water; six or eight pails of clear water usually cleans the seed, and a second washing is not necessary. Never use lye for cleaning, it will discolor the seed.

Drying.—The barrels or boxes to receive the washed seeds should have holes punched around the bottom to drain the surplus water.

Drying is done on screens or drying frames. These are made of three by four scantling, three feet in width by fourteen in length; burlap is used for the screen.

Seed is spread on the screen very thinly at first, several seeds deep. The screens are then set in the sun and air for drying, either on benches or supported by posts driven into the ground with cross-pieces nailed on.

After the first moisture is drained or dried out, seed is transferred to fresh, dry screens. In the evening the screens must be carried indoors and racked up, as seed should not be allowed to become damp even from dew.

Seed is allowed to remain on the drying frame until it is reasonably dry, and then it is removed therefrom and spread out thinly on the floor of a dry, airy room, where it is watched until it is thoroughly dry, being stirred and turned over occasionally.

Another way of drying after being taken off the screens, is to place the seed in sacks, filled about one-third full, and these are thrown across a fence or other convenient place in the air during the day, till the seeds have become thoroughly dry.

Cucumber seed should not be stored or packed for shipment until perfectly dry, known by seed breaking crisply without bending.

Market.—Besides being grown in all private gardens, cucumbers are planted extensively for market by truckers, and also by farmers as a field crop for commercial picklers. The consumption of seed, therefore, in this country is very large, and runs up to many hundreds of thousands of pounds annually. It is all produced here, the most of it in Connecticut, New York, New Jersey, Michigan, Iowa, Kansas, Nebraska, and Colorado, but as is shown by these localities, almost any section in the United States is adapted for its culture.

In a favorable season a yield of cucumber seed will average 250 pounds per acre, though at times it has been known to greatly exceed this, having reached as high as 750 pounds.

Up to within the past few years, growers' prices have ruled from twelve to fifteen cents per pound, but since the disastrous crop failures in the seasons of 1902 and 1903, due to ravages of plant lice, prices have gone higher, ranging now from twenty-five to thirty-five cents per pound. When the market returns to its nor-

mal equilibrium, the former lower prices are likely to prevail again.

EGGPLANT.

This vegetable delights in a light, warm, rich soil. About one month after fruit is in edible condition is required for seed to ripen. It is therefore necessary that a crop for seed should be started as soon as possible. In the Middle and Western States this is begun about March 10th, by sowing seed in a hotbed. When the second leaves have formed, the young plants are transferred to another or larger hotbed, where with fresh heat they should become large, strong plants about the 20th of May, when they may be set out in the open ground. Cultivation should be thorough and weeds kept down.

Eggplant should not be attempted oftener than once in the same field, neither should it be grown in a field in which tomato was raised the year before, otherwise a poor crop will be the result; tomato seems to extract from the soil what is needful for eggplant.

Ripening of seed is indicated by changing of color of the egg from a bright to a duller shade, or even somewhat yellow, also by the appearance of specks. A crop is harvested early in October, only the finest-looking eggs being selected. After gathering, the stem end is cut away for several inches, seed being contained in the other end and fruit is then left in a pile for several days until a sufficient number has been gathered to extract seed. Fruit should not be allowed to become rotten as this will injure the seed.

Extracting Seed.—On a small scale, the eggs are first pared and then cut into small pieces, say eighths; to do which a dull knife is used to avoid cutting seed.

These pieces are then mashed or crushed in a barrel, a wooden pounder being used for the purpose; or if at hand, a wine press or a cider mill will answer for crushing.

Fermentation is not permitted with eggplant, as it will make seed harder to clean and also causes seed to be darker in color. In fact, it is considered better not to allow the pulp to stand longer than three hours before cleaning. One grower whose annual crop amounts to several thousand pounds crushes the fruit by horse-power, in a large mill which is fixed not quite breast-high on the edge of a large wooden platform. The crushed pulp drops from the mill on to this platform, from which it is loaded on wagons and hauled to a creek for washing. He does not pare the fruit or cut it into pieces, but dumps the eggs whole into the hopper of the mill, the stem ends having previously been cut off in the field at time of gathering.

Washing and Cleaning.—This is done by using sieves in a tub or a barrel of water. The pulp is poured on a wide-meshed sieve at first. By working the sieve about in the water, it causes seed to separate from the pulp and pass through the sieve to the bottom of the vessel used. The water and floating pulp are then poured off, seed is taken out and washed again in clear water, this time using a finer-meshed sieve to screen out seed from the remaining pulp. If this does not render seed thoroughly clean, washing is repeated.

The large grower mentioned above does his washing in a stream which runs by his farm. He uses a box screen, which is 4 feet long, $2\frac{1}{2}$ feet wide, 18 inches deep. It has long handles at each end. The screen has a mesh of four to the inch. This screen box fits into an outside box made about 15 inches deeper, the

handles affording a means of rest at the top of the outside box. The bottom of this outside box is made of wire bronze, mosquito netting mesh, for water to drain through. To support this bronze netting strips are nailed across. The bottom also has legs at each corner for support in the water. The legs at one end are longer than the other two, to allow for the slope of the beach when standing in the water. Three men operate this apparatus. They stand in the water in rubber boots. One man at each end takes a pair of handles and lifts and shakes the screen, while the third man pours in three buckets of pulp at a time. The shaking separates seed from pulp, seed sinks through and falls to the bottom of the outside box. The pulp is then dumped out of the screen box, fresh pulp is poured in and the operation is repeated until the space in the outside box is full. Seed is then taken out, and a final cleaning is given with a sieve in a tub of water.

Drying.—This is done on screens in the same manner as given for cucumbers. But it should be hastened as much as possible, so as to have the seeds as dry as can be before night; to facilitate which the work should be begun early in the morning of a clear, dry day. While drying on the screens, stir or turn the seeds over from time to time.

As eggplant seed sprouts more easily than seed of any other vegetable, when first taken out of the fruit, it is sometimes lost by sprouting over night when not as dry as it should be.

The large grower, whose operations of extracting and washing seed have been described, does not dry his seed out-doors. He prefers, owing to depredations by birds, to dry seed on the floor of a dry, airy room. He spreads the seed thinly, less than quarter of an inch

deep and allows it to remain in that state for a day or two, stirring it frequently. He then masses the seed in greater depth, say six to eight inches, and leaves it remain thus spread out for a month or so to become thoroughly dry, which will be indicated by seed rattling. It will then be in condition for storing or shipment.

When storing, a covering of oil paper will keep out atmospheric moisture and prevent moulding. Before shipping, run through the fan-mill or seed-cleaner.

Market.—Eggplant seed is sold by all seedsmen. The principal market for it at present is in Florida, where this vegetable is grown extensively as a field crop by truckers for shipment to Northern markets.

While there is some importation, most of the seed used by the trade is grown here, mainly in New Jersey, Iowa, and in the South. In a favorable season, an average yield is about 200 pounds per acre, at from \$1.00 to \$1.25 per pound to the grower.

ENDIVE.

This is an annual, and for a seed-crop sowing is made in the Northern States early in April; in California in February and March, in rows two feet apart, thinning plants to eighteen inches in the row. Rogue carefully, pulling up and destroying all plants which are not true to variety.

When bulk of the crop is ripe, cut the stalks and lay upon cloths, and leave exposed to the sun to dry for the remainder of the day, or longer, if the weather be dry and clear.

Seed should be allowed to lay in the drying loft to become thoroughly dry before threshing. Thresh with a flail or in the machine, and clean in the fan-mill.

After seed has become thoroughly dry, it may be stored in sacks.

Market.—The demand for seed here is considerable, as endive is consumed freely for flavoring soups and making salad, especially where citizens of French or German extraction predominate. Part of the seed used is imported from Europe; balance is nearly all grown in California, which State produces about 20,000 pounds annually. It can be grown with success in almost any part of our country.

In a favorable season, an average yield of seed is about 500 pounds per acre, at from thirty to thirty-five cents per pound to the grower.

HORSE RADISH.

The original or correct name for this is said to be harsh radish. It is handled by the seed trade in the shape of sets, which are prepared by cutting off the straggling lateral or side shoots that form on the main root. These are trimmed to about six inches in length, their tops made square, and the bottom ends slanting, to prevent their being planted upside down. They are preserved over winter by storing in pits, or by keeping in a cool cellar buried in a box of dry sand or seed.

KALE.

(See Borecole, page 25.)

KOHLRABI.

Treatment for a seed crop is about the same as for cabbage and turnip, though kohlrabi is hardier than either. Sow seed later than is customary for table use, in the Northern States in July or August. On the Pacific Coast and in Europe plants are transplanted in

the fall, and left to remain in the open over winter, but in our northern sections, while plants will often winter well outdoors, the winters usually are too severe, and after the manner given for storing cabbage, plants are there taken up in autumn and stored in trenches or in a cool cellar. In early spring they are set out in rows four feet apart, two feet in the row. Those plants which were transplanted in the preceding autumn and left in the field over winter, are not disturbed in spring.

Take care of the crop, harvest, clean, etc., after the manner as given for borecole and cabbage, to which refer.

Market.—Kohlrabi seed for the kitchen and market garden is sold in moderate quantities by all American dealers, while in Europe the vegetable is grown extensively for cattle-feeding, being considered there, for that purpose, equal, if not superior, to the best ruta бага.

At present, practically all the seed used by the American trade is imported from Europe, but there is no necessity for any importation, as it could all be grown here. Yield of seed and prices range about the same as for cabbage.

LEEK.

This vegetable is a hardy member of the onion family. Seed is sown first in seed bed in spring and later transplanted into rows 15 inches apart, 6 inches between the plants; or seed may be sown in drills same distance apart, thinning plants afterwards to 6 inches apart without transplanting. It stands winter without protection, and seed is produced in the second year. Treatment, harvesting and cleaning are very similar to onion, and attention is, therefore, directed for particulars for such matters as they will be found given here-

after for onion, under its heading; as they will apply for leek.

Market.—Seed is handled largely by all seedsmen; the most of it used here is at present imported from Europe; what is produced in this country, which is of fine quality, is grown in Central California. Excellent seed can be produced in any part of the Northern and Western States. Yield of seed in a favorable season runs from 500 to 600 pounds per acre; prices paid to growers rule from twenty-five to thirty cents per pound.

LETTUCE.

This quick-growing annual delights in a cool atmosphere and an open, loose soil.

In the Eastern United States, seed for a seed-crop is sown in northern latitudes early in April; in California, in February or March. The practice is in rows twenty inches apart, thinning the plants to fifteen inches apart, or at a distance to allow for their complete development. Transplanting is only done for stock-seed, not for a commercial crop.

Like all other crops, lettuce responds to careful cultivation. When plants are in head, or are otherwise far enough advanced to determine the character of the variety, pull up all which show the slightest impurity and shoot too quickly to seed before they have headed or hearted properly; and in case of a heading variety, throw out all which do not head well.

Ripening of seed heads is indicated by their swelling and turning yellow. Cut the stalks by hand as they ripen, and lay upon cloths, and if the weather be clear and dry leave exposed to the sun and air to become thoroughly dry before threshing. It is a crop that must be handled carefully.

For Stock Seeds and Seeds for Private Use.—

Select the finest specimens which show faithful correctness as to type. These are transplanted, the plants tied to stakes for support, and only seeds which ripen first on the plant are saved. A good plan, when the operation is on a small scale, is to pull up plants as seeds are ripening, place them against a fence with a cloth under them, and allow them to remain in that position until seeds are thoroughly matured.

Threshing.—Seed must be thoroughly dry before threshing, which may be done in a threshing machine, or with a roller on a cloth on a floor. Seed is then run through a fan mill. A small quantity may be threshed in a bag, and the cleaning done with a hand sieve.

Market.—Seed is sold extensively by the trade; in some parts of the South lettuce is grown largely as an early market open-field crop. At one time, nearly all the seed that was used here was imported from Europe. But within the last thirty years it has been produced extensively in California, and now that State practically supplies the entire country with lettuce seed and even ships to Europe. The annual production in this country is at present upwards of 200,000 pounds. To the west of the Rocky Mountains, almost any section is peculiarly adapted to lettuce; but for that matter, seed of excellent quality can also be grown in all the States east of the Rockies, where the soil is loose and not over rich. If too rich, it is liable to cause rot at the root at period of blossoming.

In California, a seed-yield in a favorable season is about 500 pounds per acre, at prices to the grower of fifteen to twenty cents per pound.

MELON.

The same general directions which have been given for producing cucumber seed, will apply for a crop of melon seed. The same care must be exercised to prevent mixture of varieties; all sorts of muskmelon will mix with each other, or they will mix with pomegranate, snake cucumber or with vegetable peach; watermelons will mix with each other or with preserving citron.

In the Northern States, seed should be sown about May 20th; muskmelon in hills three feet each way, watermelons six feet each way; eight to ten seeds in a hill, thinning out to two plants in a hill. Good cultivation is necessary.

Extracting and Cleaning Seeds.—Melons for seed should be perfectly ripe. The same processes given for cucumber, to which chapter refer, will apply for extracting and cleaning melon seeds, except that large watermelons must be cut in half to go into the machine for crushing; the same machine used for cucumbers may be used for melons.

Fermentation.—For musk melon, it should not exceed three days; for watermelon, it usually takes longer than for cucumber, or until the pulp separates from the seed.

For Stock Seeds and Seeds for Private Use.—Select the earliest, the handsomest formed and finest flavored perfectly ripe melons, which are true to variety.

Market.—Upwards of 600,000 pounds of melon seeds are planted annually in the United States, two-thirds of which are the water variety, the other portion the musk or cantaloupe. These seeds are all produced in this country, by growers in nearly every State from the Atlantic to the Pacific. The most extensive commercial

growers are located in Nebraska, Oklahoma, Iowa, Kansas, Colorado, Florida, New Jersey and Delaware.

In favorable seasons a seed-yield is from 200 to 300 pounds per acre, although exceptional crops have been known of 600 pounds per acre.

Prices paid to growers range from ten to fourteen cents per pound for watermelon; twenty to twenty-two cents for muskmelon or cantaloupe.

MUSHROOM SPAWN.

This is sold by seed-dealers in the form of bricks. It is imported mostly from England and France, being laid down in New York at about five cents per pound.

The manner of preparing mushroom spawn is to mix thoroughly, fresh horse droppings, cow dung, a little loam and stable drainings, and make a mortar-like composition. This mixture is then spread on boards, or on the floor of an open shed, and allowed to become dry enough to be cut into the shape and size of bricks. These are stood on edge in a dry, airy place, and permitted to get about half dry, turning them frequently to do it properly. They are now given a planting of good, old spawn, which is performed by making two or three holes in each brick, sufficiently deep to plant in each hole, just below the surface, about one cubic inch of spawn. When the planting is done the holes are closed with the same moist material of which the bricks are composed.

The bricks are now allowed to become nearly dry. Then they are piled openly, with the spawn-planted side downward on a layer of warm horse droppings, about ten inches thick, which has been prepared on a dry bottom, as for a hot-bed. A covering of straw or hay is put over the bricks so that the steam and

heat of the dung may be diffused through them, the temperature not being allowed to get above 60 degrees. The spawn will soon begin to run, and when it has spread itself to every part of the brick, looking like white mould (ascertained by breaking one or two bricks), the operation of spawning is considered finished. The bricks are then taken out and allowed to become perfectly dry.

They should be stored in a cool, dry, dark place; kept in this way, mushroom spawn will hold its vitality five years.

MUSTARD.

This is a one season's crop and easy to raise. Sow seed in early spring, in drills two feet apart, thinning to eight inches in the row. Rogue carefully, pulling out all plants which are impure; keep the crop free from weeds. Harvest, thresh and clean after the manner as described for kale or borecole, to which refer.

Sold by seed-dealers generally, the greatest demand being from the Southern States. The most of the seed used is grown in the South, the remainder in California.

In a favorable season a yield of seed is from 1,500 to 2,000 pounds per acre; at prices to the grower, for garden varieties, of twelve to fifteen cents per pound.

OKRA.

This annual does best in a light, rich soil. Sow seed in early spring, in rows three to five feet apart, according to variety, and when plants are six inches high, thin out to fifteen inches between the plants for dwarf varieties, three feet for the tall. Rogue by pulling out

all plants which are not true to variety as respects dwarfness or tallness, shape and color of pods.

In Alabama, where the most of the seed now sold by the trade is grown, sowing is done from April 15th to May 15th; good cotton land is preferred for the crop. Harvest begins there in the latter part of October and is continued into November, or until after plants have been killed by frost, for okra keeps on bearing fruit until frost.

The ripe pods are cut by hand, the use of a machine for harvesting not being possible, owing to the thickness of the stalks, which frequently attain to two inches in diameter. Pods are taken at once to the barn or shed to be dried, after which they are shelled in a thresher or a cow-pea huller; a corn-sheller does the work very well.

A small quantity may either be threshed in a bag or shelled by hand. Clean in the fan-mill. Store, when seed is perfectly dry, in sacks.

All seed-dealers handle okra seed, the heaviest demand being from the Southern States. It is all grown in this country; mostly in Alabama and Georgia, some in New Jersey. In a good season a seed-yield is from 750 to 1,000 pounds per acre, at an average price to the grower of ten cents per pound.

ONION.

Onion seed can be grown with success in most any section of the United States. Soil for it should be moderately rich; if too rich, blossoms are liable to blight.

Bulbs for a seed-crop should be sorted carefully, throwing out all which, in shape and color, are not according to variety. No bulb under the size of a walnut should be planted for seed. Full-grown bulbs,

however, are more productive, bearing larger seed-stems than do plants from smaller bulbs. But it is customary with many who grow onion sets extensively, to raise their own seed from small bulbs not under the size of a walnut, sorted by themselves from the larger onions produced in a crop of sets. Seed produced from such bulbs is not inferior to that from full-grown bulbs.

Bulbs should be set out in drills, six inches deep, six inches apart, in rows three feet apart. Fifty sacks of full-grown bulbs are usually planted to the acre. Cultivate the crop twice or more.

In the Northern States, planting of bulbs is done late in summer so as to secure a good growth before winter. The onion is hardy and withstands the winter without protection, and seed produced from fall planting will mature earlier than that from spring-planted bulbs.

In California, planting of bulbs is done from late in autumn until February 1st, seed being harvested in October. In that climate the bulbs which are harvested in autumn are simply stored in sacks, and generally kept piled out of doors until wanted for planting.

When seed-heads turn yellow, and begin to burst, they may be cut. They are placed on cloths and left exposed to the sun and air to dry for a day or longer, according to climate. They are then taken to the barn or shed, spread thinly, and allowed to become thoroughly dry before threshing.

Threshing is done in a threshing machine; or may be done with a flail or a roller, on a cloth laid on the floor. Seed is then run once or twice through the fan-mill or seed-cleaner. After which it is given a washing in a tank or in a tub of water, to remove the light seeds and remaining portions of pod. For this operation a clear, dry day is chosen. In the washing process, the whole

is gently stirred, which causes heavy, good seed to fall to the bottom, light seed and trash to float; the latter being then skimmed off. Seed is now taken out and spread thinly on cloths in the sun to dry, during which it has to be stirred frequently. It is then taken to the drying-room or loft, and there allowed to remain spread thinly for some time until it has become thoroughly dry, when final cleaning is given in the fan-mill; after which it is ready to be stored.

Market.—Upwards of 1,000,000 pounds of onion seeds are handled annually by the American seed-trade, of which 700,000 pounds are produced in Central California; the remainder, excepting Italian and Bermuda varieties, which are imported, is grown mainly in Connecticut, Pennsylvania, Michigan and Oregon.

Of the Italian and Bermuda varieties, the best seeds continue to be imported, as the exact location in the United States has yet to be found in which seed of these can be produced equal to European in quality.

In good seasons a seed-crop runs from 600 to 700 pounds per acre; prices paid to growers for American varieties range from thirty to forty-five cents per pound for yellow and red sorts, sixty to seventy cents for white.

ONION SETS.

For the successful production of onion sets, the soil should be heavily manured, this usually being done in northern latitudes in August or September. Ploughing is done there late in autumn, or in January or February, so as to have a good freeze for the ground before seed-sowing. About the twentieth of March, say in latitude of southern Ohio, the ground is gone over with a one or a two-horse cultivator, and put in as fine tilth as possi-

ble. After a good harrowing, the soil is made even with a drag.

Seed for the production of onion sets is generally raised by the onion-set growers themselves, by planting in the fall for that purpose bulbs above the size of a walnut, which were produced by them in a previous crop of sets. See preceding chapter on onion seed.

Thirty-five to forty-five pounds of seed are usually sown to the acre, in rows three and a half inches or five inches wide, according to drill used, five inches' space being left between rows for cultivation with a wheel hoe. The crop must be cultivated and kept free from weeds; it generally being gone over five or six times up to about 20th of June, when cultivation is discontinued, otherwise sets will be injured. Harvest takes place, according to latitude, from July 4th to August 1st.

Harvesting.—When the sets show signs of ripening, indicated by the tops getting soft, they are lifted by a wheel-hoe fitted with a lifter, which is a piece of steel six and a half to seven inches wide, made sharp at the bottom and bolted on. After a number of rows have been lifted, the bulbs and tops intact are pulled and laid in small piles or windrows, five to six rows being made into one pile at a time. The position in the windrow is upright, bulbs touching the ground, tops up; the bulbs being thereby protected from sunburn. In this manner, in windrows, bulbs are left to mature and cure, exposed to the sun or rain, for two or three weeks after pulling.

In California it is the fashion, immediately after sets are lifted, while tops are somewhat green yet, to stack the tops and bulbs, packed closely, in upright position (as in windrows), in shallow boxes, which are then placed under shelter in a shed or a barn. In this manner,

onion sets are preserved in that climate for six months or longer, and are usually almost as fresh in appearance at the end of that time as they were at the beginning.

Cleaning.—To clean onion sets properly, the weather should be dry and warm. For the purpose, a quarter-inch meshed wire screen twelve to fourteen feet long, three feet in width, is generally used after the following manner.

Sets are gathered from the windrows after the dew is off in the morning, say about nine o'clock, and are first placed on canvas or boards to dry off. This is to be done in the shade, so as to avoid sunburn; sets must not be exposed to the direct rays of the sun. When they have become thoroughly dry, cleaning is in order. This is performed by simply rubbing them back and forth on the screen until they are cleaned from tops, roots and dirt, when they are pushed out of one end of it into bushel baskets.

Storing.—Onion sets are best preserved at a uniformly low, dry temperature, with absence of light; above everything, moisture and heating in bulk should be guarded against. To avoid gathering moisture and heating, they should not be packed over six inches in depth. If they become too warm they will start to growing. In the fall and spring the room in which they are stored, while it should be darkened, should have free circulation of air by opening the doors and windows, especially on warm, clear days; besides which, the sets should be stirred and turned over about twice a week.

Sets will bear a temperature down to 25 above zero without injury. But if they should chance to get frozen, do not handle or disturb them while in that condition; merely keep them covered as hereafter

directed and let them remain till the frost has naturally and gradually gone out of them. Always handle onion sets as you would apples, for even slight bruises will cause them to rot.

They may be stored in the barn or warehouse, spread out to the depth of five or six inches on a loose floor where the air can pass up through them. On approach of extremely cold weather, say 10 or so above zero, the floor, if loose, should be covered with tar-paper and the sets heaped upon it to a depth of about 18 inches, and covered with grain bags, old carpet, tar-paper, hay or straw. The doors, windows and all crevices should be closed, and kept so while the cold spell lasts.

Some of the larger growers store in crates. These crates are usually three feet wide by four feet long; the bottoms being made openly of plastering lath, the sides four inches in depth, with the end-pieces six inches high, which latter is to permit circulation of air between the crates when they are set on top of one another. In piling them, they are generally placed four to eight crates high. In case of cold weather, ten or so above zero, the crates are kept covered well with tar-paper to keep out the cold air.

Before shipment give a final cleaning by running through the fan-mill.

Market.—For many years Pennsylvania held the lead in the Union for the production of onion sets. In those days, growers obtained on an average \$4.00 a bushel for yellow and \$5.00 for white; when there was a short crop, prices advanced to \$8.00 and \$10.00 and higher, per bushel. But prices have lowered exceedingly since the West has taken up production. It is to be remembered that there was scarcely a bushel of onion sets raised around Chicago thirty-five years ago, whereas

to-day the production in its vicinity amounts to many thousands of bushels annually. Great quantities are also now produced around other Western cities, notably Louisville, Cincinnati, St. Louis, and Chillicothe, Ohio, the production in the neighborhood of the latter city alone being about 50,000 bushels annually.

The demand is confined principally to the yellow variety, owing to its good keeping qualities; the proportion of production being two bushels of yellow to one of white.

In a favorable season a crop of onion sets will average from 150 to 200 bushels per acre, but there have been exceptionally greater yields. Prices paid to growers have latterly ruled from eighty to ninety cents per bushel for yellow and ninety cents to one dollar for white.

PARSLEY.

This is a two seasons' crop, flowering and seeding taking place in the second year. To avoid mixture, the varieties must be kept separate and not allowed to seed near each other. Rogue in the fall; in the case of the curled sorts, select the best and finest-curved specimens, destroying the rejected plants. Plants are wintered over in trenches after the manner practiced for celery, or they may be left in the field where sowing was made, earth being thrown up to the plant on approach of winter, and protection given with a light covering of straw or hay; on the Pacific coast this protection is not necessary.

If wintered over in trenches, set out the plants early in spring, in rows three feet apart, one foot in the row. Cultivate and keep weeds down.

Cut the stalks when bulk of the seed is ripe. Let

them remain on the ground exposed to the sun to dry for a few days, or longer, if weather continues clear. In the barn or drying-house they should be allowed to become thoroughly dry before threshing.

Threshing, Cleaning, Etc.—All these operations are similar to celery, which see.

Market.—The foliage of parsley being largely used for garnishing and for flavoring, much seed is sold, nearly all of which, amounting to thousands of pounds, comes from Europe. The little, however, that is grown here, has proved to be equal to foreign seed in quality, indicating that there is no necessity for importation, but that all we use could be grown to profitable advantage by ourselves.

Four to five hundred pounds of seed to the acre is the average yield, but this has been greatly exceeded. Prices paid to European growers, laid down in New York, range from ten to thirteen cents per pound, according to variety.

PARSNIP.

This vegetable seeds in the second year; the best soil for it is a rich, sandy loam. No attempt should be made to grow seed where wild parsnip abounds, for mixture will surely result, and the seed produced will be unfit and unreliable.

It is perfectly hardy, and roots are left in the ground over winter. To have first-class seed, roots should be dug up and sorted over in the spring, and only the smooth, straight and finest specimens selected for re-planting. These are set out in rows four feet apart, six inches in the row; until so covered with foliage as to prevent growth of weeds, there should be constant cultivation.

Seeds are produced in heads, two seeds being formed together, flat against one another; ripening is known when these twin seeds begin to separate.

Harvest, Cleaning, Etc.—These operations are similar to those given for celery, to which refer.

Market.—Parsnip seed follows carrot in order of consumption; at least fifty per cent. of the quantity handled at present by the trade is purchased in Europe, the rest is produced here, in New England, the Middle and Western States and in Eastern Washington. In a favorable season a seed yield is from five hundred to six hundred pounds per acre, at from eight to ten cents per pound to the grower.

PEA.

The best soil for a crop of pea seed is that of a light character, moderately rich, less manure being actually required than for most other crops. Moreover it should be in good mechanical condition, as peas are not cultivated. The pea self-fertilizes, and different varieties may be grown near each other without admixture.

To have perfectly matured seed, sowing for a seed-crop should be deferred until the most favorable period for the uniformly progressive development of the plant, which in the present favored seed-pea growing sections of the United States—Central Michigan and Northern New York—is about May 15th; in fact, as soon as frost is entirely out of the ground, sometimes a week or more earlier than date given.

Sowing is made in drills, $\frac{1}{2}$ to 1 inch apart in the row, the rows 8 to 12 inches apart; about three bushels of seed are sown per acre.

Stock or planting seed should be pure and have been grown with careful attention to roguing; but roguing

must be continued as far as practicable with the commercial seed crop, labor of same being reduced to a minimum by sowing pure stock-seed. The main points to be observed in roguing are general character of growth of vine, shape of leaf, shape and size, length and breadth of pod. In growing stock-seed, rows should be made farther apart than for main crop, about the same distance as in ordinary garden culture, so as to provide the necessary convenience for roguing.

Harvest usually begins early in August. It is done when the great bulk of the crop is ripe, almost regardless of weather. If allowed to get too ripe, loss by shelling out and handling will be excessive. On large acreages, it is performed with a mowing machine having a pea-harvester attachment. The small grower, with only two or three acres, usually cuts with a heavy scythe, throwing vines by the scythe into small piles. When cutting is done with the machine, vines are forked into small piles. These are allowed to dry for a day or two, and then hauled to the barn like hay. In the barn they are stacked loosely to await the thresher.

Threshing, Cleaning.—Threshing may be done on the barn floor with the flail, but best results are obtained by use of the threshing machine especially designed for peas and beans, which has been mentioned in the chapter on beans. Cleaning is done in a fan-mill or seed-cleaner; after which seeds are carefully hand-picked to take out broken, imperfect, and defective grains and impurities. For the latter purpose a machine called a pea-picker may be used.

Market.—Besides being a great favorite in every garden, the pea is grown extensively by market gardeners, particularly in the Southern States along the coast, where, for early shipment to Northern markets, it forms

a farm crop of much importance. It is also grown largely for canning purposes.

In seed-peas the transactions in the trade lead, in bulk and monetary consequence, every other seed in the vegetable line; aggregately, more than 750 carloads of seed-peas of garden varieties are handled annually at present by the American trade. Formerly this pea seed was all imported from Europe, but now nearly all of it is produced within our own border, the exception being what is raised in Canada. Engaged in the industry in our country, there are upwards of a score of growers on a large scale, and numberless smaller growers, the great majority of them being located in New York, in Michigan, in Northern Wisconsin, and in Canada along the margin of Lake Ontario. Some of the smaller growers are scattered through Eastern Washington, Utah, Western Oregon, and Northern California. In all these sections the climate and soil are peculiarly favorable for seed-pea growing. In the southern portions, or warmer climates of the country, the crop is more subject to the pea weevil than elsewhere, and on that account production of seed-peas in such localities is not undertaken.

A yield of pea seed depends upon the variety, whether dwarf, tall, small or large-seeded, etc., varying according to season, from eighteen to twenty-five bushels per acre for early and dwarf sorts, from twenty to thirty bushels per acre for taller kinds. Prices for staple varieties range from \$1.50 to \$2.50 per bushel, according to variety; newer and choicer varieties, from \$2.50 to \$3.50 per bushel.

Pea Weevil.—This insect lays its eggs on the outside of the young pods in the field. After these are hatched, the young larva works through the pod to the

growing seed within and there makes its home, living and feeding, to become finally a pupa or a complete bug. In this last form it remains dormant in the seed, eventually to come out when the seed is sown; or as often happens, it may emerge earlier, when the seed is in the seed-bin or in the sack. By instinct the insect avoids the germ, subsisting only on the material which encloses the germ, that substance provided by nature as food for the young plant until it can succor itself by means of its roots. But sometimes the insect, when too voracious, will consume too much of this plant-food matter, and this then is the cause of some bug-eaten peas not germinating. If they do sprout, then the young plants frequently die from lack of sufficient nourishment.

To insure protection from pea weevil, the seed-dealer should dose his seed-peas with bisulphide of carbon as soon as received in store. The manner in which to do this is to place the bag or bags containing the peas in an air-tight room or a close-covered bin, and leave them exposed to the vapors of the bisulphide from twenty-four to forty-eight hours, which will kill the dormant bugs without injury to the seed. The same is also effective for killing bugs in beans, cow peas, and all other seeds.

The bisulphide of carbon is placed in a dish and set on top of the bags containing the seed. It evaporates rapidly, and the heavy vapors sink into the mass of the seed and kill the bugs. If found necessary repeat the operation several times during a season. In small quantities, bisulphide of carbon costs 15 to 20 cents per pound; one pound should treat 30 bushels of seed. The liquid and the fumes are very inflammable and poisonous, and all fire should be kept away from it; for that reason an unoccupied, air-tight room is to be preferred

for using it; some have a large, tight box or bin specially made for treatment of their seeds with it.

If it is desired to destroy weevil in a small quantity of seed, the bisulphide of carbon may be put into a small, wide-mouthed bottle, over which a cloth has been tied. This is placed in the bottom of an air-tight barrel, and the seed to be treated is poured on top and the barrel is then carefully covered; in course of two or three days all insect life will have been killed.

PEPPER.

This annual requires a rich, loamy soil for a full seed crop. No two varieties should be planted near each other, to prevent mixture. In the Northern States, plants are set out from seed-beds from May 25th to June 1st, in rows three feet apart, eighteen inches in the row. In California and in the Southern States, planting is done much earlier. Cultivate as you would for eggplant.

Seed is ripe when pods have changed color to red or yellow, as the variety may be; pods are picked off by hand.

For extracting seed on a commercial scale, a machine similar to the one for cucumber is used, operated by steam or a gasoline motor. The pods are shoveled or poured into the hopper of this machine and crushed into fine pulp, being then passed to a revolving wire reel which separates seed from large portions of pulp. Seed is now immediately washed in running water in a wooden vat, which is made 18 or 20 feet long, $1\frac{1}{2}$ feet wide, $2\frac{1}{2}$ feet deep, fitted with a wire sieve of suitable mesh, set 6 inches from the top; at the lower end there is a gate or door to let water out and remove seed. The slowly running water washes away pulp, while seed

sinks through the sieve and settles to the bottom of the vat. When seed is thoroughly clean it is spread thinly on drying screens, or on trays, which are set in the sun and air to dry. When thoroughly dry, and before storing, it is given a final cleaning in the fan-mill.

On a small scale, pods may be mashed or crushed in a barrel, or may be ground in a portable wine or cider mill, and washed in a tub or a barrel of water, using hand sieves of suitable mesh.

Pepper pulp is not usually allowed to ferment, as it will darken the color of seed; if any fermentation is given it should be very slight. Some growers instead of crushing the pods simply cut off the stem end and take out the seed core; the empty pods are then sold at about 10 cents per pound to pickle men and manufacturers of pepper slaw.

To Save Stock Seeds and Seeds for Private Use.

—Select the earliest, largest and best-shaped pods. These may be hung to a rafter in a dry, airy room; seeds keep better and are preserved best in their dried pods.

Market.—Pepper seed is handled by all seed-dealers in a moderate way, being sold at retail usually by the ounce, or in small packets, except in the South, where it is planted extensively for market and sold in larger quantities. The estimated yearly consumption in this country is upwards of 50,000 pounds. The great bulk of it, especially the mild, sweet varieties, is produced at present in California, New Jersey, and in the South; some "hot" varieties are imported. Pepper seed may be grown with profit in any of the States, especially the South.

In a favorable season, yield of seed is about 200 pounds per acre; prices paid to growers rule from fifty to sixty cents per pound.

POTATO.

It is impossible to improve a variety of potato by a selection of tubers. This may be demonstrated by planting a badly-deformed tuber; the product will show perfectly-formed tubers, true to the variety to which the deformed parent belonged.

New varieties, therefore, can only be obtained by sowing seed, which is produced in the berry borne on the potato plant. From 100 to 300 seeds are contained in a single berry, all of which are likely to produce plants which will be entirely different from the parent; no two plants will be alike; dissimilarity will be shown not only in form but in color. It is evident, therefore, that the production of a new variety is a work requiring extreme patience, as before the discovery of one that is an improvement over already existing sorts, it may be necessary to cultivate many hundreds of seedlings. It was, however, by such patience and perseverance, that all our present valuable market varieties have originated. The Reverend Chauncey E. Goodrich, of Utica, N. Y., who originated about 1866 the king of potatoes, the early Rose, a seedling of the early Goodrich (also originated by him), certainly deserved to clear a fortune from it, if he did not do so. A neighbor and friend of his, who assisted in its introduction, did reap a small fortune, said to have been about \$25,000 in one year, from its sale for seed, when it retailed at \$4.00 per pound. After an existence of forty years, the early Rose continues to-day popular and unsurpassed for its earliness and good quality.

It takes two years to produce full-sized potato tubers from seed. Starting of seed may be done early in spring in a hotbed, or in the house in shallow boxes filled with rich, light soil; in May transfer plants to

open ground. The first year's tubers are very small; these after being preserved over winter in the usual way for potatoes, are planted the following spring and produce large tubers.

Second Crop Seed Potatoes.—In the Southern States, where the early or spring crop of potatoes matures earlier than in the North, it is almost impossible owing to the climate to keep the tubers over the fall and following winter in order to plant in spring. Therefore, Northern-grown seed potatoes have largely been depended on in the South for seed for spring planting. In later years, however, the problem has been solved economically for the South by the production in that section of a second or fall crop of potatoes, which for spring planting are now preferred to Northern-grown tubers.

The method for obtaining second-crop potatoes, is to select for seed, potatoes from the spring crop. These may be left in the ground where they grew until ready to plant, or may be preserved by spreading them on the ground, and protecting them from sun and rain by a light covering of straw or leaf mould. This seed is then planted, in latitude 35 degrees, early in August. Before planting, the buds are started or sprouted by spreading the potatoes in a cool, shaded place, covering them with three or four inches of garden loam or sand, and keeping same moist, not wet, until the sprouts are an eighth or a quarter of an inch long, which will be in about two weeks' time. Planting is done in the same manner as for a spring crop, but covering is made a little deeper.

This crop matures quicker than a spring crop, and keeping qualities of these second-crop potatoes are all that could be wished for; for table use they are unexcelled.

PUMPKIN.

A seed crop of pumpkin is managed as for cucumber and melon seed. As directed for them, the same care must be taken to prevent mixture; pumpkins will mix with each other, with any variety of squash and with gourds.

In the Northern States seed is sown from May 5th to May 15th, in hills eight feet apart each way, eight to twelve seeds in a hill, thinning out subsequently to two of the strongest plants in a hill.

Harvest.—Fruit may remain on the vines until after first frost, except soft-shelled varieties, which should not be allowed to be subject to a heavy frost, as it will cause them to rot. In the Middle West, the usual method is to remove the soft-shelled varieties early in October, hard-shelled sorts about October 10th. They should be handled carefully to avoid cracking or bruising, and should be gathered in a pile on a spot to the south side of a barn or shed. In case of cold weather, protect with a light covering of straw or hay, and allow to remain for a week or two to more properly mature the fruit before extracting seed. Should any show signs of rotting, put them into a separate pile.

Extracting Seed.—Seed is removed by cutting open in the middle with a spade, a corn knife, or anything similar, dull enough to avoid cutting of seed. With a heavy iron spoon, the seed pulp is then scooped out into bushel baskets.

Washing and Cleaning.—Washing is done the same day that seed is taken out, without any fermentation whatever, except that the brown-seeded varieties may stand one day before washing. White-seeded varieties will become discolored if subjected to fermentation, which would injure their market value. It is,

therefore, advisable to wash seeds of the latter same day they are taken out

The usual method of washing is to put the pulp in a tight barrel and then mash it until it is in a mushy condition. One or two pails of water are then poured in to thin the pulp and a hard stirring is given. More water is now poured in until the barrel is filled, and the whole is stirred with a rotary motion. The white seeds will float on the top of the water and are taken out by skimming them off. Stir several times to release seeds which may be held down by the pulp. Water and pulp are then emptied out of the barrel, and seeds again washed in clear water if first washing did not render them clean enough.

In washing brown-seeded varieties, seeds sink to the bottom instead of floating.

After washing, seeds should be drained and spread on drying frames to dry. They may then be stored as for cucumber.

Market.—There is a large sale among all seed-dealers; seed is all produced in this country, largely in the Western States. Yield of seed in a good season runs from 200 to 300 pounds per acre; prices paid to growers range from eight to fifteen cents per pound, according to variety.

RADISH.

This is a hardy annual and succeeds best in a light, rich, sandy loam.

In growing a large acreage of radish seed for commercial purposes, it is not customary to transplant the roots, but they are allowed to go to seed where they are grown. Roguing, in such case, is done with the hoe several times when plants are small. When how-

ever, transplanting of roots is not done, great dependence is placed on the purity of the stock or planting seed.

This was grown the previous season from transplanted roots, which before being replanted had been critically sorted, only the finest and smoothest specimens having been selected, which in color and form were deeply characteristic of the variety and did not have very long tops.

In the Northern States, seed of the early and summer varieties is sown early in April; in California, from February 1st to March 1st. It is done not too thickly, in rows twenty inches apart, thinning subsequently to four or five inches in a row.

Winter varieties are sown in the Northern States in August. Late in autumn, roots are taken up, and after being carefully sorted, those selected are wintered over in trenches after the manner described for wintering beets. Early in the following spring, they are set out in rows two feet apart, four to five inches in the row.

Harvest is done when the great bulk of pods have ripened. The stalks are cut either with a scythe or a mowing machine. The cuttings are laid in rows or forked into piles, and left to dry. They are hauled to the barn like hay, and there allowed to remain, stacked loosely, to get thoroughly dry before threshing; radish seed requires a long time to become dry enough for the latter operation.

Threshing is done with the threshing machine, or with a roller or a flail, on a cloth on the floor.

Clean by running twice through the fan mill. After which spread the seeds thinly in the drying room and leave till they have become perfectly dry, when they may be stored in sacks.

Market.—This vegetable as well as being a favorite in every home garden, is grown extensively for an

early crop by market gardeners. Many of the larger seed-dealers will handle thousands of pounds of radish seed in course of a single season. The demand runs mostly to early varieties; red turnip, long scarlet and half long scarlet being the kinds most popular.

Nine-tenths of the seed used by the American trade is imported from Europe, the remainder is grown in this country. European seed forms the standard for the market, owing to the great care taken in its production. Most of the American seed is grown in California; the total annual production there being upwards of 100,000 pounds. Seed of excellent quality is also grown in other States, mostly in New England, Pennsylvania and Michigan. In fact, all the first-class radish seed in demand could and should be produced in this country at prices on a par with Europe.

In a good season, about 1,000 pounds of seed per acre are an average yield, but exceptional crops have been known of 1,500 pounds. Prices laid down in New York for either American or European seed, range from ten to fifteen cents per pound to the grower.

RHUBARB.

The usual method of propagation is by root, as seed rarely produces roots equal to the parent. The main root is separated so that each division contains an eye; these divisions are used for planting.

Seed, however, may be gathered from the plant. It is produced on the main stalk. The stalks after being cut, should be allowed to become perfectly dry before threshing, which is done with a machine or with a flail on a cloth on the floor, or seed may be rubbed off between the hands.

Seed-dealers handle both seed and roots in a limited

way. Prices paid to growers for roots rule from fifty to sixty cents per dozen; for seed, forty to fifty cents per pound.

SALSIFY.

Cultivation is similar to parsnip, seed being produced in the second year. Salsify succeeds best in a light, rich, mellow soil. It is extremely hardy and roots remain in the field over winter. In spring they should be taken up and sorted and the handsomest specimens replanted same distance apart as for parsnip. If stock seed has been produced in this way, the roots for a commercial seed crop may be allowed to go to seed where they stand without removal in spring. Different varieties should not be allowed to seed near each other.

The seed head resembles that of dandelion, although it is much larger. In harvesting, seed heads are usually hand-picked, and as they ripen unevenly, the field should be gone over twice a day when they are opening. They are gathered and dried on sheets. After being kept spread out for a while in the barn or drying house till they have become thoroughly dry, they may be threshed in a machine or with a roller, after which seed is cleaned by running through a fan mill. It should not be stored until it is perfectly dry.

Market.—Upwards of 75,000 pounds of salsify seed are handled annually by the seed trade in this country; most of it is produced in Central California, where a yield in a favorable season is about 500 pounds per acre, sometimes running to 1,000 pounds. Prices usually paid to growers are thirty to thirty-five cents per pound.

It is a crop that can easily be grown most anywhere in the United States.

SPINACH.

For a seed crop the soil can hardly be too rich. Sowing should be made in autumn; about the middle of September in latitude 40 degrees; drill seed in rows two feet apart, thinning to six inches in the row. It stands the winter without protection. To prevent mixture, no two varieties should be planted near together.

In spring, loosen the soil, cultivate and keep free from weeds. Rogue carefully, pulling up all plants which show a departure from the variety.

When bulk of seed is ripe, cut the stalks with a scythe or with a mowing machine, throwing them into rows, or forking into piles. Leave in the field for a few days to dry before hauling to the barn or drying house. Seed should be allowed to become thoroughly dry before threshing, which may be done either with a flail or the threshing machine.

Clean by running twice through the fan mill; as seed forms in clusters, it may be necessary to hand-rub. Let remain spread out on a cloth after cleaning for complete drying before storing.

Market.—Many hundreds of thousands of pounds of spinach seed are sold yearly by the combined American seed trade, this vegetable being grown extensively as a field crop for market. Seed is nearly all imported from Europe, but as has been said of other varieties, it could all be grown to advantage in this country. New York, Pennsylvania and some few other States produce seed equal to best European stocks.

In a good season, a yield will be 1,000 to 1,500 pounds per acre. European seed is laid down in New York, duty included, at five to six cents per pound.

SQUASH.

Treatment for raising a seed crop is similar to pumpkin. Squash does best in a good, rich soil and thrives in a warm temperature. To avoid mixture, two different varieties should not be allowed to grow near each other; squash will also mix with pumpkin and with gourds. A safe distance to keep varieties apart is forty rods.

In the Middle States and in the West, the usual time for planting is May 15th for summer varieties, May 5th to 15th for winter kinds.

Make hills for the former, three feet apart each way; for the latter, eight feet each way; summer varieties may also be planted in rows three feet apart, dropping two or three seeds every eight inches in the row.

Eight to twelve seeds should be planted in each hill; thinning when all danger from bugs is past, summer varieties to three or four plants in a hill, winter sorts two plants to a hill. If planted in rows, summer sorts should be thinned to one plant every eight inches. Cultivation should be thorough and weeds kept down.

Harvest and extract seed after the manner for pumpkin. Summer varieties should undergo twenty-four to forty-eight hours' fermentation, similar to cucumbers; but the winter varieties must not be fermented at all, the course for these being precisely like that described for white-seeded pumpkins, to which refer.

Summer squashes are washed and dried in the same manner as directed for cucumber; while for winter varieties these operations are same as for white-seeded pumpkins.

Market.—Squash seed is sold largely by the trade, the demand running principally to summer varieties. It is produced entirely in this country, mostly in the

Middle West. Seed yield in a favorable season is from 200 to 300 pounds per acre; prices paid to growers rule from twelve to fifteen cents per pound for summer varieties, twenty to twenty-five cents for winter sorts.

TOMATO.

Cultivation of this vegetable for seed is same as for table use, which being so well known, general directions for growing a crop are deemed superfluous here. But plants intended for seed are usually set out four feet each way, and good, rich soil and high cultivation are necessary.

Stock seed should be saved carefully, not only from perfectly ripe fruit, but from the earliest, largest and best-formed specimens, which besides being true to variety as to color and shape, are perfectly smooth, solid and have ripened close to the core. Such stock seed has a market value of \$10 per pound. The commercial seed crop should, however, while growing, be gone over and rogued carefully. Finally when the ripe tomatoes are gathered, they must be sorted, and all rejected which are not true or characteristic of the variety.

To be in prime, marketable condition, commercial seed must be bright in appearance; and to have such real bright-looking seed, fruit should be gathered just ripe, not over or under ripe, and must not remain in fermentation longer than is absolutely necessary to loosen the gum which clings to the seed. Seed saved from over-ripe fruit is harder to clean.

Fermentation and Washing.—Fruit is first ground up in a machine similar to the one used for grinding cucumbers, the wire reel taking out large pieces of pulp. The seed with its remaining pulp is then poured into

a tight barrel or a tank to undergo fermentation. This will take from two to three days, depending on ripeness of seed as well as temperature; the warmer the temperature, the quicker fermentation takes place. A frequent stirring must be given the mass while fermentation is going on, otherwise seed at the top is liable to become blackened.

When seed has been properly fermented, it may be washed in a vat, similar to the one described for pepper and after the same manner.

Some growers place barrels in handy rows in the field where picking is being done. On top of one of the barrels a small, portable hand mill is set for grinding the fruit. The pickers empty their buckets in the mill, while one person does the grinding. When a barrel is about three-fourths full, the mill which may easily be carried by one man, is removed to the next barrel, and so on until picking is completed. The barrels are then hauled on a sled or a wagon to a shed or some sheltered place convenient to water, where fermentation of the ground pulp is allowed to take place in the barrels. It is contended that fermentation is much better done in a smaller mass in barrels than in troughs. However, some larger growers use a trough which is made about 20 feet long, 3 feet wide, 1½ feet deep, placed on a platform raised several feet from the ground. One grower, whose crop is grown on about 100 acres, uses ten of such troughs, having them placed side by side, under shelter, near the water supply. A gateway is made at the end of each trough to let out the pulp when it is to be washed. The tomatoes are hauled in wagons from the fields to the troughs, the fruit being then ground in a hand mill set on top of a trough. The washing tank of the growers in question is made 4 feet

long, 2 feet wide, 2 feet deep, inside measure. It is placed in position convenient to the barrels, or set at the gateway end of a trough, and is filled with water (the large grower above-mentioned pumps water into his tank by horse-power). A box sieve of six meshes to the inch is then placed inside the tank. This is 3 feet long, 18 inches wide, 8 inches deep, with a pair of handles at each end. These form a rest for the sieve at the top of the tank, while the bottom of the sieve remains under the water. The fermented pulp is poured into the sieve from a barrel, one or two bucketfuls at a time or a like quantity is allowed to run in from the end gate of the trough. Two persons operate the sieve, one at each end, and by gently shaking the sieve-box up and down in the water, the pulp is washed; the seed passes through the meshes of the sieve and sinks to the bottom of the tank, while the pulp that remains in the sieve-box is emptied out. The sieve-box is then refilled from the barrel or tank and the operation is repeated as before. When the water in the tank becomes too red and slimy from the washing, it is drawn out through a tap at the end of the tank, and the tank is refilled with clean water. Seed is scooped out of the tank into a medium-sized barrel, and is then rinsed in the same barrel with clean water. The fine, slimy pulp will float on top, and by tilting the barrel it is poured out. Fresh water is poured in and the rinsing is repeated until seed is thoroughly clean, when it is taken out and dried. When there is a stream of running water accessible, seed may be rinsed in a long trough, say 150 or more feet in length fitted with a sieve its entire length; the slowly running water will perform the operation of rinsing, carrying off the remaining pulp and slime, while the seed sinks through the sieve to the bottom of the trough.

Drying.—After being rinsed clean, seed is taken up in small quantities, squeezed or pressed dry, and then spread either on wooden trays or on screens or drying frames of similar material and dimensions to the frames described for drying cucumber. These trays or screens are set in the sun and air to allow seed to dry. A clear, dry day is chosen, so as to give seed as much drying as possible before night.

The screens are placed under shelter over night and set in the sun again the following day; which is continued until seed has become thoroughly dry. While drying, stir and turn seed frequently. From the screens, seed is spread thinly on the drying room floor, and there allowed to remain till it is perfectly dry; after which before storing it is cleaned in the fan mill.

Market.—The seed trade at present handles in the aggregate upwards of 250,000 pounds of tomato seed yearly, it being sold largely to canners and to truck farmers.

It is all produced in this country by growers scattered from the Atlantic to the Pacific. In a favorable season, 200 to 300 pounds of seed are produced to the acre; average prices paid to growers range from forty-five to sixty cents per pound, according to variety.

TURNIP.

Any kind of mellow, fertile soil, from a light, sandy loam, to a heavy clay is adapted for a crop of turnip seed; that which was fertilized for a preceding crop is better than applying stable manure at time of sowing, as by the latter course the crop is liable to be worm-eaten.

If it be necessary to use a fertilizer, it is advised to apply wood ashes, bone meal, or super-phosphate.

Ground should be well ploughed and harrowed. In the Northern States sowing for turnip should be made the latter end of summer; ruta бага at least a month earlier, say July 15th to 20th; both in drills two feet apart, thinning to six inches apart. This is the course when the roots are taken up in the autumn and stored in pits or silos over winter.

In Europe, the practice is to sow in August, and toward the end of October the earth is ploughed between the rows and thrown over the plants; no other protection is deemed necessary; the following spring the growths produce seed stems. Confidence is there reposed in the stock seed; very little roguing being done. This practice of wintering over without taking up the roots is also the method in Washington and other warm parts of the United States.

In colder sections like New England and the Middle States, the roots are dug up about the middle of November and carefully sorted, only the finest roots, true to variety being selected. These are then carefully topped so as not to cut away the heart or seed germ, and are stored over winter in pits or silos. The latter may be made as long as needed, say 100 feet or more; in width 3 feet, in depth 1 foot. The pit is filled to the level of the ground, and a covering is given of 4 inches of straw, over which is then thrown 8 inches of earth, this being ridged up firmly to turn off water. Early in spring these roots are set out in rows three feet apart, fifteen inches in the row; the earth is pressed firmly about the tap root, and the whole well covered, allowing the sprouts to be above the ground. The crop should be well cultivated and kept free from weeds.

In England, to produce stock seed, the custom is to dig up the mature turnips in the fall, and after care-

fully sorting them, to store them over winter stacked up in the open and banked with straw for protection; or they are buried in pits.

When roots are to be left in the field over winter, the rows when seed is sown should be made as directed for spring planting of roots, viz., three feet apart, plants standing fifteen inches in the row.

No two varieties should be grown near each other, nor should ruta бага be raised in the vicinity of cabbage; if permitted mixture in the crop will result.

On the Northern Atlantic slope, harvest occurs from June 25th to July 10th. It is done when bulk of the crop is ripe, known by the pods becoming dry.

Owing to the loss sustained when cutting is done with a machine, by seed pods bursting and spilling seed, the work is better done by hand, and that carefully, with a reaping hook.

The stalks are gathered into small heaps, the heads laid one way. They are left to remain in the field for a week or so, to become dry. A cloth to catch loose seed should be placed in the wagon used for hauling to the barn.

Threshing may be done either with a flail or the threshing machine. Before using the latter, it should be examined to see if it is free from seed which may have lodged in cracks, shelves, etc., from previous crops. Clean by running through the fan mill.

Market.—The total annual consumption of turnip seed by the American seed trade will approximate 2,000,000 pounds. The greater portion of this is imported from Europe, mostly from England; the remainder is grown in the United States, and in quality is equal to the imported. This home-grown seed is produced mostly in New England and the Middle States, in Eastern Virginia and in Eastern Washington.

Seven Top and kindred sorts are nearly all grown in the Southern States, seed being produced there cheaper than elsewhere and is first-class in quality.

In a favorable season, from 1,000 to 1,200 pounds of turnip seed are an average yield per acre; ruta бага is somewhat more, ranging from 1,200 to 1,500 pounds. Of course, there have been exceptionally greater yields, a crop of turnip having been produced in Nebraska of about 2,000 pounds per acre.

European seed is laid down in New York, duty included, at about ten cents per pound.

HERB AND FLOWER SEEDS.

The general directions given in the preceding pages for growing commercial or field crops of seed of the different varieties of vegetables, as well as for raising choice stock seed, will also apply to the production of all herb and flower seeds. The operation is always to be governed by the character or nature of the variety and extent of crop proposed to be grown.

After all, the process of saving seeds is simple and natural. It is merely that to obtain the finest seeds which shall insure the most satisfactory results, you should save seeds only from ideal specimen plants, that is, from plants which produce only perfect flowers and possess all the characters you would like to see in the offspring. Namely, all the true attributes of the variety inclusive of a robust frame or stalk, and clean, healthy foliage.

In addition, if it is desired to save a few strictly choice seeds, then only the first or earliest perfect flowers which develop on the ideal plant chosen must be allowed to go to seed, and this plant should be covered with mosquito netting to prevent cross-fertilizing with inferior plants which may be growing nearby.

In saving seed on a small scale, the selected plants may be marked either with a wooden label or a stake driven alongside, and it is better to tie all such plants to stakes for support.

In cases where the character of the variety be such

that seed will be likely to spill or shell out in course of ripening, cloths or sheets of heavy paper may be spread under the plants close to the stem. In the forenoon after the dew is off, and at intervals during the day, shake plants well to loosen seed and cause it to drop on the cloth or paper beneath. This seed may be removed in the evening, and the paper or cloth replaced in the morning.

Cleaning may be performed with a hand-sieve of suitable mesh, or by using, if one be at hand, a seed-cleaner, of which there is a special small size made for flower seeds.

Market.—Every American is a lover of flowers, and every American home having a piece of ground, no matter how small, is sure to have its flower bed; the vegetable garden may go, but there must be flowers.

As may be imagined, there is an extensive trade in America for flower seeds, it amounting in the country at large to many millions of packets annually.

The demand for home gardens runs principally to annuals, those varieties which flower the first year from seed and then perish. The purchases by florists, who are usually heavy buyers, consist mostly of the choicer biennial and perennial sorts. Therefore, all grades and kinds of flower seeds are carried in stock by seedsmen everywhere.

The industry of flower seed growing in America while it is improving fast, is not yet at the highest advanced stage. In fact, at this time Europe produces the finest flower seeds in the world, and the American seed trade is consequently obliged to depend at present almost entirely on that source for the choicest seeds of the most approved varieties.

There is nothing to be wondered at as regards this

European success in the production of high-grade flower and other seeds. It is not owing to superiority in climate or soil, inasmuch as we have as good, if not better, in our own country; but it is due rather to careful methods in growing, *i. e.*, the most particular attention that is given in Europe to cultivation, to keeping varieties pure by selection and separation, and to an unceasing endeavor to improve varieties. In other words, these European growers, besides being trained specialists in their respective lines, are methodical and deliberate in performance, conscientious and careful to the superlative degree; points which will always place seed growers of any country in the front rank. And if these same careful practices of the Europeans were generally adopted in the United States, it should be only a question of time when importations here would cease entirely.

Production in the United States.—Seeds of certain special varieties of flowers are grown commercially, on a small scale, in some of the Eastern States, but California produces about all the flower seeds grown in the United States. While in a certain sense this latter production is quite large, it is confined mostly to coarser strains of popular varieties which, however, are the equal of European seeds of the same class.

In California, about five hundred acres are devoted to flowering sweet peas alone, the total annual production of same approximating 350,000 pounds or about seven hundred pounds per acre, at prices to the grower of eight to ten cents per pound. In the same State, flowering nasturtiums yield about 300 pounds per acre, at prices which rule from 25 to 30 cents per pound to the grower; asters about 40 pounds per acre, at \$2.50 to \$5.00 per pound to the grower.

Besides in California, flowers also grow to great perfection in Oregon, Washington, Idaho, Arizona, and in fact in the entire Pacific coast section.

BULBS.

Bulbs to be merchantable should be full-grown, not too young, and must be large and handsome in size. Such, besides being sure to bloom, generally produce the finest flowers in the greatest profusion. A bulb will flower poorly or not at all, if it be too young or not fully matured; and it will rot quickly, or not stand transportation if not properly cured.

Most varieties require at least three seasons from offsets or bulblets before they will be sufficiently matured to be marketable. For illustration, take the hyacinth. In its case, as described hereafter under hyacinth, from four to six seasons of growth are required to produce the finest bulbs, which should measure from 8 to 10 inches in circumference. The particular and minute care bestowed by the Hollanders in the production of hyacinth and other bulbs is recommended to all who engage in bulb-growing.

At present, practically all the fall planting bulbs used in America, as well as in other parts of the world, are grown in Holland, which country for many generations has enjoyed a monopoly of the business. These bulbs include the hyacinth, tulip, narcissus, crocus, iris, etc., of which the annual importation in our country totals many tens of thousands of dollars. The Holland bulb land consists of about 5,000 acres, valued at \$3,000 to \$4,000 per acre. Nevertheless, this expensive land earns a net annual profit of 16 per cent. from the growing of bulbs. The nearest to the Holland soil as well as the climate, as yet discovered in the United

States, is in northwest Washington along the Puget Sound. Some experiments in bulb-growing which have been made in that locality, have shown that all the different varieties grow there in perfection, and that as fine bulbs can be produced there as are grown in Holland. Besides which the soil is virgin and healthy, and can be bought cheaply at the present time, from \$10 to \$100 per acre, according to location. A splendid opportunity is here presented for the development of the bulb industry in America on an extensive scale.

AMARYLLIS.

Large roots are propagated from offsets, which with the parent root entire are preserved over winter in a cellar, being covered with sand. These are separated and planted out in rich soil next spring when danger from frost is over.

ANEMONE.

This variety delights in a cool climate for its proper development. As soon as the tops die down the tubers should be taken up and allowed to become dry, and then be stored in a dry room free from frost.

BEGONIA.

After the first light frost, tubers should be lifted and stored in a cellar. They should be packed in dry earth or sand, as exposure to the air for too long a time will injure their vitality.

CALADIUM ESCULENTUM.

Tubers increase in size annually by new growth. After frost has killed the foliage, the roots should be taken up and stored in a cellar or in a dry room free from frost; from North Carolina southward the tubers

are hardy enough to withstand the winter in the open ground with the beds covered with leaves or litter.

CANNA.

In the Northern States, the entire clump of roots is taken up in the fall after frost has killed the tops; store them in a cellar with all the earth that adheres to them, and divide them in spring, taking care when replanting to have one or two buds to each piece of root. From North Carolina southward cannas winter better where they grew if the tops are cut and the beds covered with leaves or litter.

CONVALLARIA—LILY OF THE VALLEY.

What are commercially known as pips are the single crowns which are detached from the clumps and grown separately for three seasons before they become marketable.

DAHLIA.

In the Northern States the tubers are taken up about a week after frost has killed the tops and before the ground has become frozen, and stored like potatoes in a cellar or in a dry room free from frost.

What are termed dry pot roots are raised from cuttings in three-inch pots placed on ashes in a frame to stop the roots from penetrating the soil, being grown in the summer and allowed to dry off in autumn. They are then taken out of the pots and stored away like large tubers. These dry pot roots make plants fully equal to those grown from large tubers.

FREESIA.

After flowering, the bulbs should be allowed to ripen naturally in the soil; they are then taken up and dried. They should be stored in a dry room.

GALANTHUS—SNOW DROP.

The dried bulbs do not stand being kept out of the ground too long; keep in a dry room.

GLADIOLUS.

Two seasons are required to produce commercial or free flowering bulbs from the small bulblets that form at the base of the bulb. These bulblets are sown the next spring thickly in drills, covered with half an inch of soil. They are taken up about the middle of September, or as soon as the leaves begin to wither. The tops are cut close to the corm, and after the bulbs are dried in a shed, they are stored away in shallow crates in a cellar, and are replanted the following spring to undergo another season's growth; from North Carolina southward they may remain over winter in the ground where they grew, protected with a covering of litter.

HYACINTH.

From the small offsets four to six years are required to produce marketable bulbs. The hyacinth is not grown in the same soil oftener than once every four years. In Holland, where the finest bulbs the world produces are raised, the soil is carefully prepared, fine and light, entirely free from stone, gravel and stiff soil. The only manure used is from the cow stable, unmixed with straw or anything else. During winter the ground is dug two or three feet deep, and in March it is covered with three inches of cow manure, afterwards spaded in a foot deep. Vegetables or flowers which do not exhaust the soil are grown on it during the summer. In October, the soil is dug two feet deep. It is now divided into beds about 5 feet in width, which are carefully raked over and made into rows a foot apart and

therein the bulbs are planted about six inches apart, being covered about four inches. Smaller, or not fully grown bulbs, are planted closer together and not covered so deeply. The beds are raked and kept clear of weeds, and about December 1st, or before winter appears, they are covered with the reeds which grow numerous along the canals in that country. First there is a layer of old reeds which were used the year before, and then a layer of new reeds to the depth of several inches, the whole being fastened down by pegs. Early in March, when danger from frost is past, the covering is removed and the beds are cleaned and then raked. They are now given a watering of cow dung and water. The beds are kept free from weeds, and in April when blooming takes place, the flowers are examined and impurities removed. The flowers are then cut off, so as to throw the whole vigor of the plant into the bulb. These cut blossoms are removed from the beds, as they are unsuitable for fertilizer and would cause rot in the bulbs.

In July harvesting takes place. The leaves are cut off, a shuffle-hoe being used for the purpose, and the bulbs are removed with the hands. They are next placed in trenches and covered with earth, in which they are allowed to remain from one to three weeks to ripen. They are then spread thinly in storehouses to dry. Finally, the tops are cut off closely to the bulb and the bulbs are cleaned and sorted.

Overgrown or unshapely bulbs are used for propagating. These are selected as soon as the bulbs are taken out of the ground. Three deep cross-cuts are made with a sharp knife in the bottom of each bulb. They are planted out, bottom upwards, and covered with loose soil. In two or three weeks the cuts open

out and are healed up. The bulbs are then taken up and spread out in storehouses till October. They are now planted out, and when taken up the following summer some 20 to 30 offsets will be produced on what remains of the parent-bulb. These bulblets are picked off and, after being given a rest, are planted out separately in the autumn after the manner for large bulbs. This process of taking up in July and giving a rest till planting time in October, is repeated for four or five years till the bulbs have reached a commercial size, which is 8 to 10 inches in circumference.

Propagating is also done by selecting strong, healthy bulbs, and hollowing out the bottom of the bulb, clearing away the center to a point, and leaving a narrow rim. This will produce more offsets, but they will be smaller and take a year or two longer to attain marketable size.

IRIS.

Propagated by offsets, which require several seasons to produce merchantable bulbs.

LILY.

Propagated from the small bulbs that form at the base of the stem. These are taken up in early spring and replanted to perfect their growth.

MADEIRA VINE.

In the North, roots should be dug up in the fall and stored in a cellar; south of Virginia roots may remain in the ground where they grew, over winter.

PEONY.

Increased by division, the tubers being separated to have one eye to each. If the divisions are planted

in autumn, they usually flower the next season, but if divided and set out in spring, they rarely flower before the following year.

RICHARDIA OR CALLA LILY.

This calla is propagated from offsets. In California, the plant grows out of doors all the year round. In that climate, when proper attention is given to its culture, the tops are cut off in July, within a couple inches of the surface of the ground, after which the plant takes a rest, and in course of a month or so it makes a fresh start, renewing its growth and bloom. The larger roots are the result of three or four years' growth, plants not being disturbed during that period.

The roots are usually dug in June and July. After which the tops are cut off close to the bulb, taking care not to injure the centre or heart-germ. The roots are then trimmed of side shoots and spread thinly on shallow crates or trays placed in a shed and allowed thus to remain for several weeks till considered cured, or dry enough for shipment to a distance.

TIGRIDIA OR TIGER FLOWER.

Propagated by offsets which are planted in spring. After a killing frost in the fall, the bulbs are lifted, the tops cut off, and after being dried, they may be kept in ventilated boxes in a cellar, or in a dry room safe from frost, or they may be hung up tied in bunches with the tops left on.

TULIP.

Propagated from offsets. As with the hyacinth, the flowers should be cut as soon as they develop, so as to throw the strength of the plant to the formation of the bulb. This will also mature the bulbs quicker, so that

they may be taken up and dried within a few weeks after the flower stems are cut. The bulbs are then replanted in October, and in three years from sets they will attain marketable size. An average yield is about 60,000 full-sized bulbs to the acre.

TUBEROSE.

This is a great industry in the United States, the production at present in one section in a radius of twenty miles around Magnolia, N. C., amounting annually to about 6,000,000 bulbs, 75 per cent. of which is exported to Europe. Propagation is by offsets. From North Carolina southward, small sets will make large flowering bulbs in one season; northward it requires two seasons.

The ground is prepared as for a crop of potatoes. Planting is done in drills 30 inches apart, the sets being placed 4 inches apart, 3 inches below the surface. The crop must be cultivated constantly. After frost, the bulbs are lifted, their tops cut to within two inches of the bulb, and they are then placed on shelves or in trays to remain four to eight weeks to dry or cure. On a small scale the roots may be tied in bunches and hung upon rafters to dry.

ORIGINATING NEW VARIETIES.

Possibilities in Plant-Breeding.—Mankind is awakening to a fuller realization of the grand possibilities of wonderful accomplishment presented in the domain of plant-breeding, or the amelioration of useful and ornamental types of plants.

The world has made creditable progress in this science within the past quarter of a century, but the work which has thus far been accomplished, represents

nothing like what may be expected in the future, now that a greater public interest is being created in the subject by the efforts of the press, the publication of text-books on the science, and notably by the special investigations which are being made from time to time under governmental supervision by experts in our national Department of Agriculture.

The scope afforded by nature in which to perform experiments for the improvement of plant-structure not only takes in all plants at present under cultivation, but includes, for practical purposes, the possible subjection, through amelioration, of many wild species now regarded beyond the pale of utility.

Qualities Requisite for Success in Plant-Breeding.—In the practice of plant-breeding, there are especially called for the following prime requisites: patience, persistence, and keenness of power of observation. Having these, the experimenter will find, besides a prospect of pecuniary reward, a fascination in the work, with a wholesome, pleasant relaxation from the monotony that usually pertains to most garden and field labor.

Seed-Trade Offers Greatest Stimulus for Production of New Varieties.—Plant-breeding as it relates to vegetables and flowers, receives its greatest encouragement and stimulus at the hands of the seed-trade, by the custom which prevails in that business of purchasing the privilege of introducing a new variety. The manner in which this is done is: a seedsman pays the highest price for first seed of the new variety, or buys up or contracts for the entire crop produced from the first seed; either of which constitutes a privilege of introduction, as it thereby secures market control of the sale of seed of the new sort for the time being. A

glance over the average seed catalogue will show to what extent this offering of novelties is being used as an advertising factor by the seed-trade of to-day. To be sure, all the so-called new varieties advertised in some catalogues as novelties are not the "real thing," but these are readily detected and become known to the initiated under the term of synonyms, or as novelties manufactured for the occasion like "wooden nutmegs."

Production of a New Variety.—To properly undertake the production of a distinctly new sort, besides breeding for only one thing at a time, there must be a definite aim and purpose in view. In other words, there must be established in the mind an ideal of the plant to be bred. Merely to breed something new, even if it be freakish or possesses no merit, must not be thought of; the freak black lima bean, for example. The market is already flooded with too many new things of no account that possess nothing of improvement (if really as good) over previously existing sorts, but which cause confusion, annoyance and pecuniary loss.

What the public demands is something better, something that will be a gain. It readily accepts a new type showing superiority over an older sort as respects maturity, form, appearance, size, flavor, endurance, or productiveness, but not otherwise.

Methods.—There are two processes for obtaining improvement in variety, namely, selection and crossing.

Selection, the simpler process, is commonly practiced, and has been used to breed to their present forms nearly all plants now under cultivation.

The other, crossing, has two methods, viz., (a) crossing proper, or crossing between two varieties that are closely related, or between plants of the same

variety; (b) hybridization, or crossing between two distinct species, which must be so nearly allied as to possess an affinity for each other, otherwise a cross cannot be effected.

Selection.—Broadly speaking, selection is based on the natural tendency of all plants (animals too) to vary; these variations being induced chiefly by environment and excess of food supply. Darwin defines it as “the law of the preservation of the favorable differences and variations, and the destruction of those which are injurious.” Another writer, Webber, says: “It consists in the skillful selection and propagation of plants showing desirable variations.”

As generally practiced, a great number of seedlings of a particular variety are specially grown or examinations are made of different fields of seedlings of the same variety. If a plant is found in a lot of these seedlings which approaches closely to the ideal of the plant pictured in the mind, that plant is chosen or selected, and its seeds saved.

To properly do this, it must be removed to a spot away from other plants so that it may seed by itself, or all the other seedlings should be destroyed. The seeds saved are sown the next season, and in the numerous seedlings which will result, there may be found a plant bearing a still stronger resemblance to the ideal character sought for. As before, this particular plant is selected, its seed saved and sown the following season. Selection is then made from its seedlings of an improvement that may show over the previous season's plant. Seeds are saved, and again and again, if necessary, the operation is repeated, till at last patience and persistence are rewarded and the ideal plant is bred.

It is perceived that the success of the operation was

not owing so much to the seedling which was first chosen as it was to the subsequent selections faithfully persisted in.

Some Modern Examples of Plant Improvement by Selection.—All of the present fine races of tomato were produced by A. W. Livingston through selection. The first variety produced (introduced in 1870) which he named the Paragon, was discovered by him in a field of large red tomato, a variety of all sorts of shapes and sizes, except that it was not smooth. Livingston observed that this plant was unlike any other in the lot. It had distinct characteristics, such as heavy foliage, great vigor and prolificness, with uniformity of shape, and smoothness of the fruit. But while it had all of these desirable qualities, the fruit was not any larger than the kind used for preserving, and was therefore too small to be of general market value.

Basing his judgment on the principle of unity of the character of the individual, he selected this plant and saved its seed. Selections were made from the seedlings, and this process of selecting and saving seed only from the plant which showed an increase in the size of the fruit, in addition to its characteristics, was kept up carefully for five years. By the end of that time he had succeeded in enlarging the size of the fruit considerably, and it was then considered worthy of introduction.

This was Livingston's first attempt at plant-breeding, and his success with it led him to devote his attention to improving the tomato family generally. In the course of twenty or more subsequent years, he produced through selection a score or more of new types of tomato, comprising the best of what are now in cultivation.

In Europe, the beet-sugar industry has been vastly promoted by carefulness through selection in breeding varieties that yield the greatest percentage of sugar. As performed, a test is made of the beet roots selected for seed by cutting out a small cylinder of the flesh, and ascertaining by polarization the richness of sugar content. The doing of this does not injure the root for planting.

The care that is taken in this testing may be imagined when it is said that in one season a firm in Europe tested nearly three million roots, from which number about three thousand were selected for seed-growing purposes, or about one root out of every one thousand tested.

The Blanche Ferry sweet pea was discovered some years ago by a lady in northern New York in her garden. She had noticed a particularly bright-colored flower in a row of the old "Painted Lady." This plant she selected and carefully saved its seeds, which were sown next year. For about ten successive years she continued to grow only this variety in her little garden, always saving her seed from the best plants. Its beauty was finally brought to the attention of a certain seedsman, who purchased a quantity of the seeds from which a crop was produced, and the variety was then introduced by him to the world as the Blanche Ferry.

Darwin relates of selection, that Williamson, after sowing, during several years, seeds of *Anemone Coronaria*, found a plant with one additional petal. He saved the seeds of this and by persevering in the same course, obtained several varieties with six or seven rows of petals. The single Scotch rose was doubled, and yielded eight good varieties in nine or ten years. The Canterbury Bell was doubled by careful selection in four generations.

Webber, dwelling on the improvement in earliness that has been accomplished with plants by selection, says: "The decided shortening of the period required for Sea Island cotton to mature, has fitted it for cultivation in certain portions of the United States, in which it is now an important crop."

The several varieties of bush lima beans now in general cultivation were discovered by accident, their origin being due to sport. Burpee's bush lima was found as a single plant by Asa Palmer, of Kennett Square, Pa., growing in a field of large white pole limas. It was about ten inches high, and bore three pods, each containing one seed. Saving these seeds, he planted them the following year. Two of the seedlings were dwarf like their parent, the other had a tendency to climb. By destroying all plants in succeeding crops for several years which manifested the climbing habit, he finally obtained a fixed type of bush lima. It was then brought to the attention of Burpee, the seedsman, who, recognizing its great merit, was the first to introduce it to the public.

Henderson's bush lima was found by a colored man not long after the close of the Civil War growing along a roadside in Virginia. Its seed was saved, and seed also saved from subsequent plants so that in time its cultivation spread and it became generally planted in Virginia private gardens. Henderson, the seedsman, had his attention called to it, and in 1889 it was introduced by him to the country at large.

Dreer's or Thorburn's bush lima was originally a single plant, discovered by J. W. Kumerle, of Newark, New Jersey, growing in his garden in a patch of Challenger pole lima. He saved the seed and cultivated the variety until it became fixed.

One of the finest additions to flowering plants in modern times is the Shirley poppy, which was bred by Rev. W. Hicks, Secretary of the Royal Horticultural Society in England. In 1880 he noticed in a waste corner of his garden a patch of the common wild field poppy, one solitary flower of which had a very narrow edge of white. This one flower he marked and saved the seed of it alone. Next year, out of perhaps two hundred plants, he had four or five on which all the flowers were edged. The best of these were marked and the seed saved, and so on for several years, the flowers all the while getting a larger infusion of white to tone down the red until they arrived at quite pale pink and one plant absolutely pure white. He then set himself to change the black central portions of the flowers from black to yellow or white, and at last secured a fixed strain with petals varying in color from the brightest scarlet to pure white, with all shades of pink between, and all varieties of flakes and edged flowers also, but all having yellow or white stamens, anthers and pollen and a white base.

Burbank, the California plant-breeder, practicing on the line of selection, has largely increased the size of the common field daisy, the geranium and other flowers. One of his latest productions is a red California poppy. In the wild flower the color is yellow or orange. Having observed a single plant which bore flowers of orange streaked with red, he saved its seeds, and after a course of years of careful selection, similar to that described of Hicks and his poppy, Burbank has finally succeeded in obtaining a fixed variety bearing entirely red flowers.

To Henry Eckford, of Wem, Shropshire, England, the world is indebted for the great improvement in the flowers of sweet peas, made by him within the past

quarter of a century. It also owes a great deal to LeMoyné for improvements in the gladiolus; to Crozy, for his improvements in cannas and to Bruant for improvements in pelargoniums.

The foregoing cases, which have been enumerated out of many others equally as interesting, will suffice to illustrate the progress being made in plant improvement. There are other grand opportunities surrounding us everywhere. In fact, the possibilities are limitless, as, owing to the tendency of nature to vary and modify, any sort of plant may be improved or changed in its character either as to shape or color of any of its parts, pod or root, flower or stem, the acidity or flavor of the seeds, flesh or fruit, sugar content of the root (as in beet), protein content (as in corn and wheat), character of the staple, length, strength, texture (as in cotton), etc.

Crossing.—Through crossing, new types are secured of greatly differing allied species or races. By its means, the undesirable characters of two distinct varieties may be entirely gotten rid of, while at the same time all the desirable points and features of both are joined in combination.

This is accomplished by pollination, that which nature performs in a chance sort of way by insects or the wind. The breeder in addition to using nature's method, applies an intelligent system or purpose. Having selected the two plants to be crossed, he carefully transfers with a camel's-hair brush, a spoon, or by using his thumb nail, the pollen from the anthers of one plant to the stigma of the other which is to bear the seeds. He then covers the pollenized flower with a small bag of gauze or mosquito netting to prevent access to it by insects carrying pollen from other plants. The rest is left to nature.

In such case where the plant selected has the stamens and pistils in the same flower, the stamens (the male organs) must be cut off with a small scissors before their pollen has ripened so as to prevent self-fertilization. The flower is then to be kept covered with a small bag until the pistil is ripe and ready to receive the pollen from the other flower selected. This is to protect it from the conveyance of foreign pollen by insects or the wind.

As in selection, crossing is best secured by having a large field in which to work. For instance, Burbank in experimenting with peaches found only about one desirable variety in each one thousand seedlings tested, while in raspberries and blackberries he found only about one in twenty thousand that he considered worthy of acceptance.

Hybrids, in the first generation, usually resemble each other. But they greatly vary in the second generation, and it is in this that there may be found the types that are being bred for.

When a desirable type is discovered, it must be fixed. This is done by continued careful selection. In other words, breeding is repeated for several more generations with its own pollen or pollen of the same cross, until it indicates unvaried reproduction, that is, it shows that it will reproduce itself true. It will then be ready for introduction.

Certain improvements may only be secured by crossing, such as the blending of color and producing a fragrant flower from an odorless one.

In the crossing of plants possessing contrary qualities, such as hardy and tender, greater vigor is the result.

Plant Breeding Among the Ancients.—"Is there anything whereof it may be said—*see this is new?* *It*

hath been already of old time, which was before us." Ecclesiastes.

"And he slept and dreamed the second time; and behold seven ears of corn came up upon one stalk, rank and good." Pharaoh's Dream, Genesis.

"We remember the fish which we did eat in Egypt freely; the cucumbers, and the melons, and the leeks, and the onions and the garlic." Numbers.

"Six years shalt thou sow thy field and six years shalt thou prune thy vineyard and gather in the fruit thereof, but in the seventh year shall be a Sabbath of rest unto the land." Leviticus.

"And he fenced it and gathered out the stones thereof and planted it with the choicest vine, and built a tower in the midst of it, and also made a wine press therein; and he looked that it should bring forth grapes, and it brought forth wild grapes." Isaiah.

"The husbandmen who do not keep their fields well weeded are not equal to their business." Chinese Sage, about 500 B. C.

The work of the modern plant-breeder, while it is mainly creditable, does not rank with the performances of the prehistoric plant wizards.

The latter, considered with reason, produced from wild nature through breeding practices of a high order, the many useful types of food and other plants now in cultivation, such as wheat, barley, rye, etc., in grains; cabbage, onion, radish, etc., in vegetables; our flax and cotton, and our many fruits. These as bred by them directly from the wild species (the most difficult part of plant breeding), have been so modified and improved in their form and character, that we of to-day are not able to trace the nativity of some of them. Our modern breeders, excepting in a comparatively few cases, have

simply been improving these antique forms, which were bred for cultivation ages back in a lost civilization.

The more we contemplate the work of the ancient plant-breeders, the more we are lost in wonder. It is plain that it was not owing to results of chance, but we can reasonably conclude that it was due to certain systematic methods, applied with a high order of intelligence, generally along the line of selection.

The living evidences of their skill are these specimens which have come down to us, and of which Pliny gives testimony that they existed under cultivation at the beginning of the Christian era, not materially different in their forms from what they are to-day.

How old are these anciently bred plants? It would probably be nearer right to date their origin at least to the time of the Sphinx, supposed to be about seven thousand years old or even much further back to that mystic golden age, when men thought out the first principles of arithmetic, astronomy, and the sciences generally, and studied the art of food, and perhaps discovered the secret since lost, of being able to live to be one thousand years old. That, even in the time of Josephus the historian, there were glimmerings of, as when in writing the views of his period, why men were formerly able to live to such great age, he said: "Because their food was then fitter for the prolongation of life."

Before leaving this pardonable reference to prehistoric plant-breeding, let us direct attention to the simple hard-heading cabbage, and its sub-varieties, brussels sprouts, broccoli, cauliflower, kohl rabi and ruta бага, and inquire whether any plant-breeder of our time is able to reproduce these in forms as we know them, from their progenitor, the wild cabbage, which is to be seen to-day

growing in Europe, producing a mass of loose leaves. If he should succeed in doing so, he would approach the skill of the prehistorics in plant-breeding.

Naming New Varieties.—The first thing in order after the production of a new variety is to give it a name or an appropriate title.

There is no good reason why the originator or discoverer of a variety should not use his own name, Latinized or otherwise, in making up a title to be adopted; some such form of title renders it easier to settle identification should controversy (as has happened) arise thereafter in the trade. And why, in case an individual name be preferred, should the introducer instead of the originator, if they be not one and the same, appropriate an honor that belongs to discovery?

But if it be preferred to form a name which shall represent the character or type of the plant itself, let it be purely descriptive, as for instance, Stringless Green pod beans, White Spine cucumber, Long Scarlet radish, Early Red-top Globe turnip. The name of a country may always be used to good effect, such as Early York cabbage, Long White Vienna radish. Avoid using superfluous high-sounding adjectives.

FORMS OF CONTRACTS MADE BY SEED-GROWERS
WITH SEED-DEALERS, AS USED BY
SOME OF THE LEADING GROWERS
IN AMERICA.

Before a grower undertakes to raise a crop of any nature for any dealer, he should secure a written contract or agreement which both parties sign; a duplicate of same is retained by the dealer. The usual custom is to have the contract form printed.

FORM No. 1.

SEED CONTRACT FOR CROP OF 1905.

....., 1905.

I hereby agree to grow for

.....
seed corn as per quantities and varieties enumerated below, and do all the work necessary for growing a good crop, and to deliver the same to in good, merchantable condition, well cleaned, dry and A No. 1, in all respects, subject to test; and agree to take the product of said number of acres and pay as follows:

..... per bushel, shelled struck measure, and for what sees fit to take in the ear. And agrees to furnish free of charge, as much seed as is required to plant the said number of acres.

NUMBER OF ACRES TO BE PLANTED AND VARIETIES.

<i>No. of Acres.</i>	<i>Varieties.</i>
.....
.....
.....
.....
.....

Terms of payment

In witness whereof, we have hereunto set our hands and seals the day and year above written.

WITNESSES:

..... (Seal)
 (Seal)

FORM No. 2.

CROP 1905.

This agreement, made in duplicate this day of by and between Thomas Martin, of Adrian, Michigan, party of the first part, and Peter T. Brown, of Reading, Pennsylvania, party of the second part, witnesseth:

That for and in consideration of the covenants hereinafter entered into by the said party of the first part, said party of the second part does hereby purchase of said first party the quantities and varieties of seeds below named, and agree to pay therefor, at the prices attached, on a basis of acceptance, or cash from date of shipment.

Said first party, in consideration of the foregoing, does agree to cause to have planted, sufficient seed or roots to produce the quantities of seeds named herein and amounts set opposite each variety below, provided

the season admits the growing of same, to deliver said seed on cars at

Shipment to be made to the party of the second part, as soon as possible after the harvest of crops.

<i>Quantity.</i>	<i>Variety.</i>	<i>Price.</i>
.....
.....
.....

In witness whereof, the parties hereto have hereunto set their hands and seals the day and year first above written.

WITNESSES:

..... (Seal)
 (Seal)

FORM No. 3.

....., 190-.

SMITH SEED COMPANY,

SAN FRANCISCO, CALIFORNIA.

Please enter our order for the varieties and quantities of seed herein named, at the prices annexed, for which we agree to accept and pay, under the following conditions and terms:

Crop of 1905 growth, to be delivered as early as possible during the following fall and winter.

In event of shortage of crop, orders to be filled pro rata.

Delivery F. O. B. San Francisco.

Terms: Net, June 1st, following delivery; or 5 per cent. discount for cash within 30 days from date of shipment.

Name

Address

<i>Quantity.</i>	<i>Variety.</i>	<i>Price.</i>
.....
.....

FORM No. 4.

ROBERT BROWN & SON, WHOLESALE GROWERS,

FREMONT, NEBRASKA.

CONTRACT QUOTATIONS. CROP 1905.

To

.....

CONDITIONS.

The prices herein quoted are for early orders, subject to change without notice ten days after date. If our supply of planting stock of any variety becomes exhausted, further orders for such variety will only be accepted conditional on planting stock being furnished by the customer, which stock is to be charged to our account at contract price. Will plant other standard varieties not herein listed, if planting stock is furnished by customer, and the order is for sufficient quantities.

Goods delivered as early after harvest as they can be properly cured and fitted for market.

In the event of short or unmarketable crops, deliveries will be made pro rata, and without responsibility on our part for such shortages and failures. We also disclaim responsibility for loss or damage by fire, or other unavoidable accidents to stock while in our possession, or in the hands of our sub-growers.

We exercise the utmost care to have all seeds pure and reliable, and of such quality as will be thoroughly satisfactory to our customers, but we give no warranty,

expressed or implied, as to description, purity, productiveness, or any other matter connected with the seeds we send out, and will not be in any way responsible for the crop.

Quotations are made for wholesale quantities only, and do not apply on small amounts of standard varieties.

Deliveries are made F. O. B. cars, at Fremont, Nebraska, and our responsibility ceases on delivery to carrier in good order, properly consigned and receipted for.

Bags charged extra, at wholesale cost to us. Second-hand bags and special brands not accepted for use.

TERMS OF PAYMENT.

All varieties except corn: Draft, payable with exchange, 60 days from date of shipment, to be accepted and sent us upon receipt of each invoice and bill of lading, otherwise invoice becomes due in 30 days from date, less one per cent. discount.

Corn: Net cash 30 days.

<i>No. of Lbs.</i>	<i>Variety.</i>	<i>Price per Lb.</i>
.....
.....
.....

Please book our order for quantities specified on this sheet, at prices therein quoted, and ship by cheapest freight as soon as ready.

Name

Address

Date

FORM No. 5.

The following list represents the different varieties of seeds-I am preparing to grow the coming season.

Personal attention is given by myself to the detail work of my seed-growing, and I claim with confidence that my stocks are unsurpassed in purity and quality.

In growing, I exercise the greatest care in roguing and keeping my seed pure, but give no warranty expressed or implied. I furnish all stock seed.

Bags: Extra at market value.

Shipment: As soon after harvest as practicable.

Delivery: F. O. B. Morristown, New Jersey.

Terms: 60 days acceptance, or $1\frac{1}{2}$ per cent. discount for cash, 10 days after date of shipment.

SAMUEL P. DAVIS, SEED GROWER,

MORRISTOWN, NEW JERSEY.

Please book my order for the following varieties and quantities of seed, subject to pro-rata delivery in event of a short crop.

Name

Address

Date

<i>No. of Lbs.</i>	<i>Variety.</i>	<i>Price.</i>
.....
.....
.....

ACCEPTED.

Date

CULTURAL HINTS FOR THE ORDINARY GARDEN.

Most varieties may be forwarded by starting them in a hotbed before spring opens, and in such case, or when starting plants in open ground in a seed or nursery bed, seed should be sown thinly in narrow rows, four or five inches apart, thinning out plants to quite small distances apart when the first true leaf appears.

Artichoke—Seedlings or suckers taken off in spring should be set out in rows 4 feet apart, 2 feet in the row.

One ounce seed will sow 100 feet of drill.

Asparagus—Seed is slow to germinate, and may be soaked 24 hours in warm water to hasten its sprouting. Sow thinly in rows 1 foot apart, thinning out afterwards to 4 inches in the row. Reset roots when one year old 6 inches below surface and 12 inches apart in the row.

One ounce will sow 50 feet of drill; 1 pound will produce about 2,500 plants.

Beans—Make rows for bush varieties 18 inches apart. Drop one bean every 3 or 4 inches, covering 2 inches deep. Make hills for pole varieties 3 feet each way; plant four or five beans to a hill.

One pint bush beans will plant 100 feet of row. One pint pole beans will plant 75 hills.

Beet—Sow table varieties in drills 18 inches apart, 1 inch deep; thin plants to 6 inches apart. Sow field varieties in drills, 2½ feet apart, thinning to 1 foot apart.

One ounce will sow 60 feet of drill. 5 pounds man-gold wurtzel, 10 pounds sugar beet will plant one acre.

Broccoli, Brussels Sprouts—Set out plants from seed bed in rows 2 feet apart, 18 inches in the row.

One ounce will produce 3,000 plants.

Cabbage—Set out plants from nursery or hotbed in

rows 2 feet apart; 15 inches apart in the row for the early varieties, 24 inches for the late sorts. The largest heads of any particular variety are produced in deep, rich soil; variations of soil markedly affect the size of cabbage from the same seed.

One ounce will produce 3,000 plants; $\frac{1}{4}$ pound is sufficient for one acre.

Cardoon—Sow in drills 3 feet apart, $1\frac{1}{2}$ inches in depth, thinning to 12 inches apart.

One ounce will sow 100 feet of drill and produce 500 plants.

Cardoon is inedible unless bleached or blanched, which is done on a dry day by tying the leaves carefully and tightly together, keeping the whole upright and ribs closely together. The plant itself is then bound, using straw bands, beginning at the root and continuing until about three-fourths of the height is covered. From two to four weeks is required for blanching.

Carrot—Sow in drills 15 inches apart, covering $\frac{1}{2}$ to 1 inch deep; thin plants to 4 or 5 inches apart; in field culture make rows $2\frac{1}{2}$ feet apart.

One ounce will sow 100 feet of row; 3 pounds one acre.

Cauliflower—Transfer plants from nursery or hotbed to rows $2\frac{1}{2}$ feet apart, 18 inches in the row.

One ounce will produce 3,000 plants.

Celery—Transplant from seed bed into rows 3 to 5 feet apart, 6 inches in the row.

One ounce will sow 100 feet of drill and produce 4,000 plants.

Blanching is begun six weeks after transplanting when the plants are not wet from rain or dew. With an ordinary hoe the soil is drawn about one foot high to

the row from each side. The leaves are taken in one hand, and with the other the soil is drawn around them, pressing firmly, being careful that no soil gets between the leaves to produce rust or rot. In about two weeks the earth is raised about a foot higher, and frequently thereafter it is again raised.

Blanching may also be effected by using hemlock boards 1 inch thick, 1 foot wide and 12 feet long; these being placed on edge beside the rows and held by wooden cleats. Wrapping the plants in thick paper is also another way for blanching celery.

Chervil—Sow $\frac{1}{2}$ -inch deep in drills 1 foot apart, thinning to 1 foot apart.

One ounce will sow 100 feet of drill.

Chicory—Sow $\frac{3}{4}$ -inch deep in drills 15 inches apart, thinning to 8 inches apart.

One ounce will sow 100 feet of drill.

Blanching is done after the manner for celery.

Chives—Propagated by division of roots or bulbs. These are planted in rows 18 inches apart, 12 inches in the row.

One planting will last many years.

Collards—Sow thinly in drills 3 feet apart, thinning to 12 inches apart.

One ounce will sow 300 feet of row.

Corn-Sugar—Make hills for the early or dwarf varieties 3 feet each way; for the late or tall kinds, 4 feet each way. Allow three stalks to stand to a hill. Some plant in rows $3\frac{1}{2}$ feet apart, 8 inches in the row.

One quart will plant 200 hills; 10 quarts, one acre.

Corn Salad—Sow thinly in drills 1 foot apart, covering about $\frac{1}{4}$ -inch deep; thin out to 4 inches apart.

One ounce will sow 50 feet of drill.

Cress—Sow garden variety thickly in shallow drills 6

or 8 inches apart. Water cress should be sown in spring along the edges of ponds, or shallow streams of fresh running water; further sowing will be unnecessary as it reseeds itself.

One ounce will sow 100 feet of drill.

Cucumber—Make hills 4 feet each way. Plant 8 to 10 seeds in a hill, covering half an inch deep. When danger from bugs is over, thin out to three or four of the strongest plants in a hill.

One ounce will plant 50 hills; 2 pounds, one acre.

Dandelion—Sow half an inch deep in drills 15 inches apart, thinning to 3 inches in the row.

One ounce will sow 100 feet of drill.

Blanch for salad by tying up or covering with inverted flower pots.

Eggplant—Set out from hotbed $2\frac{1}{2}$ feet each way.

One ounce will produce 2,000 plants.

Endive—Sow in drills 15 inches apart, thinning out to 1 foot apart.

One ounce will sow 100 feet of row.

To have the flavor mild and delicate, the plants should be blanched, which may be done when they are of good size, by gathering the leaves closely together and tying loosely in an upright bunch. This will bleach the inner leaves in about two weeks.

Kale—Sow in drills $2\frac{1}{2}$ feet apart, thinning to 3 to 10 inches apart according to vigor of variety.

One ounce will sow 200 feet of drill; 4 pounds, one acre.

Kohl Rabi—Sow thinly in drills 2 feet apart, thinning to 10 inches apart.

One ounce will sow 200 feet of row.

Leek—If for permanent position, sow in drills 2 feet apart; if for transplanting, sow in close beds. Let plants stand 9 inches apart in the row.

One ounce will sow 100 feet of drill.

Blanch after the manner for celery, by earthing up as the plants advance in growth.

Lettuce—Transplant from seed bed into rows 18 inches apart, 8 inches in the row.

One ounce will sow 125 feet of drill.

Melon—Make hills for muskmelon 6 feet each way; watermelon 8 feet each way. Plant 8 to 10 seeds to a hill to allow for bugs, and when danger from them is past, thin out to three of the strongest plants to a hill.

One ounce muskmelon will plant 60 hills; 2 to 3 pounds, one acre.

One ounce watermelon will plant 20 hills; 3 pounds, one acre.

To have extra large melons for exhibition purposes, leave but one or two melons to a vine.

Mustard—Sow in drills 1 foot apart, thinning to 6 inches apart.

One ounce will sow 100 feet of drill.

Okra—Sow one inch deep in hills or drills; in hills 2 feet apart each way, 2 or 3 plants being allowed to stand to a hill; if in drills, 3 feet apart, thinning plants to 10 inches apart.

One ounce will sow 100 feet of drill or plant 40 hills.

Onion—Sow in drills 1 foot apart, $\frac{1}{4}$ -inch deep; thin out plants to 3 or 4 inches apart.

One ounce will sow 100 feet of drill; 4 or 5 pounds, one acre.

To have the mild-flavored Italian and Bermuda varieties early, start in hotbed in January or February, sowing in drills $1\frac{1}{2}$ to 2 inches apart, transplanting to open ground without a check in their growth when danger from frost is over. By the 10th of July, they should form onions of marketable size 2 to 3 inches in diameter.

Onion Potato—Propagated by sets which are formed in a number of various sizes about the parent bulb beneath the ground. The sets being separated, are planted in rows 1 foot apart, 3 inches in the row, reaching full maturity early in fall.

Onion Shallots—Propagated by oblong-shaped sets which are produced in a cluster beneath the ground. These being separated, are planted in rows 1 foot apart, 6 inches in the row.

Onion Top—Propagated by bulblets, which grow in a cluster on the stem above ground. These bulblets are planted in rows 1 foot apart, 6 inches in the row, and quickly produce a larger bulb.

Parsley—Seed is slow to germinate, and may be soaked 12 hours in warm water to hasten sprouting. Sow in drills 15 inches apart, $\frac{1}{2}$ -inch deep, thinning afterwards to 6 inches apart.

One ounce will sow 150 feet of drill.

Parsnip—Sow $\frac{1}{2}$ -inch deep, in drills 15 inches apart, thinning to 6 inches apart.

One ounce will sow 100 feet of drill; 5 pounds, one acre.

The roots have a fine flavor after being touched by frost, and may be left in the ground over winter.

Peas—Sow in rows $2\frac{1}{2}$ to 4 feet apart, according to variety whether dwarf or tall. Drop 10 peas to a foot of the dwarf sorts, 8 to a foot of the medium tall, 6 to a foot of the very tall varieties, covering seeds one inch deep.

One quart of smaller seeded kinds, such as Alaska, will plant 60 feet of row; same quantity of larger seeded and taller varieties, such as Telephone, will plant 100 feet of row, owing to being sown more thinly.

In a home garden the vines may be supported by

brush, or what is a nice way, by wire netting fastened to 2x4 stakes driven into the ground. When the vines are to be supported, the rows should be made double, 6 inches apart.

Pepper—Transplant from nursery or hotbed into rows 3 feet apart, 18 inches between the plants.

One ounce will sow 300 feet of drill or produce 1,500 plants.

Hot varieties should not be grown near mild kinds, to prevent the former imparting their more pungent nature to the latter.

Pumpkin—Make hills 8 feet apart each way. Plant 8 to 10 seeds to a hill, thinning out to two of the strongest plants to a hill, when danger from bugs is over.

One ounce will plant 15 hills; one pound, one acre.

When grown with corn every fourth hill of every fourth row may be sown with pumpkin seed. The pumpkin plants will stand cultivation of the corn without injury, and after corn-culture stops, will cover the field.

Radish—Sow $\frac{1}{2}$ -inch deep in drills 10 to 12 inches apart. Thin to 2 inches apart for the small varieties; 3 to 4 inches for the large sorts. They mature more rapidly when standing well apart.

One ounce will sow 100 feet of drill; 8 pounds, one acre.

To have radishes in perfection, they should be grown in a light, warm soil, and the richer and more friable it can be made the better. Quality depends on quickness of growth; the roots delight in a temperature of 45° to 65°.

Rhubarb—Sow in drills 1 foot apart, thinning to 10 inches apart. Transplant in autumn or following spring into rows 3 feet each way.

One ounce will sow 100 feet of drill.

Salsify—Sow in drills 15 inches apart, thinning to 4 or 5 inches between the plants.

One ounce will sow 50 feet of drill.

Roots are better flavored after they have been touched by frost, and the table may be supplied from the garden whenever the weather will admit of their being dug.

Sorrel—Sow $\frac{1}{2}$ -inch deep in drills 18 inches apart, thinning to 12 inches apart.

One ounce will sow 100 feet of drill.

Spinach—Sow $\frac{3}{4}$ -inch deep in drills 1 foot apart, thinning to 6 inches apart.

One ounce will sow 100 feet of drill; 10 pounds, one acre.

Squash—Make hills for bush varieties 5 feet each way; for running sorts 6 to 8 feet apart. Plant 6 to 8 seeds to a hill, thinning to three strong plants to a hill when danger from bugs is over.

One ounce of bush sorts will plant 40 hills; same of large-seeded kinds will plant 15 hills; 2 or 3 pounds, one acre.

Tomato—Set plants from hotbed or nursery bed into rows 3 to 5 feet apart each way.

One ounce will produce 2,000 plants.

Fruit is improved by tying to stakes or trellises. Set one strong plant to a stake 5 to 7 feet high, tying with strong, soft twine. Prune out freely as plants advance in growth.

Turnip—Sow in drills or broadcast; the former method produces best results. Let rows be 30 inches apart, thinning plants to 4 or 5 inches apart for turnip, 6 to 8 inches for ruta бага. Seeds should be covered half an inch deep.

One ounce will sow 150 feet of drill; 2 pounds, one acre.

WHAT IS THE PROPER TIME FOR SOWING OUT OF DOORS IN SPRING?

As the seasons vary and differ according to the climate or the locality, one's own experience or that of some successful neighbor is the best guide for planting that can be suggested. A safe rule for the hardiest varieties is to sow as soon as the ground is entirely free from frost and can be made in condition. This may mean in some of the extreme Southern States January or February; in some warmer sections of the Northern States, the latter part of March or 1st of April; in colder sections not before the 20th or 25th of April or May 1st. In the Middle States (and some such rule will apply everywhere) it is pursued by many gardeners by observing nature, such as the leafing of the early shrubs and trees, the blossoming of the early wild flowers and fruit trees.

Cabbage, lettuce, onion sets, parsley, peas, radish, salsify, spinach and turnip are sown in Southeastern Pennsylvania when the violet and the arbutus, the peach, cherry and pear are in full bloom, or the maple and horse chestnut in one inch leaf, which is generally from April 18th to 25th, depending on the earliness or lateness of the season. Sowing of the less hardy varieties, such as beans, beet, carrot, celery, cucumber, kale, okra, onion and parsnip, is made a week or so later, when the apple is in blossom, or the oak (a late tree) is in one inch leaf, which is from May 1st to 5th. Corn, melon and squash are planted when all danger from frost is past, or when the catalpa and blackberry are in bloom, from May 15th to 20th.

The following table for a period of ten years taken from a record kept for twenty years by the writer, shows the season or the average time when blossoming and

leafing of certain early plants usually occur at Philadelphia:

Average dates when fruit trees and wild flowers blossomed and trees leafed around Philadelphia during a period of ten years.

	1880.	1881.	1882.	1883.	1884.
Violet, arbutus, blossom . . .	Apl. 21	Apl. 23	Apl. 25	Apl. 25	Apl. 25
Cherry, peach, pear blossom .	Apl. 22	Apl. 23	Apl. 25	Apl. 25	Apl. 25
Apple blossom	Apl. 26	Apl. 27	Apl. 29	May 1	Apl. 29
Maple, horse-chestnut, one inch leaf	Apl. 18	Apl. 23	Apl. 18	Apl. 23	Apl. 22
Oak, one inch leaf	Apl. 25	Apl. 30	Apl. 25	May 1	Apl. 29
	1885.	1886.	1887.	1888.	1889.
Violet, arbutus, blossom . . .	Apl. 26	Apl. 23	May 1	Apl. 30	Apl. 25
Cherry, peach, pear blossom .	Apl. 26	Apl. 23	May 1	Apl. 30	Apl. 25
Apple blossom	May 1	Apl. 28	May 4	May 1	Apl. 28
Maple, horse-chestnut, one inch leaf	Apl. 25	Apl. 19	Apl. 25	Apl. 27	Apl. 18
Oak, one inch leaf	May 5	Apl. 27	May 5	May 3	Apl. 27

AVERAGE TIME IN A FAVORABLE SEASON FOR PLANTS TO MATURE TO EDIBLE CON- DITION FROM SOWING OF SEED, WITH YIELD PER ACRE FOR IMPORTANT VARI- ETIES.

The earliness of varieties is usually obtained at the expense of smallness in size of fruit, head, root, pod or grain; in the case of sugar corn, ears of the early kinds are not only smaller, but the depth, plumpness and sugariness of grain are less than these found in the late varieties.

Artichoke—Matures from 90 to 120 days.

Asparagus—Cutting season of shoots in spring will range from 5 to 6 weeks. From 800 to 1,000 two-pound bunches may be cut to an acre; a two-pound bunch contains from 10 to 50 stalks, varying according to their size.

Beans—Bush varieties mature from 35 to 45 days according to variety; pole kinds, 50 to 90 days. A yield of bush varieties is from 70 to 80 bushels per acre.

Beet—45 to 65 days, according to variety; mangold-wurtzel, 100 to 130 days; yield 200 to 500 bushels of roots per acre, according to season and locality.

Broccoli—150 to 200 days.

Brussels Sprouts—150 to 200 days.

Cabbage—Early varieties from 90 to 100 days, according to variety; medium early, 100 to 120 days; late varieties, 150 to 200 days. Yield, 7,500 heads per acre.

Cardoon—140 to 150 days.

Carrot—50 to 70 days, according to variety.

Cauliflower—100 to 150 days, according to variety; 10,000 heads per acre.

Celery—110 to 150 days, according to variety. Yield 20,000 to 30,000 plants per acre, five to eight stalks per plant.

Chervil—60 days.

Collards—50 days.

Corn-Sugar—70 to 90 days, according to variety. Of a large variety like the Evergreen, 75 to 80 bushels, or about 8,000 ears have been produced to the acre.

Corn Salad—50 to 60 days.

Cress—30 days.

Cucumber—50 to 80 days, according to variety. A fair average production of slicing cucumbers per acre is 200 crates; of pickles 125 bushels (200 pickles to a bushel) per acre. Pickle houses generally pay growers 40 to 50 cents per bushel.

Dandelion—150 days.

Eggplant—120 days; yield 8,000 to 9,000 fruits of two pounds each per acre.

Endive—80 to 90 days.

Kale—50 to 60 days; yield 200 to 400 bushels per acre.

Kohl Rabi—60 days; 300 bushels per acre.

Leek—90 days; blanching size, 150 days; 100 to 125 bushels per acre.

Lettuce—40 to 60 days, according to variety; 40,000 heads per acre.

Melons—70 to 90 days, according to variety; yield 18 muskmelons to a hill; 9 watermelons to a hill.

Mushroom—30 to 40 days.

Mustard—30 days.

Okra—60 days.

Onion—100 to 130 days, according to variety; 300 to 1,000 bushels per acre, depending on the variety, season and locality.

Parsley—30 days.

Parsnip—150 to 200 days; yield full-grown roots 300 to 700 bushels per acre, according to season and locality.

Peas—50 to 70 days, according to variety; 100 to 300 bushels per acre, depending on season and variety. Early sorts are not grown profitably at less than 80 cents per bushel, nor late kinds at less than 60 cents.

Pepper—100 to 120 days, according to variety.

Potato—75 to 90 days; 100 to 400 bushels per acre are yields variously secured, depending on climate and soil; 1,000 bushels have been obtained under superior conditions.

Pumpkin—120 to 150 days.

Radish—20 to 25 days early varieties, 25 to 30 days medium early varieties, 35 to 50 days summer varieties, 50 to 75 days winter varieties.

Salsify—150 to 170 days; yield full-grown roots, 100 to 150 bushels per acre.

Squash—50 days early varieties; 120 to 150 days winter varieties.

Spinach—40 to 50 days; 200 barrels per acre.

Tomato—100 to 120 days, according to variety; from 4 to 5 months are required for a full crop. From 10,000 to 12,000 pounds or from 200 to 240 bushels are produced per acre. Canneries and catsup houses usually pay from \$6.00 to \$7.00 per ton for fruit.

Turnip—60 to 90 days, according to variety; yields will sometimes reach 1,000 bushels per acre, though the average is much less than that.

PERIODS FOR VEGETABLE SEEDS TO GERMINATE.

The following are the periods that it usually takes for seeds to germinate after being sown. Quickness of germination depends somewhat on seasoning or age of seed, but more upon conditions of weather and soil:

Artichoke from 12 to 20 days.

Asparagus from 18 to 30 days.

Beans from 4 to 8 days.

Beet from 7 to 15 days.

Borecole, Broccoli, Brussels Sprouts, Cabbage and Cauliflower, 4 to 10 days.

Carrot from 14 to 21 days.

Celery from 12 to 21 days.

Chervil from 14 to 21 days.

Collards from 4 to 10 days.

Corn Salad from 12 to 15 days.

Corn from 4 to 10 days.

Cress from 4 to 7 days.

Cucumber from 5 to 10 days.

Eggplant from 7 to 21 days.

Endive from 3 to 7 days.

Kohl Rabi from 4 to 10 days.

Lettuce from 4 to 6 days.

Melon, Musk, from 5 to 10 days.
Melon, Water, from 7 to 14 days.
Mustard from 3 to 7 days.
Onion from 7 to 14 days.
Parsley from 18 to 30 days.
Parsnip from 7 to 14 days.
Peas from 4 to 10 days.
Pepper from 7 to 18 days.
Pumpkin from 5 to 10 days.
Radish from 3 to 5 days.
Salsify from 7 to 14 days.
Sorrel from 7 to 14 days.
Spinach from 7 to 14 days.
Squash from 5 to 10 days.
Tomato from 6 to 14 days.
Turnip from 3 to 5 days.

VITALITY OF SEEDS.

In the majority of cases fresh seeds give the best results, that is, when it is desired to produce plants with a strong leaf growth. Naturally, plants from perfectly fresh seeds possess greater vigor, but for plants that it is desired should head, fruit or bulb well, like cabbage, lettuce, cucumber, melon, pumpkin, beet, carrot, onion, radish and turnip, it is preferable to use seeds two or three years old. This applies as well to flowers; seeds two years old tend to produce more double flowers than fresh seeds. Such is the wonderful effect that seasoning or age produces on the life-substance mysteriously bottled up within the seed germ.

The table which follows, gives the average vitality of the different varieties of vegetable seeds. In nearly all cases if seeds are carefully preserved, the vitality may extend much longer; for instance, it is known of bush

beans of a certain variety having germinated finely when ten years old. On page 73, in the article on pea weevil, directions are given for destroying weevil and bugs in seeds.

There are usually many more seeds in an ounce than is actually denoted by the table, but due allowance has been made for such which are immature or defective, it having been considered that it will answer practical purposes to present only an approximate number of well-matured seeds, instead of the exact number of all the seeds.

COLOR AND VITALITY OF SEEDS.

	Color and form of seeds.	Average vitality—years. Approximate number of well-matured seeds in an ounce.
Artichoke . . .	Grayish, streaked with blackish-brown, oblong, flattened	500 5
Asparagus . . .	Black, triangular	750 4
Bean, bush . . .	Vary in size, form, color, according to variety	50 3
Bean, pole . . .	Vary in size, form, color, according to variety	25 3
Beet	Brownish woody shell, enclosing 2 to 4 reddish-brown, smooth kidney-shaped seeds proper	750 5
Borecole—Kale.	Reddish-brown or blackish-brown, rounded	5,000 5
Broccoli	Reddish-brown or blackish-brown, rounded	5,000 5
Brussels Sprouts.	Reddish-brown or blackish-brown, rounded	5,000 5
Cabbage	Reddish-brown or blackish-brown, rounded	5,000 5
Cardoon	Grayish, spotted with brown, oblong, flattened	400 5
Carrot	Pale-brown, oval, flattened, thin	10,000 4
Cauliflower . . .	Resembles cabbage, though generally not so plump	5,000 5
Celery	Yellowish-brown, triangular, aromatic when crushed	40,000 6
Chervil	Blackish-brown, long, pointed	5,000 2
Chicory	Dark grayish-brown, long, angular	10,000 8
Collards	Resembles cabbage	5,000 5
Corn-Sugar . . .	Either waxy-yellow, red, slate, accord- ing to variety, shriveled	150 3
Corn Salad . . .	Buff, rounded, grooved	9,000 8
Cress	Reddish-brown, oblong, rounded	7,500 5
Cucumber	Yellowish-white, oval, much flattened.	750 8
Dandelion	Brownish, oblong, slender	25,000 3
Eggplant	Yellowish, flattened	5,000 5
Endive	Grayish, long, angular	10,000 8
Kale	(See Borecole).	
Kohl Rabi	Black or reddish-brown, rounded	5,000 5

COLOR AND VITALITY OF SEEDS—*Continued.*

	Color and form of seeds.	Approximate number of well-matured seeds in an ounce.	Average vitality—years.
Leek	Black, triangular	6,000	2
Lettuce	Either white, black or yellow, according to variety, oval, flattened	10,000	4
Melon, Musk.	Usually yellow, sometimes nearly white, varying in size according to variety, oval, flattened	600	8
Melon, Water	Either red, white, black, yellowish or grayish brown, according to variety, oval, flattened	100	8
Mustard	Yellow or blackish or reddish-brown, according to variety, rounded	10,000	8
Okra	Greenish-drab, blackish at eye, rounded.	450	4
Onion	Deep blue-black, triangular.	5,000	2
Parsley	Grayish-brown, ovoid, aromatic	5,000	3
Parsnip	Pale-yellowish, brown or yellowish-green, nearly circular, flat, thin.	4,000	2
Pea	Either creamy-white, white, bright yellow, yellowish-green, olive-green, bluish-green, pale blue, blue, greenish-blue, grayish, brownish, smooth, dented or shriveled, according to variety	40	4
Pepper	Yellow, nearly circular, flattened	3,000	5
Pumpkin	Pale-yellow or pure white, oval, flattened	125	6
Radish	Spring and summer varieties, grayish-red; winter sorts, yellowish-red; rounded	2,000	5
Rhubarb	Brown, triangular, membranous at corners	1,000	3
Salsify	Brownish, long, slender	2,000	3
Sorrel	Brownish, triangular, smooth	20,000	2
Spinach	Either rounded or smooth, angular or prickly, according to variety	1,500	5
Squash	Either pale-yellow or pure white, according to variety, oval, flattened	100	6
Tomato	Yellowish-white or pale-gray	10,000	4
Turnip	Black or reddish-brown, rounded	5,000	5

TESTING SEEDS.

When there is any doubt as to the vitality of seeds, they should be given a test before sowing them or offering them for sale.

In making the test, it is desirable to know what proportion or percentage will germinate, as, if this proves to be small, seed must be rejected or destroyed. The usual rule is to make the test with 100 seeds taken from the lot just as it runs, without picking out any that seem defective. A record of all tests should be kept in a book ruled and headed like the following illustration:

Date test began . . .	Variety.	Name of grower . . .	No. of seeds tested . . .	Average No. of days for seeds to sprout . .	No. of seeds sprouted . .	Remarks.
1904. Sept. 4	Select Jersey Wake- field Cabbage . . .	Brill.	100	8	78	Good, strong vitality.
Sept. 4	Blood Turnip Beet .	Jones.	100	14	23	Slow; no good

The best method for testing is in earth on the benches of a greenhouse if convenient; if not, then by sowing the seed in shallow boxes of light soil in fine tilth placed near the window of the room occupied. Before sowing, water the soil thoroughly, cover seed lightly and spray with a fine rose sprayer or Scollay sprinkler. Seeds like asparagus, okra and parsley may be soaked to advantage from 12 to 24 hours before test is made in soil.

A simple way to test seeds which germinate readily is to place them between moistened layers of raw cotton, flannel cloth, or thick blotting paper, which are

then laid between two dinner plates and kept in a warm room, giving proper attention to keeping the layers moistened as necessary.

To pick out seeds of grasses to be tested, use a pane of glass, over the surface of which lay spread thinly the seeds, which have previously been made thoroughly wet. The glass is then held up to the light, and the seeds may easily be picked out from the chaff with a forceps and counted.

BEST METHOD FOR KEEPING SEEDS IN STORE.

Seeds are best kept in a dry, airy room. They should not be placed in air-tight vessels. Cloth sacks are better for keeping seeds in than anything else.

The best way, and it should be done with all fine seeds especially, is to fill the sacks about half full (in order to handle them more readily) and suspend from racks specially made, or from hooks attached to the ceiling rafters. The bags should not lay against a wall. Holding suspended in the way mentioned, will permit free circulation of air about the bags, and render safe from mice.

Unceasing watchfulness is necessary in the care of seeds to preserve from damage by insects.

Seeds kept in drawers and bins should be overhauled, particularly during the warm season, and if there are any indications of insect life, such as lumpiness or forming in small balls, etc., the seeds should be taken out and given a cleaning in a sieve or in the fan-mill. The drawer or bin should also be carefully cleaned before the seeds are put back.

A few tar-balls put into each sack, drawer or bin will serve measurably to drive away insects, though they are not a sure preventive. See directions for killing weevil and insects in seeds in article on pea-weevil on page 73.

TRIAL GROUND.

This is a space set apart in a field in which to test stocks of different growers to see whether true or not; also to make trial of new varieties to observe their merits and compare with other sorts; it is a means, too, for detecting fake novelties. Many large firms devote considerable acreage to their trial grounds, making trial of every lot of vegetable and flower seeds received in store, no matter by whom grown; a systematic record being kept of the trials for subsequent reference.

The usual record book is ruled in columns, with appropriate headings, as for instance, "name of variety," "name of grower," "date seed sown," "date of maturity," "remarks." In the latter column are noted "criticisms," whether observed to be true to type or not, differences in type, whether improvement or not, whether meritorious or not, etc.

In the trial grounds the amount of space devoted to each variety is usually a single row 12 feet in length; the rows of each class (the different varieties of beet, cabbage, etc.) being ranged alongside each other.

The variety sown or on trial is marked by a large wooden stake or label driven in at the top of the row, on which has been written with indelible ink the record number of the variety with its name, as for example. "128 Select Jersey Wakefield Cabbage," so that all that will be necessary when results are to be noted is to turn to No. 128 in the record book (which is always carried along when making observations in the trial grounds), find the place reserved for the variety, and with pencil make the record at once in the field.

DESCRIPTION OF THE DIFFERENT VARIETIES
OF VEGETABLES, INCLUDING THE VARIOUS
SYNONYMS OR OTHER TITLES WHICH MANY
VARIETIES BEAR IN THE TRADE.

ARTICHOKE.

Large Green Globe.—Heads or buds measure from 3 to 5 inches across, nearly round; scales deep-green, thick and fleshy, pointed at the tips.

In European gardens there are a dozen or more varieties in various favor, but in America only the above sort is under cultivation, being considered the best of all.

ASPARAGUS.

Conover's Colossal, or Barr's Mammoth, Conover's Giant, California Mammoth, Donald's Elmira, Giant Argenteuil. Stalks are large; many an inch in diameter.

There is practically but one variety in cultivation, it having a number of synonyms as above. It is undoubtedly the same old variety spoken of by Pliny as being under cultivation in his time in Roman gardens, the shoots of which grew so fair and large that three would weigh a pound. The coloring of the heads varies with the nature of the soil; in heavy loam, dark green or purplish heads are produced; in very sandy soil the heads are usually light green or nearly white.

BEAN.

Green Pod Varieties.—Best of All. Seed cream, streaked with dull red; medium early; pod half round, dashed with red.

Brown Valentine, or Refugee, Thousand to One. Seed brown mottled; early; pod round, thick, pale.

Canadian Wonder. Seed large, slightly flat, deep

crimson color; hardy; medium early; pod long, broad, flat.

China Red Eye. Seed white, spotted purplish-red about the eye; early; hardy; pod straight, flat.

Dwarf Horticultural, or Dwarf Cherry, Dwarf Cranberry, Dwarf Marble, Dwarf Wren's Egg, Quail Head, Scipio Dwarf, Speckled Cranberry. Seed cream, streaked with dull red; medium early; pod slightly curved, streaked with red.

Emperor William, or Dwarf Dutch Case Knife, First in Market, Low's Champion, White Scimeter. Seed white, flattened; early; pod half-round, sickle-shaped.

Extra Early Refugee. Seed brown-mottled; extra early, pod round, thick, lightish-green.

Longfellow. Seed red-mottled; early; pod round, thick, straight.

Long Yellow Six Weeks, or Newton, Rob Roy. Seed yellow; early; hardy; pod flat, often curved.

Mohawk, or Brown Six Weeks. Seed variegated with drab, dull purple and different shades of brown; early; hardy; pod broad and flat, nearly straight.

Navy, or Boston Pea, Early Marrow, Snow Flake, White Soup. Seed small, white; pod round.

Red Valentine, or Extra Early Red Valentine, Extra Early Red Round Pod Valentine, Red Marrow. Seed red-mottled; extra early; pod round, thick, slightly curved.

Round Yellow Six Weeks, or Yellow Cranberry. Seed yellow; early; pod thick, slightly curved.

Stringless Green Pod. Seed brown; extra early; pod round, thick, straight.

White Kidney, or Royal Dwarf, Stanton. Seed white, long; pod irregular.

White Marrow, or Large White Dwarf Cranberry,

Mountain, Succotash. Seed white, thick, nearly round; pod flat.

Wax Pod Varieties.—Crystal Wax, or Ancient American, Cabbage Wax. Seed small white; early; pod ivory white, round, thick.

Currie's Rust Proof Wax. Seed large, purplish or brownish-black; early; pod broad, flat.

Davis Wax, or Ventura Wonder. Seed white; early; pod straight, half flat.

Detroit Wax. Seed white, deep brown around the eye; early; pod flat.

Dwarf German Wax, or Butter Wax, Cylinder Pod. Seed small black; early; pod round, curved.

Golden Eye Wax. Seed white, blotched with yellow; early; pod straight, flat.

Golden Wax, or Perfection Wax, Rust Proof Golden Wax. Seed white, mottled with dark-brown around the eye; early; pod straight, flat.

Red Flageolet Wax, or Crimson Flageolet Wax, Scarlet Wax. Seed large, purplish-red, flattened; medium early; pod pale yellow, long, flat, somewhat curved.

Refugee Wax. Seed brown-speckled; early; pod bone white, round, curved.

Valentine Wax. Seed red-mottled; early; pod yellow, round, thick.

Wardell's Dwarf Kidney Wax. Seed white with dashes of light purple about the eye; early; pod yellow, broad; flat.

Pole or Climbing Varieties.—Golden Butter Pole, or Golden Cluster Wax, Mont' or Wax. Seed white; pod yellow, long, flat, thick.

Horticultural, or Housewives' Delight, Red Speckled Cranberry, Scipio Pole, Wren's Egg. Seed cream, streaked with dull red; pod medium, slightly curved, green streaked with red.

Kentucky Wonder, or Monstrous Podded Southern Prolific, Old Homestead, Seek-no-Further, Texas Prolific. Seed grayish brown; pod green, long, thick.

Lazy Wives. Seed white; pod green, long, thick, broad.

Red Speckled Cut Short, or Corn Field, Corn Hill. Seed white with reddish-brown dots; pod green, medium, round.

Scarlet Runner. Seed lilac-purple variegated with black, large; pod green, long, broad, flat.

Southern Prolific. Seed grayish brown; pod green, long, thick.

Tall German Wax, or Black Algerian Wax, Black Butter Pole, Indian Chief. Seed black; pod yellow, medium, flat.

White Crease Back, or Fat Horse, Mobile. Seed small, white; early; pod green, long, round, thick.

White Dutch or Case Knife. Seed white; pod green, large, flat.

White Runner. Seed pure white, thicker than the Scarlet Runner, of which this is a variety; pod green, long, broad, flat.

Yard Long, or Asparagus, Cuban Asparagus, French Asparagus, Snake. Seed small, cinnamon-brown; pod pale green, round, eighteen to twenty inches long.

Lima Sorts.—Burpee's Dwarf or Bush, or Dwarf Large White Lima. Seed white, flat; pod green, same size as regular Pole Lima strain.

Carolina or Sewee. Seed white, flat, small; early; pod green, short, flat; a pole variety.

Dreer's Bush Lima, or Dwarf Potato Lima, Kumerle, Thorburn. Seed plump, white; pod green, same size as Improved Pole Lima.

Henderson's Bush Lima or Dwarf Carolina. Seed

white, small; very early; pod green, short, flat. There is a sub-variety, seed of which is dull white, spotted and streaked with purple.

Improved White Pole Lima, or Challenger, Dreer's Lima, Potato Lima. Seed white, plump; pod green, flat.

Large White Lima, or Butter, Early Jersey Lima, Jersey Lima, King of the Garden. Seed white, flat; the well-known Pole Lima.

BEE T.

Garden Varieties.—Bassano or Extra Early Turnip. Extra early; pink, globular root, flesh white, circled with bright pink; foliage green, leaf-stems greenish-white, stained with red.

Bastian's Turnip, or Philadelphia Early Turnip, Simon's. Early; large, turnip-formed root; flesh bright red, zoned with lighter rings; foliage dark green, with red stems and veins.

Early Blood Red Turnip, or Acme, Arlington Favorite, Early Columbia, Dewings, Edmunds, Market Gardener, New Crimson Chief. Early; round, blood-red root and flesh; foliage deep red, sometimes inclining to dark green, stems and veins brilliant red.

Eclipse, or Detroit, Dark Red. Extra early; round blood-red root and flesh; dark foliage.

Egyptian, or Crosby, Excelsior, Extra Early Turin. Extra early; improved strain, half round, dark blood-red root and flesh; foliage dark.

Half Long Blood Red. Late; wedge-shaped root, dark blood-red flesh and foliage.

Lentz, or Dark Stinson, Early Forcing, Electric, Improved Arlington, New Surprise. Extra early; round, dark red root, flesh crimson with rings of lighter hue; foliage dark green with red stems and veins.

Long Blood Red or Ne Plus Ultra. Late; long, tapering root; skin, flesh, and foliage deep red; stems and veins blood-red.

Swiss Chard, or Silver Beet, Spanish Spinach. The leaves are medium size, erect, pale green with whitish ribs and veins.

Cultivated for its leaves and leaf stalks, the former being used as spinach, the latter stewed like asparagus. The roots are tough and fibrous and unfit for use.

Field Varieties.—Champion Yellow Intermediate Mangel Wurtzel, or Gate Post, Golden Giant, Leviathan. Large yellow root, flesh white; foliage pale green.

Giant Long Red Mangel Wurtzel, or Colossal Monarch, Norbiton Giant, Prize Mammoth, Saw Log. Long root, moderately even in form; skin and flesh red; leaves green, stems green stained with rose-red.

Golden Tankard Mangel Wurtzel. Root of large diameter, flesh yellow; foliage pale green.

Klein Wanzleben. Conical, straight even root, broad at the shoulder and tapering; skin and flesh white; foliage pale green.

Lane's Imperial Sugar. Long, smooth root, broad at shoulder, gradually tapering; flesh white; foliage pale green.

Vilmorin's Improved White Sugar. Long, thick root; skin and flesh white; foliage pale green.

White Silesian Sugar, or White French. Long, thick root; skin and flesh white; foliage clear green.

BROCCOLI.

Large Early White.—Tall, erect, dark green leaves; heads very white and close.

Purple Cape. Close, compact, large brownish-purple heads.

BRUSSELS SPROUTS.

Tall, nearly four feet in height, producing small heads in great abundance.

CABBAGE.

Bergen Drumhead, or **Buncombe**, Large Bergen, Large German Drumhead, Large Late Mountain, Stone Mason. Large roundish head, slightly flattened at the top; leaves glaucous-green color, firm, thick texture; short stem; late, 125 to 140 days.

Danish Ball Head, or **Amager**, **Baseball**, **Cannon Ball**, **German Export**, **Hard Heading**, **Hollander**, **Luxemburg**, **Solid Emperor**. A distinct late sort; medium-sized, nearly round, hard, solid head, of most excellent keeping and shipping quality; 125 to 140 days.

Drum Head Savoy, or **Perfection Savoy**. Large flattened, roundish head, yellowish-green at the center, leaves of which are sea-green, wrinkled or crumpled; more tender and delicate in flavor than the smooth-leaved sorts; late, 125 to 140 days.

Early Flat Dutch, or **All Seasons**, **All Year Round**; **Chou Bonneuil**, **Early All Head**, **Early Drumhead**, **Early Summer**, **Eclipse**, **Faultless**, **Long Island Medium Flat Dutch**, **St. Dennis**, **Solid South**, **Southern Cross**. Early; medium-sized round head, flattened; short stem; 100 to 115 days.

Early Jersey Wakefield, or **Little Pixie**, **Select Early Jersey Wakefield**. Small, conical-shaped head, small stalk; 90 to 100 days.

Early Oxheart. Less than medium-sized, egg-shaped head; short stalk; 100 to 115 days.

Early Spring, or **Flat Parisian**. Small, flat, roundish head; 90 to 100 days.

Early Winnigstadt, or **Early Cone**, **Pointed Head**,

Quedlinburg Winnigstadt. Intermediate early; large conical-shaped head; 100 to 115 days; an excellent shipping variety.

Early York. Small, roundish head; short stem; 90 to 100 days.

Etampes, or Advance, Earliest Express, First Early, Henderson's Premium, Lightning, Wonderful. Small, conical-shaped head; 80 to 90 days.

Green Curled Savoy. Medium-sized, yellowish-green head, nearly round, somewhat pointed at the top; 110 to 120 days.

Green Glazed. Large head, loose and open; long stalk; leaves varnished or glossy, shining green; resists the attacks of worms, fleas and caterpillars better than other sorts; 110 to 120 days.

Large Late Flat Dutch, or Bloomsdale. Large Late Flat Dutch, Danish ditto, Excelsior ditto, Market Gardeners' ditto, Matchless ditto, Premium ditto, Silver Leaf ditto, Superb ditto, Acme, Autumn King, Chicago Market Garden, Colossal Hundred Weight, Large Late Drum Head, Marblehead Mammoth, Sure Head, World Beater. Heavy, broad, rounded solid head, flattened at the top; short stem; color bluish green; 125 to 140 days.

The old type staple late variety. Introduced here from Europe by the first settlers; not yet improved on; as seen above, has many synonyms.

Large Wakefield, or Charleston Wakefield, Long Island Beauty. Conical-shaped head, larger and later than the Early Jersey Wakefield; 100 to 115 days.

Large York. Medium-sized, roundish head; short stem; 100 to 115 days.

Louisville Early Drum Head, or Deep Head, Eclipse, Florida Header, New Hard Head, Reedland Early

Drum Head. Less than medium-sized, roundish head, flattened at the top; 90 to 100 days.

Mammoth Red Rock. Large red or purple roundish head; 125 to 140 days.

Red Dutch, or Early Dark-Red Erfurt, Red Rock. Medium-sized red or purple roundish head; 110 to 115 days; this and the preceding are generally used for pickling.

Vandergaw's Early Drum Head, or Bloomsdale Early Drum Head, Succession, Volga. Intermediate early; medium-sized, roundish, flattened head; 100 to 115 days.

CARDOON.

Tours.—Ribs large and solid; considered the most tender and delicate variety.

CARROT.

Early Scarlet Horn Half Long. Root medium-sized, cylindrical, pointed; flesh reddish-orange, heart small; 55 days.

Early Scarlet Short Horn, or Bellot. Root four to five inches, somewhat oval, smooth, fine-grained; orange-red; 45 days.

French Earliest Short Horn, or Early Round Parisian, Extra Early French Forcing, Golden Ball. Small, almost globular root, about two inches; orange-red; 40 days.

Half Long Scarlet, or Chautenay. Short, thick, stump-rooted; orange; 60 days.

Long Orange, or Altringham, Intermediate, Long Red Surrey, Victoria. Thick at shoulder, tapering, twelve to fourteen inches long; reddish-orange, heart pale yellow; 70 days.

Long Red Coreless. Half long, red-fleshed; 55 days.

Nantes. Medium size; cylindrical, with a blunt point, red, coreless; 60 days.

Orange Danvers, or Rubicon Half Long. Cylindrical, stump-rooted, broad-shouldered, medium large, dark orange; 65 days.

Ox-heart, or Early Gem, Guerande. Root four to six inches long, diameter three inches, very blunt at apex; flesh orange-red, heart yellow; 55 days.

St. Valery. Broad-shouldered, two and three-quarters to three inches across, tapering, ten to twelve inches long, reddish-orange; 70 days.

White Belgian. The largest carrot; sixteen to eighteen inches length; four inches diameter; coarse flesh.

White Vosges, or White Giant. White, late, broad-shouldered, six to eight inches, tapering quickly.

Yellow Belgian. Similar to White Belgian, except in outside color, which is green above ground, yellow below; late; 15 to 18 inches in length, nearly 3 inches in diameter.

CAULIFLOWER.

Algiers, or Reliable. Late; large dark-green leaves, short stem; big, solid white head.

Dwarf Earliest Erfurt, or Early Snow Ball, Alabaster, Best Early, Early Copenhagen, First, Ideal, Long Island Beauty, Prize Earliest, Seafoam. Good-sized head, pure white; stalk medium length, leaves long and narrow, 90 to 100 days.

Early Dwarf Erfurt. Similar to the preceding, but larger and later.

Extra Early Paris, or Nonpareil. Dwarf; medium size, pure white head.

Lenormands. Late variety; large handsome head, about nine inches across.

Veitch's Autumn Giant. Late, vigorous, well protected by foliage; large, compact, white head.

CELERY.

Boston Market. Dwarf spreading; leaf stalks short and stout; leaflets dark-green, heart solid, white.

Celeriac. Produces a large, solid, brownish, irregular root or tuber, three to four inches in diameter. This is the edible portion.

Dwarf White Solid, or Kalamazoo. Dwarf, compact; leaflets small, pale green; stalks broad, thick, crisp; heart solid, pure white.

Giant Pascal, or Winter King. Stalks of the largest size; leaf stalks long and thick, leaflets dark-green and thick; heart solid and thick-set.

Golden Heart, or Crawford's Half Dwarf, Golden Dwarf, Henderson's Half Dwarf. Dwarf, compact; stalks broad; heart solid, and when blanched remarkable for the light-yellow color of stalks and leaves.

Large White. Compact, robust, about two feet high; leaflets broad; thick heart.

Paris Golden Yellow, or Golden Self-Blanching. Like White Plume, to a certain extent is self-blanching. Dwarf, stocky habit; solid stalks; as the plant approaches maturity the inner stems and leaves assume a light-golden hue.

Paris Red Ribbed. A sport of the preceding, but dwarfer in habit; thick leaflets with yellow specks in them, the stems shaded with red.

Pink Plume. Similar to the White Plume, but having reddish-colored stalks.

White Plume or Self Blanching. To a certain extent it is self-blanching; central leaflets turning light color and sometimes becoming nearly pure white at maturity.

It, however, requires to be earthed up as with other varieties to produce desired results.

CHERVIL.

Curled.—Foliage delicately and beautifully frilled.

CHICORY.

Large Rooted or Barbe de Capuchin. Deep green leaves, long, fleshy roots, measuring when well-grown 12 to 14 inches in length, about one inch in diameter at their thickest part.

COLLARD.

Georgia, or Cabbage, Creole, Improved White Georgia, Silver, Southern Curled. Cultivated extensively in the Southern States for cabbage greens. Grows from two to three feet high, with a mass of leaves which do not head; the central leaves sometimes form a sort of rosette.

CORN.

Garden Varieties.—Adams' Early or Burlington. Not a sugar corn; but an early, dwarf, small-eared dent variety, which on account of its hardiness can be planted much earlier than sugar varieties; height of stalk six feet; 70 to 75 days.

Asylum, or Darling's, Early Mammoth, Triumph. Large ear, white cob, deep grain; 75 to 80 days.

Black Mexican, or Squaw. Eight-rowed, bluish-purple grain; 75 to 80 days.

Country Gentleman, or Little Gem, Ne Plus Ultra, Quaker Sweet, Shoe Peg. Large ear, white cob, narrow deep grain, irregularly set on cob; 75 to 80 days.

Egyptian, or Washington Market. Large ear, broad, deep grain; 90 to 95 days.

Extra Early Adams. Not a sugar corn; a sub-variety of the Adams' Early; earlier than it, smaller ear; height of stalk four feet; 65 days.

Extra Early Cory, or First of All. Eight-rowed; small ear, red grain; 60 to 65 days.

Extra Early Crosby, or Boston Market. Twelve-rowed; small ear, white grain; 70 to 75 days.

Extra Early Minnesota. Eight-rowed; small ear, white grain; 65 to 70 days.

Extra Early Narragansett, or Marblehead. Eight-rowed; small ear; red grain; 65 to 70 days.

Golden Sugar, or Brighton, Early Orange, Golden Bantam, Golden Coin, Golden Sweet. Eight-rowed, short ear, yellow grain; 65 to 70 days.

Imitation Sugar, or Early Market, First in Market, Southern Roasting Ear. A hybrid between Adams' Early and Sugar Corn; hardy; matures in about 80 days.

Kendall's Early Giant. Ten to twelve-rowed; ears about eight inches long; white cob; 65 to 70 days.

Late Mammoth. Large ear, broad, deep grain; 85 to 90 days.

Mammoth White Cory. Twelve-rowed; small ear, white grain; 65 to 70 days.

Old Colony, or Excelsior, Landreth, Squantum. Twelve-rowed; large ear, white cob, deep grain; 75 to 80 days. An old variety originated about fifty years ago.

Perry's Hybrid, or Chicago Market. Twelve- to fourteen-rowed; large ear, white cob; 75 to 80 days.

Stowell's Evergreen. Large ear, white cob, deep, sugary grain; 80 to 85 days. Remains a long time in fresh condition, hence its name; an old variety without superior.

White Evergreen. Large ear, white cob, deep, very white grained; 80 to 85 days.

Zig Zag Evergreen. Similar to Stowell's Evergreen except that grains are irregularly set on cob; 75 to 80 days.

Except those noted otherwise in the description, the foregoing are all sugar corns.

CORN SALAD.

Known also as Lamb's Lettuce, or Feticus and Veticost.

Broad-leaved, large-seeded. There are several sorts, but this is the only one cultivated in America.

CRESS OR PEPPER GRASS.

Curled.—Dwarf, compact; leaves feathered like parsley.

Golden Yellow, or Australian. Dwarf; yellowish-green, broad-leaved; mild in flavor.

Upland, or American, Land. Hardy, perennial; similar to water cress in form of leaf and taste.

Water. Hardy, aquatic, perennial; leaves rounded.

CUCUMBER.

Cumberland.—Large vine; long fruit with roughened surface, dark green, white spines.

Early Frame, or **Early Cluster,** Evergreen, Short Green, Westerfield Chicago Pickling. Medium-vined; fruit about 5 inches long, 2 to 2½ inches in diameter when matured for slicing; green ripening yellow, black spines. Very old variety.

Early Russian, or **Extra Early Seedling,** Extra Early Siberian, Ever Bearing New Siberian. Small, short-jointed vine, bearing usually in pairs small fruit three

to four inches in length; green ripening to dark reddish-yellow, black-spined; prolific; a week earlier than any other sort.

Ford Hook Famous. Large vine; fruit long, smooth, dark green with white spine.

Gherkin, or Burr, Round Prickly, West India. A native of tropical America. Small, slender vine, small foliage; fruit abundant, two to three inches in length, oval form, thickly set with spines.

Long Green. Large vine; fruit large and long, green ripening yellow, black spines.

Long Green Turkey. Large vine; fruit 15 to 18 inches in length; form long and slender, usually solid near the stem; seeds sparsely; skin deep green, ripening a reddish-yellow, black spines; excellent for pickles.

Nichol's Medium Green, or California Pickle. Medium, large vine; fruit medium large, about twice as long as thick; dark green ripening yellow, black spines.

Short Prolific, or Boston Market, Boston Pickling, Chicago Pickling, Early Green Prolific, Extra Early Green Prolific, Jersey Pickle, Prize Taker. Small vine; fruit smaller than Early Frame, averaging four to five inches in length when matured enough for slicing; green ripening yellow, black spines.

White Spine, or Arlington White Spine, Bennett's White Spine, Perfection White Spine, Early White Spine, Evergreen White Spine, Fordhook White Spine, Improved White Spine, Peerless White Spine, Bismarck, Commercial Pickle. Medium vine; fruit about 6 inches long, $2\frac{1}{2}$ inches in diameter; deep green with white spines; as it ripens the skin gets paler, and when fully ripe it is nearly white.

DANDELION.

Cabbaging.—Leaves fully double the size of the common dandelion.

French. Broader leaves than the preceding, less curly.

EGGPLANT.

Large Spineless Purple, or New Jersey, New Orleans Market, New York Purple. Large, round, smooth, glossy, deep purple skin.

Black Pekin. Similar in form to the preceding; skin jet black.

White. Also similar in form to the Large Purple; skin creamy white; in Europe the white skin sorts have the preference.

ENDIVE.

Green Curled, or White Curled, Moss Curled. Leaves much cut and curled; heart leaves full and close.

Broad-leaved, or Batavian, Escorolle, Lettuce-leaved. Leaves yellowish-green, long and broad, edges somewhat ragged.

KALE.

Asparagus, or New Orleans Broad Leaf. Dwarf; broad, greyish-green leaves, slightly curled at the edges; stalks of the leaves have almost the flavor of asparagus.

Dwarf Curled Scotch, or Dwarf German, Cottagers, German Greens, Siberian, Sprouts, Winter. Dwarf, spreading; bright green, finely curled leaves.

Dwarf German Purple, or Dwarf Brown Purple. Similar to the preceding, except in color which is deep purple.

Jersey, or Cow or Tree. Grows to a height of six feet or even taller. Leaves large, from $2\frac{1}{2}$ to 3 feet in

length, smooth or but slightly curled; usually grown for stock, but the young sprouts are mild and tender for cooking.

Sea Kale. A perennial, propagated from seeds or roots. Leaves are large, thick, roundish, smooth, in color bluish-green; young shoots when from 3 to 9 inches long are blanched and used.

Tall Green Curled Scotch. Height two to four feet, curly dark-green leaves.

Tall Purple Curled Scotch. Similar to tall green, except in color which is deep purple.

KOHL RABI.

Early Green Vienna, or Early White Vienna. Light green bulb, short-leaved; matures for table use in 70 to 80 days.

Early Purple Vienna. Similar to the preceding, except in color.

Large Green, or Large White. Bulb much larger than the early sort; matures for table use in from 90 to 110 days.

LEEK.

Large London, or Broad Flag, Large Flag. Tall, thick stems about 4 inches in length, $1\frac{1}{4}$ inches in diameter; broad leaves.

Large Musselberg, or Carentan, Scotch Champion, Scotch Flag. Stems tall, reaching six to eight inches in length, two to three inches in diameter; very broad leaves.

Large Rouen, or American. Thick, short stem, under strong cultivation grows four inches in diameter; fan-shaped dark green leaves.

LETTUCE.

There are three general types of lettuce: (a) Cabbage Leaved; leaves broad, rounded, more or less wrinkled, and in some varieties much curled, overlapping each other, forming a head like cabbage. (b) Cut Leaved; leaves long, loosely spreading and irregularly cut on the edges. (c) Cos Leaved; leaves spatulate, much longer than broad; forming a conical-shaped upright plant, from one to two feet in height.

Cabbage-leaved Varieties.—Big Boston, or All-right, Big Head, Chesterfield, Giant White Forcing, Houston Market, Red Edge, Trocadero. Was introduced from France under the name of Trocadero. Seed is whitish; compact, broad, hard head; leaves broad, mostly smooth; color, light, dull green, narrowly edged with light brown; matures in about 80 days.

Brown Dutch, or Brown Gincio, Brown Batavia. Seed blackish; medium sized, firm head; leaves broad, somewhat blistered and crumpled; color, medium dull green, tinged with dull faint brown, sometimes a decided brown in blotches; 80 days.

Buttercup, or Golden Ball, Michell's Very Best. Seed whitish; medium-sized firm head; leaves broad, somewhat blistered and crumpled, flat at edges; color very light-green, never spotted in any part; 80 days.

California Cream Butter, or Beckert's Golden, Blonde Beauty, Early Spring, Large Passion, Philadelphia Butter, Spotted Passion, Summer Drumhead, Treasure. Seed brownish-black; large, very firm head; leaves broad, somewhat blistered and crumpled, flat at edges; color dark-green, freely spotted with brown; 80 days.

Cold Frame White Cabbage. Seed whitish; medium-sized, firm head; leaves broad, somewhat blistered and

crumpled, flat at edges; color medium-green, tinged in places with light-brown; 75 days.

Deacon, or Colossal, Golden Gate, Golden Heart, Largest of All, Large Drumhead, Norfolk Royal Cabbage, Russian, San Francisco Market, St. Louis Butter, Summer Gem, Summer Queen Drumhead, Sunlight, Triumph, White Russian. Seed whitish; large, fairly compact head; leaves broad, peculiarly smooth; color light grayish-green, unspotted and untinged; 75 days.

Defiance, or Always Ready, Slow Seeder, Standwell. Seed whitish; large, firm head; leaves broad, somewhat blistered and crumpled; color medium-green, tinged light-brown in places; 80 days.

Denver Market, or Early Ohio, Golden Forcing, Sutton's Favorite, Weber's Curled. Seed whitish; large, somewhat soft head; leaves excessively blistered and crumpled, frilled at borders; color very light-green, unspotted; 80 days.

Golden Queen, or Stone Head Golden Yellow. Seed whitish; small head; leaves broad, blistered and crumpled; color very light-green, unspotted and untinged; 65 days.

Hanson, or Excelsior, Gardener's Favorite, Los Angeles Market, Mastodon, Montreal Market. Seed whitish; large, hard head; leaves broad, somewhat blistered and crumpled, borders frilled; color very light-green, unspotted; 90 days.

Hubbard's Market, or Early Challenge, Early White Butter, Early Market, Early White Cabbage, French Market, Gold Nugget, St. Louis Market. Seed whitish; large, very firm head; leaves broad, somewhat blistered and crumpled, color medium-green, unspotted; 70 days.

Malta, or Drum Head. Seed whitish; very large,

fairly compact head; leaves short, spatulate in shape, slightly but coarsely blistered and crumpled, borders coarsely frilled; color very light-green, unspotted; 90 days.

Maximum, or Immensity, Leviathan, Matchless, Midsummer, Summerlead, Superba. Seed brownish-black; very large, fairly firm head; leaves broad, fairly smooth, slightly blistered and crumpled, borders plain; color dark green, spotted and tinged with dark brown; 90 days.

Mignonette, or Delicate. Seed blackish; small, extremely hard head; leaves broad, much blistered and crumpled, borders frilled; color dull dark brown with dull dark green in less exposed parts; 70 days.

New York, or Bonanza, Hasting's Drum Head, New Ice, Nonpareil, Wonderful. Seed whitish; extremely large, very hard head; leaves broad, somewhat blistered and crumpled, borders frilled; color dark green, unspotted; 90 days.

Red Besson, or Bronzed Red, Continuity. Seed blackish; large, loosely formed head; leaves broad, much blistered and crumpled, borders plain, color brilliant brown interspersed with bright green; stem and base of midribs pink; 80 days.

Reichner, or Early White Butter, Florida Header, Mongolian, Neapolitan Sash, Rochester Market, Silver Ball, Waldorf, Yellow Queen. Seed whitish; medium sized, very compact head; leaves broad, somewhat blistered and crumpled, borders plain; color light green, unspotted; 65 days.

Speckled Dutch Butter, or Brown Speckled Dutch Butter, Virginia Solid Header. Seed whitish; medium-sized hard head; leaves broad, blistered and crumpled, borders undulate; color medium green, distinctly

spotted and faintly tinged in places with brown; 70 days.

Tennis Ball, Black Seeded, or All Heart, All Year Round, Baltimore Cabbage, Black Seeded Summer, Bloomsdale Butter, Eclipse, Everlasting, Hard Head, Long Island Winter, Market Gardener's Private Stock, Ninety and Nine, Salamander, Satisfaction, Sensation, Twentieth Century, White Peach. Of European origin; known in America for more than half a century. Medium sized, very hard head, leaves broad, much blistered and crumpled, borders plain; color light green, unspotted, 75 days.

Tennis Ball, White Seeded, or Boston Market, Ideal. Like the preceding, an old sort. Small, very hard head; leaves broad, blistered and crumpled, borders plain; color medium green, sometimes brownish in large areas, but never distinctly spotted; 60 days.

Wheeler's Tom Thumb, or Landredth's Forcing. Seed blackish; small, hard head; leaves broad, much blistered and crumpled, borders undulate; color dark green, unspotted with brown; 70 days.

Yellow-Seeded Perpignan, or Bloomsdale Early Summer, Champion, Creole, Reliable, Stubborn Header, Waite's Summer Cabbage. Seed yellowish; medium-sized, very compact head; leaves broad, much blistered and crumpled, borders plain; 80 days.

Cut or Loose-leaved Varieties.—Black-Seeded Simpson, or Constitution, Earliest of All, Earliest Forcing, First Early. Seed blackish; crisp, broad leaves, frilled borders; color very light green, unspotted; 80 days.

Boston Curled. Seed blackish; crisp, broad leaves, excessively frilled borders; color medium-green, unspotted; 70 days.

Early Curled Simpson, or Curled Silesia, Crisp and Tender, Lacrosse Market, Perpetual. Seed whitish; crisp, large blistered, crumpled leaves; color very light-green, unspotted; 75 days.

Grand Rapids. Seed blackish; crisp, short, spatulate leaves, excessively blistered and crumpled, borders excessively frilled; color very light-green; unspotted; 70 days.

Prize Head, or American Gathering, Brown Curled, Cincinnati Market Gardeners, Ice Drum Head, Onondaga, Peer of All. Seed whitish; crisp, short, spatulate, much blistered and crumpled leaves, borders deeply and excessively frilled; color bright brown, varying to bright green in less exposed parts; 80 days.

Cos-leaved Varieties.—Paris White, or Green Cos, Heat Resisting Cos, Long Loaf, Romaine, Self-Closing Cos, Triannon Cos. Seed whitish; large crisp leaves, thick, stiff, self-folding, closely but not tightly overlapping; color very dark-green, unspotted; 85 days.

Red Winter. Seed brownish; large, crisp, thick, stiff, fairly self-closing leaves, loosely overlapping one another; color deep, bright brown, unexposed parts bright green; 85 days.

MELON.

Musk or Cantaloupe Varieties.—Acme, or Anne Arundel, Atlantic City, Baltimore, Baltimore Market. Medium-sized, oval in form, slightly pointed at both ends; heavily netted and ribbed; green flesh.

Banana. Long form, thirteen to eighteen inches in length, two to four inches in thickness; smooth, pale-green skin, without ribs, looking curiously like a banana; flesh yellow, blending from green to salmon.

California, or San Joaquin. Large size, round form,

slightly flattened at ends; heavily ribbed and netted; flesh deep yellow or orange.

Columbus. Large size, round form; green flesh; skin buff-colored, covered with thick, whitish netting, almost entirely free from ribs or seams.

Emerald Gem. Small size, round form, flattened at the ends; flesh salmon-colored; skin smooth, emerald-colored; ribs marked, not deeply seamed.

Extra Early Hackensack, or Arlington, Champion, Chicago Market, Early Cape May, Superb. Early, roundish, flattened at both ends; heavily ribbed and netted; flesh green.

Green Persian, or Bay View, Cassaba, Giant of Colorado. Large size, oblong, twelve to fifteen inches in length, heavily ribbed and netted; skin green, flesh light green.

Hackensack, or Turk's Cap. Similar to the extra early Hackensack, but larger and a week or ten days later. The synonym, Turk's Cap, somewhat describes the form of both varieties.

Jenny Lind, or Extra Early June, Jersey Belle. Early, small size, rather flattened in form, heavily ribbed and netted; flesh green.

Long Island Beauty, or California Beauty. An improved type of the large Hackensack; large size, round in form, much flattened at both ends; heavily ribbed and netted; flesh green.

Montreal, or Outremont Beauty. Very large size, round in form, slightly flattened at the ends, broad heavy ribs; dark green skin, heavily netted; flesh light green.

Netted Gem, or Alamo, Colorado, Dewey Gem, Golden Gem, Golden Jennie, Rocky Ford. Small size, slightly oval in form; heavily ribbed and netted; flesh

light green; skin light yellowish hue when fully ripened.

First introduced as Netted Gem, but now more commonly known as Rocky Ford.

Nutmeg, or Green Citron. Medium-sized, oval in form; flattened ends; heavily ribbed and netted; flesh green, skin green.

Osage, or Miller's Cream, Salmon and Green. Medium size; slightly oval form, rounded ends; lightly ribbed and netted; skin dark-green, flesh deep orange.

Paul Rose, or Petoskey. Small size; slightly oblong form, heavily ribbed and netted; flesh deep salmon-colored, skin light-green or faint golden when ripe.

White Japan, or Surprise. Medium-sized, round form; flesh cream color; skin smooth, white, and seldom netted.

Winter Casaba, or Santa Claus, Winter Pineapple. Large size, round form, pointed at stem end, flattened at the other; smooth corrugated skin, yellowish-green in color; flesh light-green. Possesses none of the common Musk Melon odor; seldom ripens on the vine, but may be stored in a cool, dry place or cellar and allowed to ripen like winter pears; keeps long.

Water Varieties. Alabama Sweet. Large size, oblong form; thin dark green rind; flesh deep-red, crisp; seed white.

Arkansas Traveler, or Santiago. Large size, long form; thin, tough rind in color dark-green with stripes of darker shade; flesh deep red; seed drab.

Black Spanish. Large size, nearly round form; dark or blackish-green rind; flesh crisp, bright scarlet; seed nearly black, tipped with brown.

Blue Gem, or Georgia Blue, Gloussier, Iceberg. Large

size, thick oval form; rind dark bluish-green with faint stripes of a lighter shade; flesh deep red; seed black.

Boss. Large size, long form; rind dark-green; flesh deep scarlet; seed very dark brown.

Bradford. Large size, long form; rind dark-green striped with darker shade; flesh deep red; seed white.

Cuban Queen. Large size, oblong form; rind thin and tough, striped in dark and light-green; flesh bright red; seed blackish-brown.

Dark Icing, or Early Ford Hook. Medium-sized, nearly round form; thin rind, color dark green, with occasional faint stripes of light-green; flesh bright red, crisp; seed white.

Dixie. Large size, oblong form; rind thin and tough, dark green, with stripes of lighter green; flesh bright red; seed dark brown.

Duke Jones, or Jumbo. Large size, oblong form; rind dark-green, with irregular stripes of lighter shade; flesh bright red; seed white, darkened around the tip edge.

Florida Favorite, or Sibley's Triumph. Large size, oblong form; rind dark green, faintly striped with a darker shade; flesh deep red; seed white.

Georgia Rattlesnake, or Gypsy. Large size, long form; rind striped and mottled with various shades of green; flesh bright scarlet; seed white.

Ice Cream. Large size, nearly round form; rind pale-green; flesh white and sweet; seed white.

Jordan's Grey Monarch, or Long Light Icing. Large size, long form; rind light-green color, mottled; flesh deep red; seed white.

Kleckly Sweet, or Monte Cristo. Large size, oblong form; thin, dark green rind; flesh bright scarlet, crisp; seed white.

Kolb Gem, or American Champion. Large size, thick oval form; rind thin and tough, marked in light and dark green stripes; flesh coarse, bright red; seed dark brown.

McIver Sugar, or Wonderful. Large size, oblong form; rind dark green with broad stripes of light green; flesh crisp, pale pink; seed white.

Mountain Sprout. Large size, long form; rind striped with light and dark green; flesh deep red; seed dun-colored.

Mountain Sweet. Large size, long and slender form; dark green rind, sometimes marbled with different shades of green; flesh scarlet-red; seed dark brown.

Peerless. Medium-sized, oblong form; thin rind, light green in color, mottled; flesh scarlet; seed light brown.

Phinney's. Early, or Extra Early. Medium sized, oblong form, rind two shades of green, mottled; flesh deep red; seed white, blackened at the tip edges.

Preserving Citron. Large size, round form; rind light and dark stripes; flesh greenish-white; seed red.

Round Light Icing, or Ice Rind. Similar to Dark Icing, except color of rind is light green; seed white.

Pride of Georgia. Large size, oval form; rind dark green with light and dark green stripes; flesh pink; seed white, blackened at the tip edges.

Seminole. Large size, long form; rind tough and thin, color light green or grey; flesh carmine; seed light brown.

Sweet Heart. Large size, oval form; rind light green, mottled with dark green; flesh dark red; seed dark brown.

Triumph. Large size, thick oval form; rind bluish-green; flesh dark red; seed black.

MUSTARD.

Black.—Seed brownish-black, leaves large, deeply lobed, dark green color.

Giant Southern Curled, or Chinese, Creole-Curled, Georgia. Seed brown; large, dark green leaves with extra curled edges; twice the size of the ordinary white.

Ostrich Plume. Seed brown; dark green leaves, long, ruffled and frilled.

White. Seed yellow; leaves large, deeply lobed, of a deep green color.

OKRA.

Dwarf Green, or Density. Pod green, ridged.

Lady Finger. Tall habit; long, slender, light green ridged pod.

Perkins, or Long Green Pod. Dwarf habit; long, slender, dark green ridged pod.

Tall Green, or Long. Green, ridged pod, longer than the dwarf variety.

White Velvet, or Creole, Long White Pod, New South, White Lady Finger. Tall habit; long, round, smooth pod, velvety-white in color.

ONION.

Australian Brown.—Early, medium-sized, globular form, flesh white, skin bright reddish-brown; solid, fairly good keeper.

Bermuda Island Red. Medium size, flattened form, white flesh, purplish-red skin; desirable for early use, but not a good winter keeper.

Bermuda Island White. Similar to the preceding, except the skin is straw-color.

Early White Queen, or Bloomsdale Pearl, Extra Early Barletta. Early, medium size, white flesh, sil-

very-white skin; flattened form, mild flavor; desirable for early use, but not a good winter keeper.

Extra Early Red. Early, medium size, flattened form, flesh white tinged with pink, skin deep red; solid, good keeper.

Paris Silver Skin, or Autumn White Wax. Early, medium size, white flesh, waxy-white skin, flattened form, mild flavor; desirable for earliness, but not a good keeper.

Prize Taker, or Spanish Globe, Spanish King. Large size, globular in form, white flesh, straw-yellow skin, solid, fairly good winter keeper.

Red Tripoli, or Copper King, Mammoth Pompeii, Red Garganus. Large size, flattened form, white flesh, reddish-brown skin; mild flavor; desirable for early use, but not a good winter keeper.

Red Wethersfield. Large size, flattened form, flesh purplish-white, skin deep purplish-red; solid, good keeper.

Southport Red Globe, or Red Rocca. Large size, globe or round form; flesh slightly tinged with pink; skin dark red; solid, good keeper.

Southport White Globe, or Silver Ball, White Rocca. Large size, globe or round form, white flesh, silvery-white skin; solid, good keeper.

Southport Yellow Globe, or Yellow Rocca. Large size, globe or round form, white flesh, straw-yellow skin; solid, good keeper.

White Portugal, or Silver Skin. Medium size, flattened form, white flesh, silvery-white skin; solid, fairly good keeper.

White Tripoli, or El Paso, Mexican, Silver King, White Garganus. Large size, flattened form, white flesh, silvery-white skin; mild in flavor; desirable for early use, but not a good winter keeper.

Yellow Globe Danvers, or Long Keeper. Medium size, globular form, white flesh, light golden-brown or pale-yellow skin; solid, good keeper.

Yellow Strasburg, or Flanders, Yellow Dutch. Large size, flattened form, white flesh, straw-yellow skin; solid, good keeper.

PARSLEY.

Double Curled, or **Extra Curled**, **Fine Curled**. Very curly, fine-cut dark-green leaves.

Emerald, or **Beauty**, **Beauty of the Parterre**. Fine curled and twisted dark-green leaves.

Moss Curled, or **Champion**, **Fern-leaved**, **Triple-Curled**. Densely crimped and curled, dark-green leaves.

Single or Plain. Leaves plain, not curled; flavor stronger than the curled sort.

Turnip-rooted, or **Hamburg**. The edible portion is the fleshy root, which resembles a small parsnip. It is used for flavoring soups and stews.

PARSNIP.

Improved Half Long, or **Bloomsdale**, **Devonshire**, **Elcombe Giant**. Root half long, and of thick diameter toward the crown; sugary.

Long Smooth or **Hollow Crown**, or **Cup**, **Guernsey**, **Long White**, **Student**, **Sugar**. Long, smooth root; sugary; the old well-known staple variety.

PEA.

Extra Early Varieties.—**Alaska**, or **Earliest of All**, **Kentish Invicta**, **Laxton's Earliest**, **Sitka**. This is as early as the **Daniel O'Rourke**. Height two and a half to three feet; pod dark-green, straight, about two and a

half inches long, containing five or six peas; seed round, blue, slightly pitted.

This variety was originated in England under the name of *Kentish Invicta*, and introduced here about thirty-five years ago. *Alaska* is the most popular name by which it is now known in America.

Alpha. Extra early; height three feet, medium-sized pods; seed small, wrinkled, light-green.

Daniel O'Rourke, or *Canada Extra Early*, *Carter's Earliest*, *Dexter*, *Eureka*, *First and Best*, *Landreth's Extra Early*, *Maud S.*, *Morning Star*, *Philadelphia Extra Early*, *Rural New Yorker*, etc. Height of vine two and a half to three feet; straight pods, about two and a half inches long, containing five or six peas; seed round, smooth, light cream color.

This was introduced here from England about sixty years ago, and in earliness has not yet been improved upon.

Early Frame, or *Early June*, *Early Kent*, *Early May*, *Early Prince Albert*, *Early Washington*. Height of vine three feet; pods straight; about two and a half inches long; seed round, smooth, light cream-colored.

Many years ago this was the most popular of all the early varieties, but it has been superseded by the *Daniel O'Rourke*, which is a week or ten days earlier.

Gradus, or *Early Giant*, or *Prosperity*. This is but a few days later than the *Daniel O'Rourke*; height three feet; large well-filled pods, about three and a quarter inches in length; seed large, wrinkled, cream-colored.

Dwarf Early Varieties.—*American Wonder*. Vigorous, productive, dark foliage; height nine inches; medium-sized pods; green, wrinkled seed.

Blue Peter. Hardy and fairly productive; height ten inches; broad, flattened pods, borne at the top of the

vines; good flavor; seed blue, round, slightly flattened and dented.

Little Gem, or Premium Gem. Height eighteen inches, hardy, prolific; pods two and a half to three inches long, borne singly on both sides of the stalks; fine flavor; seed green, wrinkled.

Nott's Excelsior. Extra early; height twelve inches; pods two and a half to three and a half inches in length, well filled; vigorous, productive; seed wrinkled, square at the ends, green in color.

Tom Thumb. Height ten inches, prolific; pods two and a quarter inches long; seed small, round, white, similar to Daniel O'Rourke, and like it in quality.

William Hurst. Height twelve inches; resembles American Wonder in habit, but more hardy and vigorous, bearing in profusion long-curved, well-filled pods; light-green, wrinkled seeds.

Medium Height, Medium Early Varieties.—Blue Beauty, or Perfection. Height twenty inches; vigorous, productive; pods well filled, fine flavor; seed blue, round, smooth.

Blue Prussian. Height three feet, vigorous; pods two and three quarter inches long, slightly curved; seed small, smooth, compressed on the sides, blue.

Dwarf Blue Imperial. Height three to four feet; hardy, vigorous; pods about three inches long, well filled; seed large, blue, smooth, somewhat flattened; quality good.

Dwarf Telephone, or Daisy. Height twenty inches; hardy, vigorous, productive; pods about three inches in length, broad, straight, rounded or curved at end, well filled, often containing ten large peas of pale-green color; fine flavor; seed large, light-green, much shriveled and shrunken.

Eugenie, Alliance, or Prince of Wales. Height three feet; hardy, vigorous; pods about two and three quarter inches long, containing five or six peas; seed cream-colored, wrinkled, flattened; flavor fine, as is the case generally with cream-colored, wrinkled varieties.

Heroine. Height two feet; vigorous; luxuriant foliage; pods extra long, slightly curved, well-filled, eight to nine peas each; fine flavor; seed green, very much wrinkled.

Horsford's Market Garden, or Abundance. Height twenty inches; resembles Little Gem, but ten days later; pods medium size, produced in profusion in pairs, but not so well-filled as McLean's Advancer; seed green, wrinkled.

Juno. Height two feet, vigorous; pods straight, thick, well filled with seven to nine peas each; fine flavor; seed large, deep green, wrinkled.

McLean's Advancer. Height two feet; vigorous, productive; long, broad, well-filled pods borne near the top of the stalk; seed green, wrinkled.

Pride of Market, or Golden Sugar. Height two and a half feet, vigorous, productive; pods about three inches long, well-filled, borne in profusion; fine flavor; seed blue, round, smooth.

Senator. Height two and a half feet; pods very long, curved, borne near the tops of vines, often in pairs; fine flavor; seed light green, wrinkled.

Shropshire Hero. Height two and a half feet; hardy, vigorous, productive; pods larger, longer and better filled than Yorkshire Hero; fine flavor; seed green, very much wrinkled.

Stratagem or Sharpe's Queen. Height two and a-half feet; vigorous, luxuriant foliage; pods broad, about three inches long, containing six to nine large peas; seed green, wrinkled; fine flavor.

Yorkshire Hero, or Alameda Sweet, Big Gem, Dwarf Champion, Everbearing. Height two and a half feet; hardy, vigorous, productive; pods broad, about two and three-quarter inches in length, borne in profusion; fine flavor; seed large, green, wrinkled, flattened.

Tall Late Varieties.—Admiral. Height three to three and a half feet; hardy, vigorous; medium-sized pods (about like Daniel O'Rourke), produced in abundance, well filled, quality good; seed small, cream-colored, wrinkled.

Auvergne, or Bloomsdale, French Canner, Petit Pois.

Height four to five feet, hardy, productive; pods about four inches long, round, slightly curved; seed small, round, white.

Black Eye Marrowfat. Height four to five feet; hardy, vigorous, productive; pods three to three and a half inches long, broad, thick, leathery, borne near the top of the vine, containing four to five large peas of good quality, but not so sweet as the wrinkled sorts; seed large, round, cream-colored, with a distinct black eye.

Champion of England. Height four to five feet, vigorous, productive; pods about three and one-quarter inches long, broad, from five to seven peas each; seed light green, very much wrinkled.

Duke of Albany, or American Champion. Height two and a half to three feet, vigorous, productive; pods about three and one-half inches long, broad, nearly straight, well filled; quality fine; seed large, light green, very much wrinkled.

Forty-fold. An improved Champion of England, pods larger, longer and better filled; height and seed similar.

Sugar Marrow. Height three and a half to four feet,

hardy, productive; pods long, well shaped, well filled with peas of the true marrow flavor; seed small, white, slightly pitted or dented.

Telegraph, or Giant-podded Marrowfat, Long Island Marrowfat. Height three and a half to four feet; strongly resembles the Telephone as to vine and pod; deeper shade of green and more hardy and productive; in quality not so good as Telephone; seed dark green, round, dented.

Telephone, or Victoria. Height three and a half to four feet, vigorous, productive; pods light green, three and three-quarter inches long, broad, straight, well filled, six to ten large peas each; seed large, light green, very much wrinkled; quality fine.

White Marrowfat. Height three and a half to four feet, hardy, vigorous, productive; pods three to three and a half inches long, broad, thick, leathery, borne near the top of the vine, containing four to five large peas of good quality, but not so sweet as the wrinkled sorts; seed large, round, cream-colored.

Sugar or Edible-pod Varieties.—Dwarf Purple Blossom. Height twenty inches; pods about three inches long, broad, tender; seed gray.

Melting Sugar. Height five feet, productive; pods three and a half to four inches long, three quarters of an inch broad, somewhat bloated and twisted, seed brown.

Tall Sugar. Height five feet, productive; pods three and a half to four inches long, broad, tender; seed white.

PEPPER.

Large Fruited Varieties.—Chinese Giant. Stocky habit; fruit four to five inches long, four to five in

diameter at the stem; when ripe brilliant scarlet; flesh mild.

Golden Dawn. Plant stocky and branching; pods large, nearly four inches long and three in diameter at the stem; deep yellow when ripe; flesh mild.

Golden Queen, or Giant Yellow. Stocky habit; fruit four to six inches long, three to four in diameter at the stem; deep yellow when ripe; flesh mild.

Large Sweet or Bell. Plant stocky and branching; pods nearly four inches long and three in diameter at the stem; brilliant coral-red when ripe; flesh mild.

Procopp's Giant, or Spanish Monstrous. Sturdy habit, fruit six to eight inches long, two in diameter at the stem end; glossy scarlet when ripe; flesh mild.

Ruby King. Very much like the Golden Queen, excepting that fruit is brilliant red when ripe.

Squash, or Tomato-shaped. Stocky habit; fruit compressed, two and a half inches in diameter, two in depth; brilliant coral-red when ripe; flesh mild.

Small Fruited and Hot Varieties.—Bird. Fruit sharply conical in form; one and three-quarter inches in length, about one-half inch in diameter; brilliant coral-red when ripe; intensely pungent.

Celestial, or Kaleidoscope. Fruit conical form, one to two inches long, produced in great profusion; ripening from green alternately to lemon, golden and scarlet; intensely pungent.

Cherry. Fruit globular or cherry form, deep scarlet when ripe; intensely pungent. There is a yellow-fruited sort.

Coral Gem. Dwarf habit, slender fruit one inch long, produced in abundance; bright red when ripe; intensely pungent.

Long Red Cayenne. Fruit long, conical, nearly four

inches long, one to one and a half in diameter; coral-red when ripe; intensely pungent.

Tabasco. Tall habit; three to four feet in height; bears in profusion slender fruit one inch in length; deep scarlet when ripe; intensely pungent.

PUMPKIN.

Canada.—Oblate form, deeply and regularly ribbed; comparatively large size, twelve to fourteen inches in diameter, about ten in depth; shell or rind thick and hard; deep orange-yellow in color; flesh yellow, fine-grained; more flattened in form than the Common Field variety.

Cashaw. Curved, crookneck form, solid and cylindrical, thickened more or less at the blossom end; large size, reaching fifty pounds or more in weight; color of rind light-cream; flesh yellow, fine-grained, sweet.

Cheese. Fruit much flattened, cheese-shaped, regularly ribbed; large size, fourteen to sixteen inches in diameter, eight to ten in depth; rind quite hard, deep reddish-orange in color; flesh thick, yellow, fine-grained, sweet.

Connecticut Field. Fruit rounded, more deep than broad, flattened at ends, regularly and prominently ribbed; twelve to fifteen inches long, ten to twelve in diameter; rind hard, color orange-yellow, flesh yellow, coarse-grained.

Japanese or Japanese Pie. Early, medium-sized, crooknecked; rind dark-green, mottled with yellow stripes; flesh deep orange; fine-grained, sweet.

Mammoth Potiron, or Jumbo, King of the Mammoth. Rounded, thickened form, depressed at ends, slightly ribbed; rind salmon-orange; flesh deep yellow.

The Mammoth Potiron is the largest pumpkin, sometimes reaches two feet in diameter, from 100 to 200 pounds in weight.

Mammoth Tours. Large size; oblong form; rind deep orange, slightly mottled; flesh yellow.

Nantucket, or Hard Shell, "Nigger Head." Flattened or depressed form, but sometimes oblong; medium or rather small size; faintly ribbed; color dark green, which becomes lighter at full maturity; rind thick, hard, covered more or less with warty excrescences; flesh yellow, thick, fine-grained, sweet.

Sugar. Round, flattened form; small size, eight or nine inches in diameter, five or six in depth; regularly ribbed; rind hard, orange-yellow; flesh light yellow, fine-grained, sweet, abundant bearer.

Tennessee Sweet Potato. Medium size, pear-shaped; rind creamy-white, with light green stripes; flesh creamy-white, fine-grained, sweet.

RADISH.

Early Varieties.—Chartier. Long thick root, not so long as the Long Scarlet; red, shading to white at the bottom.

Early Deep Scarlet Turnip, or Cherry, Ne Plus Ultra, Red Turnip, Scarlet Button. Spherical root, when full-grown measuring about an inch in diameter; skin deep scarlet; flesh white, sometimes stained with red.

Earliest Scarlet Erfurt, or Early Bird, Fire Ball. The earliest red round-rooted variety; small root, small top.

Earliest White Short-top Turnip, or Hail Stone. The earliest white round-rooted radish; small bulb, short leaves.

French Breakfast. Oval root, the upper part scarlet, the bottom tipped with white.

Half-Long Deep Scarlet, or Paris Beauty. Small, thick root; good color.

Long Brightish Scarlet, or Long Cardinal. Medium-long root, scarlet tipped with white.

Long Purple, or Delicious Red. Long root; skin deep purple; flesh white.

Long Scarlet, or Cincinnati Market, Early Frame, Early Scarlet Short-top. Long slender root, deep-pink color, becoming paler toward the tip.

Long White Icicle. Grows about four inches long; slightly stump-rooted; glossy white skin.

Long White Vienna, or Long White Lady Finger, New Pearl. Long, slender, white root.

Scarlet Globe, or Carmine Globe, Prussian Globe, Rosy Gem, Scarlet of France. Round root; brilliant red color.

Scarlet Olive-shaped, or Red Rocket. Oval root, one and a half inches deep, three-fourths of an inch in diameter; skin deep scarlet, flesh tinged with red.

Triumph, or Striped. Small round bulb, white marked with scarlet stripes.

White Olive-shaped, or Newcome, White Rocket. Oval form, medium size, white skin.

White-tipped Scarlet Turnip, or Rapid Forcing, Ruby Pearl, Scarlet Ball. Round root, bright scarlet tipped with white.

White Turnip, or White Box. Medium size, round root, white skin.

Summer Varieties.—Celestial, or White Chinese. Large size, stump-root form, pure white skin.

White Strasburg, or Hospital, Nonpareil, Sandwich, White Chartier, 1834. Large root; oblong, tapering form, white skin.

White Stuttgart. Large size; top-shaped root; white skin.

Yellow Turnip, or Golden Globe, Yellow Summer. Large size, nearly or quite round; russet-yellow skin; white flesh.

Winter Varieties.—California Mammoth White, or Mammoth Russian. Large size, from eight to ten inches long and two to three in diameter; skin white.

Long Black Spanish. Large, long, thick form, six to eight inches long, one to one and a half in diameter at the top; skin nearly black, flesh white.

Long White Spanish. Differing from the Black Spanish only in color of skin.

Round Black Spanish. Large, round form, skin nearly black, flesh white.

Scarlet China. Large size, stump-root form, four to five inches long, one and a half to two inches in diameter at the broadest part; skin scarlet and pink, tipped with white.

RHUBARB.

Linnaeus.—Exceedingly early, medium-sized, high-flavored, thin skin, tender; possesses very little acidity.

Tobolsk. Leaves and stalks below medium size, stained red at the base; thin skin, tender; like the preceding, possesses very little acidity.

Victoria. Later than the preceding varieties; leaves and stalks large; the latter two and a half to three inches at their broadest diameter; stained red at the base; rather thick skin; more acid than the above two varieties.

SALSIFY OR OYSTER PLANT.

Long White.—The old French variety. Roots long and tapering, white within and without, measuring when well grown twelve to fourteen inches long, about one inch in diameter at the crown.

Sandwich Island. Roots white, nearly twice as large as the preceding; foliage stronger; quality superior.

Wisconsin Golden. Roots yellowish, larger than the Sandwich Island; foliage crimped or curled; quality first-class.

SCORZONERA, OR BLACK OYSTER PLANT, BLACK SALSIFY.

Root long, slender and tapering; skin grayish-black; flesh white, tender and sugary.

SORREL.

Broad Leaved.—Leaves ten to twelve inches long by six in diameter; leaf-stems red at the base.

SPINACH.

Bloomsdale, or Curled Savoy, Norfolk Savoy. Hardy; thick dark-green, wrinkled leaves.

Enkhuisen, or Long Standing, Thick Leaf. Large, smooth, dark green leaves.

Flanders. Large, thick, succulent, halberd-shaped dark green leaves, somewhat wrinkled; very hardy.

Prickly. Round, smooth, bright green leaves.

The hardest of all spinach, named from its spiny seed.

Round Savoy. Large, round, thick, fleshy, dark green leaves.

Victoria, or Ever Ready, New Parisian. Broad, thick, dark green leaves, wrinkled in centre.

Viroflay, or Belgium Evergreen, Improved Thick-leaved. Large, thick, fleshy, dark green leaves.

SQUASH.

Summer Varieties.—Early White Bush, or Cymbling, Pattypan. Bush habit; round, flattened form; edges scalloped; skin and flesh white.

Extra Early Bush. Bush habit; earlier than the preceding, but similar in shape; skin yellow; flesh pale yellow.

Fordhook. Oblong form; eight to ten inches long; slightly ridged, smooth, thin, yellowish skin; flesh light straw-yellow, vine vigorous.

Golden Summer Crook-neck. Bush habit; long form, about two and one-half feet in length, partly crooked, with slender neck covered with small wart-like bunches; skin deep yellow; flesh greenish-yellow.

White Summer Crook-neck. Similar to the preceding, but larger and white in color.

Fall or Winter Varieties.—**Boston Marrow.** Oval form, pointed at the ends; skin deep cream-yellow; flesh salmon-yellow; vine running habit.

Delicata. Small size, oblong form; skin striped with dark green, slightly ribbed with orange; flesh orange.

Delicious. In size about like the old Hubbard, oval form, thickest at the blossom end; skin dark grayish-green, flesh dark orange.

Essex Hybrid. Large, broad, round form, flattened at the ends, with a large nub at the blossom end; skin orange, flesh yellow or pinkish.

Faxon. Medium size, round form, flattened, slightly scalloped; skin greenish-orange, flesh yellow.

Hubbard. Oval form, pointed at the ends; skin dark-green; flesh salmon-yellow; vine strong, running habit.

Mammoth Chili. Largest of all squashes; rounded, oblong form, slightly flattened at ends; skin smooth, with broad, open netting, orange-yellow in color; flesh yellow; under strong cultivation will reach a weight of 100 pounds.

Mammoth Whale. Large size; long oval form, two

to three feet in length, with a straight neck at the stem end; skin dark olive-green with slight striping of a lighter tinge; flesh orange-yellow; under strong cultivation will attain a weight of 60 pounds.

Pike's Peak. Large size, oval form tapering at the blossom end; skin dark olive-green; flesh light-golden; vine strong, running habit.

Red or Golden Hubbard. Similar in form to the Green Hubbard, but skin is orange-yellow, turning to salmon when ripened.

Warted Hubbard. Similar to Green Hubbard, but fruit is more heavily warted.

TOMATO.

Acme, or Essex Hybrid, The Honey. Early, medium-sized; round form, slightly depressed at the ends; smooth, solid, purplish-red.

Aristocrat. Early; short, thick stems, almost self-supporting; leaves curled, dark-green; fruit borne in clusters, medium size, nearly round form, glossy red.

Atlantic Prize, or Earliest of All, Early Ruby, Extra Early Richmond, Money-maker. Extra early, medium-sized; flattened and irregular in form; bright red.

Beauty, or Baltimore Prize Taker, Cincinnati Purple, Climax, Table Queen, Trucker's Favorite, Volunteer. Early; medium-sized, round form; solid, smooth, purplish-red.

Buck-eye. Early, similar to the Beauty, except fruit is larger; round, smooth form; solid, purplish-red.

Dwarf Champion, or Meteor, Station, Tree, Upright. Early; short, thick, stiff stems, almost self-supporting; leaves curled, dark green; fruit borne in clusters, medium-sized, nearly round form, purplish-red.

Dwarf Stone. Early, plants dwarf, bushier or stalk-

ier in habit than the regular Stone; fruit larger than Dwarf Champion, borne in clusters, round form; smooth, solid, scarlet.

Earliana. Extra early; medium-sized, round form; smooth, bright red fruit, borne in clusters.

Early Jersey, or Advance, Alpha, Cumberland Red, Conqueror, Early Cluster. Early; medium-sized, round form; somewhat rough, solid, bright red.

Favorite, or Bell, Brandywine, Cardinal, Mayflower, Optimus, Red Cross. Early; medium-sized, round form; solid, smooth, dark red.

Golden Queen, or Golden Trophy, Lemon Blush, Sunrise, The Shah. Early; large size, round form; solid, smooth, yellow, sometimes tinged with red at the blossom end.

Green Gage, or Ivory Ball. Medium early; small, round fruit, averaging $1\frac{1}{2}$ inches in diameter; in color bone-white.

Honor Bright. Medium early; large, round form, solid, smooth; during growth and ripening, fruit undergoes changes in color, first light green, then waxy-white, then lemon, finally bright red.

Husk, or Barbados Gooseberry, Ground Cherry, Mexican, Strawberry, Winter Cherry. Low, spreading habit, small yellow fruit, enclosed in a husk; usable only for preserving or making pies.

Matchless. Early; large size, round form; solid, smooth, cardinal red.

Paragon, or Baltimore Queen, Brinton's Best, Red Queen, Royal Red, Ten Ton. Medium early; medium-sized; smooth, solid, deep red.

Peach. Medium early; small, round fruit, averaging $1\frac{1}{2}$ inches in diameter; pinkish in color, covered with a slight bloom as in a peach.

Pear-Shaped Red. Medium early; fruit two inches long by one in diameter; color yellow.

Pear-Shaped Yellow, or Fig. Differing from the preceding only in color.

Perfection. Early, medium-sized, round form, slightly depressed at the end; solid, smooth, deep red.

Ponderosa, or Four Hundred. Late, very large size; flattened, long form, ridged or ribbed; solid, few seeds, purplish-red.

Red Cherry, or Currant, Grape. Fruit small, averaging half an inch in diameter, borne in clusters; bright scarlet.

Stone, or Red Beauty. Early; large size, round form; solid, smooth, scarlet.

Trophy. Medium early; large size, round form; solid, generally smooth, deep red.

Turner's Hybrid, or 1,600 Dollar, Lorillard, Mikado, Potato-Leaved. Medium early; thick, broad leaves, like the potato; large, round form; smooth, scarlet, purplish-red.

TURNIP.

Turnip Proper Varieties.—Cow Horn, or Large Cropper, White Tankard. Late; long form, rounded at the end; average length ten or twelve inches, diameter about three inches; skin pure white, green at the crown; flesh white.

Early Flat Dutch. Narrow, strap-leaved; round form, very much flattened, averaging four inches in diameter and two and a half inches in depth; skin white with green at the crown; flesh white.

Early Snow Ball. Perfectly round form; snowy-white skin and flesh.

Extra Early Red Milan. The earliest turnip; narrow,

strap-leaved; medium-sized, round form, oblate or flattened; skin white with a purple top; flesh white.

Extra Early White Milan. Similar to the preceding, except that the skin is entirely white.

Golden Ball, or Yellow Globe, Yellow Stone. Late; nearly globular form; skin bright yellow below ground, greenish above; flesh pale-yellow.

Large White Norfolk. Late, large size, globular form; skin white, sometimes washed with green; flesh white.

Pomeranian White Globe. Medium early; large size, globular form; skin pure white; flesh white.

Red Top Flat. Differing from the Early Flat Dutch only in color of the top.

Red Top Globe. Early; narrow-strap leaves; globular form; skin white, with purple top; flesh white.

Scarlet Kashmyr, or Cardinal. Medium-sized, round form, flattened; skin crimson-scarlet; flesh white.

Seven Top, or Forester. Cultivated for the tops which are used for boiling with cured meats; bulb of no account.

Southern Prize, or Dixie Land. Of more recent origin than the Seven Top, to which it is similar, and like it cultivated only for the tops.

White Egg, or Extra Early White French. Early; oval form, medium-sized; white skin and flesh.

White Stone, or White Stubble. Medium early; larger than Early Flat Dutch; round form, somewhat flattened; skin white, tinged with green; flesh white.

Yellow Aberdeen, or Yellow Scotch. Late; large size, globular form; skin deep yellow; flesh pale yellow. There are two varieties, known as Purple Top and Green Top, from the color above ground.

Ruta Baga or Swedish or Russian Turnip

Varieties.—Champion, or Improved Purple Top Yellow Ruta Baga. Large size; ovoid in form; skin yellow, with deep purple crown; flesh yellow; sweet, well flavored.

Long Island, or American. Large size; roundish in form, having less neck than the Champion; skin yellow, with deep purple crown; flesh yellow; sweet, well flavored.

Sweet German, or Breadstone, Budlong, Rock. Oval in form, large size; skin white, greenish-brown above ground; flesh white; very sweet and mild.

White French. Long, tapering form, measuring when well grown eight to ten inches in length, four or five inches in diameter at the thickest part; skin white; flesh white; sweet and delicate.

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It gives Growers' prices with instructions for buying.

It contains tables of standard quantities as used for putting up small 5-cent packets.

It contains a list of synonyms of the different varieties, so that the buyer can purchase under the true names at nominal prices.

It gives formulas for preparing Lawn Grass Mixtures, etc.

This Book has already had an enormous sale in this country, in Canada, South America, Europe, and Africa.

