

## THE CARROT

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*Illustrations by Famke Zonneveld*

### Carrots as Spears of Light

In November the ploughed fields and meadow lands seem so bleak. Grasses are bleached and burdocks expire by the wayside. The autumn sun has travelled elsewhere and has taken its life with it. It shines only faintly, like a message from another hemisphere. Yet a legacy is left from the sun's descending course. Day by day it has sent spears of light into the ground; and miraculously, they still stand there, like a Greek bulwark against the winter snow. We call these spears of light carrots.

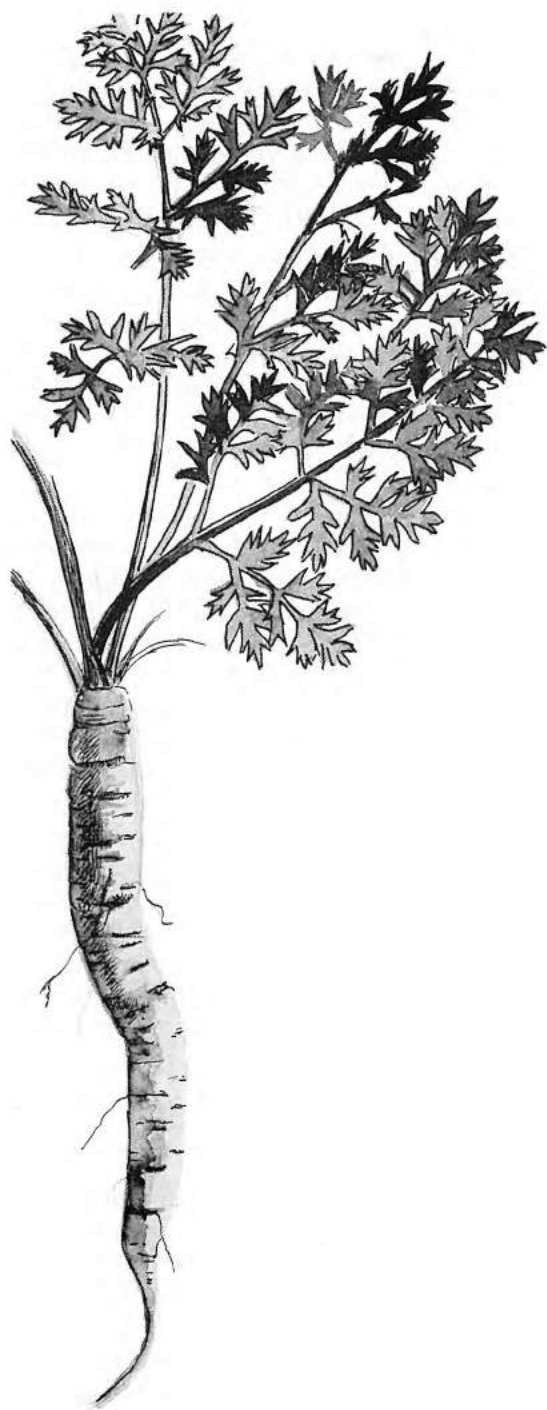
The carrot carries the force of sunlight through the winter. Its lacy foliage is especially suited to prepare for this. Even during early growth the fernlike leaves show a refined, sparse quality usually reserved for the stages close to the flower. Their flavor is both pungent and aromatic, as if to say: "Yes, I touch the earth very firmly, but am not overcome. I bring a scent from the upper regions into the root and yet never lose my form." In carrot the balance of earth and light can hardly be surpassed. The effects of light are visible even in the slender seed-leaves, which are nearly identical in form to the forked bracts under the flower. This shows a markedly different relation to the earth than does a succulent cotyledon like cabbage.

The root itself is rounded and shoots down smoothly and deep, as deep as 5 feet in some soils. Even in the wild carrot (the Queen Anne's lace) this tendency of form is maintained. It lacks the endless branching of root hairs found in plants less bound to the light. If stones or hard clay block its path, it may become forked or short-stumped, but its internal qualities remain constant.

### Soil for Carrots

The soil must be prepared to receive this spear of light, so that it can develop qualities of summer sun within winter conditions. This depends on the way sand, clay, and humus are wedded in a particular piece of ground. Over the years it has become clear to me that carrot quality is a kind of barometer for the garden as a whole.

Whereas ordinary carrots are fairly easy to grow, large, sweet and tender ones require a mature garden bed. They relish the humus most when it has become fully bound to the soil life. Nature has already



provided a good quality humus in some areas. Especially in parts of New England, there is an abundance of old humus in the soil. Old humus is different from organic matter, or even fresh compost. It needs a period of time and the working of earthworms and other small soil creatures. But as I said, the quality of carrots can be used as a barometer for this soil culture. The garden as a whole can be improved by improving the carrot beds.

### **Give a Thought to Double-Digging**

I don't believe that short, stumpy varieties of carrot, such as Planet or Kinko, will solve the problem of a shallow shale soil, low in humus. Even for small market gardens, it is often worthwhile to consider raised beds and double digging. The combination of well-matured compost and deep cultivation will always produce the best carrots. Since this may take years to achieve in some soils, it is good to begin a few beds at a time.

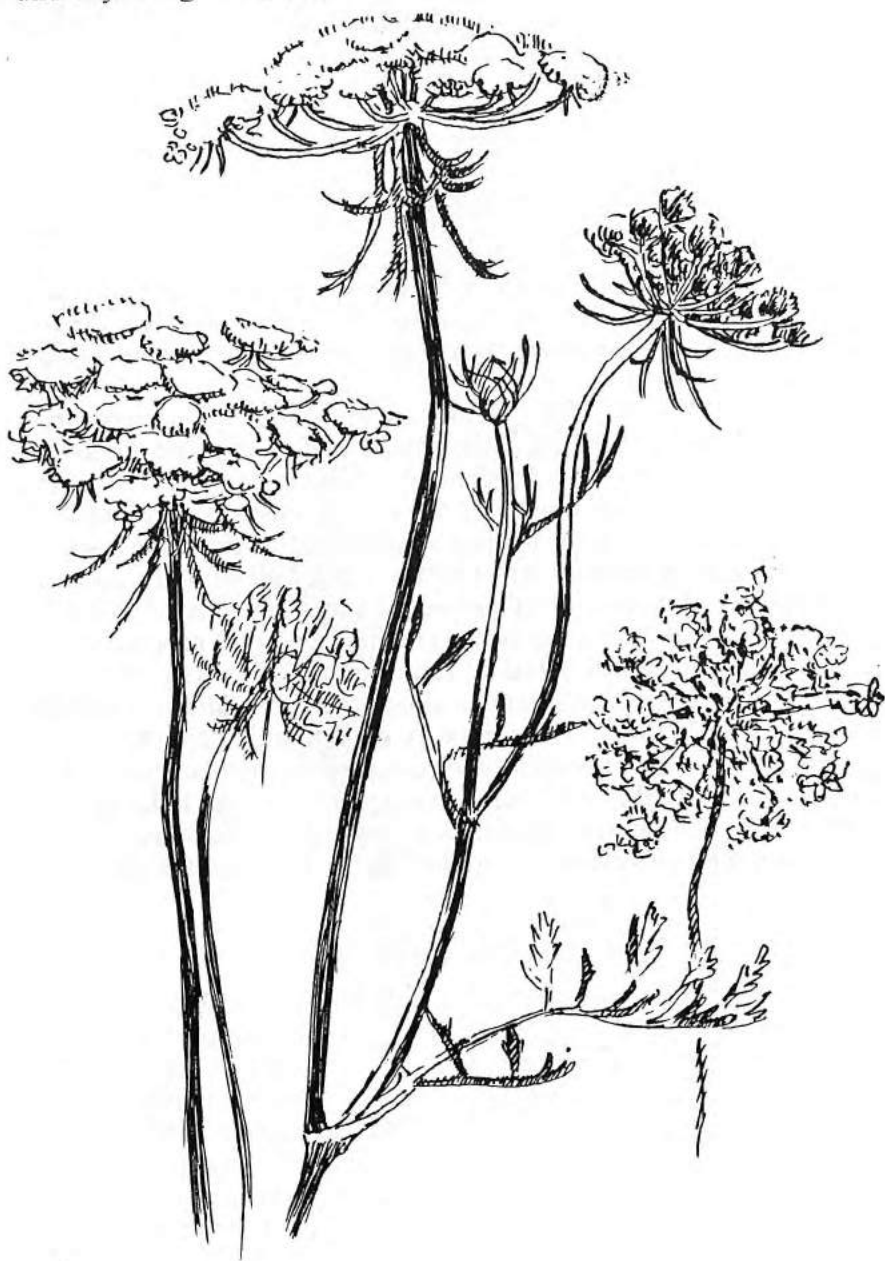
Double-digging a bed is really not much more difficult than ordinary digging. It means a concentration of work in late autumn or early spring, but saves the labor of cultivation for the rest of the season. It is especially important on poorly drained soils, or soils with compacted clay. Double-digging simply involves throwing a spit of dirt forward across the width of the bed, so that the subsoil is exposed. Apply several shovels full of mature compost to the opened spit, dig it into the subsoil, take a step backwards and repeat the process. It only takes a few hours to dig a bed 3½ feet wide and 35 feet long. Doubtless many market gardeners cannot afford this labor-intensive system. They are at the mercy of nature, even with the aid of chisel plow and subsoiler. For them the initial choice of land for carrot culture is most important. On the other hand, an apprentice and I double dug nearly two acres in late fall and early spring some years ago. To save time, we used picks to break up the subsoil. I enjoyed the work.

### **Choosing Carrot Land**

If a choice of soil to be used for carrots is available, select a sandy to medium clay loam. A percentage of sand (silica) is important because it reflects the cosmic forces of light, producing roots which are smooth, clear and fiberless. A percentage of clay mediates between plant and humus, improving color and keeping qualities. If heavy clay soils are worked carefully, they can also yield good roots, but midsummer crusting of seed beds is often a problem.

In choosing land for carrots beware of perennial weeds. These can

make a hopeless job, even for the home gardener. Cleansing can be achieved by continuous tillage, rye in autumn and buckwheat as a smoother crop. In small beds fork-sifting is practical, but time consuming. Sod ground is also bad because of wire-worms and undecayed organic matter.



## Compost and Horn Manure

In my opinion, cow manure composted half and half with fresh garden refuse produces the best quality carrots. Horse manure can compose about a quarter of the heap, but used alone, especially with sawdust, it produces a light and heartless compost. This is excellent for a seed-cover, but not as a basic carrot fertilizer. It just doesn't nourish. I know it has enough NPK, but it lacks the body and micro-life of cow manure. Compost for carrots should be fully mature and quite crumbly.

Horn manure (500) is the next step in building a carrot soil. It helps the humus, the earthworm, the sand and the clay to interact and form a working whole. This can't be achieved overnight, but is indispensable to the gradual development of land to be used for Bio-dynamic carrots. Applied during the autumn, horn manure will hasten the decay of organic residues lying dormant in the soil. In the spring it will activate the soil prior to seeding. Horn manure is most effective when sprayed during descending moon on root days in the afternoon.\*

## Carrot Varieties

Many varieties of carrots are fine if well grown. The factors to deal with are fiber, sweetness, bitter oil and soapiness. The Nantes group, especially Touchon, are noted for sweetness and freedom from fiber and off-flavors. They are unsurpassed for fresh eating and immediate marketing. They are not noted as keepers, but do keep fairly well into the winter. Many feel that they have just the right shape, like a plump, smooth Havana cigar. The ends are nicely rounded and the flesh is clear.

The Chantenay group includes red-cored Chantenay and Goldin-hart. These have broad shoulders and a rapid taper. They have more fiber than Nantes, but can be delicious even when extremely large. They never seem to get bitter or soapy. Their higher fiber content helps them to keep well. Very good for less than optimal soils.

Danvers is a vigorous grower with strong tops and high yield. It has the highest Vitamin A content of the well-known carrots. Though often of excellent quality, it occasionally gets that wild carrot flavor. Hilling of the carrot shoulders later in growth helps to minimize this. One of the best keepers, it is not the best for juice, due to occasional bitterness. Scarlet Keeper (Johnny's) is another higher fiber storage carrot, but in my opinion, is no improvement over Danvers or Chantenay.

\* See *The Kimberton Hills Agricultural Calendar*

Juwarot (from Thompson and Morgan in England) is the carrot highest in Vitamin A. Seed was too expensive for me to experiment with, but I found it a bit soapy in taste. Orlando Gold is another carrot high in A which is reputed to be of good flavor.

Most supermarket carrots are either Emperor or Gold Pak. These are extremely long (12 inches or more as opposed to 6 or 8 inches in the other types) and require deeply worked loam free of stones. I have grown Emperor carrots in New Hampshire that rivalled any carrots I have tasted before or since, but for some reason they did not flavor-up so well in Pennsylvania. The Emperor types are used for fresh market. They also keep very well. Hybrid carrots are used by commercial growers for vigor, uniformity and very rapid maturity. Seed is over four times more expensive. They are not necessary for most growers and certainly not home gardeners.

Finally there are the short stump-rooted varieties. These include Kinko, Planet, Oxheart and Short 'n' Sweet. They are designed for shallower and poorly prepared soils. Use them only as a last resort.

### **Carrot Sowing**

Carrot seeds are very small (and delicately aromatic, so be sure to savor their aroma as the first carrot meal of the season!). There are about 23,000 carrot seeds to the ounce. That makes 368,000 seeds to the pound. I emphasize this fact because carrots must be sown very thinly and this requires more consciousness than most other sowings. In Europe only the oldest peasants were allowed to sow carrot seed. Younger people must make a special effort to reduplicate their restraint. Sowing by hand should imitate a very fine spring rain. If you don't have it already, pretend you suffer from arthritis and move slowly. Another trick is to cut carrot seed in half with baked millet seed, sand or baked old carrot seed. The latter is especially good for mechanical seeders. On the other hand, extremely thin carrot stands are not as vigorous as those with some company. For some reason germination and early growth are more vigorous in groups. A balance has to be struck between a paltry stand and excessive thinning, which can deal a heavy blow to any carrot grower.

Settings on mechanical carrot seeders seem so variable, I cannot give any indications. I have used #8 and #6 in Planet Jr. with good success in a spring sowing. Most growers start lower than the company's plate-hole suggestion. Test the seedfall on newspaper first. Try several settings the first year under the same soil conditions. Much depends on soil type and available moisture.

In my early gardening years I frequently broadcast carrot seed. This



takes real skill. I think you can always do better with closer set rows. A bed 3½ to 4 feet wide can have up to 4 rows of carrots. Yield will be enormous and weeds under better control. On a field scale carrot yield can be increased by using tight double rows (5 inches apart) with alternate wider spacing for a tiller.

On a small to medium scale, crusting of heavy clay soil can be circumvented by covering the seeds in a shallow furrow (¼ inch deep) with sifted compost. The compost should be about the thickness of black velvet. To make the process easier, I collected horse manure in sawdust to make special compost that requires no sifting. Be sure to tamp or roll the seed bed after covering. Besides rapid emergence in heavy soil, the great benefit of compost covering is that the black band allows for immediate cultivation, since it demarks the slowly germinating rows. For spring sowing or on lighter land, this method is unnecessary.

Carrots can be sown from 3 to 5 weeks before the last expected frost in spring. The day-night temperature should average around 50° F., but such rules can't replace a little instinct and second-guessing about how the season will be. In warm years I've sown carrots in March in Pennsylvania, watched 6 inches of snow cover the seedbed and found the seedlings just emerging as the snow melted. Learn to feel the moment when winter is over and spring is just beginning: that's the right moment for carrots. For the autumn crop count back 4 months from the first hard autumn frost. In Pennsylvania that ranged from June 15 to July 7, depending on irrigation. Carrots keep best in the root cellar when they attain full size.

### **Companion Plants**

In large plantings of late carrots, I have always preceded the crop with dwarf English peas. Peas prolong the soil life of early spring and keep the ground moist. Rows of early carrots can alternate with dwarf peas. The composite family is also a good companion to carrots. In Europe the black salsify or scorzonera, a tasty root grated in salads, is used widely as a companion. Scorzonera helps to repel the carrot fly. Chicory, escarole and lettuce are also good companions to carrots, perhaps because they attract earthworms. The onion family — chives, garlic chives, and garlic in particular — improve growth and repel carrot fly. The fly is also repelled by aromatic herbs such as catnip, horehound, rosemary, sage, hyssop and lemon balm. Dill and fennel are not good companions; both slow the growth of carrots. In later plantings rows of carrots can alternate with beans. Beans can also follow the spring carrot crop without any addition of compost.

## Bio-dynamic Sprays

Silica (501) can be used up to 5 times on the storage crop. Each spraying will increase the light assimilation so important to the development of light-storage in the root. The carrot is especially receptive to silica when the leaves are just beginning to feather out. Sprays are most effective on root days, descending moon, if possible. Leaf days can be used as alternatives. The beginning of root formation is the next crucial stage for the use of silica. Spray when roots are about the same color and size as your pinkie. Though silica is usually sprayed with the rising light of the morning, switch to afternoon sprayings at this point, when saps are descending into the root.

If leaf blight has been a problem in your area, equisetum (508) can be used as a preventative; however, it will not cure an existing attack. Nutritional sprays are helpful in this regard, as well, and give additional vigor to the crop, even if blight is not present. Nettle tea and dilute seaweed tea are excellent foliar stimulants during leaf growth. Valerian spray (507) is an aid to sweetening the roots during later development, especially in periods of extended cloudy weather. Late silica sprayings improve maintenance of vitamins and quality during storage. September and early October are the best times for such sprays.

## Cultivation and Thinning

Many growers insist that carrots should be skim-cultivated even prior to emergence. With compost covering this is very easy. Another method is to demark the row with a 10 percent mixture of radish seed. A lot of unnecessary hand weeding can be avoided by keeping all but a one inch band skimmed clean, before, during and after emergence. Since emergence can vary from 10 to 20 days, this is very important. Summer weeds are very fast. For small gardens the scuffle-hoe, stirrup hoe, or action hoe work perfectly. Push or drag it behind you in a straight line razor close to the compost cover, radish seedlings or barely emerging carrots. Put on your glasses for this job.

Wheel-hoes work even better. Buy a slicing hoe for an old high wheel cultivator or adapt the cheaper head of an action hoe to fit the mounting bracket. A block of wood can act as an intermediary piece. English bicycle tires make superior replacements for old bent high wheels. The low wheel slicing hoes are even better, but are much more expensive. They are available in this country as the Jupiter Wheel Hoe.\* They focus the pushing force directly at the line of cultivation,

\* D.H. Tilmore Co., Inc., Hinesburg, VT 05461



increasing efficiency and accuracy.

Whatever method you use, use it often and very shallowly. Depth work should have been completed during bed preparation. Learn to shave exceedingly close to carrot seedlings. There are usually enough excess seedlings to risk slicing off a few.

Careful thinning is essential to a strong stand of carrots. No matter how skillfully you sow, the carrots usually have to be thinned to 2 inch spacings. But this need not be done immediately after emergence, unless the seedlings come up as thick as grass. First slice off those that deviate from the furrow line. Then give the stand a chance to establish itself. As I said before, the cotyledons like company for awhile. When the first true feathery leaf begins to emerge from between the seed wings, the row can be thinned to one inch and finger carrots thinned to two inches a month later. Many gardeners, however, prefer to space the entire row at 2 inches from the beginning. Wide initial spacing is preferred for storage carrots.

### Carrot Pests

A thick dusting of wood ashes is often used to provide an inhospitable nest for the carrot fly, whose maggots tunnel through the roots. Wood ashes also add potassium which helps to sweeten the carrots, though sufficient amounts are always present in good compost. The carrot worm is a beautiful green, black and yellow caterpillar. It doesn't appear until the foliage is fully developed. Since the caterpillar is the larval stage of the swallowtail butterfly, I am hesitant to recommend any controls at all; but if it becomes serious then "Bacillus Thuringiensis," sold as Dipel or Thuricide, can be used. The presence of both insects indicates an incomplete cultural environment. Give more attention to soil, compost and companion planting.

Leaf blight causes foliage to become brown. In severe cases the leaves die back to the ground. Though the foliage will re-grow, they never become vigorous enough to produce anything but bland, tasteless carrots. By then it is too late to use the Equisetum spray (508). Much better to use it right from the beginning, especially if leaf blight occurs in your area. Though normal carrot rotation is 3 years, once land is infected, a 6 year rotation must be practiced.

The only sure protection from rabbits and deer is good fencing. Soap-based repellents are sometimes effective. Muskrats and woodchucks have to be trapped, since they dig under fences. The burning of pelts has met with inconclusive results.

## Harvest and Storage

Many people harvest carrots at finger size, but they really only develop flavor, color, and sweetness at full maturity. Harvest can begin about 70 days after sowing; but storage carrots can be 4 months in the ground and still be delicious. They need some size and more dry matter in order not to shrivel in storage. Old summer carrots can get woody, but not well-timed fall ones.

The strong foliage of Danvers half long makes it the easiest carrot to pull by hand. Others require lifting with spading fork or chisel plow. If you intend to store carrots for the winter, harvest them as close to hard frost as you dare. In Pennsylvania that means the middle of November; in New England sometime in late October.

No matter what method is used for harvest, mechanical injury must be avoided. Fork-speared and broken roots must be culled and either used within a month or fed to livestock. Carrots are very good for young stock and though the roots don't rot easily, it is better to store only sound ones. I have never had any problems with pulling the foliage clean away from the carrot, instead of leaving the suggested few inches of stem. Because of the retention of field heat, never put sun-heated carrots directly into a big pile. Let the roots get cold (40°F) before you put them into storage.

There are many different ways to store carrots. Some people layer them in boxes with slightly damp sand. Kept very cold (33 to 35°F) this works well, but I have tasted more off-flavors from sand than any other medium. Hardwood leaves, especially maple with their natural growth inhibitor, maintain better flavor, but if the pile generates heat, like a compost heap, it can fill from top to bottom with carrot root hairs. Leaf moisture must be just right, only slightly damp, and the temperature as close to freezing as possible.

By chance I found a carefree way to store carrots. Many years ago I happened to be overwhelmed by several tons of carrots and little help. I left quite a lot of them in the woven plastic feed bags used to haul the carrots off the fields. They kept in better condition than any other method I had tried. Later I read a USDA report that roots store best in perforated plastic box liners. I know that plastic is not very Biodynamic, but the bags are sure easy to move around, and burlap bags rot and fall apart. Whatever method you choose, the one factor that can't be changed is temperature. In Autumn it's often more difficult to get a root cellar below 40°F than it is to keep frost out.

Home gardeners with no root cellar can mulch carrots through the winter. The trick is timing. Mulch lightly when frost is regular, but not deep. When ground frost begins, mulch more heavily with leaves or

straw. For example, if the ground normally freezes down to 18 inches in your area, then put on 24 inches of mulch. But don't lay a heavy mulch before hard frost lest the carrots rot or rodents have a field day.

### Carrot Seed

Seed-saving will not be successful unless the wild Queen Anne's Lace is removed from the vicinity around your garden. Carrot and Queen Anne's Lace are the same species, cross easily and produce a white tasteless offspring. If you can get over this hurdle, choose the



best looking roots from your fall crop. The shape should be evenly tapered, the color deep orange, the flesh appear smooth, clear and free from bumps and side roots. These can be stored vertically in boxes filled with soil. The foliage can be pulled off but don't cut into the growing point. In early spring replant these roots in the garden, giving each root 2 feet all around. These will produce umbels of seeds that can be harvested when dry. Carrot seed is viable for at least 3 years and often much longer.

**SEED**      Seed per oz. 23,000; seed per lb. 368,000.  
A packet will sow 30 ft. of row. An oz. will sow 300 ft.  
2-3 lbs. of seed will sow an acre; all the above depend on soil  
and spacing.  
Germination: 55%. 21 days at 50° F.  
Viability: 3 years, at least. Days to harvest: 70-80.

### MOON CALENDAR

All cultural practices including BD sprays in root, descending moon if possible. For seed replant cellared roots in Leo.

### ROTATION

3 years between crops; 6 years if leaf blight is prevalent.

### BD SPRAYS

Horn manure (500) before sowing. Silica (501) up to 5 times from appearance of true leaves to harvest. Equisetum (508) for blight, but well before its appearance. Valerian (507) late in root development. Later sprayings of silica can be applied in the evening for this root crop.

### COMPANION PLANTS

Peas, beans, chicory, endive, escarole, lettuce, chives, onions, leeks. Aromatic herbs such as rosemary, horehound, sage, catnip, lemon balm, and scorzonera help repel carrot fly.