Cultivation of the Dahlia

A Bolles Dahlia Booklet

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Cultivation of the Dahlia

by

CHARLTON BURGESS BOLLES

Media, Pennsylvania

Member The American Dahlia Society
and The California Dahlia Society

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CULTIVATION OF THE DAHLIA

CULTIVATION of the dahlia is comparatively simple. The tuber, or green plant, whichever is chosen, is planted six inches deep in April, May, June or the first half of July, in soil deeply plowed or dug, moderately, but never excessively rich. A generous handful of bone meal for each tuber may be safely added. The surface of the soil is kept free of weeds, and by a four inch deep stirring with hoe or cultivator drying out is prevented until blooming time, when cultivation should never exceed two inches in depth, because feeding roots are now near the surface. A top dressing of fertilizers once a week for improvement of blooms, during flowering, and the results are as certain as anything can be in horticulture.

Dahlias will grow anywhere. Vigorous and full of blooms they have been found rooted in a low mound of coal ashes. Of course, the best results follow when the soil and cultivation most nearly meet their needs. But they seem to be very satisfactory practically everywhere. In gravel, sand or exceptionally infertile soil the plants will grow slowly till fall, and perhaps only reach a height of three or four feet, yet producing many excellent flowers late in the autumn and a large and vigorous crop of tubers. In a deep, black soil, or a soil very rich in plant food, dahlias produce a veritable

jungle of growth, over six feet high, easily broken by high winds, especially if it is a wet summer, the growth becoming very tender.

The dahlia can be grown in any State in the Union although the early frosts of northern Maine, New York, and some other States make the season a comparatively short one, particularly so since spring comes so late where frosts are early in the autumn.

More fortunate sections of the country afford over seven months of growing weather from planting to frost. Around Philadelphia, in 1919 and 1920 some dahlia gardens were untouched by frost, and that without protection, until November 20. Reports on October 30 in 1920 from the District of Columbia, and from Maryland, showed dahlias blooming in unharmed profusion. A report from California December first tells of cutting a profusion of blooms on that date. In lower New Hampshire frost occurred October 9, in 1921, and on November 1 in 1920. On October 24, 1921, dahlias were still blooming profusely in eastern Massachusetts. November 2, 1921, brought the first killing frost in Michigan. October 17, 1921, dahlia blooms were flourishing in Ohio.

The average date of the last killing frost in spring, as recorded by the U. S. Department of Agriculture, is considered as the opening of the growing season for each State. Plowing usually precedes this date from 15 to 30 days. The occurrence of the first killing

frost in fall marks the close of the growing season. Nevada, Idaho, and Wyoming have the shortest growing season, only ninety days. Vermont, Colorado, and Oregon come next, enjoying but one hundred and ten days. Delaware, Maryland, and Virginia have two hundred growing days. North Carolina, Alabama, and Mississippi two hundred and ten days. California has two hundred and forty growing days, while Florida leads all the States with two hundred and seventy-five days. The average available growing season, in days, per State is: Maine 120; New Hampshire 120; Vermont 110; Massachusetts 145; Rhode Island 145; Connecticut 145; New York 150; New Jersey 180; Pennsylvania 140; Ohio 170; Indiana 180; Illinois 180; Michigan 130; Wisconsin 140; Minnesota 130; Tennessee 190; Alabama 210; Mississippi 210; Arkansas 200; Louisiana 220; Oklahoma 190; Texas 220; Montana 95; Idaho 90; Wyoming 90; Colorado 110; New Mexico 150; Arizona 180; Utah 120; Nevada 90; Washington 130; Oregon 110; California 240; Iowa 180; Missouri 180; North Dakota 100; South Dakota 120; Nebraska 140; Kansas 175; Delaware 200; Maryland 200; Virginia 200; West Virginia 180; North Carolina 210; South Carolina 235; Georgia 250; Florida 275; Kentucky 180.

Some garden lovers can hardly ever be induced to prune a bush, or destroy even a strawberry runner. It would be against nature to expect these delightfully enthusiastic folk (yet with a zeal not according to

knowledge), to delay their dahlia planting when the first sweet lures of the garden beckon in April. Yet there is not only a Spring, but a Fall of man. These Early Birds can joyfully and triumphantly cut their first dahlia blooms in late June. If a hot, dry spell follows these easy successes, and irrigation is neglected or impossible, flower buds blast; the foliage goes into an untimely sere and yellow; the stalk and branches "wood-up" hard and dry. Joy is turned into mourning. Bloom-bearing ends for that season, because the dahlia will only flower on soft, succulent, green growth.

Climate conditions averaging from season to season near New York and Philadelphia, allow farmers to sow oats on St. Patrick's Day, plant potatoes April 9th, and the first planting of sugar corn May 10th. The first killing frost, except in extreme lowlands, may not come until November. In such a climate and season dahlias should not be planted until the last week of May, and the tenth of June is still better. You will not get flowers as early, but you will certainly have more of them, and far finer ones, particularly in September and October, when the dahlia is at its best. Planted late your plants are younger when the hot, dry summer days come, and just as a vigorous youth can endure the heated spells with less likelihood of collapse, or other serious effects that would overcome an elderly person, strongly growing dahlia plants, because they are young, go safely and successfully through the trying, drouthy,

torrid days. The great labor of flower production has not been taken up. Autumn comes with invigorating coolness, the plants begin to bloom, as if sharing their grower's enthusiasms and ambitions, and they keep it up until Jack Frost ends the color harmonies with a suddenness that is always too soon.

The work put upon dahlia plants by their profuse flower production is tremendous, and the top fertilizing at blooming time, practiced by skillful growers, is designed to meet the plant's requirements. Yet it is believed that foliage and tubers exhaust the plant even more.

Of course, if one plants at all extensively, he should start the late-flowering varieties fairly early, and the early blooming sorts later. The fortunate possessor of land enough and dahlias enough can plant "early and often" and have a succession of blooming. If some plants fall scorched by the wayside in August their loss can be borne with a certain resignation.

In sections like the northern parts of the New England States, Central and northern New York, where killing frosts often come late in August, certainly early in September, dahlias must be planted much earlier in the spring, in some sections as soon as it is safe to do so. Inasmuch as twenty days are required for the sprout of the six inch deep tuber to reach the surface, planting can be done before the last spring frost has passed, if it is necessary, where the growing season is

very short. Tubers may also be started in a cold frame, or in the house, in such localities.

The beginner always asks why not plant early? Will not May planting give better results than mid-June? The locality is, of course, the deciding factor. Some seasons in parts of Maine the ground is frozen a foot deep when May begins, and the first killing frost is due with September. In some sections of New York grape culture is impossible, and peaches and pears cannot be grown because spring frosts persist so long, and September killing freezes are so early. Where the growing season is so extremely short dahlias should be planted as early as possible, and carried over the dry spells with judicious irrigation. In regions where abundant summer rains are unfailing, tubers can be set out any time from potato planting until July. Disbudded, top fertilized, the plants will bloom profusely until killed by frost. In regions where summers are dry and hot the early May plantings inevitably become hard and woody, so hard that the succulent new branches so necessary for the production of excellent flowers will not come out. In such localities June planting sends the plant into August young and vigorous. Judicious watering will usually carry the plant on practically unhurt into cool and safe September.

There are no fixed rules of course. Whether planted early or late, and no matter how often and how thoroughly the ground is cultivated, a fatal har-

Single Two Cactus

Two Fancy Decorative Show

Show Decorative

DAHLIA TYPES

MODERN DAHLIAS

Golden West, *Hybrid-Cactus*

Madame Marze, *Decorative*
Futurity, *Decorative*

P'ony Type
Decorative

dening of the plant tissues may take place, the plant stop growing during August if the season be not only excessively dry, but also hot, and the soil's humus content not large enough to hold sufficient moisture, and irrigation be impossible. In such an extreme condition the only remedy is to cut the plant down, leaving a stump with two leaves. If frost does not come until November you will have some fine flowers, for the plant has an elaborate, well-established root system, and can readily recover. Some seasons a month of blazing hot weather is followed by a long spell of rains. New strong shoots are likely to start up from the roots. When this happens it will certainly pay to cut down the old, drouth-damaged growth. Because the new shoots come from a ready-made vigorous root system they will grow like Jack's famous Beanstalk, and bloom in two weeks. Sometimes a dahlia plant here and there in the garden stops growing when six or eight inches high. The foliage keeps green but the plant remains a dwarf. One grower reports a treatment that with him has never known failure. The plant is carefully lifted, and the tuber thoroughly washed, replanted, and watered for a week. Cutting the plant down to the ground is easier, however, and thus early in the season, if watered for a week, it is likely to send up new and vigorous shoots.

As far back as 1839, in England, when Paxton wrote upon the dahlia, it had been discovered that the

soil could be too rich. He says: "It is a most fatal error to imagine that the flowers of Dahlias will be improved, or rendered larger, by being planted in a rich and highly nutritive soil; for instead of this being the case, they will expend all their strength in producing shoots and leaves, and the flowers will be few in number, and much impoverished; or they will be so rank and coarse, as to lose all that beauty of form which is so much desired in the Dahlia."

Heavy soils must be lightened, or few and poor flowers will be the result. One grower states that he put twelve (12) inches of coal ashes over every inch of his garden, which was composed of heavy clay. The ashes were forked in, not spaded, and a thick spread of stable manure applied. After that leaf compost was added each spring and limed to neutralize probable sourness. The resultant soil proved excellent for dahlias.

A number of experienced and competent growers do not recommend coal ashes, claiming they contain too much alkali, and injure the plants. Undoubtedly this is true concerning the ash of some coals. But such a medium for improving the mechanical condition of hard, heavy ground, is often the only one convenient for the home gardener, and has been used with excellent results. Adding the ashes to the garden little by little, through the winter, as coal is burned, might allow any soluble elements to be washed away by rains. The ashes are

not for fertilizer, and coal ashes are practically worthless as such. Their only function is to render hard soils loose and friable. Quantities of gravel and sand are to be preferred, but coal ashes have served many well. One grower in Colorado reports unsatisfactory and even harmful results from the use of coal ashes. He is sure that the coal used in his locality contains hurtful alkaline substances. At any rate the ashes are sufficiently corrosive to destroy the cement or brick linings of ash pits in a few years. He urges the utmost caution in the use of coal ashes, unless local experience has shown the practice to be harmless.

Because the dahlia is so wonderfully accommodating it does not follow that it will grow and flourish and profusely flower "if planted in any old kind of soil, in any old way, and cared for in any old way." In good, average, and particularly in rich garden soil no fertilizer should be used at planting time. The soil is fertile enough for luxuriant production of stem and foliage. The addition of fertilizers rich in nitrogen in the spring would mean too much foliage, and later disappointment, because of scarcity of blooms in the autumn. But be sure that your soil is right. It would be poor counsel to advocate the withholding of fertilizers at planting time everywhere. Every organism, vegetable as well as animal, must have nourishment, and some soils are extremely sterile. They have been worn out by many crops, with no returns of plant food, or they

are naturally lacking in most plant food elements. A very light soil will have much of its plant food washed out of it by rains in a few years, and fertility must be constantly renewed. The artist who said that he mixed his palette colors with brains is a model for gardeners. Treat the soil, and cultivate your plants, with the same incomparable mixture.

Anyone has sense enough to know that plants will do better in some soils than in others, and this is often the secret of Mr. A always raising better crops than Mr. B. Commercial dahlia growers receive letters from some customers praising the quality of roots sent them, because they grew so well. Other customers write dismal tales of ill-success, strongly flavored with hints of blame for poor stock sent them. Dahlia results depend a good deal upon the soil, and even in a field no larger than twenty acres there may sometimes be found five different kinds of soil. Soils are very much what the gardener makes them. A clay soil requires coarser manure and more lime. Any soil is greatly benefited by the addition of generous amounts of humus (decayed vegetable matter). Just ordinary soil, the soil you have, can be so treated that it will grow flowers that can win prizes at exhibitions. The soil most to be desired, the best soil, is a deep, loamy friable, open one; yet soil that retains generous portions of the rains, but with such good drainage that it will never become water-logged and actually drown out the plants by smothering

the roots. If it is excellent soil for corn or potatoes, and the drainage is certain, it is well nigh ideal ground. Dahlias abominate wet feet, and will not prosper if their roots are in sodden soil. Some growers prefer a stony hill, or a gravelly slope, knowing how important good drainage is. You will be fortunate if your soil is in good condition from previous enrichments and cultivations of growing crops. Such a soil is much better than one that has to be manured at planting time. Dahlias are naturally luxuriant growers, and are greedy users of plant food. Too much plant before blooming time means excessive foliage, but scant flower production.

A generous portion of your soil should consist of humus. Fifty per cent of average, ordinary soil is not soil at all, but air and water. If you can add only twenty-five per cent of humus you increase the air content and at the same time wonderfully increase its moisture-holding capacity.

Smash all the clods. The hard lumps, often almost as firm as if composed of lava, or burnt clay, cannot hold plant food in solution, and plant food must always be dissolved, for only when it is in solution can plants absorb it.

You cannot grow fine dahlias, or any other plants for that matter, year after year without the addition of animal manures, or at least of vegetable substances. Amateurs rush to the storekeeper for bone meal and

sheep manure, buying a few pounds each year. Unless you are among the happy and fortunate few who live on a farm, or "place," with a cow and a horse or two, start a compost heap. Do it no matter where you are. Pile up every leaf, never burn leaves; they are too valuable for that. Add lawn clippings, kitchen garbage (putting to one side the cutlery, silver spoons, and tin cans). Sods, weeds, should be included. Wet the pile down twice a month with hose or bucket. The older this compost is the better. It requires eighteen months to compost hardwood leaves thoroughly. In the fall, or spring, spread this compost over the garden and turn it under. The results will be worth dollars and will amaze you. As large a proportion as forty per cent of leaf mould, or home compost, can be added to the soil.

Before planting cut off the long, weak, white sprouts a quarter inch from the tuber, and throw the spindling shoots away. "There's a reason." If your storage was warm, a little moist, and if you are among the wise ones, and plant late, your tubers may have long sprouts. Generally they are white, literally enemic, unfit to start a struggle for existence; not sufficiently strong and vigorous to graduate into sturdy, fine plants. Cut the sprout off. Another and a stronger shoot will take its place, and invariably will be better. Those who grow mainly as a hobby, and are wishful of carrying off the first prizes at the dahlia shows, always discard the first sprout, no matter how short or how thick and promising it may be.

Now^r for the reasons. The tuber's second sprout is always a better one. That's enough reason. But the first sprout, unless it started in light, has been very seriously handicapped from the start. It is white. It shot up in the dark, and the green color of health and vigor is lacking. Without the green chlorophyll, which can only be formed in the presence of light, plant food cannot be organized and absorbed by the plant. The first step in plant food formation is the appropriation of energy from sunlight by the chlorophyll, which acts as a transformer of the sun light-energy. This light-energy having travelled 95,000,000 miles, is picked up by the plant, or rather by its agent, the green chlorophyll, and is used in taking the carbonic acid gas (carbon dioxide) out of the air, the water dissolved food substances out of the soil, the roots acting as collectors and canvassers for the plant. The entire plant food menu is digested, and recombined into foods (nourishments) for the plant cells, making a new plant by growth, and repairing wastes as the plant life progresses. All this has been absent in the puny, white sprout's existence. So cut it off. It's a poor thing. Incidentally, it may be here noted, we can understand the reason for planting far enough apart to allow plenty of light and air. Crowded, the leaves shut off light and air from one another. Plenty of light, free access of fresh, flowing air, is indispensable for growing the best dahlias, or any plants.

The distance dahlia plants should be from one another varies with the variety, and somewhat according to the purpose of the planting. In the home garden rows four feet apart, the single plants two and a half feet from one another in the row, is entirely suitable. A triangular group of three as nearly two and a half feet apart as possible, with a little space for light and air between them and shrubs or other mass plantings is an attractive decorative planting for the garden. Varieties catalogued as making very large plants should have four feet between each plant, and five feet will be better, if convenience of cultivation and easy access for cutting flowers is desired, and there is ground enough to afford such liberal spaces. If space in the home garden is limited, two feet apart in the row will do provided they are not crowded unduly by other plants on either side. Growers raising dahlias commercially generally have field rows about four feet apart, and drop the tubers at distances of eighteen inches to two feet in the rows, according to large or small growing varieties.

Dahlia gardens are sometimes failures, but they are usually the gardens of beginners. Every year growers receive indignant letters declaring the worthlessness of the tubers received. If it is a beginner that writes the letter you can depend upon it that the grower is not to blame. The most hit-or-miss planting and cultural methods have been used, and failure was a

[A] CLUMPS OF TWELVE AND THIRTEEN TUBERS

Photographed May 1, after successful storage in a home cellar at an average temperature of 45 degrees.
Exceptionally hard and plump. Small clump is "Sylvia." See Plate B.

[B] WELL WINTERED TUBERS DIVIDED FOR PLANTING
Group of ten tubers is from one clump of "Sylvia." Photographed June 1.

See Plate A.

foregone conclusion. More failures are due to too rich soil, than too poor soil; too early and too shallow planting; too much rather than too little water.

If your dahlia plants are tall, luxuriant, rankly growing, but bear few blooms, the soil is too rich, particularly in nitrogen, or they do not have sunshine enough, or they have too much water. Any one of these conditions is likely to result in poor and scanty flowering. Often the home gardener has allowed all three conditions to afflict his cherished plants. Of course, if he starts wrong, there will be disappointments all the way along to the bitter end. The tubers may have been planted too near the surface, in which case the roots will dry out during the fierce heats of summer. Plant not less than six inches deep, and always place the tuber upon its side, flat, sprout uppermost. If in doubt as to the sprout's starting point, lay the tubers in a little earth, in a box, or in the garden, anywhere, in a warm, sunny location. Keep the soil moist and in a very few days the sprout, if the tuber ever is to produce one, will show itself. Then plant, six inches deep, in its proper place in the garden.

It ought to go without saying that only one tuber, or one plant, is placed in a position. Yet multitudes of folks every season plant the entire clump that was dug the fall before, without dividing the tubers. Inasmuch as the average yield is thirteen tubers per clump, and twenty tubers are not uncommon, it does not require

much imagination to understand the plight of the poor plants. The crowded sprouts have neither room, nor food enough, and the gardener will have almost no blooms, poor plants, and weak, small tubers at harvest time. The field clumps must be divided into individual tubers before planting, using a strong knife, a chisel and mallet, sometimes a hatchet, taking great care to have part of the parent central stalk left upon the crown or bud end of the neck of each tuber. Dahlia tubers have no "eyes" or buds. The buds are located just where the neck of the tuber joins the main stem of the plant. This fact should be clearly understood, and is gone into at length in the chapter upon propagation, as is also the increase of dahlia plants by cuttings, a method which allows fifty, and even five hundred, new plants to come from a single tuber. Single tubers of the wonderful but expensive "new creations" may be purchased and many plants obtained from the one root. Growers use this method to increase stocks of rare and costly varieties.

There are many localities where dahlia success is certain if the soil be merely "tickled with a hoe." All the necessary conditions for dahlia plants are naturally present. They cannot help growing well. Other regions present natural adverse conditions, which have to be overcome. One grower whose immense plantation includes sand, gravel, loam, bottom land, and hills, has not failed of a harvest of blooms and of roots

for more than thirty years. Cultivation is the secret of his success. The soil is never allowed to cake and bake, dry out by capillary attraction to a hard, caked surface. Fertilizers are used in moderation; pinching back and disbudding are practiced.

A certain garden lover invited a friend and showed him with manifest pride one of the finest kitchen gardens it has ever been anyone's good fortune to look upon. There was a splendid plot of tomatoes, planted widely apart; the lima beans were carefully thinned, only four to a pole, the corn was spaced and thinned right, and everything was exceedingly flourishing and fruitful. Over on one side of the lawn were the dahlias, close to a wire fence marking the boundary of the property. The wire fence allowed light and air enough for the dahlias, and on one side was the smooth lawn. The dahlias were planted very close to the fence, and less than six inches from them, on the adjoining property, was a tangle of tall grass and weeds, greedily sucking up moisture and plant food from the dahlias by their far-flung network of roots. No attempt was made to keep up a dust mulch, and prevent evaporation from the soil surface of the precious moisture below. The gardener was justly proud of his fruitful, luxuriant vegetable garden, and knew why he had a right to be. He never would have reason to be proud of his dahlias. He may even believe that he was sold weak and run-out stock.

A neighbor bought some tubers to establish a row of dahlias each side of her front walk. It was a fairly new house, and the top soil, as is usually the case, was the last thrown out of the cellar excavation. The lot was graded, but this centuries-old hard pan, from six feet below the surface, formed the top soil for lawn and garden. She did not wish to spoil her grass, so the holes for the dahlias were little punctures, not over five inches across, and not any deeper. The tubers were choice, but one certainly felt sorry for them. The solid clay in which they were planted caked and baked almost as hard as a flower pot. At a time when the plants should have been luxuriant green bushes eighteen inches high they were poor, stunted six-inch things, doomed to absolute failure. Yet the house was equipped with copper water conductors throughout, because such fine equipment was known to bring the most satisfactory results. Ignorance concerning plant life, and lack of thought as to what a living plant might reasonably require, is all the more surprising when so much common sense is exercised in other directions.

First-year amateurs are likely to write the nurseryman a complaining letter because small tubers have been received. Yet dahlia tubers vary in size according to variety. Some dahlias, John Wanamaker, Perle de Lyon, Madame Marze, for example, produce large tubers. But the beginner, and even the amateur of several years experience, wants large roots. He seems

to feel that when he receives big tubers he is getting more for his money, and will have more vigorous plants, and that he is unfairly dealt with when the grower sends him small roots. Yet the grower cannot force nature. Among apples the Russet, and the Ben Davis do not reach the size of the Twenty Ounce Pippin. The Seckel pear never approaches the Bartlett in size. In fact a very large, a monstrous dahlia tuber, should never be planted. Many of these gigantic growths are two years old, and will continue to increase in size if planted. The food for the plant is drawn from the soil by the roots of this immense tuber and some of it is absorbed by the tuber, causing it to increase in size, instead of nourishing the growing plant above ground. Very few new tubers are formed for the next season's planting. The big tuber can be planted if at least two thirds of it is cut off and thrown away. One third, next to the sprout, will keep the sprout alive and nourish it until roots for the new plant form. The new roots will have to work for a living, a fine plant will result, with an abundance of blooms and a splendid clump of new tubers to be harvested.

One of the prominent growers in this country sends out with his roots this pleasant message: "If you have good luck with your dahlias tell me so. I like to know that you are pleased. If you do not succeed be sure to tell me that, for there is a reason, and I may be able to advise you concerning it." The reason will probably

center about cultivation. Cultivation is the secret of dahlia growing. This world is governed by laws that make no allowance for good intentions. Geraniums and dahlias almost seem exceptions to laws that have no exceptions. The truth is these two popular plants are long suffering and overlook neglect; "enjoy poor health" better than almost any other garden favorites.

In Sayers' "Treatise on the Dahlia," Boston, 1839, he writes, in the quaint style of the time: "There is no flower of such a decorating character as the Dahlia in its season; for whether it finds a place around the limited ground of a city residence, or the open exposure of the rural cottage, its brilliant flowers shine unrivalled and attractive to every observer; by the roadside it invites and cheers the wearied traveler, and in the city it gives a lively conception to every passer by." Sayers hits the nail upon the head when he adds: "The Dahlia adapts itself to more varieties of soil and location in favorable seasons than any other family of plants that claims so general admiration". As a proof of this, we find it flourishes in the impure air of the city equally as well as in the most salubrious air of the country. Nor does a different kind of soil act so materially on its well-being as on many kinds of plants, which are partial in their nature and will only flourish in their peculiar soil and location. But should the season prove unpropitious, the most unremitted and scientific exertions of the cultivator cannot counteract its effect on the flowering;

although in some cases good culture will greatly assist the process. The most unpropitious season to the Dahlia in this climate is a long continuance of drought in the months of July and August: for when this occurs the growth of the young shoots is impeded so that the flower buds cannot unfold and develop; but are impoverished in their embryo state in the shoots, which are naturally converted into a hard woody substance, in order to bear the extreme dry season. In this case it is not until the cool nights of the fall months that the Dahlia can make the proper shoots for flowering; and this often happens so late that the entire stalk is killed by the frost before flowering commences. The most favorable locations in such seasons are the borders of rivers, lakes, or large sheets of water, that afford a humid atmosphere in the mornings and evenings of hot sultry weather: for there is no plant of the flower garden that is more benefited by a humid atmospheric air than the Dahlia."

In 1922, 83 years after Sayers wrote, it is the judgment of experts that fogs are a help. By the seashore; or in a region of large ponds or lakes, the fogs, heavy dews, and general humidity of atmosphere are all immensely enjoyed by dahlias.

Cultivation gives three important results. It destroys weeds (other plants that are struggling for survival with the dahlia); it greatly improves the soil by admitting air to its recesses as the cultivation tools

stir it; and it provides a dust mulch. Every writer upon gardening refers to the dust mulch, and urges that it be kept up. There is nothing mysterious about it. It is the simplest, and about the most effective thing, in the world. The dust mulch is a layer of loose, dry soil, three or four inches deep, upon the moist, deeper soil. Where it is present capillary attraction is broken up and the moisture in the earth, placed there by winter and spring rains, is prevented from evaporating rapidly, and held in the earth-reservoir for the support of plant-life. The searching roots find it.

Weeds are a blessing in disguise. Were there no weeds human nature could be depended upon not to cultivate the soil to anything like the extent it is done at present. It is very important that air penetrate the soil. Plowing permits this, once or twice a year. Cultivation with hoe or rake introduces air, once or twice a week if, you wish. The eye can note the improvement to young cabbage plants twenty-four hours after they have been hoed. The success of the Chinaman with cabbages on the Pacific coast lies in his practice of walking around each plant twice a day. Presumably John Chinaman carries a hoe in hand. Give this Oriental treatment to your dahlias twice a week instead of the hose or bucket one. A splendid crop of dahlia blooms, and tubers, can be raised in any region of fair annual rainfall if a dust mulch is kept up without intermission. It is not only important to have the dust mulch, but it is just as important that it be kept up.

Cultivation commences when the tuber is planted. Then, if the dahlia grower, whether amateur or commercial, knows his business, the soil receives thorough preparation. It should be plowed seven inches at least in preparation for planting, and if this is done in the fall, and again in the spring, all the better for dahlias. Dahlias are deep root crops, and for fine tuber production, which is more than half the harvest, a loose, friable, deeply stirred soil is required. Two weeks after planting, since it requires three weeks for the shoots to appear, the soil surface can be stirred with a rake, to break up any tendency to cake or bake, and incidentally kill any weed seedlings that may by this time have started germinating. As soon as the dahlia shoots are through the ground, go over the plantation thoroughly. Never let a weed get so much as a start, and keep the surface finely pulverized. Just as soon after a rain as the soil can be worked, before it begins to show a smooth, dried-out appearance, break it up finely with hoe or rake. Clay soils will cake and bake very quickly with a few days of sunshine, after rain, and this hurtful condition cannot fail to be seen, and must be immediately remedied, if you have not been wise enough to have prevented it. In clay soils a rainy summer means the use of hoe or rake or horse drawn cultivator after every rainstorm, as soon as the water sinks sufficiently into the soil to allow tools to be used without becoming "gummed up" with the adhesive clay mud. In such

soils a ten days' hot spell is sufficient to dry out the soil to a depth of a foot. Test some neglected corner of the garden. The soil can sometimes be found to be dry as dust for a depth of twelve inches. Such a condition is destructive to all healthy plant growth, and must not be allowed if one desires dahlia blooms.

The value of the dust mulch is that it makes irrigation unnecessary. Artificial watering is very apt to do harm. Where it is not practiced, and the roots have to work for their living, and travel far and deep for water, more plant food is discovered by the roots, and the water supply is moderate, steady, certain, and according to nature. More hoes and less hose is the rule of successful dahlia growers. Keep the dust mulch going.

Dry spells the last of June, and any time, sometimes all the time throughout July and August, bring the danger of a sudden check in growth which is almost as disastrous to dahlias as to lettuce. If your plants seem to have stopped growing, and present the appearance of stunted, bushy dwarfs, less than a foot high, it is more than probable that their growth has been stopped. Too little moisture about the roots is the probable cause. Sometimes varying, intermittent moisture supply is the reason. A wet spring is followed by much rainy weather, and that in turn by hot dry days. Then more rain, followed by hot days, repeated several times in the course of a month. Unless the

soil has been constantly and thoroughly cultivated, thus regulating the moisture content of the soil, the poor plants have been alternately soaked in water and cooked in dry earth—an experience sufficient to ruin them for the rest of the season. The dust mulch greatly lessens the harm likely to be done by repeated extremes of weather, and if the dust mulch never fails the threatened check in growth can be prevented.

In August a surface mulch of stable manure, especially valuable if it is strawy, will keep the surface soil cool and prevent evaporation, and help the blooms whenever rains or irrigation wash some of the manure into the soil. Lawn clippings, spoiled hay, any litter that does not contain too many ripe weed seeds or plant diseases, or insect pests, are also excellent mulches.

Cultivation with rake, hoe, or horse drawn implement is the one rule that has no variation, and applies equally to every locality and to all climates. Conditions differ so greatly over an area as mighty as that of the United States, that few rules can be formulated that apply with equal force everywhere. As a rule dahlias should not be watered. Yet in the dry, cloudless seasons of parts of California irrigation is absolutely necessary, and in various other sections of the United States if overhead piping or hose facilities allow, judicious applications of water make the difference between exceptionally fine blooms or poor and indifferent flowers. Observe your plants carefully, note their

progress, learn to interpret their appearance, whether stunted and bushy; long, lean and lanky; bright, clean clear green in color (dark, or light, according to variety); or dull and yellowish as to foliage; buds blasting here and there. You can in time readily ascertain if your plants are growing well, are flourishing and healthy, or are backward and in a deplorable condition. Half-formed, one-sided flowers indicate that the plant has "bloomed itself out," or is starving. The application of fertilizers (a table-spoonful of nitrate of soda to a gallon of water for a quick-acting one) will make the plant vigorous if not too near the end of the growing season. If, in prolonged dry spells, despite a faithful keeping up of the indispensable dust mulch (or even of other mulches), your plants show unmistakable signs of needing water (yellowish foliage, blasting buds, slow, poor growth), apply water until the ground has been soaked for a foot in depth. This will require a large amount of water, and a good deal of time. Probably you have seldom watered anything so thoroughly. If you can adjust piping or hose so that a spray falls just sufficient to soak in as fast as it reaches the ground you are fortunate. Let the spray fall unceasingly for hours—until the ground a foot down has been saturated. Repeat this when needed (until weather conditions improve), but not oftener than once a week. More frequently would be decidedly harmful.

If your garden is dug instead of plowed so much the better. It is a rare plowman that goes down uniformly six inches, rarer still the man and the team of horses that will put the plow in seven inches. Yet dahlias require a deeply tilled soil. To the average amateur gardener to "spade up the garden" is a simple though muscle-tiring task. Probably, however, it will be that part of your gardening joys and duties that is done worse than any other. Hardly ever is a garden dug deep enough. It should never be dug less deep than the full depth of fork, or spade, or shovel—one spit the English gardeners call it.

If your garden is small, and if you really desire the finest possible flowers (and this applies not only to dahlias but to all other deeply growing plants), remove the top soil one spit, and then dig the subsoil another spit, letting in air to the hard, compacted soil, and return the top soil. This is not so difficult a task. Remove two square yards or so of top soil, putting it in a pile. Then dig the uncovered subsoil, without throwing it out. Start digging a fresh area, throwing the top soil upon the spaded subsoil section, and so on. When through throw your first pile of top soil into the last hole, and the work is done. If you have litter and miscellaneous compost to spare it can be dug into the subsoil, reserving the best compost for the top soil layer. Thus you lighten up the subsoil, allow the air to mix with it, and the litter you incorporate increases its water holding capacity, making more constant and less

varying the water supply of your growing plants. If you doubt this dig an experimental plot two spits deep adding some compost to the subsoil. Let this be next to an equal area dug only the depth of your shovel or spade. Cultivate the surface of each plot equally well, and in every other way treat the two plots the same. The difference in plants and flowers will convince you of the worth of deep digging. If you grow flowers for exhibition deep digging will be a necessity—if your fellow exhibitors practice deep digging, for only those plants growing in a deeply tilled soil will produce the prize winning blooms. If you dig deeply, if you keep the dust mulch going, you can plant where you please, and have prize winning blooms. Anyone can do this.

As to location—give your dahlias the choicest position in your field or garden. They deserve it, and no plant in your garden will respond more generously to good treatment, or produce such glorious blooms. Give the dahlias the favored spot, and the place of honor. Do not plant them in the shade. There are two or three named dahlias that will do well in partial shade. The exceptionally delicate varieties thrive better in partial shade, particularly if it falls upon them during the hot middle of the day. Exhibition flowers can be produced with a more beautiful texture and greater exquisite delicacy of color if protected from the fierce fading action of direct sunshine. The use of cheese cloth shading at blooming time secures such flowers

from plants that have, before flowering, developed well in unshaded locations.

Paxton, London, 1839, wrote: "The Dahlia delights in a position where it can constantly receive the vivifying and strengthening rays of the sun, from the time he issues forth in eastern glory, to the period of his setting below the western horizon."

Upon a small bit of land, like a town or city lot, it is often well-nigh impossible not to have some shade, from trees, or fence, or buildings, fall upon the garden at some hour of the day. If you have half a day's full sunshine upon your plant you can grow dahlias successfully. They will grow in half shade, and greater care of cultivation, fertilizing, etc., can be added by way of compensation. But do not plant them in partial shade if you have an entirely sunny location. Of course, tree-shaded positions, and bits of ground in the midst of vigorously growing shrubs, are entirely unsuitable. Such locations will not have enough sunshine and air, besides suffering from the appropriation of most of the plant food by the trees. If you have land enough be generous with it. Allow more space for the flow of air about your plants. Without sufficient air seeds cannot sprout, nor plants grow, nor vegetable and animal matter decay in the soil. Harmful bacteria cannot live in soils through which there is a good circulation of air. Tuber dry rot occurs in heavy soils, that are closely compacted, and not adequately aerated.

Disbudding and pinching back is a part of cultivation. Larger and better flowers are produced, by the one, and stockier plants with an increased number of bloom bearing branches, by the other practice. Pinching back comes first in time. Pompons are naturally dwarf growing, and bushy, and do not need it. The peony type, mostly, also grow bushy, and need not be pinched back, unless one desires very low-growing plants. But the other types, decoratives, cactus, single, are improved by pinching back, unless they are designed for tall, mass effects, in ornamental designs, when they are very effective carefully staked, along borders, or in group planting here and there, against suitable backgrounds.

If you have many plants, and the location is a windy one, the considerable labor of staking and tying up can be avoided by forcing the plant to branch below ground. The increased branches in such case are like so many additional stems, bracing the plant, anchoring it to the soil, and rendering it almost proof against any storm of wind and rain. To accomplish this, when planting your tubers (six inches deep, of course), cover with not more than three inches of soil. When two, or if you wish, three sets of leaves have formed, pinch out the terminal leaf bud, and as the plant grows fill in the hole or furrow. The lowest branches will be joined to the central stem underground.

Right way

PLANTING

Plant six inches deep, sprout uppermost.

Wrong way

TAGGING IS IMPORTANT

Preparedness in the matter of tags cannot be too much emphasized. There is no reason why you should not know your dahlias by name, and it is embarrassing to a genuine garden lover not to be able to answer the queries of visitors who come to admire his blooms.

The self-respecting and careful gardener will have legible tags, strongly wired, attached to plants, or stakes, before harvest time. As the end of the growing season approaches he will go through his garden and be sure that each tag is accurately identified with the plant it represents. Slender wire will be replaced by strong copper or galvanized wire. In many cities, and at amusement parks, slot machines may be found that for a cent or two will punch names in raised letters on strips of aluminum. Such tags are ever-lasting, can always be read, the soil that may become attached to them in storage piles can be rubbed off in a moment without injuring their legibility in the least, and they cannot rust or decay.

You may cover your tubers six inches deep when planting, if you prefer, and when two or three, or even four sets of leaves have formed, (the earlier the better), pinch out the central, terminal bud of leaves. Many of your plants thus treated will become stocky, bushy, sturdy, with vigorous and strong branches for flower production. Some of the longer and stronger growing branches can also have tips pinched out if you wish. Tall growing varieties will be reduced about one third in height, and most storms will pass over them without harm. Indeed, it would be an unusually severe wind that could do them damage.

If you wish each individual plant to be the best possible plant, and its blooms as fine as the plant can produce, allow but one plant, (stalk), to a place. A tuber is more apt to throw up two or more shoots than only one. If you cut a prematurely started sprout off when taking the tuber from storage, you are almost sure to have two shoots take the place of the wisely removed first sprout. Dahlias are energetically prolific. As soon as the strongest shoot can be determined cut off the others below ground, and if any reappear remove them also. Thus you will have a single but extremely sturdy plant. An additional advantage is the orderly and vigorous growth of the tubers. Where three or more shoots are allowed to grow each shoot tends to develop its own group of tubers. These underground groups of tubers compete with one another for plant food, for

space, and crowd each other so much that at harvesting time, digging reveals an immense clump of only moderately sized tubers, tangled together hopelessly, sometimes tuber united to tuber near the base of the different shoots in a thick fleshy mass. You may think you have an extra tuber harvest, but at cutting-up time in the spring you will be otherwise convinced. In order to separate as many plantable (or salable) tubers as possible the thick root masses must be chopped through with hatchet, or separated by saw and chisel. Crown bud (eyes) will be crushed, damaged, or destroyed. Far better one, or at the most, two strong stems during the summer. You will have better tuber production, and more of them can be safely separated for sales and planting. Many growers allow two stems if they are strong. Undoubtedly more blooms are secured, and if you desire flowers for private enjoyment rather than exhibition or sales of choice blooms, two stems will please you entirely — and you will probably permit the two stems the first year or two of your dahlia growing. After that if you buy the more expensive sorts, and some of “the latest creations,” you will no more think of allowing two stems to a place, than of allowing your neighbors’ cats or dogs to use your dahlia plot as a promenade.

Disbudding is the removal of some of the profusely produced flower buds in order to allow the buds that are left an opportunity to develop into the finest and

largest possible flowers. Some varieties produce so many buds that the plant would be quite unequal to the great work of bringing all of them to anything approaching satisfaction as to form and color and size. Pompons and single dahlias do not require disbudding. John Wanamaker and Princess Juliana must be constantly disbudded.

Usually, although not always, flower buds are produced in groups of three, and almost always the central bud is strongest and best. Allow the flower buds to develop until they are as large as peas; by that time it will be clear which bud is the finest. Pinch off the other two. Looking down the branch, from the bud that is left, either now, or somewhat later, shoots will be observed starting from the branch in the axils of the leaves (at their union with the branch). Many of these shoots will eventually produce groups of three flower buds, while in some cases only one flower bud will start. These buds can be pinched out, leaving but one bud to a joint, as they appear. Or, if you desire that the first bud mentioned, the terminal flower bud of the branch, should develop into a superb flower, that you can cut with two or more feet of stem, remove all of the lower shoots as fast as they appear. This permits the branch to devote all its sap and energy to the production of one splendid flower. The beginner, if he has but a few plants, will prefer more and smaller blooms, to few and perfect ones. If one is fortunate enough to have

one hundred plants, or more, he should disbud severely by all means. For exhibition blooms not more than three or four flowers are ever allowed a single plant, often only one.

There seems to be a feeling with beginners that pinching back plants, and disbudding, are difficult matters, not easily understood or practiced. But it is as simple as can be. Once understood and actually done one wonders that there ever should have seemed anything difficult or obscure concerning such practical operations. It would be a good plan for the beginner to buy, along with his other first planting of tubers, a dozen low priced sorts, such as many catalogs list at ten cents each, or one of the dollar "Collections" containing twelve to twenty mixed, unlabelled, tubers. These can be planted by themselves, and used as a practice plot, some to be pinched back, some to be moderately disbudded, some kept to only four flowers, as though for exhibition blooms, some let severely alone, except for the cultivation of the soil; a few might be extra fertilized "within an inch of their lives;" and the tuber sending out the largest number of sprouts could be allowed to grow them all, as a "horrible example." In his first season the beginner could thus give himself a liberal education in dahlia culture, comparing actual garden practices and results with all that he has read or been told. Let him tell himself at the start that his low-priced collection of plants are to be merely subjects

for experiments, and then treat them boldly and fearlessly, knowing that mistake or failure only means knowledge gained, not loss. The thoughtful care these set-aside plants receive would result in surprisingly fine flowers, for while the varieties cost little in money, and would not be the "latest creations," they would be dahlias that were counted among the favorites of yesterday, and all would be beautiful and desirable. The absorbed attention the beginner would give his experimental plants would quicken his powers of observation, and he would learn in this way, in a single season, what less careful growing might not teach him in several years. A pocket note book should complete the equipment. Put down everything — planting dates; (start the experimental plot as early as possible, and plant every two weeks for experiment and succession of blooms); last spring frost, first killing autumn frost; dates and number of rain falls, and of cloudless days; dry spells, when, how many, and how long, and temperatures, with record of cultivation given during such periods; date of first flower bud appearance, of blooming, and if you have time, actual count of blooms produced per named variety, with note as to amount of disbudding practiced. The mere writing down of all this information is apt to fix it in the memory, whether the notes are consulted afterwards or not, and the effort to record many details wonderfully enlarges observation.

Devote a section of the note book to questions that arise while actually at work in the garden. Answer these questions yourself as far as possible by thinking about your plants, by reading catalogs and garden magazines and books. Form a local dahlia society, or join the nearest one; take your note book to the meetings; contribute your first-hand information, and ask your questions. Buy a few of the many excellent books upon gardening. Subscribe, of course, and without fail, to at least two garden magazines, and carefully file them. They furnish a liberal education in horticulture in the course of time. The publishers sometimes print a complete index annually. Probably quite as useful would be making a card index of what is of particular value and interest to your personal garden plans. In this index should be entered magazine articles, with date including the year, page, number of illustrations; chapters in books that you can consult, but do not buy; reference to your miscellaneous clippings, that can be filed by subjects in envelopes, or better still in the ordinary and very convenient commercial letter file. The writer has taken, at one time, a dozen farm, garden, and poultry periodicals, and never failed to obtain from each, in actual, practical, money value a great deal more than the subscription cost. Two publications he recommends unreservedly: The Garden Magazine, Doubleday Page and Co., Garden City, L.I., N.Y., \$3.00 a year; The Flower Grower, Madison Cooper, publisher, Cal-

cium, N.Y., one year, \$1.50, three years, \$3.50. If one is interested in general farming, even sympathetically and without a farm, a good farm paper makes delightful reading, and always contains much of value to the home gardener. Farm atmosphere, farm point of view, are wholesome. The Rural New Yorker, 333 West 30th street, New York, \$1.00 per year is invaluable. The weekly Hope Farm Man's Notes in this publication constitute a moral bracer and a mental tonic unique among such publications. The Farm Journal, Washington Square, Philadelphia, five years \$2.00, two years \$1.00, one year fifty cents, is excellent.

The beginner should write early in January for catalogs, study descriptions, make his selections and send his orders not later than February fifteen. Orders are accepted in rotation, and disappointment is avoided, for of late years growers have sold out many varieties surprisingly soon, so rapidly is the dahlia increasing in popularity, no flower more so. In this year of grace 1922 the dahlia is the flower of the greatest public favor in America. The Golden Rule also dictates early ordering. Dealers are swamped with delayed orders late in the spring, making much hardship for them and their assistants.

Open the package containing your order as soon as it is received; check up your order from the duplicate you made. Now is the time to correct errors or omissions, if any, as far as it can be done from the labels.

Complaints have been justly made that some dealers are extremely careless, and that they also substitute without the customer's permission dahlias other than those ordered. Be sure and state in your order whether you will accept substitution or not. If your order is late time will be saved if you allow substitution, and the grower, if honest, will send full value in other varieties, if sold out of those you order. Tubers wrongly labelled can only be discovered at blooming time. If your disappointment justifies doing so return the label to the dealer as proof and ask for credit of the desired variety for the next season, or your money back. This may be also done concerning tubers that never sprout. Sometimes it is almost impossible to be sure at shipping time that a fine looking tuber has an eye on the crown end of the neck or not. Out of a stock of thousands of the most carefully inspected roots some are likely to prove "blind." You may happen to receive one of the roots without a bud. No reliable grower sends such roots out intentionally, and will always make good upon receiving his label and a letter stating the facts. If your just complaint is ignored, or not satisfied, see that future orders of yourself and friends are transferred to another grower.

Having checked up your order do not store it in some dry, warm place, expecting the roots to be in excellent condition at planting time. Many tubers have dried out and died when so treated. Thoughtful

Ready to be disbudded

After disbudding

Clumps must be split apart

Two-year old tubers. Discard two-thirds of each one before planting.

flower lovers who keep winter growing house plants put a box of excellent, sifted, soil in the cellar before the ground becomes frozen. If you are not so supplied obtain earth or sand, preferably earth, moisten it until it is crumbly, but not wet, and place your unpacked tubers in it, upon their sides, sprout (eye) side up as far as you can determine this. Use a top layer of four inches of earth, and store in a cool place, but one safe from freezing, until planting time. If you do not plant for a month or more inspect the box occasionally, lest the soil dry out. A little water can be supplied, if necessary, to prevent total dryness.

Tubers should be planted six inches deep, flat, upon their sides, not placed vertically. The entire tuber must be down in the deep, moist soil. This is one of the greatest protections against drying out in hot weather, with resulting stunting of growth, and withholding of blooms. The feeding roots for the new plant are formed where the sprout starts, and it is very important that they be deep in the soil, for from them are developed the tubers you expect to harvest. If you planted the tuber vertically, with its base at the bottom of the hole or furrow, the end containing the sprout would be very near the surface and you would have a poor plant, few flowers, and fewer tubers.

If you elect to be among the wise, late planters, your tubers will have started sprouts in almost every instance before being placed in the garden, thus making

plain which side should be laid upwards. The sprout will grow into a fine plant if it is not planted pointing upwards, just as potatoes do, but the most careful growers have always made every effort to place the sprout side uppermost, and their practice is worthy of consideration. When the sprout is underneath the tuber and has to turn about to make its way to the surface the stem is naturally longer, and the turn makes a more confused growth among the tubers, and renders broken necks more likely when dug.

Twenty-one days are usually required to bring the sprouts above ground, after the tuber is planted. In a dry season a longer time may be needed. Some varieties seem exceptionally dormant; tubers naturally thin-skinned dry out more than others during winter storage; and a longer time in the ground is needed for them to wake up. Excellent plants have often come through the ground forty-five days after planting.

The Irish have a helpful proverb: "What's natural cannot be desperate." The dahlia beginner and amateur should take it to heart. Some dahlias flourish in certain regions and soils, while fifty or one hundred miles away they are failures. Melody (the decorative), is such a variety. This is the "natural" condition under which one has to try out the alluringly advertised and truly wonderful and beautiful newer varieties. Change of climate, excess of food and irritation, are the three main factors producing change and variation in

plant life. When dahlias are moved from their happy California home, for example, to the sterner realities of existence found in the eastern United States, it is not at all surprising that they sometimes disappoint the expectant grower. But the dahlia is amazingly accommodating and willing, and if frustratingly homesick the first year, will often cheer up during the second season and do itself as proud and seem as much at home as if on the Pacific Coast. California grown tubers that disappoint eastern growers the first year often become well acclimatized the second season. Failure the first summer should not discourage any one. Carefully harvest the tubers. The next year may bring success.

For the older sorts, that are still exceedingly desirable, the beginner has the advantage of catalog descriptions, written after years of experience. When a sort is recommended without any reservations, as an unfailing bloomer, adapted to any and every soil, it is pretty safe to invest in that variety. In fact, since it does take "one voyage to learn," the beginner should gain his first-hand dahlia experience with varieties that are approved as reliable anywhere. Often growers recommend "Collections." The beginner cannot do better than buy these. All his attention can then be devoted during his first year to straightforward growing without the vexing distractions of "shy bloomers" and other dahlia idiosyncrasies. Varieties warranted to be certain bloomers and sun-resisting are excellent

for the beginner. Countess of Lonsdale, Mrs. Charles Seybold, Hortulanus Witte, and Mrs. J. Gardner Cassatt are such. Any good catalog will mention others.

The beginner had better stake his plants. The experienced amateur, with a plantation of choice varieties, containing from fifty to fifteen hundred expensive sorts cannot afford to allow his plants to be unsupported. Such a plot, in scores of cases, so devoted are modern dahlia enthusiasts, represents not less than \$500, often more than \$1,000. Growing so luxuriantly, with a large hollow stem, many very succulent, easily broken branches, and a mass of foliage affording winds opportunity to exert strong pressure, dahlias are always better staked. Commercial plantations covering acres, of course, cannot be staked. But the home gardener should support his plants. Procure strong stakes at the start, and they will last for many years. They can be stained or painted green. A large plot, not a part of the ornamental garden, can be staked with cuttings from pasture or wood lot, about half the height of bean poles, and the effect is seemly. In particularly ornamental groups of dahlias, in the forefront of the garden, iron rods are excellent, being strong and inconspicuous. They may be obtained in quantity for about twenty cents each. Five and a quarter to five and a half feet is a good length, twelve to eighteen inches being driven into the ground.

Driving the stakes in the holes or furrows before laying down the tuber is a guarantee against damaging the root in any way. But if the supports are driven soon after the plants are up, and are not placed nearer than four inches little injury is likely to be done. Strips of cloth make tying material that cannot hurt the plant. Good sized soft bundle twine will do, and may be collected during the year from the packages of the family shopping. Twine and string of small size is hardly suitable, as it will cut into stems and branches. Do not tie tightly about the stem; allow for growth.

A single season will demonstrate the advantages of staking. Rains, plus the whipping effect of winds, lessen the supporting value of the soil about the plants. The stalk of unstaked plants will be found growing out of a hole two inches or more in diameter by mid-summer. Then the August or September "corn breaker" will come along and its strong winds will break the stems from the roots and tubers, seriously checking the growth of the plant, and quite possibly killing it. In one instance two-thirds of a large plantation was ruined for the season by an early August storm.

A strong staking arrangement can be made with two laths. Drive them into the ground ten inches apart, the plant between them; each lath slightly sprung outwards is an advantage. Wire the tops of the laths together, making several inches flat contact. Leave one wire end long enough to attach the label. If one works

alone a small monkey wrench, or a bicycle wrench, is helpful in holding the lath tips together for wiring.

There is no objection in taking advantage of a wire or paling fence for the support of dahlias. If there is plenty of light and air on either side the plants may be set only two feet apart, if hiding the fence is desired. If you cannot cultivate both sides of the fence plant ten inches away from it and cultivate a strip of ground twenty inches wide.

Dahlia enthusiasts living within easy distance of saw mills, planing mills and carpenter shops equipped with power machinery, will find it worth while to visit them often. Trimmings, odds and ends accumulate now and then, according to the work in hand, and sometimes can be purchased cheaply. Make your visits at least monthly the year round. Those happy amateurs who grow half a thousand to a thousand fine varieties might obtain fence pickets. There is a woven wooden picket fence manufactured, the pickets about the length of a lath, but five times as strong, and pointed at one end, exactly right for dahlia stakes. They could be purchased without the wire in quantity. Several growers could unite and purchase advantageously, and probably through any large hardware and woodenware store, whose trade catalogs would furnish manufacturers' addresses. One careful grower saturates the driven end of such stakes with creosote, not only to preserve the wood, but to prevent fungus growth about

the wood, which, he thinks, might spread until it injured his tubers. He also takes the prevailing direction of winds into account, so placing his picket stake that the plant is pushed by the wind against the stake, instead of being pulled away from it. This lessens the probability of tying material being broken by the strain.

The roofs of many modern houses have their shingles nailed upon strips that come in bundles twelve feet long, the strips being about one inch by three inches. Cut in half these strips make admirable dahlia stakes, and are fairly low in price as lumber comes nowadays.

In the East common opinion seems to be that growing dahlias in California is one bright, flawless round of joy and success. Yet a notable grower says: "Don't you believe that we can grow dahlias in California without lots of attention. I think that down here in the sunshine dahlias require more care than in the East, because we have to water them, and then they bloom so freely that they have to be disbudded, and the dead flowers have to be cut constantly."

In fact, Californians have much to contend against. In 1919 there was a long period of cool, cloudy weather, succeeded by intense heat. Many plants were killed by the great change, and others were set back fully thirty days before continuing normal growth.

In Southern California tubers planted in February and March begin blooming in May, and are at their best in midsummer. Green plants can be set out until July

fifteenth, and carefully cultivated, will produce fine blooms in the autumn. Irrigation is essential, preferably the furrow system. A furrow each side of the row of plants has the water turned into it for nearly ten hours, a moderate flow, allowing the soil underneath the plants to become thoroughly soaked. Hoeing, raking, cultivation in some form, must follow the water as soon as possible each time it is used. Bone meal is sprinkled throughout the furrow after the water subsides, and is covered with soil.

Pests seem rampant in California. Red spiders, aphides of all sorts, mealy bugs, and ants abound, besides thrip, not to mention blight and mildew. Poultry will keep down some of the insects, while overhead spraying for several hours without letup will entirely put an end to the insect troubles. But this has to be done when the daily temperature is 100 in the shade, and between 120 and 130 in the sunshine. The flowers are inevitably injured, but would be utterly ruined by insects if the spraying was not done.

Then there are several dahlia climates on the Pacific coast. Dry air is the general menace, from the south, to as far north as Seattle. San Francisco may be said to be perpetually shrouded in sea fogs, but Oakland, directly across the bay, has more sunshine. Only twenty miles distant, San Mateo and San Rafael regard a fog both as a curiosity and as a good fortune. Monterey, Del Monte, and some other places are foggy. The labor is exclusively Japanese.