

American
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THE AMERICAN HORTICULTURAL SOCIETY, MOUNT VERNON, VIRGINIA 22121 (703) 768-5700

April, 1975

Dear Member:

One of my earliest acts as newly elected AHS President is to thank you personally for your involvement in the Society and to ask for your continued participation in the future. In recent years, we have witnessed an astonishing growth in membership as we tapped a rich and seemingly limitless pool of nationwide interest. We are now in an enviable position of influence in the horticultural, gardening, and environmental field. However, our new prominence is not without challenge, particularly if we are to convert the dream of the National Center into a reality. I need your support to help strengthen the Society's programs and activities.

Many members, although new to the Society, seek ways to become more fully identified with the National Center. An Ad Hoc Committee, formed during the 1974 Horticultural Congress, has recommended courses of action for all of us -- Officer, Director, member and friend.

Every sector of our nation faces inflated costs and fiscal uncertainty. These restraints not only hamper our programs, but threaten the security of the River Farm property. In the past, we have relied on a few generous foundations and individuals to help us overcome our transitional growing pains. These appeals continue, but your help is also needed if the Society's activities are to be expanded.

We estimate that the first stages of our development program will require \$125,000 -- a realistic goal that is well within our reach. Every member of the Society is being called upon to aid AHS in a time of real need.

Please give as generously as you can. Contributions may be sent to AHS headquarters and are income tax deductible.

Sincerely,

Henry M. Cathey

Henry M. Cathey
President

Society Establishes Friends Program



Members of the American Horticultural Society are invited to become "Friends of River Farm" — Dues \$25.00 per year (tax exempt contribution).

The purpose of the "Friends" is to refurbish and equip A.H.S. Headquarters so that our historic mansion can be made available for a fee for receptions, garden club meetings, flower shows, horticultural lectures, botanic art shows, and other educational programs. These events will provide the Society with much needed financial resources to help develop River Farm into a national center for all American horticulture.

Throughout the year, "Friends" will be invited to attend a series of special events. The first "Friends Day" will be Sunday, May 4, 1975, from noon to 6:00 p.m. at River Farm. A Dutch Auction and Plant Sale will be featured. Educational gardening exhibits and demonstrations are also planned. The highlight of the afternoon will be a "Bull Roast By The River" with liquid refreshments available. Appropriate musical background will be provided.

All "Friends of River Farm" are invited to bring their spouses and children. The bull roast is \$3.00 per person. Please complete the coupon below if

you plan to attend our first "Friends Day." Make your reservations now. Admission by ticket only. Reservations cannot be accepted after April 21.

Note: We expect the event to sell out before the closing date.

Membership Form

I wish to become a "Friend of River Farm"

- \$25.00 enclosed.
- I will attend the first "Friends Day" on May 4, 1975. Please make reservations for _____ persons @ \$3.00 per person. *NOTE:* open to "Friends" and their family only.

I enclose \$ _____ Total

Name _____

Address _____

City _____ State _____ Zip _____

Contributions are income tax deductible. Please make checks payable to A.H.S. Friends. Send remittance along with the completed coupon to:

The AHS "Friends" Committee
c/o The American Horticultural Society
Mount Vernon, VA 22121

Plant People Alert

Your gardening skills are needed in your community to make 1975 the most productive and rewarding growing season in the history of our nation. We inhabit every zip code mailing district. We know what can be grown in every community. Each of us will have opportunities to help novice gardeners initiate gardening projects. Many of these new plant people have never spaded a garden plot, foiled an insect, or had the pleasure of sharing the fruits of their labors with friends.

Without precise information and continuing encouragement, the inexperienced gardener will not be able to cope with troubling leaf spots, flower drops, stem rots, and insect intrusions. This must be the year to redouble our efforts and show others the benefits of plants, planting and greenness.

Indications are that 1975 will see attempts to grow more plants within our living spaces than ever before. The benefits to the individual, the family, the community and the nation are far greater than the simple projected savings in food costs. Gardening creates aesthetic enjoyment, provides healthy exercise, and produces a feeling of physical and mental well-being. The rewards of backyard ecology and community horticulture to the environment are many.

For gardening projects to succeed, every plant person must give his community a helping hand during the approaching growing season. It's easy to learn your neighbor's gardening plans for 1975, particularly if you identify yourself as someone who is planning his own garden. One remark usually turns on a flow of questions. Which vegetables are easy to grow? How much sunlight do tomatoes need? How can I grow lettuce on the balcony of my 18th floor condominium? Is there anything other than grape ivy that will grow in my kitchen window? Where can I rent a plot of land to grow a small vegetable garden? How do I get rid of cutworms? Is it alright to mix flowers with my vegetables? The questions

are endless.

The questions must be answered.

This issue of the *American Horticulturist* contains resource articles for advanced gardeners to use in their educational endeavors with novice gardening friends. One article suggests fool-proof vegetables to plant in aluminum foil covered plots. These gardens allow for a maximum utilization of light and moisture with little or no cultivation. The emphasis is on the selection of a few kinds of vegetables and flowers requiring a minimum of care for a productive growing season. We also outline a plan for a vegetable garden. A suggested 10' x 10' plot is duplicated here to become a permanent resource for future years.

It is important for us to remember what the new gardener faces. He will be tilling soils that have not been used before for growing plants. Trees that were traditionally producers of cooling shade will suddenly become monsters which block the sunlight from the garden patch and soak up precious moisture from the ground.

A visit to the local garden center may produce more problems for the novice. "What type of gardening tools do I need? What type of fertilizer do I use? How safe is "Brand X" insecticide? Do I really need that plastic combination weeder, watering can and post hole digger?" Even after seedlings appear the novice is still faced with questions: "How often do I water? When do I thin and pinch back, when to pick, how to prepare, to preserve, to store?"

Many organizations are ready to help the novice gardener. County agents, garden centers, garden clubs, arboreta, nurseries and florists are all organizing educational programs throughout the USA. But there are still the thousands of new gardeners who will be reached only through individual contact. You, the advanced gardener, can help these people because you are the mainstay of the gardening community. —HMC

For United Horticulture . . . the particular objects and business of The American Horticultural Society are to promote and encourage national interest in scientific research and education in horticulture in all of its branches.

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OUR COVER PHOTO—Tomato Seedlings by Allen Stoner, Research Horticulturist USDA, Beltsville, Maryland.

Growing Dahlias



Clarence G. Phillip

506 N. Oak Street

Falls Church, Virginia 22046

General Habits and Growth

The dahlia is a native of Mexico and Central America, on mountain slopes at altitudes of 4,000 to 8,000 feet, growing in ledges and limestone bluffs or lava beds. The growing season is long, the days hot, the nights cool. During the early summer, there is little rain, but later in the summer and early fall, there are almost daily thunder showers. Some varieties are found in the steaming jungles of Honduras and Guatemala. These varieties are vine-like in nature. The dahlia, in botany, is a member of the *Compositae* family, capable of self-pollenization. Most dahlias grown today are crosses, or hybrids, of several other varieties. For this reason seed from named dahlias will not produce the same blooms as the parent, but will be a mixture of the color and characteristics of its forebears. Therefore, it is necessary to plant a root or a cutting of a particular variety in order to have flowers of that variety.

Sources of Plant Stock

Dahlia stock is derived mainly from the roots that were planted the year before, the whole clump being saved over the winter. New plants are obtained by dividing the clump so that a sprout, or eye, is maintained on each division. This root is planted directly to the field, or if desired it can be propagated to secure several green plants. This method is most used by dahlia growers to obtain more plant stock of a particularly desirable or valuable variety. Propa-

gation is done by putting the root in a greenhouse bench, or where no greenhouse is available, in a pot or flat filled with sand or soil around the first of March. The pot or flat is then placed in a warm light place and the soil kept slightly moist. The sprout on the root will begin to grow. When it has two pairs of leaves, it is cut off about $\frac{1}{16}$ of an inch from the root. The sprout is then dipped in a rooting medium to produce roots. Then it is potted in a 3-inch pot and permitted to grow until planting time. Where the sprout was cut from the root, two more sprouts will begin to grow, which are removed by breaking off, and more sprouts will continue to appear. In that way it is possible to get 6 or 8 good plants from a single root.

Another method of obtaining plant stock is by growing dahlias from seed. Seed can be obtained from any commercial grower, and is usually available in specific plant type, such as seed from large decorative or cactus dahlias, or from miniatures or pompons, etc. The seed is planted in flats from March 15th to April 1st. When the seedlings are 2 or 3 inches tall they can be potted or placed about 2 inches each way in a flat. The plants can be set out any time after the first of May. It should be emphasized that this latter approach is something of a hobbyist's method because you don't know what kind or color of flowers you'll have and a good percentage of the plants will not produce satisfactory flowers. This method, however, is the way most new introductions are

produced.

Soil and Garden Requirements

Dahlias can be grown anywhere, in any type of garden soil, in any site where they get at least six hours a day of sunlight. No special type of soil preparation is required, other than that needed for any other flower or vegetable. In general, the same type of preparation and site that will grow good annuals, sweet corn or tomatoes is ideal. If you are starting a new bed, or if you have a heavy clay soil, it would be a good idea to add a shovelful of sand or compost to the soil where the root or plant is to be placed.

Planting Roots

The large flowering dahlias should be planted about three feet apart in rows three to four feet apart. The stake should be set first at planting time. To drive a stake down later in the season may damage the roots and impair the quality of the flowers. The miniatures and pompons and other small flowering varieties can be planted two feet apart. A three-foot stake will suffice in most instances for the small dahlias, but the large dahlias need a five or six-foot stake. For the gardeners who do not like the conspicuousness of stakes, try planting your dahlias around your yard. Plant a few next to a fence, or in front of a tall hedge, or along a garage wall, on the sunny side. Plant the small dahlias at ends of rows in the garden, in the back of a rose bed, or among the iris. There are many ways dahlias can be used



Princess Beatrix



Maris Schnugg



Wm. Jeffries



Michele Gunn Browning

to enhance the general beauty of your yard.

After the stake is set, loosen up the soil with a shovel and dig a hole 8 or 9 inches deep, mix some sand or compost in the bottom and add a small handful of superphosphate (if manure has not been used in the initial preparation).

Plant the roots (with good live eyes) about 5 to 6 inches deep. If you have good loose soil where drainage is not a problem, cover the root with an inch or two of soil, covering in the hole as the plant grows. If you have a heavy clay soil, which holds water after a shower or heavy rain, it would be better to plant the root about 4 inches deep and cover level with the surrounding area. This will prevent water from standing around the root and rotting it. Be sure to keep the soil loose over the root, as crusting of clay soil may prevent the sprout from coming through.

When to Plant

Dahlias can be planted any time after danger of frost is past. Shows begin in September, and dahlias have better color when nights are cooler, thus, most exhibitors plant after the 20th of May. Some fast blooming varieties such as Arthur Godfrey, Pride of Parkersburg, Juanita, Barbarossa, and Sherry, can be planted as late as June 5th for good blooms around September 15th.

Pinching

Around the middle of June, your plants should begin to show size and strength. By then they will have 3 or 4 branches, with 3 leaves on each branch. At that time, the center stem above the top pair of leaves should be pinched out, or broken off. A good time to do this is after a rain, when the plants are firm and erect. This pinching is done to en-

courage vigorous side branching, and should be done on every dahlia regardless of type.

Disbranching and Tying

After the center pinch is made, the side branches which you note will come out at the axis where the leaf branch begins, will soon be shooting out in all directions. As soon as the plant gets large enough to require support to remain upright, a loose tie should then be made, taking care not to pull the plant too tightly to the stake. This method of tie should be made whenever it appears necessary to keep the plant upright and keep the branches straight.

By the middle of July or early August, the large flowering varieties will be about 3 feet tall, and have a number of branches from the main stem. On each of these branches in turn will be several pairs of leaf branches with a new branch coming out at the axis of the leaf branch and the terminal stem. After four or five nice straight stems are selected on the large dahlia plants all of these branches forming at the leaf axis should be cut or broken out. This is done so that the strength of that branch will go to the flower bud which will form at the top of the branch. On the medium-flowering dahlias, seven or eight branches can be shaped up in this manner. This disbranching method is not necessary on the small-flowering dahlias. You want them to become bushy to obtain as many flowers as possible. It is common to have 30 to 40 blooms on a miniature or pompon dahlia.

Disbudding

By early August, three buds will appear on the ends of branches that you tied to the stake. As soon as these buds are large enough to be

safely handled without causing damage, the two side buds should be removed, leaving the center bud. One of the side buds you removed is a leaf bud; if you discard the other two buds and save that one, the stem will grow another foot or so, and form three more buds. This is often done when necessary to time blooms for a show.

If you save the other side bud, you will find the bloom will form about 4 or 5 days later than the center bud bloom; and the stem will get a little longer on some varieties. For this reason, it is always best to use the center bud, unless it is damaged by insects. The small-flowering dahlias do not need disbudding. Exhibitors showing small-flowering dahlias generally trim off side blooms or branches when readying the blooms for the show. On large dahlias, disbudding is practically a must. But it's easy, takes only a few seconds, and pays off in much finer blooms.

Cultivation and Fertilizing

After your plants have started to grow, the only cultivation necessary is the sensible practice of keeping the weeds down, and the soil loose, the same as you would do for any other garden crop. All working of the soil within 18 inches of the plant should stop after August first, because dahlias are very shallow rooted, and the roots may be cut or damaged by cultivation. Mulching the beds with straw or leaves, helps keep the soil cooler and the weeds down.

Fertilizing is a relatively simple matter. Once you begin to grow prize-winning blooms, you will develop your own ideas as to fertilizer. For good results, if you can obtain manure, work it in in the early spring, at least a month or six weeks before planting. Dahlias, whether

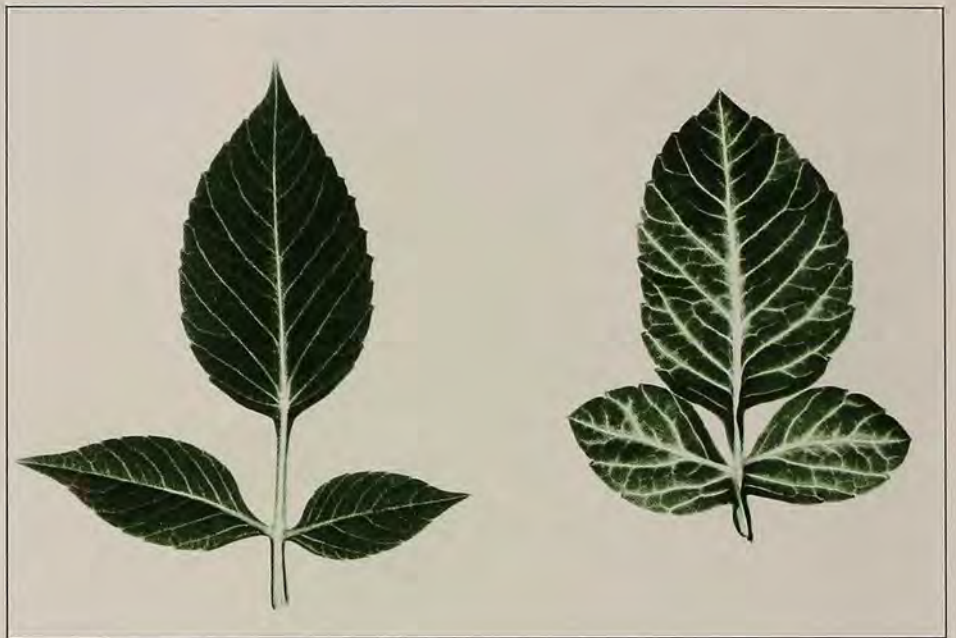
manure was used or not, should be side-dressed around August 15th (use 5-10-5). From that date, no more fertilizing is necessary on the small-flowering dahlias, but the large-flowering plants will benefit from two more side-dressings with 5-10-10, working it lightly into the soil under the mulch. Be careful about the amount you use; it is very easy to over-fertilize with commercial fertilizer, resulting in burning the roots and stunting the plant. Use only about 2 ounces, or a small handful, for the first two side-dressings, spreading it around the plant. The latter feeding on the large-flowering dahlias can take about as much as a 3-inch flower pot filled $\frac{2}{3}$ full.

Water

Just sufficient water to keep the plants growing is all that is necessary until the buds are formed. After the bud is formed, the plants can be watered heavily once or twice a week; twice is best. Do not water frequently and lightly, always soak with one inch of water. Dahlias are shallow root makers, and in a period of drought, these roots will be seriously damaged.

Disease Control

Diseases of the dahlia are relatively few, and should not be a serious problem in any new dahlia planting. The two most harmful diseases are mosaic, which manifests itself in a stunted appearance of the plant, with elongated blister-like swellings on the top leaves; the other is ringspot, which is easily discernible by a small yellow ring appearing on the leaves throughout the plant. If either of these diseases appears, the best thing to do is to pull the plant out and get it out of the yard, since the disease can be spread to other plants by insects. Both dis-



Healthy dahlia leaf on left. Dahlia infected with mosaic virus on right shows discoloration along leaf veins.

eases are root-borne, and the roots of a diseased plant will produce a diseased plant the next season.

A word of caution: do not be too quick in pulling out plants that appear to have mosaic disease. Sometimes insect damage, or fertilizer burn, may produce symptoms that look somewhat like mosaic. It's recommended that you ask an experienced grower to look over your plants before deciding to dispose of them.

Mildew may occur in a dahlia planting during cool evenings and heavy dews. It is noted by the typical gray residue appearing on the leaves. A good preventive is to provide circulation of air around the plants. One practice is to pull off the bottom row of leaves, so that there is a space of 8 inches to a foot of clear space under the plant.

If mildew does occur, it is easily controlled with a light spraying of

any of the most recent fungicides recommended for the control of mildew.

Insect Control

The dahlia is a hardy plant. Generally, any spray program that you may be using on other plants in your yard will suffice for dahlias. Pesticide use is regulated by state laws. Consult your nearest county agricultural agent (Extension Service) for information on uses permitted in your area.

The most serious pest on dahlias is red spider, which occurs usually during the summer and fall. The leaves of a plant infected with red spider will first show a slight yellowing, and as the insects multiply, the leaves will turn more yellow and have a reddish tinge. The lower leaves are affected first, and gradually the entire plant will yellow and die. Pull off a leaf that is turning yellow, and looking on the underside of



Removing lateral buds to produce a larger terminal bloom.

the leaf, you will notice a tiny webbing, and with a magnifying glass, you will see swarms of the tiny insects. During hot, dry weather these insects spread rapidly from one plant to another.

Early in the summer before the temperature reaches 90 degrees a light dusting of sulphur is a very good control. After hot weather arrives, sulphur cannot be used, as it will burn the plants.

The stem borer is an insect that appears during late May and the month of June and may cause some concern. These insects live over the winter in a larvae state in old weeds, grass, and other plant debris. When the warm weather arrives, the larvae soon outgrow the host plant and leave it to search for better living quarters. Nothing suits its fancy more than a young dahlia plant. It will drill a hole in the stem and usually crawls inside and up towards



Dividing the root. Note that root is removed from the clump with care taken to include the eye.

the top of the plant, or into a branch.

Its presence is indicated by the sudden wilting of a branch. You must get rid of the borer if you wish to save the plant. One way to do this is to find the point of entry (usually a small hole with a little residue around it). You can then slit the stem on that side—being careful not to cut across to the other side—upwards until you find the borer and take it out of the plant. This removal will not do lasting harm to the dahlia.

Exhibition

When cutting dahlias, either for exhibition, for your own home, or to give to friends, a few simple precautions will do much to enhance the lasting beauty of your flowers. Some dahlia blooms, if not conditioned properly, will break down quickly due to loss of moisture in the petals. If possible, cut only flowers that are fully matured. Cut

in the early morning, or in the evening after the sun goes down. If planning to take your blooms to a show, or somewhere that will require taking them out of water for a period of time, the blooms should be cut the evening before, and placed in cool water overnight. Do not submerge leaves that you expect to show above the top of your container, as they will turn black if left in water any length of time. Some growers scrape the lower three or four inches of the stem before placing in the water.

Digging and Storing Roots

Your dahlias will continue blooming until they are killed by frost. Sometimes an early frost will burn off only the top portion of the plant. Do not disturb them at this time. The roots will continue to mature while any part of the plant remains green.

When the plants are finally killed off to the ground, you can begin digging the roots. The danger in delaying your digging is that the heavy freezes, or snow, make it impossible to dig before your roots are frozen or water damaged. The plants may be cut off, and the roots left in the ground for a week or 10 days to cure, but if you do cut off the plant and you find hollow stems, it would be well to use aluminum foil or some other matter to plug up the stems so water cannot get down into the crowns.

Remove the stake, and cut all around the clump with a shovel, about a foot from the stem. Then put your shovel under the clump, and lift it out and lay it to one side. It should be remembered that at this time dahlia roots are very turgid, and break easily, so handle the clumps with as much care as possible when digging.

Some Recommended Dahlia Varieties

LARGE (SIZE A)

Arthur Godfrey—Flame
Mrs. Hester Pape—Dark Red
Lavengro—Lavender
Kidd's Climax—Pink and Yellow
Blend
Surprise—Semi-Cactus—Pink
Lula Pattie—White
Alfred C—Semi-Cactus—Orange
Croydon Renown—Dark Pink

MEDIUM (SIZE B)

Edna C.—Yellow
Windlassie—White
Juanita—Dark Red
Mrs. A. Woods—Lavender
Orchid Princess—Semi-Cactus—
Light Blend, White & Lavender
Shawnee Dream—Semi-Cactus—
Dark Pink
Sterling Silver—White

SMALL (SIZE BB)

The Queen—Semi-Cactus—
Lavender
Doris Day—Cactus—Dark Red
Lion's International—Dark Pink
David George—Dark Red
Yellow Pride—Semi-Cactus—
Yellow
Poise—Semi-Cactus—Bicolor,
Red and White

MINIATURES

Ruby Charm—Cactus—Red
Gem—Lavender
Decoy—Flame
Billy—Cactus—Yellow
Paulie Pal—White
Wiggles—Cactus—Orange
Johnny Casey—Cactus—Bicolor,
Red and White

POMPONS

Small World—White
Carole Newstead—Yellow
Little Matthew—Dark Red
Poppet—Orange
Little Willo—Purple
Andrew Lockwood—Lavender
Pom of Poms—Light Red



Leave the clumps right where you dug them for at least three hours before handling again. Then break off the surplus soil, and take them into the basement, or wherever you plan to store them. Let them lie out in the open for a week or ten days. Then the roots may be wrapped in some newspaper and placed in a paper carton, or a bushel basket, and placed in as cool a place as possible, where it will not freeze.

It is recommended that the tubers be checked every few weeks throughout the winter. If the roots appear to be too moist, or a grey mold is beginning to appear, unpack the containers and lay the clumps out in the open until they dry off a little. If the clumps are dry and the tubers are beginning to shrivel, sprinkle water on them.

In April, bring the clumps out, as they should be showing sprouts (or eyes) at this time. Using a clipper, or a sharp knife, divide the clumps so that you have an eye with each tuber.

The tubers may be placed in flats and covered with peat moss, and on sunny days, the flats may be set out in the sun. Be sure to take in at night to avoid freezing. The garden should be prepared as soon as the

soil can be worked.

Some dahlias produce large tubers—others must be purchased new each year. Label every plant to keep track of persistence or loss.

Some commercial dahlia growers who publish a catalog or descriptive price list

Pennypack Dahlia Garden, Stanley Johnson,
Cheltenham, Pa. 19012
Ruschmohr Dahlia Garden, H. Dewey Mohr,
Rockville Centre, N.Y. 11571
Blue Dahlia Gardens, G. Kenneth Furrer,
San Jose, Ill. 62682
Forest View Gardens, Rt. #3, Box 136,
Fairmont, W. Va. 26554
Rocky River Dahlia Gardens, E. J. Wind,
Columbia Station, Ohio 44028
Nat C. Lundgren, 123 Wood Street, Santa
Cruz, Ca. 95060
Almand's Dahlia Gardens, 2541 West Ave-
nue 133, Sar Leandro, Ca. 94577
Erikson's Dahlias, 667 Raleighwood Ave-
nue, Eugene, OR 97401
E. Ray Miller's Dahlias, 167 N.E. 12th
Avenue, Hillsboro, OR 97123
White Dahlia Gardens, 2480 S.E. Creighton,
Avenue, Milwaukie, OR 97222
Lakeside Dahlia Gardens, Arthur Simpson,
Rt. 2, Carbondale, IL 62901
If you are seriously interested, join the:
AMERICAN DAHLIA SOCIETY,
163 Grant Street, Dover, N.J. 07801

Americans need not feel “guilty” about fertilizing their lawns and gardens. Although some publicists have assumed that the fertilizer used in urban America somehow dooms people in far off lands to food insufficiency, the facts indicate otherwise. Release of the little non-farm fertilizer used here at home could hardly make a difference where famine is really a threat. Yet it does a whale of a job in making our cities and suburbs habitable.

In the last decade America has donated some twelve billion in “seed money” to foreign lands, always with the promise that the recipients will then become self-sufficient in food production. Yet, today the world is less well fed than ever before! Sometimes the programs backfire (they undercut local efforts); sometimes they are impractical (socio-economic factors interfere); and even when helpful, an increasing population usually outdistances the gains. What is badly needed is a balancing of population with resources, and not further cosmetic treatments.

Only infrequently is lack of fertilizer the limiting factor to food adequacy. Most often, the experts tell us, absence of a commodity marketing system in underdeveloped lands makes it economically unfeasible to increase production much beyond the subsistence level; the cost of fertilization cannot be recovered. In other cases lack of water, lateritic soils, non-adapted crops, pests, ignorance of fertilizer technology, or any of many other causes restrict food production. Fertilizer is best employed in the technologically advanced agriculture of temperate climates. Technological farming may not even be appropriate in overcrowded, tropical lands, and sometimes can initiate environmental

Let's not fritter fertilizer

*Dr. Robert W. Schery**

**Director, The Lawn Institute
Marysville, Ohio 43040*

degradation. One can't assume that American methods are everywhere applicable, nor that the energy inputs required for mechanized farming are practical where the ill-fed mostly dwell.

Yet the benefits to American society from the little fertilizer used to maintain plantings under stringent urban conditions are very real. Of course the spirit is buoyed by growing things, and our surroundings become more attractive. But be-

yond this, city plantings refresh the air, recycle noxious substances, ameliorate temperature extremes, and enhance the environment in many subtle ways. Without turf, there is costly siltation; without shrubs and trees, much noise pollution; without ornamentals, stark landscaping and adverse psychotics! Are we to forego all of this in exchange for a fanciful hope that somehow the meager amount of non-farm fertilizer used in the United States can correct food imbalances worldwide?

Let's not fritter away our fertilizer needlessly, either at home, or on stop-gap measures that are hardly corrective of food inadequacies in distant lands. The more humane course may be to insist upon local corrections sooner rather than later and to recognize that our increasingly scarce domestic resources cannot be called upon unendingly for worldwide programs. For example, though natural gas is now insufficient in America to meet demand, enough is flared uselessly in far parts of the world to furnish double the world's requirements for fertilizer nitrogen.

Actually, insufficiency of fertilizer is often more a matter of cost than availability. The worldwide fertilizer deficit amounts to only a few percent (and this is destined to disappear shortly as more facilities come on stream). Fertilizer generally does become more available when the market price is met. Some countries cannot, or refuse to, pay competitive prices for fertilizer. But seldom are they reticent to spend on armaments.

Lowering America's horticultural standards by abandoning fertilization of our lawns, gardens, parks, and recreational grounds is neither an effective nor desirable way to succor the world's ill-fed.



PITY THE BLASÉ GREEN THUMBER. HE'LL REAP BITTER FRUITS.

Henry Mitchell
"Earthman"

The Washington Post

Recently I was painting an inside wall with vermilion paint and reflected on the difficult, austere, stony path we gardeners tread, as distinct from those who paint and acquire instant glory out of a can.

No wonder, I reflected, that people like paint and furniture and rugs and glass (preferably kept distinct and not all spattered together) because the results are immediate and it does not take five years to perceive that on the whole it was a mistake.

In gardening, on the other hand, it can take a century to convince you the avenue of oaks should have had an initial spacing of 75 feet between acorns.

Some will say, well, we rarely plant avenues of oaks, and that may be true. But the point is valid, all the same.

It is only after some passage of time that the beauty of a garden becomes apparent, even if it is a beautiful garden; and it is only after a few years that a nonbeautiful garden shows its greatest faults.

Since this is so, I will never understand why some people agonize considerably over what sort of furniture or car to buy, when one is as good as another, and when no chair, no Cadillac, no Ford is going to get any grander with the years.

And yet sometimes gardeners, who are dealing not with the inconsequential fripperies of the parlor or the highway but with living plants (the major element of Eden, you will remember) take extremely casual views about what is to go in the garden.

"I was thinking of a persimmon," they will say, "but the nursery didn't have any when I was out there, so I got a shadbush."

Great leaping lizards, as a philosopher once said, what kind of decision-making is that? It is like saying, "Well, I thought I'd marry Ethel but she didn't answer the phone so I married Phoebe."

As we know, Ethel is probably no more remarkable than Phoebe—one would do as well as the other—and yet one is shocked at anyone who does not at least carry on a little in making the choice.

The persimmon and the shadbush—each is a small tree of great beauty, worthy of a choice spot (as prim garden writers are fond of saying) in any garden. It's not that the gardener always makes the wrong choice, it's that so often the gardener makes no choice at all. That is sad.

The primary task of garden-making is deciding what plants to grow and how to relate them to each other so the total effect is better than anyone would have supposed.

In comparison with that difficulty, the culture of the plants is hardly worth thinking of, since (to put it in a nutshell) they either grow or they don't.

When people have babies they do not sit up all night saying maybe the baby won't live. No. Common observation shows that babies tend to live, despite occasional terrible exceptions; and common observation should convince anybody that plants also tend to live, at least to their allotted span, without the gardener's getting into a swivet.

Why do some gardeners get endless pleasure from their gardens, while others get so little? Why do some gardens strike us as delightful, though there may not be any rarities in them, while others strike us as a bit lifeless, even though they may be packed with costly oddments?

The secret of the pleasure-giving garden is that there the gardener has either consciously or unconsciously followed a couple of cardinal rules.

Never plant anything you don't go wild about, merely because you think it would be good to have some. As an example, I greatly dislike the shrub *Kolkwitzia amabilis*, or "beauty bush," and this is not merely because of its revolting name of beauty bush but because I flatly do not like its routine foliage, its routine bloom texture, its routine lack of fragrance, its simple-minded endlessly reliable sheaves of pink bloom (I have not found anything wrong with its color) and its general lack of distinction in habit of growth.

I mention this because the *Kolkwitzia* is generally a favorite of almost all good gardeners. Many consider it a truly first-rate shrub.

My prejudice against that shrub is doubtless irrational, since many of my objections to it are equally true of lilacs and mock oranges, some of which I admire almost without reservation.

The point is not really whether my notions of the *Kolkwitzia* are reasonable, but whether I really feel them.

It is important for me as a gardener to get to the bottom of the question: Do I really like or dislike a shrub? Have I really considered all aspects of the plant before coming to a conclusion? Most of all, do I really know how the plant behaves in the garden?

In the case of the *Kolkwitzia*, yes, I have carefully observed it at all seasons over some years, and yes, I know all the arguments in its favor. I dislike it all the more.

Therefore, I should not grow it, and of course I do not, though St. Luke and a cloud of angels vouched for its merits.

The reason the absence of *Kolkwitzia amabilis* from

my garden is so fine is that I know I dislike the plant, and I know it is not there because I would not have it there. This is quite different from the absence of *Magnolia sargentiana robusta*, which is missing because I suspect it may not be hardy and cannot find a source for it even in California and because I do not (in any case) have room for it.

Two missing shrubs, then: one missing deliberately, but the other missing only because I cannot manage to have it. There is a great difference there.

There is an equally great difference among plants that are present in a garden. Is a certain rose present merely because it was easily available or (even worse) because it is a great rarity and hardly any other garden has it? Or is it present because the gardener has made it his business to survey the entire world of roses and come at last to say, "Yes, 'Mme. Gregoire Staechelin' is worth growing even in my own garden."

Again, let me remind you it is not all that vital whether the rose is "worth growing" in any absolute, provable, abstract sense. What counts is whether the gardener has given the matter such thought as he is capable of, and has all the roses pretty well straight in his head, not floating around up there willy-nilly.

As we all know, sometimes we fall in love with a plant willy-nilly—without knowledge, without discernment. Love at first sight, love without knowledge, is not always a mistake in gardens. But as a general rule, the pleasure of the garden is likely to be more intense, if the plants are chosen with enormous care, truly reflecting what the gardener believes to be the very best.

There is only a little, at best, that can be learned about gardening in a lifetime, and even that little may be conveyed to others only with difficulty and only at the risk of seeming to be talking about nothing at all.

To sum up, in case anyone has not been paying sharp attention here: There is no substitute for thinking about your plants, there is no substitute for learning what one can about them (as time, energy and brains permit); there is no substitute for making clear firm choices once you know what you love, and once you have some real grounds for loving, and there is no substitute for planting the things you get excited about; there is no substitute for refusing to grow anything you do not believe to be beautiful.

If these precepts are properly mastered, you will enjoy your garden with a pleasure of exceptional quality. If you do not, on the other hand, you may well miss the chief excitement of the whole business.

Chrysanthemums for Everyone

Walter S. Greene

Vice President

National Chrysanthemum Society

The pleasant young lady awaited my reply. I was flustered. At last it had happened. For years, I recalled, a frequent joke among my sophisticated green thumb friends concerned the lady who asked the local garden center for chrysanthemum bulbs. Surely no person could be so uninformed. It was merely a jest.

After further thought, I met her inquiry for a source of bulbs with my own question. "Would you really like to grow chrysanthemums and do it without bulbs?" "Yes, yes," she smiled.

This incident continued to concern me. I suspect there was a time when I did not know whether chrysanthemums grew from bulbs. There may be many gardeners who do not know about the culture of chrysanthemums. Perhaps I should try to create a desire on the part of every gardener to grow this versatile plant.

Bloom Form

The ancestor of the cultivated chrysanthemum we grow today was probably *Chrysanthemum indicum* Linn, a native of Eastern Asia, with a bloom resembling our native daisy. Through the efforts of many growers in selecting and breeding, the modern plant has been developed. The chrysanthemum as we know it does not occur naturally anywhere in the world.

A member of the family *Compositae*, the bloom consists of many little flowers.

The little flowers in the chrysanthemum bloom may be of two types which may be illustrated by the familiar daisy. The prominent eye of the daisy consists of little flowers, known as disk florets. The disk florets are perfect flowers having both male and female organs. The tubular disk florets are usually much shorter than the strap-like ray florets arranged around the periphery.

The ray florets, usually flattened may also be tubular or spatulate in outline. They are imperfect and contain the pistillate parts only.

The basic chrysanthemum bloom is the single, having one row of ray florets and a prominent disk. When the ray florets are arranged in more than one row and there is also a prominent disk, the bloom is classed as a semi-double. If the center disk is the most prominent part of the bloom with the ray florets playing a minor role, the bloom is an anemone.

The incurve and reflex types are nearly globular in outline with no visible disk florets. The ray florets of the former curve up and inward, while the florets of the reflex curve down.

The small popular pompon is also globular with short, firm ray florets. Decorative is another bloom type with flat ray florets and a flattened rather than globular outline.

Three bloom types with tubular ray florets are recognized. One is the spider which is characterized by distinct hooks at the distal end of the floret. Its disk florets are hidden. The quill is similar to the spider except that the ends of the tubular florets are not hooked but pointed. Spoon is a third bloom type with tubular ray florets. The ray florets are spatulate at the tips and there is a distinct central disk. The two remaining types are known as brush (or thistle) and the lacinated. Comparatively few of these last two types are in commerce, and their names are fully descriptive.

Size and Color

The National Chrysanthemum Society, Inc., USA, recognizes five color classes: yellow, white, purple-pink, bronze-orange, and red. Attempts to develop a blue shade have not been successful. A number of cultivars have been introduced which have a greenish cast. These are regarded as shades of white.

Bicolor blooms are not uncommon. The color is determined by the color of the uppermost side of the floret. In some tight incurves where only the underside of the floret is presented to view, the color may appear as



ss Atlanta
 Single Bloom Type—1 row florets



Frolic-Pompon Spray

orange or bronze. By bending the floret down, a beautiful shade of red may be seen.

The variation in bloom sizes in chrysanthemums is amazing. The so-called florist standard, one bloom to a stem, is produced by pruning all side branches during growth and removing all flower buds except one. When this style is grown, only one to three stems are usually produced per plant. Reducing the number of stems on a plant helps to increase the bloom size. Optimum nutrient and moisture conditions also assist in producing blooms of unusual size. The genetic heritage is the major controlling factor however. Some gardeners with a desire to experiment have discovered that growing a single stem on a bush or garden type plant which normally has many blooms two inches in diameter, results in a plant six feet tall. To their dismay the plants produce only a single bloom, still on the order of two inches in diameter.

Tiny pompons with flowers small enough to pass through an engagement ring may be observed growing in the shadow of a giant spider whose outstretched florets could hide a basketball. These sizes are extreme. The common garden chrysanthemum usually has blooms two to three inches in diameter, while the disbuds average six to ten inches across.

Blooming Season

The chrysanthemum plant is endowed with a number of built-in regulators. With the approach of the shorter days in autumn, the plant is induced to initiate and develop flower buds. Researchers have established that the chrysanthemum is photo-periodic, responding to light as well as to darkness. The number of hours of darkness required for the maturation of flower buds has been pin-pointed.

Generally speaking, when day length decreases to 14½ hours or less, the development of the flower bud begins. This development continues to the point of full

bloom, provided that the length of the days continue to shorten by at least another hour.

Commercially, tremendous use is made of the effect of long nights on the chrysanthemum plant. The industry annually produces millions of plants and blooms for our enjoyment at all seasons of the year. This feat is accomplished by artificial means. When the plant has reached a desired age, it is shaded with a black cloth to simulate a night-time condition.

All chrysanthemum cultivars do not respond equally to the same number of short days-long nights. Some cultivars may require a period of 56 short days while another cultivar may need as many as 77 short days. The former cultivar is then placed in the so-called 8 week response group while the latter is assigned to the 11-week group. The actual range for all chrysanthemums is much greater than the examples given here, although the great bulk of commercially available cultivars fall within this range.

The response to day length is an important factor for the new grower of chrysanthemums to consider when selecting cultivars for home use. This is especially true in areas where early frost may damage the plant prior to bloom maturity. The beginner should select cultivars with an 8 or 9 week response unless some measure of protection against weather conditions is available. Many advanced growers in the more northern states resort to the use of temporary shelters. These shelters are constructed of suitable framing material covered with transparent plastic. Heaters are sometimes necessary for nights when the temperature falls below freezing.

Depending upon the climatic zone, one may expect



to see naturally grown chrysanthemums in bloom anywhere between early September and late December. The chrysanthemum has become synonymous with the advent of autumn and is a favorite bedding plant in parks, playgrounds, and public areas of many cities.

Plant Forms

Through selective breeding, the chrysanthemum has produced many bloom forms and a variety of plant types. The training and control of some plant forms is made possible by the chrysanthemums' ability to produce side branches which arise from the leaf axils. The removal of the growing tip is a stimulus for the development of side branches.

Another stimulus to induce branching is the development of a flower bud early in the season which often aborts. This type of bud is common to the garden hardy varieties. There are also self breaking, low spreading, cushion types used for landscape purposes. The free branching, free flowering types used in the garden for cut flowers, may appear with any of the various bloom forms and grow within a great range of heights. Many cultivars are suitable for pot culture and may be grown either with one or more stems to a plant.

A number of cultivars of Japanese origin are grown by bonsai enthusiasts. These cultivars, in the hands of skilled gardeners, become highly attractive examples of the art. The most spectacular form for a single chrysanthemum plant is the cascade. It requires many hours of labor to produce an 8 foot plant three feet wide, completely covered with hundreds of small blooms. Although Japan is usually the place to witness this style of plant



art, there are many individuals in this country who produce outstanding cascade specimens.

Columns, topiaries, hanging baskets, and tree forms are some of the many other forms which the versatile chrysanthemum may be made to assume.

Cultural Requirements

To do its best, the chrysanthemum requires at least 5 to 6 hours of daily sunshine. Good drainage for the plant's shallow root system, in a soil with a high proportion of humus is essential. The soil should be slightly acid. To conserve moisture and reduce weed growth, a mulch of bark, straw, pine needles, and seed hulls or similar material is helpful after planting in late spring.

Pests and Disease

We know of no insect in this country that considers the chrysanthemum as its exclusive host. Aphids, various species of leaf hoppers and an assorted number of caterpillars including cutworms and the cabbage looper are the insects most often encountered by the chrysanthemum. Some cultivars hold an attraction for rabbits while others are prized by cucumber beetles.

Several types of fungi producing discolored areas in the foliage may appear. The ever-present garden mildew is occasionally found on chrysanthemum foliage. The florets of the bloom may also be attacked by a fungus which causes brown spots that may spread until a beautiful specimen is completely ruined. These diseases develop when unusual moisture conditions prevail or when proper air circulation is not provided.

The control of the various pests and diseases is no great problem. The customary insecticides and fungicides effective against these pests when they attack other plants also work for the chrysanthemum.

Propagation

The propagation of chrysanthemums may be carried out by dividing old clumps into individual rooted stems or by rooting cuttings. Rooted cuttings are made by placing the terminal two or three inches of new growth in a rooting medium.

Media for rooting should have some moisture holding capacity as well as providing good drainage. A mixture of sand, perlite, and peat moss is most often used. The most rapid development of roots takes place in 10 to 14 days when bottom heat near 70°F. is provided. Light and moisture are essential. A plastic covering will help maintain a humid atmosphere. Light may be supplied by a wide spectrum of fluorescent tube indoors or, if warm enough, outside, indirect sunlight is most beneficial.

The use of rooted cuttings rather than root divisions may result in sturdier plants of uniform size. For those who do not wish to propagate their own plants there are many local and mail order nurseries supplying excellent rooted stock in the spring or early summer. Horticultur-

ists may consider themselves fortunate if they reside in a locality where there is a chapter of the National Chrysanthemum Society. Many of these chapters hold annual plant sales in the spring and offer a wide selection of high quality plants at modest prices.

Fall Flower Shows

To view the very best and the newest in chrysanthemums, one must attend a show devoted entirely to the "Queen of the Fall Flowers". These shows, exclusively for chrysanthemums, are sponsored by local chapters of the National Chrysanthemum Society, Inc. Nearly fifty shows are held annually to provide an opportunity for growers to demonstrate the results of their horticultural efforts. The exhibit of blooms and the distribution of publications stimulates an interest in a most rewarding hobby.



Rocky Mountain Horticulture



is different

“Just what makes it so different?”

First, and fundamentally, the Rocky Mountain area has limited rainfall (usually under 12 inches). This affects all other horticultural conditions. It not only necessitates additional irrigation to grow most ornamental plants, but produces low average humidity that drains the moisture from our plants. With less rain, we naturally have more hot sunshine. That also tends to dry out plants.

The inevitable result of thousands of years with low rainfall is an alkaline soil because there is little available water to leach out excess salts.

To further complicate matters, living at the foot of the mountains produces erratic weather that is capable of changing spring to winter in just a few hours. These conditions affect plant growth and hardiness, much more than a variation in length of growing season or minimum temperature.

To define this area, I have drawn a circle approximately a thousand miles in diameter, centering near the southwest corner of Wyoming, up into Canada, around through Kansas, down through New Mexico, through Oregon and back again to Canada (see figure A).

We do have many variations within this area: a great range of elevations, longitude, soil conditions and average precipitation. Actually 80% of our population lives at the foot of the mountains, where the land is relatively level, the soil deep, the season long and the water scarce. Luckily, irrigation of melted snow from the mountains is possible.

The communities of Denver, Salt Lake, Spokane, Missoula, Pocatello, Cheyenne, Flagstaff, Las Vegas, and Santa Fe are all included in this area. Each has its own peculiarities, but there are more similarities than differences.

The Rocky Mountain area has for many years been a “forgotten country,” horticulturally. Although it comprises almost one third of the total area of the United States, this region was the last to be populated, and still has more open places than any other section. In the last

few years, many people have been looking longingly at these open places, in an attempt to retreat from congestion, pollution and urbanization.

The resulting population shift has created great need for horticultural literature adapted to our peculiar climatic conditions.

Some “Eastern” horticulturists have developed Zone Maps designed to help new gardeners select suitable plants for all U. S. Hardiness Zones. They are based primarily on the average length of the growing season and minimum average temperatures. The charts are helpful in areas which naturally receive adequate rainfall, but often are of little use in our arid-alkaline area. This misinformation also enables a few unscrupulous plant merchants to sell plants that will not tolerate our climate and soil. Additional complications result from the existence of at least three unofficial versions of the hardiness map, which place Colorado into either Zone 4, 5, or 6.

To temporarily correct this problem, it would be easy to overlay these existing maps and take special note of the Rocky Mountain area. Naturally the list of hardy plants for this region must be revised.

Over the years, Rocky Mountain gardeners, nurserymen and horticulturists have tested thousands of ornamental plants for hardiness. From their experiences it is now possible to compile lists suitable for our unique conditions. These complete lists will require considerable time to compile. In *Table 1*, I have selected a few recommended plants for the average conditions throughout the area. To give others a better idea of our climatic conditions, I have first compiled a small list of plants that do not usually grow here: Azalea, Rhododendron, Holly, Boxwood, Flowering Dogwood, Beech and Zelkova. Plants only rarely surviving include: Phellodendron, Abelia, Red Maple, Hickory, Hornbeam, Hop-hornbeam, Sweet Gum, Yews, Genista, Winterberry, Lirope, Pachysandra and Vaccinium.

There are many ornamentals that will survive our Rocky Mountain environment. The problem with some

George W. Kelly
McElmo Creek Rt.
Cortez, Colorado 81321

Top Left—The Chinese Catalpa is not as well known as it deserves. It is a small tree but with larger flowers and longer pods than the common western Catalpa.

Bottom Left—The Russianolive is a most versatile plant; useful for shadetree, hedge or tall shrub. They like it so well here that they have naturalized themselves some places on the desert.

Right—Plumed fruits of the Apache’s Plume. It grows in dry places on the desert. The small, white flowers are in bloom all summer.

of these natives is that the struggle to survive in a land of little rainfall, has compelled them to develop root systems that are extremely deep and widespread. Many are difficult to handle under normal nursery conditions. Nonetheless, we are gradually learning how to propagate and distribute these valuable plants. They are be-

coming more available as demand increases.

For discussion I have grouped the existing zones 4, 5 and 6 and made a basic list of hardy plants for the Rocky Mountain region. Key: (*) plants that have shown a definite resistance to alkalinity; (†) plants that have limited use.

ROCKY MOUNTAIN REGION—HARDY PLANTS

LARGE SHADE AND STREET TREES

- ACER PLATANOIDES. Norway Maple, including Schwedler's.
- †ACER SACCHARINUM. Soft Maple, including the Cutleaf variety.
- AESCULUS HIPPOCASTANUM. Horse Chestnut, also Buckeye.
- †AILANTHUS ALTISSIMA. Tree-of-Heaven. Produces suckers.
- BETULA PENDULA. Cutleaf Weeping Birch, also the River and Gray.
- *CELTIS OCCIDENTALIS. Western Hackberry. A tough native.
- *FRAXINUS PENNSYLVANICA LANCEOLATA. Green Ash, also White Ash.
- *GLEDITSIA TRIACANTHOS INERMIS. Honey-locust and named varieties.
- JUGLANS NIGRA. Black Walnut. Slow growing and deep rooted.
- PLATANUS OCCIDENTALIS. Sycamore.
- †POPULUS SARGENTII. Broadleaf Cottonwood, also Narrowleaf and Lanceleaf. Must have plenty of room and water.
- PRUNUS SEROTINA. Black Cherry. Excellent, tall tree.
- †QUERCUS FALCATA. Red Oak, also bicolor, alba and borealis.
- QUERCUS MACROCARPA. Bur Oak, also Q. robur, English. Hardy.
- †SALIX SP. Golden, Wisconsin or Russian Willows. Need water.
- TILIA AMERICANA. American Linden, also European and Littleleaf.

SMALLER ORNAMENTAL TREES

- CATALPA SPECIOSA. Western CATALPA, also the smaller C. OVATA, Chinese.
- CRATAEGUS MOLLIS. Downy Hawthorn, also Coxpur, Washington, Toba and several natives.
- *ELAEGNUS ANGUSTIFOLIA. Russian olive. Very versatile.
- KOELREUTERIA PANICULATA. Goldenrain Tree.
- MALUS SP. Flowering Crabs, especially Dolga and Hopa and any with Redvein blood or improvements like Royalty, Radiant or Almey.
- †POPULUS TREMULOIDES. Quaking Aspen. Produces suckers.
- PRUNUS AMERICANA. Newport Plum, Redleaf.
- †SOPHORA JAPONICA. Pagoda Tree. Tender twigs.
- SORBUS AUCUPARIA. European Mountain-ash, and varieties. Tender bark.
- SYRINGA AMURENSIS JAPONICA. Japanese Tree Lilac, also Chinese Tree Lilac.

LARGE EVERGREENS

- *JUNIPERUS MONOSPERMA and OSTEOSPERMA. Desert Junipers.
- *JUNIPERUS SCOPULORUM. Rocky Mountain Juniper, and many varieties.
- PICEA PUNGENS. Colorado Spruce, also Black Hills and Norway.
- †PINUS CEMBROIDES EDULIS. Pinyon Pine. Intolerant of overwatering.
- PINUS PONDEROSA. Ponderosa Pine, also Austrian, Scotch, Limber and Bristlecone.

LOW EVERGREENS

- *JUNIPERUS CHINENSIS PFITZERIANA. Pfitzer Juniper, and varieties.
- JUNIPERUS CHINENSIS PROCUMBENS. And varieties.
- JUNIPERUS SABINA TAMARISCIFOLIA. "Tammie" Juniper. Compact.
- JUNIPERUS SP. Such as Wilton, Armstrong, Marshall, Hetz, VonEhron.
- *PINUS MUGO MUGHUS. Mugho Pine. Must have sun.

SHRUBS

- ACER GINNALA. Amur Maple, also A. tatarica.
- ALTHEA SERICA. Rose-of-Sharon, white, pink, blue.
- AMELANCHIER SP. Serviceberry or June Berry. White flowers.
- AMORPHA CANESCENS. Leadplant, and A. fruticosa, Indigobush.
- †BERBERIS KOREANA. Korean Barberry. Tall, attractive.
- †BERBERIS THUNBERGII. Japanese Barberry and Redleaf variety.
- BETULA FONTINALIS. Rocky Mountain Birch. Tall.
- †BUDDLEIA ALTERNIFOLIA. Hardy Butterfly Bush. Tall, drooping.
- BUDDLEIA SP. Many colors in the Butterflybush that kills back.
- *CARAGANA ARBORESCENS. Siberian Peashrub, also Dwarf & Cutleaf.
- CARYOPTERIS INCANA. Common Bluebeard. Gray foliage.
- †CHAENOMELES SP. Flowering Quince. Intolerant of high alkalinity.
- COLUTEA ARBORESCENS. Bladderpod.

- CORNUS RACEMOSA. Gray Dogwood. Similar to Viburnum lentago.
- CORNUS STOLONIFERA COLORADENSIS. Colorado Redtwig Dogwood.
- *COTONEASTER ACUTIFOLIA. Peking Cotoneaster. Black fruit.
- COTONEASTER INTEGERRIMA. European Cotoneaster. Red fruit.
- *COWANIA STANSBURIANA. Cliff Rose. Desert plant with white flowers.
- EUONYMUS ALATUS. Winged Euonymus, especially var. compactus.
- EUONYMUS ATROPURPUREUS. Wahoo. Rose fall color.
- EUONYMUS EUROPEUS. European Euonymus and varieties.
- FONTANESIA FORTUNI. Desert Bamboo. Inconspicuous flowers & fruit.
- FORESTIERA NEO-MEXICANA. Desert Privet. Black berries.
- Forsythia sp. Golden Bells. Early yellow flowers.
- †HIPPOPHAEA RHAMNOIDES. Sea-buckthorn. Orange berries.
- †*KOLKWTZIA AMABILIS. Beautybush. Especially alkali tolerant.
- †*LIGUSTRUM VULGARE. English Privet, and varieties, including Lodense.
- LONICERA KOROLKWI. Blueleaf Honeysuckle. Tall, gray leaves.
- *LONICERA TATARICA. Bush Honeysuckle, especially Zabell and Wheelers.
- †PHILADELPHUS CORONARIUS. Big Sweet Mockorange, and varieties.
- *PHILADELPHUS LEMOINEI. Lemoine Mockorange. Has native blood.
- PHYSOCARPUS OPULIFOLIUS. Ninebark & especially P.o.nana; Dwarf.
- †POTENTILLA FRUTICOSA. Bush Cinquefoil, and its many varieties.
- PRUNUS BESSEYI. Sand Cherry or Hanson's. Edible fruit.
- PRUNUS GLANDULOSA. Flowering Almond. Pink and white.
- PRUNUS TOMENTOSA. Nanking Cherry. Edible fruit, early bloom.
- PRUNUS TRILOBA. Flowering Plum. Double, pink flowers.
- PRUNUS VIRGINIANA DEMISSA. Western Choke-cherry, also Shubert's.
- PURSHIA TRIDENTATA. Antelope or Bitterbush. Must not overwater.
- †PYRACANTHA WYATTI & PAUCIFLORA. Firethorn. Broadleaf Evergreen.
- *QUERCUS GAMBELII. Scrub Oak, and many variations.
- *RHAMNUS CATHARTICA. Common Buckthorn, also Tallhedged.
- *RHUS TRILOBATA. Threeleaf Sumac. Unlike other sumacs.
- †*RHUS TYPHINA. Staghorn Sumac, also Smooth & R.M. dwarf.
- RIBES ALPINUM. Alpine Currant. Compact and versatile.
- †RIBES AUREUM. Golden Currant. Produces suckers.
- †RIBES SP. Many native Gooseberries. Thorny and spreading.
- *ROSA FOETIDA BICOLOR. Austrian Copper Rose. Flame-colored bloom.
- ROSA SETIGERA. Prairie Rose. Pink flowers.
- RUBUS DELICIOSUS. Thimbleberry. White flowers.
- †SALIX SP. Various shrub Willows. For damp places.
- SAMBUCUS CANADENSIS. Elderberry, and others. Black berries.
- *SHEPHERDIA ARGENTEA. Silver Buffaloberry. Red berries.
- SPIRAEA ARGUTA. Garland Spirea. White flowers.
- †SPIRAEA FROEBELII. Froebel's Pink Spirea, low, sometimes kills back.
- SPIRAEA TRICHOCARPA. Korean Spirea, like V.H. but informal.
- SPIRAEA, VANHOUTTEI. Vanhoutte Spirea, and dwarf varieties.
- SYMPHORICARPUS ALBUS, OREOPHILUS, OCCIDENTALIS and others. Snowberry.
- SYRINGA ROTHOMAGENSIS. "Persian" Lilac and Cutleaf variety.
- *SYRINGA VULGARIS. Common Lilac and French Hybrids.
- †*TAMARIX HISPIDA. Kashgar Tamarisk. Becomes overgrown.
- VIBURNUM AMERICANUM and OPULUS. Cranberry-bush.
- VIBURNUM DENTATUM. Arrowwood. Slim, shade tolerant.
- VIBURNUM LANTANA. Wayfaringtree. Number one aristocratic shrub.
- VIBURNUM LENTAGO. Nannyberry. Attractive flowers and fruit.
- VIBURNUM OPULUS STERILE. Common Snowball. Old favorite.
- XANTHOCERAS SORBIFOLIUM. Yellowhorn or Chinese Chestnut. Tall.
- *YUCCA SP. Soapweed or Spanish Bayonet. Evergreen.

VINES

- CAMPISIS RADICANS. Trumpet creeper. Woody vine with orange flowers.
- *CLEMATIS LIGUSTICIFOLIA. Western Virgin's Bower, not fragrant.
- *LONICERA JAPONICA HALLIANA. Hall's Japanese Honeysuckle.
- *PARTHENOCISSUS QUINQUE FOLIA ENGELMANNII. Englemann Virginia creeper.
- *POLYGONUM AUBERTII. Silver-lace Vine. White flowers.
- VITIS SP. Beta Hybrid Grape. Vigorous vine and good fruit.



The majority of the population of the mountain states is at the foot of the mountains where the land is more nearly level, and the growing season longer. Here the necessary supplementary irrigation water is available.



The Enticing Eggplant

*William D. Adams
Harris County Extension Horticulturist
Texas Agricultural Extension Service
Texas A&M University System*



*From left to right— 'Long Tom' 'White Beauty'
and 'Green,' varieties of eggplant.*

A common recommendation made by garden writers is, "never plant more of a vegetable than you can use." Anyone who gardens, however, knows this is not always an easy recommendation to follow. Some people just enjoy giving excess produce to friends. For a connoisseur of unusual vegetables there's another pitfall: wanting to grow every variety of a particular vegetable that exists. This can be a frustrating pastime. For the last several years I've been enthusiastically growing every eggplant variety I could find, partially because there are so many interesting and unusual varieties, and partially because my wife prepares a delicious eggplant mozzarella casserole.

The eggplant (*Solanum melongena*) is probably a native of tropical India. It has also been grown for many years in warm areas of China and the Philippines. It was primarily grown as an ornamental in Europe during the 16th and 17th centuries and used similarly in early nineteenth century America. Eggplant is now a popular garden vegetable.

Though better adapted to warm climates, the small-fruited early maturing varieties such as 'Morden Midget' have been developed for planting even in Canada. The number of varieties of both large and small types is almost staggering. Some of my successes include:

—Green Eggplant. Perhaps not the prettiest variety grown, it is nevertheless very productive and tasty. Unlike some varieties it doesn't tend to get bitter during mid-summer. There are actually two varieties available—one called 'Applegreen' and the other just 'Green.'

—White Eggplant. Several varieties are available including: 'White Italian' and 'White Beauty.' These very mild eggplants are also ornamental. Occasionally a plant will produce off-color grayish-green fruit. Apparently seed of genetically pure white eggplants is hard to produce.

—Long, Skinny Eggplants. Included in this group are varieties and hybrids classified as *Solanum melongena* var. *serpentinum*. Generally, these eggplants are produced on plants which are smaller than those of the standard varieties. Thus, they are better adapted to the mini-garden. The flavor of these eggplants is mild and the plants are very productive. Some of the varieties available include: 'Chinese Long Sword,' 'Long Black,' 'Japanese F₁ Hybrid' and 'Long Tom.' The latter is actually a hybrid between an oriental variety and a standard large variety. The oriental varieties grow up to 12 inches in length and only ¾-1 inch in diameter.

—Miscellaneous Small Eggplants. Most of these are classified as *Solanum melongena* var. *depressum*. Included are the varieties 'Early Hybrid Pickling,' 'Golden' and 'Golden Yellow.' One variation, a green bullet-



Top—One of the small-fruited varieties, 'Early Pickling Hybrid' is well adapted to northern climates, small gardens and container growing.

Bottom—Eggplants are not only good to eat but ornamental both in flower and in fruit—eggplant flowers.

**Hard to Find
Eggplant Varieties:**

**Seed Company
Key Number**

'Morden Midget'	1, 2
'Green'	8
'Applegreen'	1
'White Italian'	7
'White Beauty'	1, 2
'Golden'	3
'Chinese Long Sword'	4, 6
'Long Black'	4
'Long Tom'	5
'Golden Yellow'	7
'Hybrid Purple Pickling'	7
'Japanese F ₁ Hybrid'	7
'Jersey King Hybrid'	9

Seed Companies

- | | |
|--|---|
| 1. Farmer Seed & Nursery
Faribault, MN 55021 | 6. LeJardin du Gourmet
Ramsey, NJ 07446 |
| 2. Geo. W. Park Seed Co., Inc.
Greenwood, SC 29647 | 7. Nichols Garden Nursery
1190 North Pacific Hwy.
Albany, OR 97321 |
| 3. Gurney Seed & Nursery Co.
Yankton, SD 57078 | 8. Reuter Seed Co., Inc.
320 N. Carrollton Ave.
New Orleans, LA 70119 |
| 4. Glecklers Seedsmen
Metamora, OH 43540 | 9. W. Atlee Burpee Co.
300 Park Ave.
Warminster, PA 18974 |
| 5. Henry Field Seed Co.
407 Sycamore Street
Shenandoah, IA 51601 | |

shaped pickling variety is available in local imported food stores as "Stuffed Greek Eggplant."

—Standard Eggplants. These varieties are given the scientific classification *Solanum melongena* var. *esculentum*. The best known variety is 'Black Beauty' but improved forms, more vigorous with less tendency to become bitter, are 'Black Beauty Hybrid' and 'Florida Market' (Cooks strain). The bitter tendency is especially pronounced when fruits fail to mature rapidly. Eggplants are best harvested from the time they are ½ their mature size up until they begin to lose their gloss.

Eggplants are heat loving and are easily stunted if planted before consistent 70° weather. Eggplants planted in a nitrogen rich soil may produce a glorious plant but no eggplants. Most well-prepared garden soils will only need an application of superphosphate (0-20-0) as a preplant treatment. Five pounds per 100 square feet rototilled into the soil should be adequate. Once the plant has set fruit approximately an inch in diameter, sidedressing with five teaspoons of ammonium sulfate or two to three teaspoons ammonium nitrate per ten foot of garden row will keep them setting fruit and growing vigorously. This sidedressing should be repeated at two to three week intervals.

Eggplants should be spaced 18-24 inches apart in the row with rows 24-36 inches apart.

Other than these few basic cultivation requirements they have only one major home garden pest—red spider mites. Red spider mites are very small but can be detected by leaf symptoms. Leaves will have a silvery or yellow speckled appearance due to the mite's feeding activity. When you first notice damage, a commercial insecticide used according to directions will usually give control. Be sure to direct the spray to the underside of the foliage as well as to the upper surface.

Eggplant Mozzarella

- | | |
|---|--------------------------|
| 2-3 medium size eggplants (grapefruit size) | 1 lb. mozzarella cheese |
| 1 lb. hamburger | ½-1 cup parmesan cheese |
| 1 large onion | 1 large can tomato sauce |

Fry hamburger and onion together and drain thoroughly. At the same time boil eggplant, peeled and cut into bite size pieces, until tender. Layer in a casserole dish sauce, hamburger, eggplant, cheese (a little of each type), continue layering and top with cheese. Cover with a lid or aluminum foil and heat in 350°F oven until bubbly. For variety add mushrooms or black olives.

The New All-American Vegetable Selection



As you plan your vegetable garden you may wish to consider the new All-America selections. Three vegetables were selected as award winners this year.

Premium Crop is a new broccoli which produces large, compact heads, with light blue-green color. The crop is ready to harvest in about 60 days after the plants are set out. The announcement of this new broccoli stated that no side shoots were produced, which might be a disadvantage in the home garden. The production of side shoots prolongs the harvest season, and these small bud clusters are a nice size for freezing.

Snow Crown is a vigorous new hybrid cauliflower which produces solid white heads of the Snowball type. It has excellent quality when served either cooked or raw. The heads measure 8 inches across and will remain tight for several days after harvest.

Yellow Baby is a really new and different watermelon. Yellow Baby is a delicious, sweet, crisp, icebox size melon, with bright yellow flesh. The fruit is almost round, up to 7 inches in diameter, and ripens about 75 days after being planted. The plants are productive even under cool growing conditions.

Table King squash received an All-America award in 1974. This acorn type squash is produced on a compact bushy plant, which makes it adaptable to the small family size garden. The fruit ripens in about 85 days after planting and has golden yellow flesh.

Goldcrop wax bean was another 1974 selection. This flavorful, disease-resistant bush type bean produces long, slender crisp yellow pods, with white beans. The

plants are sturdy, and the crop is ready to harvest in about 65 days.

Aristocrat is an early bush type zucchini squash, which produces fruit over a long period, starting about 50 days after being planted. The fruit should be picked when only 6 to 8 inches long. They may be steamed or baked, or sliced raw as a substitute for cucumbers in a tossed salad.

Ruby Ball is a new dependable dark red cabbage. This hybrid matures in 70 days, and makes firm, round heads. It will stand in the garden for several weeks without bursting, and tastes delicious both cooked and raw.

Victory is an outstanding All-America cucumber selection of 1972. The vigorous vines are very productive, and resistant to anthracnose, leaf spot, mosaic, mildew, and scab. It will produce high yields without pesticide sprays.

Bell Boy is one of the best peppers for the home garden. The plants are vigorous and productive, and are resistant to drought and mosaic.

Waltham Butternut and **Gold Nugget** are winter type squash which were All-America winners several years ago. Also, **Stonehead** and **Emerald Cross** cabbage.

The **Ruby Queen** is the only beet to ever receive the All-America award. Other vegetable crops with only one winner include the **Freezonia** pea, **Clemson Spineless** okra, and **Jade Cross** brussel sprouts.

There are many more All-America selections which continue to give good crops in home gardens. Look for them in your garden center or seed catalog. You will have good results with these outstanding vegetables.

Has a novice gardener ever asked you how to begin a vegetable garden? There are many sources of information available, but usually in so much detail that it is hard to decide what to suggest. This article is in three parts and will be continued in the June and August issues.

Give this material to novice gardeners to help them get started. You—the advanced gardener—must provide information about planting times, fertilizers and soil conditions in your community. Armed with this information any aspiring green-thumber will reap a bountiful harvest—
NATURE WILLING.

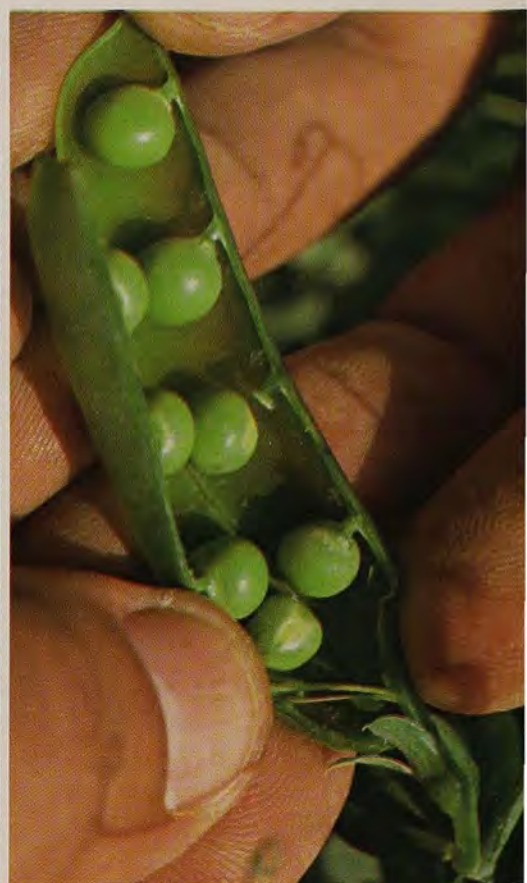
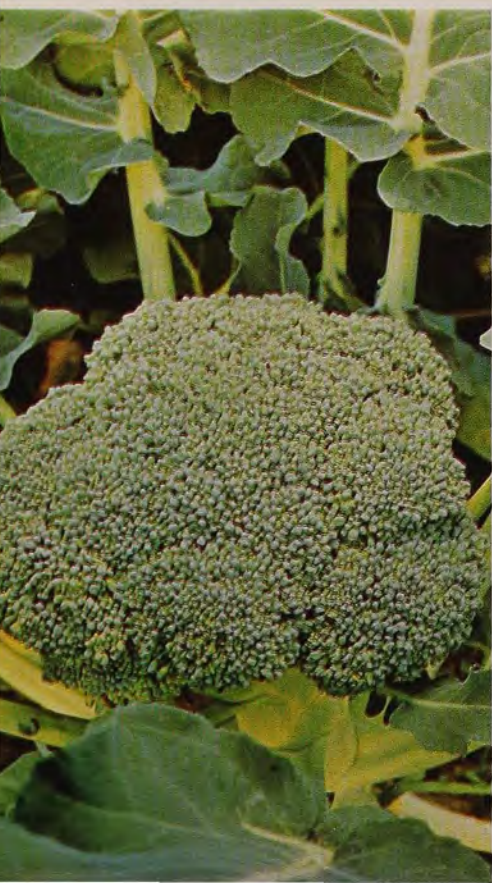
The planting season is upon us. Soon many new gardeners will try to grow vegetables at home for the first time. Often the dream garden visualized in March, planned in April, and planted in May, vaporizes by August. To be frank, many people don't know how to grow vegetables. They become discouraged when seeds fail or lose interest when heat, drought and vacation periods descend.

Growing vegetables that look like pictures in the seed catalogs requires skill, experience, good soil, favorable exposure, and a kindly growing season. Many vegetables will not do well when grown by a novice gardener, yet others will thrive with a minimum of care.

Steps to fool-proof gardening:

1. Select vegetables you and your family will eat and use. Many gardeners go all the way through the growing process and wind up with vegetables that they have no use for. Decide what you can use and which recipes will make them attractive to your family.
2. Select fool-proof vegetables for the table. Seedlings often offer better chances of success than starting from

FOOL-PROOF



seed. But a few started plants supplemented by seed usually provide a longer harvest season.

3. Select a location with full sun. Growing plants even in partial shade will reduce growth and cut down on the size and number of vegetables.

4. Choose your site carefully. Avoid spots which make a swishing sound when you walk over them. Check for a surface coating of algae and mosses. This means that the area not only does not drain freely, but it is also too acid for the most rapid growth of vegetables. Determine the drainage pattern in the area. A sudden rain storm can wash away the whole garden plot. Select a plot that is level, well-drained and away from foot traffic.

5. Plan your garden. A small, well-tended plot will be much more successful than a field with poor care. I suggest that you start with a 10 x 10 foot plot that includes eleven vegetables (see Figure A).

6. Soil preparation: check with advanced gardeners in your neighborhood to find out what kind of soil you have. Most novice gardeners find that there is little top soil with humus left in their yard. You should modify

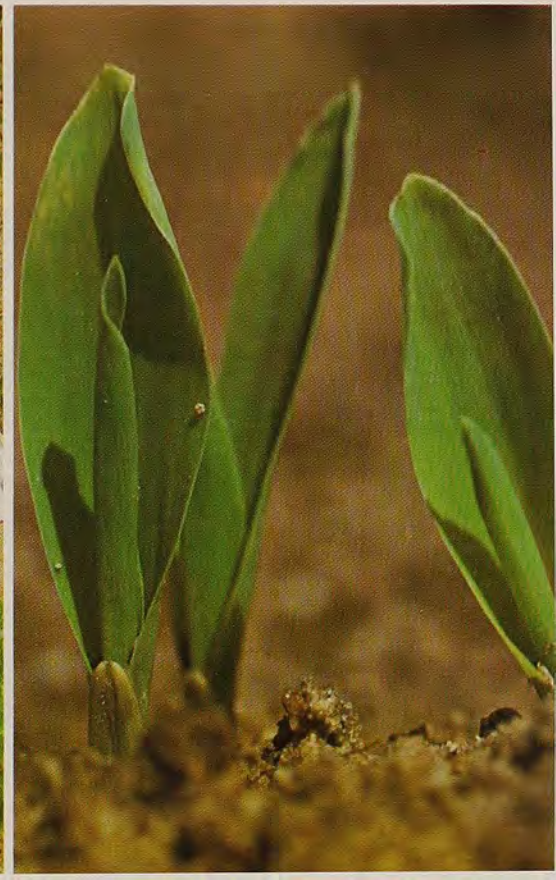
your plot to ensure:

- A slightly acid soil
- Some humus to promote the development of fine roots
- Some large soil particles to promote drainage of water
- A mixture of small, medium, and large particles with an addition of small twigs and sticks to ensure good exchange of oxygen and carbon dioxide.

I usually add 10 lbs. limestone and 5 lbs. of 5-10-5 fertilizer to 100 square feet of growing space. I mix in a 2-3 inch layer of peat moss, composted leaves, or coarse saw dust. You can add almost any kind of organic matter to the soil if you do not blend in more than 3 inches of at any one time. Most successful garden plots require many years to create a favorable soil environment for the best growth of the plants.

7. Preplanting: digging the garden plot can be done with a spade or with a wide range of power equipment. Perhaps someone in the neighborhood has a rototiller you may borrow. If you decide to spade the area by

VEGETABLES





Soil Preparation: Correct soil consistency for Springtime digging is when mass pressed into ball crumbles.

hand, mark off the area with a string. Start by digging and defining the margins of the plot. Attempt to confine all of the sod, roots and small sticks within the area. Remove only large stones, debris, and stumps. Dig down 8 to 12 inches. This will mean that you must penetrate several layers—moving and mixing as you proceed.

8. Final preparation: spade the growing area several times over a two to three week period. This helps break up the sod into smaller pieces. The constant turning will accelerate the decomposition of the leaves, stems, and roots. If there is insufficient rainfall during the preplanting period, sprinkle with water to prevent drying the soil.

The constant turning and addition of water will increase the bulk of the soil. Avoid walking on the area as much as possible. When you are finally ready to plant, the soil level of the plot should be at least 4 inches above the surrounding area. This will ensure that rainwater will drain out of the garden rather than into it. A plot raised 4 inches above the surrounding area will settle during the growing season and assume its original level. Finally, rake the plot in preparation for planting seed or seedlings.

9. Planting seedlings: for the small plot, a novice gardener can get a head start on the season by starting plants in the window or under lighting in the home. These seedlings can be selected to give a wide range of plant varieties and harvest times.

Select stocky seedlings with deep green foliage. Seedlings with flower buds will generally establish themselves and produce fruit. Drench the root balls with the recommended concentration of house plant fertilizer just prior to planting. This will ensure rapid rooting of the seedlings in the garden plot. Keep seedlings in cool, bright, but not direct, sunlight until you are ready to plant them.

Planting seedlings requires a series of quick steps. Re-dig each spot with your spade to open an area large enough to fit the plant. Carefully remove the root ball from the container. Avoid pressing on the stem or root system. Firm the soil around each plant and water the

PLANT:	BEETS	CABBAGE	CARROT	EGGPLANT	LETTUCE
	One oz. of seed sows 100 ft.	One oz. produces 3,000 plants.	One oz. sows 200 ft.	One oz. produces 2,000 plants	One oz. sows 300 ft.
Number of seed/oz.	1,600	9,000	23,000	6,300	23,000
Optimum temp. for best germination (degrees F)	68-86	68-86	68-86	68-86	68
Temp. tolerance	Tolerance of cool environment	Tolerance to cool environment	Tolerance of a cool environment	Requires warm environment	Requires cool environment
Usual time for germination (days)	3-14	3-10	6-21	7-14	7
Type of plant	Seed	Plant	Seed never transplant	Plant	Plant or seed
Planting date	Plant 2-4 weeks before frost-free date	Plant 6 weeks before frost-free date	2-4 weeks before frost-free date	Require hot weather	Plant 6 weeks before frost-free date
Planting: Depth and distance	Rows 1½-2 feet apart, ½" deep, 2-3" apart	Rows 2½ ft. apart, 2 ft. apart	Rows 1 ft. apart, ½" deep, 2-3" apart	2 ft. row, 18" apart	Rows 1½ ft., ½" deep, 1 ft. apart
Planting frequency	3 weeks intervals	Spring and Fall crops	3 week schedule	Once—harvest fruits	Every 2 weeks
Days to maturity	55 days	72 days	75 days	70 days	45 days



Plastic or aluminum mulches help retain soil moisture and eliminate the need for weeding.

entire area when you finish. Wait several days and water again. At no time should you sprinkle water on the foliage without adequately watering the soil.

10. Planting seeds: use fresh seeds each year. Share them with gardening friends. This will mean that you can grow a wide range of plants. Store your seed in a closed jar in a dry area, preferably at temperatures between 32° and 50°F. A table on the seed packet usually lists the number of seeds per ounce, temperature preferences, and the number of days required for germination.

To plant the seed, open a furrow with the hoe or rake

three times the diameter of the seed. Sow the seed down the furrow at regular spaces—as suggested in the table. Use the hoe or rake to move the soil into the furrow and gently firm and level the area. Water soil immediately to start the seed germination processes. Continue to water at frequent intervals—usually every three or four days—until the seedlings emerge from the soil. Thin the seedlings when the true leaves appear to distances suggested in the table. The table tells which seedlings can be transplanted and which ones must be planted directly in the area where they will be grown.

Mulching: assume that as soon as you leave the surface of the plot undisturbed, seedlings of all kinds of weeds will begin to emerge. These seeds are a residue from plants growing in the area for the past number of years. Only by steaming the soil, constant cultivation, or by mulching can you control weeds. For a small plot—the most effective way is to mulch the entire surface of the plot—leaving a narrow slit where the plants emerge from the soil. There are many kinds of mulches—sawdust over newsprint, grass clippings and hay, black plastic, and rocks. I suggest that you use a mulch of aluminum foil—the heavy duty kind which comes 18 inches wide, in bolts of 100 feet. Two boxes will cover your 10 x 10 plot. The foil is rolled down (see drawing)—the edges are covered with soil to hold it in place until the plant grows over and forms a foliage mulch. The foil will provide several desired effects:

SPINACH— New Zealand	ONIONS	PEPPERS	RADISH	TOMATO	ZUCCHINI
One oz. sows 75 ft.	One oz. of seed sows 200 ft.	One oz. sows 100 ft. row	One oz. sows 100 ft. row	One oz. of seed 11,500 plants	One oz. will plant 60 hills
350	9,500	4,500	2,000	11,500	200-400
50-86	68	68-86	68	68-86	68-86
Tolerance of heat	Requires cool soil for germination	Requires warm environment	Requires cool environment	Requires warm environment	Requires warm environment
5-28	6-10	6-14	4-6	5-14 days	4-7
Plants or seed	Seed or sets	Plant or seed	Seed—do not transplant	Plant or seed	Seed or plant
2-4 weeks prior to frost-free date	4-6 weeks before frost-free date	Requires warm environment	4-6 weeks ahead of frost-free date	Plant on frost-free date	Plant at frost-free date
1½ ft. rows, ½" deep, 5-6" apart	12-24" rows, 1" deep, 3" apart	18-24" rows, 2-3 ft. apart	1 ft. rows, ½" deep, 2" apart	2½ ft. rows, 3-4 ft. apart, seed ½" deep	Rows 3-4 ft. apart, 6 seed per hill, 3-4 ft. apart
Once	Once	Once—remove fruits	Every 5 days	Once—remove fruits	Once—remove fruits
70 days	110 days	70 days	22 days	54-78 days	50 days

Diagram: Mixing Seed and Plants Cool and Warm Weather Crops



Figure A

–Water conservation. The surface of the soil will not dry out due to exposure. All the water in the soil will be available for the developing plant. You will water the plants less frequently than un-mulched plants.

–Increased available light and/or temperature. The foil will reflect light and heat. Truck farmers have known for more than 20 years that plants grown with aluminum foil mulched soil develop more rapidly. The effect occurs only during the early stages of growth. The expanding leaf canopy eventually shades the reflected light. As long as the plants have adequate water, burning (or dehydration) of the foliage does not occur.

–Reduced attractiveness to day flying insects. Alumi-

num foil reflects light. Day flying insects will not land in an area covered with aluminum foil since the ultraviolet is reflected. Protection is afforded up to 3 feet above the foil. A margin of 2-3 feet of foil is required to border the garden plot. The effect of reduced attractiveness to day flying insects is lost when the leaves cover the foil.

Next Issue:

Watering; Weeding; Fertilizing; Staking; Additional Planting; Pest Control.

Following Issue:

Harvesting; Preparation of Foods; Preparing soil for Fall-Winter Planting.



Environmental Requirements for Seed Germination

Dr. Henry M. Cathey
President
American Horticultural Society

Only with the knowledge of environmental conditions that individual species of plants require can seeds be placed, spaced, nurtured and brought into the transplanting stage of growth. Presently, we do not know many shortcuts to greatly speed up the growth process. However, research has taught us the basic requirements for germination of most seeds, including the number of days required to produce a seedling with a strong root system and a well-developed leaf structure. If the proper requirements are met, we can germinate seeds on a year-round basis with consistent results.

Temperature is a Factor

We grow plants brought back for cultivation from many parts of the world. Each seed has its optimum temperature for germination and subsequent growth. Some seeds will germinate at varying temperatures, others only when held within a narrow temperature range. Most seeds in nature are subjected to fluctuations of temperature: warm during the day, cool during the night. The seeds listed in *Tables 1 and 2*, unless otherwise noted, should be held at correct temperature until the seedlings are fully expanded. They

then may be moved to another environment to permit further controlled growth. Both *Tables 1 and 2* present information on the optimum temperature during the germination process. These temperatures may be considerably different than the temperature required to bring the seedlings to maturity. The lists are separated into two groups: *Table 1* for vegetables; and *Table 2* for annual bedding plants and ornamental herbs.

The Effect of Light

Light may also be a controlling factor in seed germination. Some

seeds are inhibited when exposed to light. Table 2 lists plant and ornamental herb seed under three categories. "D" means exposure to continuous darkness during the germination process. "L" means exposure to continuous 300 foot candles of cool white fluorescent light during the germination process. "DL" means the presence or the absence of light had no effect on seed germination.

Cool white fluorescent lamps, hung 30 centimeters above the seed growing medium, are a simple method to ensure adequate illumination for seeds requiring light.

Dormancy in Seeds

Freshly harvested seeds often possess inhibitors which block the germination process.

The following tables assume that the seeds have been harvested without mechanical injury, cleaned, dried, and have been held for several

months at a dry (50°F) environment. Most seeds held for at least three months after ripening will have reached their maximum potential to germinate with vigorous seedlings.

Table 1 lists the common and Latin names for 62 popular vegetables. Temperatures shown are most favorable for seed germination. The two temperatures represent a daily alternation of sixteen hours at the first temperature and eight hours at the second. Exact optimum temperatures have not been determined for all seeds. Tolerance to a cool germination environment is designated by (TC), a requirement for cool by (RC) and a requirement for a warm environment by (RW).

Two figures are shown for the time of germination of vegetable seeds at the specific temperatures. Seeds whose germination may be favored by exposure to light are designated with (L). These seeds should be planted on the surface of the germi-

nation medium and exposed to sunlight and continuous cool white fluorescent illumination.

Table 2 presents a summary of the information obtained from 112 kinds of annual potted plants and ornamental herb seeds. The table gives a common name, the cultivar tested, the accepted genus and species, and the approximate number of seeds per ounce. The optimum temperature for best germination is listed in degrees Fahrenheit. Also included is the response (or non-response) to 300 foot candlelight from cool white fluorescent lamps and the usual time required for uniform germination. A line above or below the temperature suggests that the grower should avoid temperatures higher (line above) or lower (line beneath) the optimum temperature. Exact optimum germination temperatures have not been determined for these seeds as they have for the vegetable seeds.

Table 1

Guidelines for germination of vegetable seeds.

Common and Latin names	Approximate seeds per ounce (Number)	Optimum temperature for best germination (Degrees F.)	Temperature tolerance or requirement	Continuous light	Usual time required for uniform germination (Days)
Artichoke— <i>Cynara scolymus</i>	700	68-86	TC	—	7-21
Asparagus— <i>Asparagus officinalis</i>	700	68-86	TC	—	7-21
Asparagusbean— <i>Vigna sesquipedalis</i>	225	68-86	RW	—	5-8
Beans:					
Garden— <i>Phaseolus vulgaris</i>	100-125	68-86	RW	—	5-8
Dry edible— <i>Phaseolus vulgaris</i>	100-125	68-86	RW	—	5-8
Lima— <i>Phaseolus lunatus</i>	25-75	68-86	RW	—	5-9
Runner— <i>Phaseolus coccineus</i>	25-30	68-86	RW	—	5-9
Beet— <i>Beta vulgaris</i>	1,600	68-86	TC	—	3-14
Broadbean— <i>Vicia faba</i>	20-50	68-86	TC	—	4-14
Broccoli— <i>Brassica oleracea</i> var. <i>botrytis</i>	9,000	68-86	TC	—	3-10
Brussels sprouts— <i>Brassica oleracea</i> var. <i>gemmifera</i>	9,000	68-86	TC	—	3-10
Cabbage— <i>Brassica oleracea</i> var. <i>capitata</i>	9,000	68-86	TC	—	3-10
Cabbage, Chinese— <i>Brassica pekonensis</i>	18,000	68-86	TC	—	3-7
Cardoon— <i>Cynara cardunculus</i>	700	68-86	TC	—	7-21
Carrot— <i>Caucus carota</i>	23,000	68-86	TC	—	6-21
Cauliflower— <i>Brassica oleracea</i> var. <i>botrytis</i>	9,000	68-86	TC	—	3-10

Common and Latin names	Approximate seeds per ounce (Number)	Optimum temperature for best germination (Degrees F.)	Temperature tolerance or requirement	Continuous light	Usual time required for uniform germination (Days)
Celeriac – <i>Apium graveolens</i> var. <i>rapaceum</i>	72,000	50-68	RC	–	10-21
Celery – <i>Apium graveolens</i> var. <i>dulce</i>	72,000	50-68	RC	L	10-21
Chard, Swiss – <i>Beta vulgaris</i> var. <i>cicla</i>	1,600	68-86	TC	–	3-14
Chicory – <i>Cichorium intybus</i>	27,000	68-86	TC	L	5-14
Citron – <i>Citrullus vulgaris</i>	300	68-86	RW	–	7-14
Collards – <i>Brassica oleracea</i> var. <i>acephala</i>	9,000	68-86	TC	–	3-10
Corn, Sweet – <i>Zea mays</i> Cornsalad (<i>Fetticus</i>)	120-180	68-86	RW	–	4-7
<i>Valerianella locusta</i> var. <i>olitoria</i>		68	TC	–	7-28
Cowpea (southern pea) – <i>Vigna sinensis</i>	225	68-86	RW	–	5-8
Cress:					
Garden – <i>Lepidium sativum</i>	12,000	68	RW	L	4-10
Water – <i>Rorippa nasturtium-aquaticum</i>	150,000	68-86	TC	L	4-14
Cucumber – <i>Cucumis sativus</i>	1,100	68-86	TW	–	3-7
Dandelion – <i>Taraxacum officinale</i>	35,000	68-86	TC	L	7-21
Eggplant – <i>Solanum melongena</i> var. <i>esculentum</i>	6,500	68-86	RW	–	7-14
Endive – <i>Cichorium endivia</i>	27,000	68-86	TC	L	5-14
Kale – <i>Brassica oleracea</i> var. <i>acephala</i>	9,000	68-86	TC	–	3-10
Kale, Chinese – <i>Brassica oleracea</i> var. <i>alboglabra</i>	9,000	68-86	TC	–	3-10
Kohlrabi – <i>Brassica oleracea</i> var. <i>gongylodes</i>	9,000	68-86	TC	–	3-10
Leek – <i>Allium parvum</i>	11,000	68	RC	–	6-14
Lettuce – <i>Lactuca sativa</i>	25,000	68	RC	L	7
Muskmelon (including cantaloup) – <i>Cucumis melo</i>	1,300	68-86	RW	–	4-10
Mustard – <i>Brassica juncea</i>	18,000	68-86	TC	L	3-7
Mustard, spinach – <i>Brassica perviridis</i>	15,000	68-86	TC	–	3-7
Okra – <i>Hibiscus esculentus</i>	500	68-86	RW	–	4-14
Onion – <i>Allium cepa</i>	9,500	68	RC	–	6-10
Onion, Welsh – <i>Allium fistulosum</i>		68	RC	–	6-12
Pak-choi – <i>Brassica chinensis</i>	18,000	68-86	TC	–	3-7
Parsley – <i>Petroselinum hortense</i> (<i>P. crispum</i>)	18,500	68-86	TC	–	11-28
Parsnip – <i>Pastinaca sativa</i>	12,000	68-86	TC	–	6-28
Pea – <i>Pisum sativum</i>	90-175	68	RC	–	5-8
Pepper – <i>Capsicum</i> spp.	4,500	68-86	RW	–	6-14
Potato – <i>Solanum tuberosum</i>		68	TC	L	
Pumpkin – <i>Cucurbita pepo</i>	100,300	68-86	RW	–	4-7
Radish – <i>Raphanus sativus</i>	2-4,000	68	RC	–	4-6
Rhubarb – <i>Rheum rhaponticum</i>	1,700	68-86	TC	L	7-21
Rutabaga – <i>Brassica napus</i> var. <i>napobrassica</i>	12,000	68-86	TC	–	3-14
Salsify – <i>Tragopogon porrifolius</i>	1,900	68	RC	–	5-10
Sorrel – <i>Rumex acetosa</i>	30,000	68-86	TC	L	3-14
Soybean – <i>Glycine max</i>	175-350	68-86	RW	–	5-8
Spinach – <i>Spinacea oleracea</i>	2,800	59	RC	–	7-21
Spinach, New Zealand – <i>Tetragonia expansa</i>	350	50-86	–	–	5-28
Sweetpotato – <i>Ipomoea batatas</i>		77	–	L	

Common and Latin names	Approximate seeds per ounce (Number)	Optimum temperature for best germination (Degrees F.)	Temperature tolerance or requirement	Continuous light	Usual time required for uniform germination (Days)
Squash— <i>Cucurbita moschata</i> and <i>C. maxima</i>	200-400	68-86	RW	—	4-7
Tomato— <i>Lycopersicon esculentum</i>	11,500	68-86	RW	—	5-14
Tomato, husk— <i>Physalis pubescens</i>	35,000	68-86	RW	L	7-28
Turnip— <i>Brassica rapa</i>	15,000	68-86	TC	—	3-7
Watermelon— <i>Citrullus vulgaris</i>	200-300	68-86	RW	—	4-14

Guidelines for Germination of Annual, Pot Plant and Ornamental Herb Seeds.

Common name and cultivar	Genus and species	Approximate number seeds/oz.	Optimum temperature for best germination	Continuous light or dark	Usual time required for uniform germination (days)
Ageratum Golden	<i>Lonas annua</i> (L.) Vines & Druce	128,000	70	D	5
Ageratum Blue Mink	<i>Ageratum houstonianum</i> Mill.	200,000	70	L	5
Alyssum Carpet of Snow	<i>Lobularia maritima</i> (L.) Desv.	90,000	70	DL	5
Amaranthus Molten Fire	<i>Amaranthus tricolor</i> L.	47,000	70	DL	10
Anise	<i>Pimpinella anisum</i> L.	9,600	70	DL	10
Aster Ball White	<i>Callistephus chinensis</i> (L.) Nees.	12,000	70	DL	8
Balsam Scarlet	<i>Impatiens balsamine</i> L.	3,300	70	DL	8
Basil Dark Opal	<i>Ocimum minimum</i> L.	20,000	70	DL	10
Basil Lettuce Leaves	<i>Ocimum basilicum</i> L.	9,600	70	DL	10
Begonia, fibrous-rooted, Scandinavia Pink	<i>Begonia semperflorens</i> Link & Otto	2,000,000	70	L	15
Begonia, tuberous-rooted, Double mix	<i>Begonia X tuberhybrida</i> Voss.	2,000,000	65	L	15
Borage	<i>Borago officinalis</i> L.	2,100	70	D	8
Browallia Blue Bells and Silver Bells	<i>Browallia speciosa</i> Hook. (B. Major Hort.)	130,000	70	L	15
Browallia Sapphire	<i>Browallia viscosa</i> HBK Compacta	340,000	70	L	15
Calceolaria multiflora nana	<i>Calceolaria X herbeohybrida</i> Voss.	600,000	70	L	15
Calendula Orange Coronet	<i>Calendula officinalis</i> L.	3,000	70	D	10
Companula—Annual Mix	<i>Campanula medium</i> L.	50,000	70	DL	20
Candytuft Giant White	<i>Iberis amara</i> L.	9,500	70	DL	8
Carnation Chaband's Giant and Imp. Cardinal Red	<i>Dianthus caryophyllus</i> L.	14,000	70	DL	20
Celosia Toreador	<i>Celosia argentea</i> L.	28,000	70	DL	10
Centaurea Blue Boy	<i>Centaurea cyanus</i> L.	7,000	65	D	10
Centaurea Dusty Miller	<i>Centaurea gymnocarpa</i> Moris & deNot.	7,000	65	D	10
Centaurea—yellow	<i>Centaurea moschata</i> L.	7,000	70	D	10
Chives—Grass onion	<i>Allium schoenoprasum</i> L.	22,000	60	DL	10
Christmas Cherry Masterpiece	<i>Solanum pseudocapsicum</i> L.	12,000	70	DL	20
Cineraria Maritima Diamond	<i>Senecio cineraria</i> DC.	65,000	75	L	10
Cineraria—Vivid	<i>Senecio cruentus</i> DC.	150,000	70	DL	10
Clarkia—Florist mixture	<i>Clarkia elegans</i> Dougl.	90,000	70	DL	5
Cobaea—Cup-and-Saucer Vine, purple	<i>Cobaea scandens</i> Cav.	375	70	DL	15

Common name and cultivar	Genus and species	Approximate number seeds/oz.	Optimum temperature for best germination	Continuous light or dark	Usual time required for uniform germination (days)
Coleus Red Rainbow	<i>Coleus blumei</i> Benth.	100,000	65	L	10
Coriander—annual	<i>Coriandrum sativum</i> L.	1,240	70	D	10
Cosmos Radiance	<i>Cosmos bipinnatus</i> Cav.	5,000	70	DL	5
Cynoglossum—Firmament	<i>Cynoglossum amabile</i> Stapf & Drummond.	5,000	60	D	5
Cuphea Firefly	<i>Cuphea llavea</i> Llave & Lex. var. <i>miniata</i> Koehne	7,000	70	L	8
Cyclamen Pure White	<i>Cyclamen persicum</i> Mill.	2,500	60	D	50
Dahlia—Unwins dwarf mix	<i>Dahlia pinnata</i> Cav.	2,800	70	DL	5
Dianthus Bravo	<i>Dianthus chinensis</i> L.	25,000	70	DL	5
Didiscus Blue Lace	<i>Trachymene caerulea</i> R. Grah.	10,000	65	D	15
Dill	<i>Anethum graveolens</i> L.	6,300	60	L	10
Dimorphotheca Orange Improved	<i>Dimorphotheca sinuata</i> DC.	9,500	70	DL	10
Euphorbia—annual poinsettia	<i>Euphorbia heterophylla</i> L.	5,000	70	DL	15
Exacum Tiddly-Winks	<i>Exacum affine</i> Balf.	1,000,000	70	L	15
Fennel, sweet	<i>Foeniculum vulgare</i> Mill.	4,000	65	D	10
Feverdew Ball Double White Improved	<i>Matricaria capensis</i> L.	145,000	70	L	15
Freesia White Giant	<i>Freesia</i> (garden cultivars)	3,000	65	DL	25
Gaillardia Tetra Red Giant	<i>Gaillardia pulchella</i> Foug. var. <i>picta</i> Gray	14,000	70	DL	20
Gazania—Mix	<i>Gazania rigens</i> R. Br.	12,000	60	D	8
Gloxinia Emperor Wilhelm	<i>Sinningia speciosa</i> Benth. & Hook.	800,000	65	L	15
Gomphrena Rubra	<i>Gomphrena globosa</i> L.	5,000	65	D	15
Grevillea (Australian Silk Oak)	<i>Grevillea robusta</i> Cunn.	3,000	80	L	20
Gypsophila Covent Garden	<i>Gypsophila elegans</i> Bieb.	2,400	70	DL	10
Helichrysum (Everlasting)	<i>Helichrysum bracteatum</i> Andr.	36,000	70	L	5
Heliotrope Marine	<i>Valeriana officinalis</i> L.	50,000	70	DL	25
Hollyhock Powderpuffs Mix	<i>Althaea rosea</i> (L.) Cav.	2,000	60	DL	10
Hunnemannia (Bush Escholtzia) Sunlite	<i>Hunnemannia fumariaefolia</i> Sweet	8,000	70	DL	15
Impatiens Holstii Scarlet	<i>Impatiens holstii</i> Engler & Warb.	44,000	70	L	15
Kalanchoe Vulcan	<i>K. blossfeldiana</i> v. Poelln.	2,500,000	70	L	10
Kochia Bright Green	<i>Kochia scoparia</i> (L.) Schrad. var. <i>culta</i> Farwell	45,000	70	DL	15
Larkspur White Supreme	<i>Delphinium ajacis</i> L.	8,000	55	D	20
Lobelia Crystal Palace	<i>L. erinus</i> L. var. <i>compacta</i> Nich.	700,000	70	DL	20
Lupine Giant King Oxford Blue	<i>Lupinus hartwegii</i> Lindl.	1,300	55	DL	20
Marigold Doubloon	<i>Tagetes erecta</i> L.	10,000	70	DL	5
Marigold Spry	<i>Tagetes patula</i> L.	9,000	70	DL	5
Marjoram, sweet	<i>Majorana hortensis</i> Moench.	100,000	70	DL	8
Mesembryanthemum criniflorum	<i>Dorotheanthus bellidiformis</i> (Burm.) N.E. Br.	100,000	65	D	15
Mignonette Early White	<i>Reseda odorata</i> L.	27,000	70	DL	5
Mimosa (Sensitive Plant)	<i>Mimosa pudica</i> L.	4,500	80	D	8
Morning Glory Heavenly Blue	<i>Convolvulus</i> sp.	650	65	DL	5
Myosotis Ball Early	<i>Myosotis sylvatica</i> Hoffm.	44,000	55	D	8
Naegelia Art Shades	<i>Smithiantha X hybrida</i> Voss.	1,500,000	70	L	15
Nasturtium Golden Giant	<i>Tropaeolum majus</i> L.	175	65	D	8

Table 2

Common name and cultivar	Genus and species	Approximate number seeds/oz.	Optimum temperature for best germination	Continuous light or dark	Usual time required for uniform germination (days)
Nemesia Fire King	<i>Nemesia strumosa</i> Benth. var. <i>suttonii</i> Hort.	90,000	65	D	5
Nicotiana Crimson Bedder	<i>Nicotiana alata</i> Link & Otto var. <i>grandiflora</i> Comes	400,000	70	L	20
Nierembergia Purple Robe	<i>Nierembergia hippomanica</i> Miers	175,000	70	DL	15
Pansy Lake of Thun	<i>Viola tricolor</i> L. var. <i>hortensis</i> DC.	20,000	65	D	10
Parsley—Extra triple curled	<i>Petroselinum crispum</i> (Mill.) Nym.	18,500	75	D	15
Penstemon Sensation Mixture	<i>Penstemon</i> X <i>gloxinioides</i> Hort.	55,000	65	D	10
Perilla Burgandy	<i>Perilla frutescens</i> Brittl. var. <i>crispa</i> Deane	20,000	65	L	15
Petunia Maytime	<i>Petunia hybrida</i> Vilm.	200,000	70	L	10
Phlox Glamour	<i>Phlox drummondii</i> Hook.	14,000	65	D	10
Plumbago, blue	<i>Plumbago capensis</i> Thunb.	2,000	75	DL	25
Poppy Nudicaule Iceland	<i>Papaver nudicaule</i> L.	275,000	70	D	10
Portulaca, yellow	<i>Portulaca grandiflora</i> Hook.	280,000	70	D	10
Primula Chinese Giant Fringed	<i>Primula sinensis</i> Sabine	18,000	70	D	25
Primula malacoides White Giant	<i>Primula malacoides</i> Franch.	385,000	70	L	25
Primula Fasbender's Red	<i>Primula obconica</i> Hance.	130,000	70	L	25
Rosemary, perennial	<i>Rosmarinus officinalis</i> L.	30,000	60	DL	15
Rudbeckia Single Gloriosa Daisy	<i>Rudbeckia laciniata</i> L.	40,000	70	DL	20
Sage, perennial	<i>Salvia officinalis</i> L.	3,250	70	D	15
Saintpaulia Blue Fairy Tale	<i>Saintpaulia ionantha</i> Wendl.	750,000	70	L	25
Salpiglossis Emperor Mix	<i>Salpiglossis sinuata</i> Ruiz & Pav.	125,000	70	D	15
Salvia St. John's Fire	<i>Salvia splendens</i> Sello	7,500	70	L	15
Savory, Bohnenkraut	<i>Satureia hortensis</i> L.	15	65	L	15
Scabiosa Giant Blue	<i>Scabiosa atropurpurea</i> L.	4,500	70	DL	10
Schizanthus Ball Giant Mix	<i>Schizanthus pinnatus</i> Ruiz & Pav.	60,000	60	D	20
Shamrock, True Irish	<i>Trifolium dubium</i> Sibth.	28,000	65	D	10
Smilax	<i>Asparagus asparagoides</i> (L.) Wight	4,000	75	D	30
Snapdragon Orchid Rocket	<i>Antirrhinum majus</i> L.	180,000	65	L	10
Statice Iceberg	<i>Limonium sinuatum</i> (L.) Mill.	350	70	DL	15
Statice suworowii Russian	<i>Limonium suworowii</i> (Reg.) Kuntze	12,000	70	D	15
Stock, Lavender column stock	<i>Matthiola incana</i> (L.) R. Br.	16,000	70	DL	10
Streptocarpus	<i>Streptocarpus</i> X <i>hybridus</i> Hort.	750,000	70	L	15
Sweetpea Ruth Cuthbertson	<i>Lathyrus adoratus</i> L.	350	55	D	15
Thunbergia gibsoni	<i>Thunbergia gibsonii</i> S. Moore	500	70	DL	10
Thyme, perennial	<i>Thymus vulgaris</i> L.	96,000	75	DL	10
Tithonia Torch	<i>T. rotundifolia</i> (Mill.) Blake	3,500	70	D	20
Torenia	<i>Torenia fournieri</i> Lind.	375,000	70	DL	15
Verbena Torrid	<i>Verbena hybrida</i> Voss.	10,000	65	D	20
Viola Blue Elf	<i>Viola cornuta</i> L.	24,000	65	D	10
Vinca, Periwinkle—alba aculata	<i>Vinca rosea</i> L.	21,000	70	D	15
Wallflower Golden Standard	<i>Cheiranthus cheiri</i> L.	14,000	70	DL	5
Zinnia Isabelina	<i>Zinnia elegans</i> Jacq.	2,500	70	DL	5

Decorative Plants from Vegetables

Do you always separate flowering plants from your vegetables? Since most gardeners have limited space and time, the two types of plants can be mixed together.

A few favorites are:

PARSLEY—from the carrot family, can be used to edge any type of flower bed, annual or perennial garden.

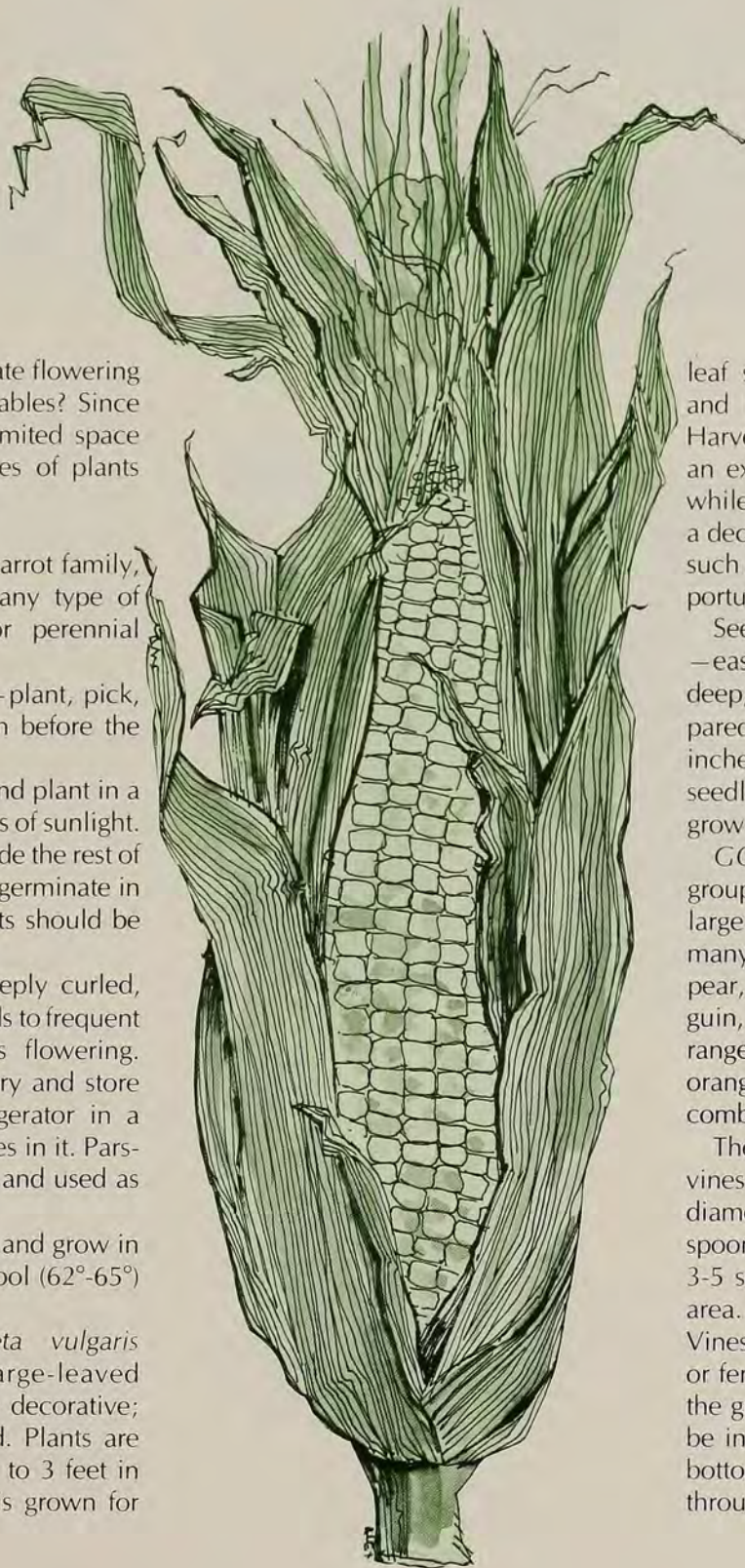
Grow as an annual—plant, pick, and plan to plant again before the first ones go to seed.

Soak seed 24 hours and plant in a spot with at least 3 hours of sunlight. It will tolerate some shade the rest of the day. The seeds will germinate in 5 to 7 days. Your plants should be spaced 6 inches apart.

Parsley foliage is deeply curled, 1 to 2 ft. tall and responds to frequent trimming which delays flowering. Harvest, wash, shake dry and store in the bottom of refrigerator in a polybag with a few holes in it. Parsley may also be frozen and used as garnish.

Lift plants in Fall, pot and grow in a sunny window in a cool (62°-65°) room.

SWISS CHARD—*Beta vulgaris cirila*—Tap-rooted, large-leaved beets; foliage is highly decorative; green and red, crinkled. Plants are bold, upright and grow to 3 feet in height. The vegetable is grown for



leaf stalks (cooked like asparagus) and leaves (cooked like spinach). Harvest the individual leaves over an extended period of time. Meanwhile in the garden, they will add a decorative touch to bedding plants such as petunia, alyssum, ageratum, portulaca.

Seed are as large as grains of corn—easy for children to plant ¼ inch deep, 3-4 inches apart in a well prepared sunny bed. Thin plants to 8 inches apart. Transplant the extra seedlings or give them to friends to grow in their garden.

GOURDS—are a very mixed group of plants, with small yellow or large white flowers. Available in many forms: bottle, egg, orange, pear, spoon, cave man's club, penguin, turban, and serpent. Colors range from dishrag white, yellow, orange, to deep maroon, in every combination.

They grow like weeds with big vines. Dig a hill 12-18 inches in diameter, add peat moss and 2 tablespoons of 5-10-10 fertilizer. Plant 3-5 seeds 1 inch deep in a full sun area. Seeds will germinate in 8 days. Vines should be trained on a trellis or fence. Do not let them trail along the ground as many of the fruits will be injured or poorly colored on the bottom. Water and fertilize regularly throughout the growing season.



Gourds are a mixed group of plants available in many forms with wide range of colors.



Swiss Chard Foliage is highly decorative touch to bedding plants.

Harvest fruit when they are fully formed and colored. Use a clipper to cut them off vine. Store in a cool dry place. When they are completely dry, paint with a clear shellac. This will preserve them for years.

PUMPKINS—take 100-120 days to mature and require a large area of land. They may weigh up to 100 lbs. and reach 70 inches in circumference. They require full sunlight, excellent drainage, adequate water throughout growing season and a steady but moderate fertilizer.

Plant seed in a specially prepared hill 2-3 feet in diameter. Add top soil or peat moss and $\frac{1}{2}$ cup of 5-10-5 fertilizer and mix thoroughly.

Plant 5-6 seeds per hill—each hill at least 8-10 feet apart. Water well.

Seedlings appear in 5-6 days if soil is warm.

Thin to 2 plants to a hill. Get out of the way—the monster vine runs all over the place!

Use clipper to cut fruit off of vine. Store fruit in a cool place.

Bonus: cut open fruit, remove seed, wash, and place on a cookie sheet. Roast in a 275°F oven and cooking oil for 30-40 minutes. Salt to taste and enjoy as a “high” food value snack.

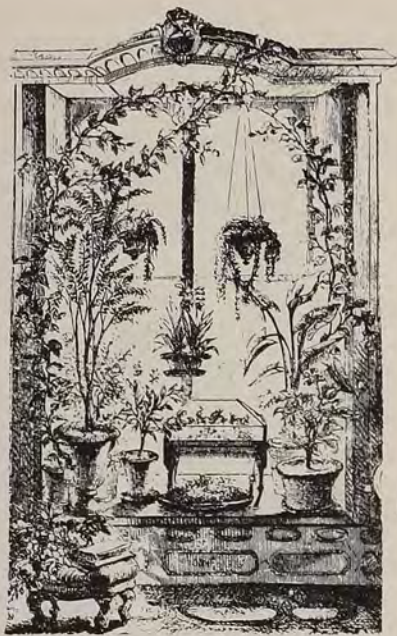
INDIAN CORN—use as a tall accent in any flower bed. Some varieties have decorative foliage:

- Strawberry has small mahogany red ears; 2 inches long; can be popped as well.
- Calico (Rainbow) comes in many colors.
- Gracilis is green with a white stripe.

Indian corn requires 100-110 days to mature. Select a full sun area. Add peat moss or compost and mix in $\frac{1}{2}$ cup of 5-10-5 fertilizer.

Plant 5 to 7 kernels 2 inches deep and water to start. Seed will germinate in 5 days. Do not thin. Add $\frac{1}{2}$ cup of 5-10-5 one and two months after planting the seed.

When shucks are dry, pull corn ears from plant. Store in a cool dry place. Use them as decorations for years.



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The Society's 1975 Horticultural Explorations

The travel adventures offered by the Society have been organized for the discriminating horticulturist or naturalist desirous of sharing experiences with other persons with similar interests.

The itineraries are extremely diversified with accents on horticultural subjects that are distinctive in the areas visited. These exposures are dependent upon the development of the country and the availability of gardens, large or small, public or private.

The accommodations are the very best available and selected on the basis of past experience. The daily programs are complete with some time available for resting or shopping. Based upon previous explorations, groups may be fully subscribed long before departure. If you are sincerely interested in any of these fascinating travel experiences, please communicate with the A.H.S. office for detailed brochures or advance reservation.

AN EXPLORATION OF FLORA AND FAUNA OF SOUTH AFRICA – September 6th to 28th, 1975

Because of previous over-subscriptions to horticultural visits to South Africa, an additional itinerary has been planned which will include not only the fantastic spring flora, but also the fauna and avi-fauna of that country. Sunny South Africa is a naturalist's dream! The flora is one of the richest in the world with over 16,000 species, many with outstanding merit for horticultural purposes. The Protea

genus has about 150 species, many of great beauty and design either as fresh or dried flowers. Another prominent family, the Cape Heaths (Ericas) has over 600 species varying in size, color, habit and flower form.

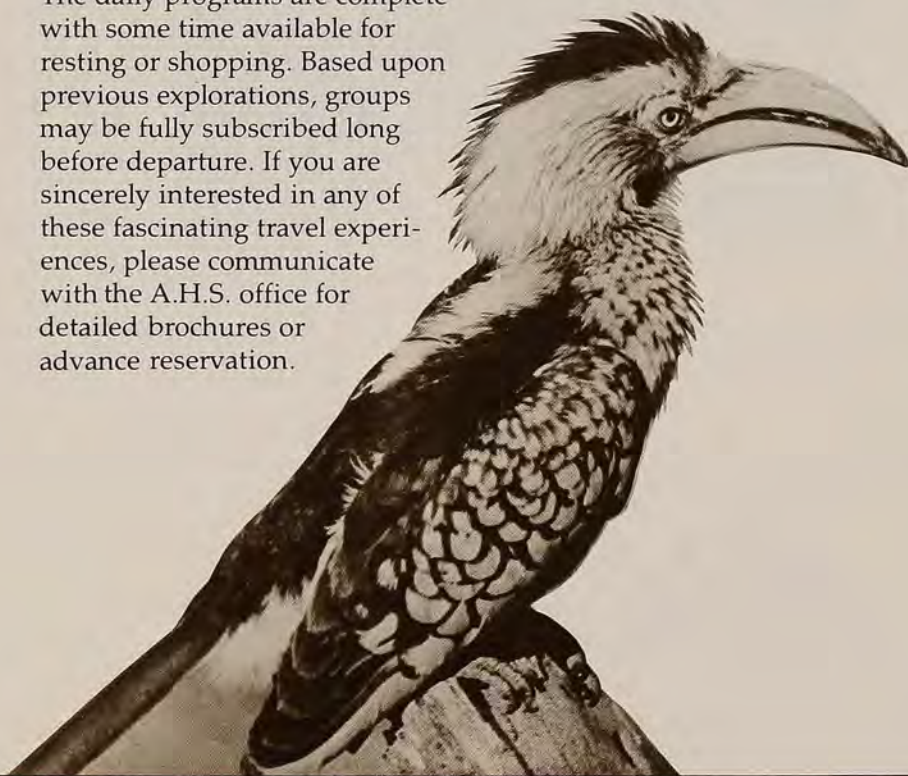
There are over 900 species of birds in South Africa, many which cannot be seen elsewhere. In addition there are some 300 species of mammals from the tiny pygmy shrew to the massive elephant. The national policy of conservation and preservation of the flora and fauna has provided humans with the opportunity of viewing that priceless heritage of wild life which in the past came so near to extinction.

This superb travel adventure includes areas of the country with outstanding displays of native flora, particularly in the Cape Province. The greatest population of birds and animals are concentrated in the Natal Zululand areas where several reserves will be visited. In addition, there are planned visits to private homes and gardens, flower shows and reserves as well as the native crafts. Every aspect provides extraordinary opportunities for the enthusiastic photographer.

This exploration will be conducted by Dr. & Mrs. Richard H. Pough, renowned naturalists. There will be native authorities and guides assisting.

AN EXPLORATION OF EXOTIC SOUTHEAST ASIA – September 12th to October 12th, 1975 A Post-Congress Event

This unusual and fascinating venture may be commenced in San Francisco on September 12th with one night and day in Honolulu or join in Honolulu on





the evening of September 13th for the flight to Hong Kong.

Thus begins this captivating journey through one of the most intriguing corners of the world. After three days in Hong Kong, a teeming cosmopolitan city, fly on to Singapore 'Crossroads of the Orient.' Visit many areas of interest including the excellent Botanic Garden and an impressive Orchid Garden. Continue to Medan, on the Island of Sumatra, and to Lake Toba and Samosir Island with its ancient culture. Then a flight to Jakarta, on the Island of Java. After comprehensive visits in that capital city, drive to Bogor Botanic Garden, Samudra Beach and Bandung each with its unique attractions among the beautiful countryside. Fly to Jogjakarta for a few days and finally to the enchanted Isle of Bali with its myriad of fascinating people, artisans, arts and crafts—four days of enriching experiences.

Farewell to Indonesia and on to another culture—Thailand and its capitol Bangkok. After three days of colorful experiences in the city and surrounding area, fly to the northern city of Chiangmai,

situated in a valley surrounded by rugged mountains. The area is famous for nearby hill tribes, craftsmen and interesting countryside—four days with unusual experiences returning via bus for a final night in Bangkok. Next morning return flight to San Francisco, arriving the same evening.

This group will be conducted by Mr. & Mrs. Harold Epstein, prominent horticulturists and world travelers.

AN AUTUMN EXPLORATION OF THE ORIENT—October 19th to November 13th, 1975

This period is climatically the finest time to visit Japan and other areas included in this itinerary. It is usually a comfortable season, clear and sunny with a hint of autumn crispness.

Most prominent during this time are the magnificent displays of chrysanthemums, the national flower which is used as the crest of the Imperial House. They have been cultivated in Japan for over 1,500 years, in a huge number of varieties with extreme diversity of form and color. They are trained to grow in fantastic shapes, from the statuesque individual show flowers to the potted plant with a thousand perfect blossoms. Most impressive are the life size figures clothed with patterns of live chrysanthemums meticulously arranged. It is the season for the colorful foliage of maple and other deciduous trees plus the fruits of persimmons and tangerines which also add to the color of the landscape.

While the itinerary accents gardens and shows—private, public and temple—it also includes

opportunities to learn the fascinating arts, handicrafts, culture, food and history of Japan. There are visits to producers of handicrafts including the ever increasing popularity of the subject of bonsai. Two full weeks are devoted to various areas and islands in Japan.

Then fly to the seldom included island of Okinawa with its distinctive culture and crafts. After two days there, continue to Taiwan with the traditions of Old China. Highlights will be the drive through the Taroka (Marble) Gorge, a major engineer-



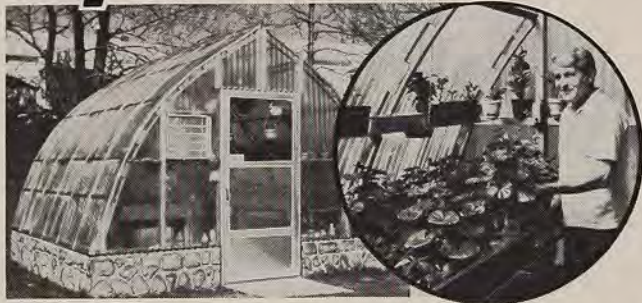
ing accomplishment and a visit to the National Palace Museum with its priceless treasures from the mainland.

The last few days are in the hub of the Far East, Hong Kong with all things Chinese.

Explore this fascinating colony for the finale of the Exploration of the Orient. Depart on the morning of October 12th arriving early next morning in San Francisco.

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BOOK REVIEWS

THE NEW YORK TIMES BOOK OF VEGETABLE GARDENING

by
Joan Lee Faust
Quadrangle/The New York Times Book Co.
1975
276 pp. + index;
Illus. black & white
color by Allianora Rosse
\$9.95

"Beginning gardeners often make the same mistakes — growing too much and making the garden too big. Start small," says Joan Lee Faust, in her new book on Vegetable Gardening, "and let the vegetable garden grow with the family's appetite and your own know-how." And to increase "your own know-how" this is your practical easy-to-use guide, from "catalog shopping" to putting the garden to bed at the end of the season.

Included are plans for a beginner's vegetable garden, family garden, and gourmet garden. The author tells where and how to grow 44 vegetables and 12 herbs, with suggestions for organic gardening and companion planting. Each plant is shown in several stages of growth with colorful illustrations.

The geographical distribution among sources on the seed and plant source lists is commendable. The bibliography is short enough not to overwhelm and references are well chosen and diversified. Further, if you want to confirm the suitability of the author's variety recommendations for your growing conditions, she has included addresses of all state extension services from whom you can get recommendations for your state.

Eggplants can decorate your patio. Lettuce makes a sprightly green border for a flower bed or a bright container plant for your balcony. Gardening for food can be profitable. Vegetable gardening by this book will add fun as well as knowledge to your venture. Highly recommended.

J.S.

TOMATOES—THE MULTI-PLANT METHOD

by
Leopold Klein
The William Frederick Press
New York—1974
\$3.95

With the increased interest in cutting the bill at the supermarket checkout counter, this little paperback should become a best seller. The author gives clear and well illustrated instructions for growing a good crop of tomatoes in a terrace container. The method described is worth considering even if you have a regular vegetable garden, and the clear

illustrations point out a great many details of tomato growing which are overlooked by the average gardener. Two items of information which will be needed by rank beginners are unfortunately missing. There are no suggestions on the choice of tomato varieties, nor recommendations for the elimination of damping off in the seedling stage. Beyond that point, the instructions and illustrations should allow anyone to enjoy a bumper crop.

G.S.D.

25 VEGETABLES ANYONE CAN GROW

by
Anne Roe Robbins
Dover Publications, Inc.
1975
Illustrated by
Leonard J. Robbins
Index viii + 216 pp. \$2.00

This handy paperback is a 1974 unabridged republication of the 1942 original. Space allotted to the individual vegetables includes historical notes, food value, how much seed to buy, and suggestions for canning and other uses.

Of course, the selection of varieties in 1942 is in many cases totally different than would be the choices today. For example, with tomatoes, varieties are now offered which are resistant to the most common tomato troubles — fusarium and verticillium diseases and nematodes. Reference to the latest seed catalogs and to the recommendations of your state extension service will have to be your guide in such cases.

On the other hand, this book is a product of the pre-chemical era and specific uses of rotenone, pyrethrum and bordeaux mixture are offered. Two maps depict the average dates of earliest fall and latest spring frosts.

J.S.

LOW MAINTENANCE PERENNIALS

by
Robert S. Hebb
September/October 1974, January/February
1975 issues of *Arnoldia* Arnold Arboretum,
Jamaica Plain, Massachusetts
\$2.00 each

Two special issues of the journal *Arnoldia* should make many new friends for the Arnold Arboretum. *Low Maintenance Perennials* is a self-explanatory title. Following general cultural instructions for each genus, a list of recommended species and horticultural varieties is given with individual descriptions and further cultural notes as necessary. Commercial sources for each plant are cited from among a nationwide list of 70 nurseries offer-

ing perennial plants. Although recommendations are based on material grown at Harvard University's Arnold Arboretum near Boston, Massachusetts, the information is applicable to a greater or lesser degree according to the individual plant material for the entire United States. With excellent photographs and up-to-date listings of horticultural varieties, these two "handbook" issues of *Arnoldia* are a must for the serious gardener. While they may be purchased separately, *Arnoldia* is one of the benefits enjoyed by membership in the Friends of the Arnold Arboretum.

G.S.D.

MAN, NATURE, AND ECOLOGY

by
Keith Reid, et al.
Doubleday & Company
New York—1974
\$14.95

This textbook, aimed at the high school senior or college freshman level, is an excellent introduction to a subject which is today too often approached from an emotional point of view without an understanding of fundamental principles. As would be expected, human population control, environmental pollution, and resource depletion all receive their fair share of attention in this book, but the basic principles of natural ecosystems are also extensively discussed and extremely well illustrated. The effects of man's endeavors upon himself and his environment are discussed, not only for the major nations of the world but also for the emerging nations.

G.S.D.

THE COMPLETE BOOK OF TERRARIUMS

by
Charles Marden Fitch
Hawthorne Books, Inc.
New York—1974
\$8.95

As a subculture of the growing interest in house plants, modern terrariums have carried the concept far beyond the 19th century Wardian case. Mr. Fitch's book covers all aspects of terrarium growing with not only the usual how-to-do-it instructions but also with explanations about why things should be done in a given manner. Both hardware and plant material are discussed in a clear and informative style supplemented by ample illustrations. While not everyone may want to include small pieces of statuary within their terraria, the author's designs for planting should serve as inspiration for the home terrarium gardener.

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