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DAYLILIES FOR

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There are more than 150 active daylily breeders in this country struggling to outdo each other. The raw material these breeders have to work with is enormous and would have astounded daylily breeders of only 25 or 30 years ago. In addition to the basic species colors of yellow and orange, the range now includes pink, peach, melon, bright red, orange red, dark red, many shades of lavender and purple, brown, near black and those with such a mixture of colors and shades that they are spoken of as polychromes. There are daylilies now so close to pure white that we have stopped speaking of them as "near white" or "off white" and are just calling them "white". A new cultivar named 'Gentle Echo' is a good example. Unfortunately for northern gardeners, it is an evergreen and there may be trouble in growing it in the north for any length of time. Also, unfortunately, from many a breeder's standpoint, it is a diploid.

A true blue daylily is still missing and may be a long way off, but progress is being made. There are bicolor daylilies with strongly contrasting flower colors. There are those with picotee edges. Some have very striking "eye zones". The newest departure involves plants with frilly edges on all their flower segments, like 'Golden Surrey' and 'Chicago Lavender Lace'. The most remarkable of



Photos by Author

this type is 'Creepy Crawler' with very pronounced lacy edges.

A relatively new and striking development to both the breeder and the gardener is the ever-increasing number of tetraploid daylilies. Dr. Virginia Peck, in the late summer issue of 1977 of the *American Horticulturist*, did a masterful job of describing this daylily's emergence. In the tetraploids all the old colors and many new ones are available, but their flower size includes some from the miniature and small-flowered range as well as those with larger flowers.

The American Hemerocallis Society is the official registry for new daylily cultivars. Since this society started in 1946 (then known as the Midwest Hemerocallis Society) it

has registered over 20,000 cultivars. The first named daylily was 'Apricot', which originated in England in 1892. Interest in breeding these predominantly yellow and orange flowers was slow for the next 30 years. But in the 1930s interest began to pick up. Still, until the year 1948 only an average of 150 cultivars a year were registered. For the next 30 years the average increased to 550 a year. And for the last few years in the 1970s, the average was over 700 new cultivars annually. This is a staggering number. Obviously the average gardener can buy only a tiny bit of the annual output and will have trouble even seeing more than a very few of these new ones. This means that the vast majority of new

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R EVERYONE



Far Left—'Tet Set'
Left—'Little Hustler'
Above—'Something Else'
Below—'Far Out'

Prairie Grasses for Gardeners

Rachel Snyder
Editor, Flower and Garden Magazine

"Everywhere, as far as the eye could reach, there was nothing but rough, shaggy, red grass, most of it as tall as I . . . As I looked about me I felt that the grass was the country, as the water is the sea."

—Willa Cather, "O Pioneers"

There was no word in English for the broad grasslands found in the vast interior of North America by the exploring Europeans. These were an entity unknown to the English-speaking world, so we adopted the name used by early French adventurers—"prairie." It means meadow. Today, ecologists may define a prairie wordily and in various ways, but the main idea is a treeless expanse dominated by native grasses.

Many broadleaved plants, called forbs, co-exist with grasses in a prairie, and until now these have had more attention from gardeners than the grasses. Phlox, goldenrods and asters are three popular groups of garden flowers with strong prairie origins. Finally now the grasses seem to be winning a more proper share of horticultural recognition. Perhaps recent efforts (still unfulfilled) to save a portion of the fast vanishing tallgrass prairie in a national park or preserve, have contributed to the growing interest.

This recognition was understandably slow in coming. An educated eye and brain are needed to distinguish the different grass



species. Agrostology, the branch of botany dealing with grasses, is an arcane science to the layman. Beyond the botany and into the horticulture of prairie grasses, even less

is well known. In keeping with the timelessness of expanses where they grow, many species do not respond quickly to a gardener's touch.

Nevertheless, ample motives beckon us to learn how to grow and use them. One motive is prairie restorations, being attempted now in many botanical gardens and in private and public projects. Another motive is to have "ecology lawns," a practical idea for swards that maintain themselves in reasonable order without much mowing or care. Another motive, with farmers, is the valuable hay crop prairie grasses offer. To the flower arranger, many of these grasses are quite beautiful either fresh or dried, and some of them are appropriate subjects for flower gardens. To soil conservation, highway and park planners, the prairie grasses offer soil stabilizing, conservation and low maintenance capabilities, plus permanence.

Permanence is one of their great charms.

For all we know, a sod of undisturbed big bluestem may be as old as the patriarch 4,900 year bristlecone pines in California's White Mountains, often cited as the most venerable living things. The grasses owe their endurance through difficult times to deep and efficient roots and their habit of retreating into dormancy when conditions make growth untenable.

Two threats they cannot with-

stand are the plow and encroaching trees. The tree threat deserves more consideration than it usually gets, in relation to preservation of prairies. Since wind driven fires no longer sweep prairie regions to clean them occasionally of infringing trees, a prairie may be as surely destroyed by overtopping forest as by plow. This possibility is particularly great in the more humid eastern, or tallgrass, prairies.

If you have a piece of prairie to preserve, and cannot use fire, you must resort to tree riddance by ax and by herbicide. But these will not have the purifying effect of fire. On the other hand, if you grow prairie grasses close to combustible buildings, be alert to the fire hazard they present, for in dry winter condition, a clump of bluestem, switch or indiagrass will burn like a torch.

From over the hundreds of thousands of square miles of original prairie (much of the Midwest) there have been described around 300 species of native grasses. From these, six or seven individual species have emerged as a basic first group for ventures into horticulture. Giving credit where it is due, the Soil Conservation Service of the U.S. Department of Agriculture has led the way for about 40 years in testing, studying and growing various strains and varieties of these and others for range renewal, roadside restoration, airports, waterways and similar uses. Commercial enterprises have followed, fostering the first essential for horticultural development, namely, a source of good seeds. Until recently, no such reliable seed sources existed for gardeners.

These six or seven main kinds are: big bluestem or turkeyfoot (*Andropogon gerardi*) (formerly *furcatus*); little bluestem (*Andropogon scoparius*) (some recent authorities may place it in *Schizachrium*); indiagrass (*Sorghastrum nutans*); switchgrass (*Panicum virgatum*); sideoats grama (*Bouteloua curtipendula*); western wheatgrass (*Agropyron smithii*); and possibly buffalo-

grass (*Buchloe dactyloides*). In this group the last-named is a misfit in the tallgrass group because it seldom grows over five or six inches high (if that) but it is being widely tried in the Great Plains as a lawn grass that needs no watering and only seldom mowing.

Of the first six, all but western wheatgrass are warm season grasses, starting to green up only after the soil warms in spring. They burgeon into vigorous growth through the peak of summer heat. Sideoats is earliest of these to reach maturity, usually by early August. By late summer the rest have shot up their flowering stems or "culms," quickly transforming into seeds—and these stiff wands will persist, unless mowed or grazed off, until early the next spring. By then most will have broken over from the rigors of winter, and the seeds will have been shed.

Big bluestem (turkeyfoot) (*Andropogon gerardi*) is usually considered the backbone of tallgrass prairies. It grows robustly, easily to six feet where moisture is plentiful, and in August a man on a horse could vanish into a prairie of it. It grows in a tufted fashion with stout rhizomes that reach out and establish a sod. The three-fingered structure on which the flowers and subsequently seeds form is the reason for the name "turkeyfoot," although occasionally there will be fewer or more than three of the two-inch "fingers." To start this for gardens, sow fresh seeds lightly covered in flats in autumn in a coldframe; let them freeze through winter, to emerge the next spring. Or plant seeds outdoors in the ground in spring. Transplant young plants to the permanent garden the following spring.

Little bluestem (*Andropogon scoparius*), the state grass of Nebraska, is what Willa Cather meant by the "red grass" of autumn. It usually forms a dense tuft or clump, but it also tillers out. In good conditions it grows to four feet tall, and its flower and seed arrangement from

August to October is a graceful, delicate, softly bearded affair borne in racemes alternating or spiraling up the branching stems. The reason for the common name "bluestem" for both this and big bluestem is presumably the frequent bluish cast in leaf blades and stems. Sometimes the blades are tinged purple. Start seeds of this for a garden in the same manner as described for big bluestem.

Indiagrass (*Sorghastrum nutans*) is the equal of big bluestem in height (to six feet by September, when it matures). It surpasses it in beauty of the wand-like seed stems, which slightly resemble cultivated sorghums, although they are more graceful. It forms a clump with short scaly rhizomes growing steadily outward. The foliage is rough to touch but refined in appearance, and after frost it turns yellow-orange. For gardens, plant this as described for big bluestem.

Switchgrass (*Panicum virgatum*) represents a very large genus that botanists consider difficult. It has a lot of weedy annual relatives, but this perennial *Panicum* is fairly easy to distinguish by its lacy, delicate seed panicles up to five feet tall on stout erect stems growing out of dense clumps of coarse foliage. The many-branched flower and seed head is about 15 inches long and 5 to 7 inches across, with diffuse hair-like pedicels such as children use for "tickle-grass." Easily grown, this seed can be planted almost any time moisture is present. It needs no special treatment, and you can seed it directly where you want it in the garden.

Sideoats grama (*Bouteloua curtipendula*) is diminutive compared to the four grasses just described, growing only 2 to 3 feet high when in seed. The basal clump of neat, handsome bluish foliage is 6 to 10 inches high, spreading outward by slender rhizomes and eventually forming a tight sod. This grass has been tried for seldom-mowed "ecology lawns." Its bloom and seed



A Colony of *Iris* *Kaempferi* from Seed

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The idea of growing the beautiful clematis-flowered iris from Japan, *Iris kaempferi*, has been uppermost in my mind for a long time. While reading the beautiful, illustrated book, "Flowers of the World", by Frances Perry and Leslie Greenwood (1) in their discussion of *Iris kaempferi*, I noted the statement "a mixed batch of seeds affords a cheap and often highly satisfactory method of starting a colony of *Iris kaempferi*". I at once thought that this was the experiment I would try. Being a scientist, I have found again and again that a willingness to experiment was the most important attribute of solving a question of any kind. All gardeners should experiment. Does not much of the sport of gardening begin with experimenting?

For good seeds, I contacted the noted plantsman, Reginald Perry of London, who was hybridizing *Iris kaempferi* from plants that he had personally brought in from Hokkaido, Japan, for his nursery at Enfield, England. These iris were from the Higo strain. Late in October he sent me a generous gift of seed from one of the self-pollinated iris. Outdoor sowings were made in my Chicago garden the first week in March, 1975, in stone troughs having good drainage in a mixed soil of one-half peat and one-half leafmold. The seed were sown individually in the normal manner and carefully



Photos by Author

watered. The troughs were then covered with metal trays. They were watered when the soil was dry. If a snow happened to fall, the trays were removed to allow the snow to cover the plantings. Since the troughs were on the patio outside the kitchen door, we were able to watch the progress of the seeds. We awaited the warmth of early spring to stimulate the seeds into growth. By May 2nd, all seeds were starting and the tray covers were removed permanently. By June 4th, the plants were 4 inches high and growing vigorously. The germination was excellent.

The seedlings were allowed to grow in the troughs until August. When they were 12 to 14 inches tall, they were transplanted to a specially prepared bed for them to establish a

deep root system well before winter. This first year after the ground froze they were covered with protective evergreen boughs. After developing small clumps during the second year's growth, they were left uncovered during the worst winter in our time. In early spring of their third year, the plants began to grow and flourish. On May 26th, maiden buds were showing on all of the two-year-old seedlings. How intriguing to watch the flower spikes lengthen with their tight buds. On June 12th, the great folded silk-scarfs of the flowers began to open and give a display of their enchanting beauty. Each bloom lasted at least three days.

The range of colors was wide and pleasing, some blotched, some stip-

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Quotables

Tom Stevenson

I have spoken to several arborists groups in the last few years, says Dr. Alex L. Shigo, Chief Plant Pathologist, USDA Forest Service, Forestry Sciences Laboratory, Durham, N.H., and there are questions about wounds and decay that are asked at every session.

The major question deals with wound dressings. When I first spoke out against wound dressings I felt that the arborists were very much disturbed and many did not want to believe what I was saying.

I feel now that I am making some headway in convincing them that I am helping them more than hindering their operations.

I answer this question now by explaining to them that wound dressings may not harm the tree but they do no good either.

After a tree is wounded, the injured bark should be removed and the wound shaped as an elongated ellipse. The bark should be cut back from the wound so that the exposed area is enlarged over the actual size of the injury.

Then the dead and dying branches of the tree should be pruned properly, and I emphasize the word properly.

Sanitation is the next step. Old dead material around the tree should be removed. Dead material harbors all types of microorganisms that could infect wounds.

The next step is to consider whether the not-so-valuable trees and shrubs might be crowding the injured tree. This would be a good time to cut some of the competing trees.

The tree should be fertilized properly and watered also. Then

after all of these things have been done, if the homeowner wants some colorful or wound dressing on the surface, then apply it. I keep stressing the point that wound dressing should be in priority 5 or 6.

At the same time I keep stressing the importance of maintenance programs for trees and especially high value trees.

If the arborists follow these guidelines they will make more profit, make the homeowner very pleased and also help the tree.

The next major group of questions concern cavity filling. This one will die hard. I usually begin an answer to this question by restating the points I have made so many times concerning compartmentalization of defects in trees.

After a tree is injured the cambium (new ring) forms a barrier zone that separates invading fungi from the wood tissue that forms subsequently. This barrier is very effective and continues to limit the decay even after 50 or 60 years.

Now, when a person considers filling a cavity, the first thing they think about is cleaning as much decay as possible from the tree. Great care must be taken not to break through that barrier zone from the inside. The barrier zone limits decay and if that barrier is broken, the microorganisms will move out into the healthy tissues that surround the decay.

It is fine if a person wants to put some material in a cavity to enhance the appearance of the tree.

Aesthetics must be considered first. Second, some of the materials may add some strength to the stem. Third, the material put into the cav-

ity may act as a base for the formation of new callus material. So I am not against filling cavities, but I feel that a person should not fill a cavity with the thought that they will stop the decay process.

Another question often asked concerns water collecting in decay columns. Apparently the common practice is to bore a hole below the opening to drain the water. The basis for this is that most people believe the water in the column will cause the entire hole to decay rapidly at that point.

The best thing you can do is leave it alone. When a hole is bored into the stem, the barrier wall around the defect column is broken and the microorganisms have easy access to the healthy tissues.

Questions on pruning are always asked. Dead branches should be pruned flush with the main stem. If a branch stub several inches long is left and a callus ridge forms around the stub, I recommend cutting the stub as close as possible to that callus ridge. I am against cutting the callus ridge flush with the main stem.

All kinds of chemicals are being pumped into trees now for various reasons. Every time the bark is broken, you have a wound. I will be looking into some of these problems very soon. I realize that some of the wounds over long periods of time could result in serious problems.

Above all, I feel that vigor is all important and regular programs of maintenance must be considered if we are to keep our trees beautiful and healthy. Fertilize and prune them, particularly to remove dead wood, and water them during pro-

longed dry weather.

A healthy, vigorous tree can often withstand insects and diseases that otherwise might kill them.

The Organic Gardener Benefits U.S. Effort

Over the last several decades, as commercial agriculture in the United States has become increasingly mechanized and dependent upon inorganic fertilizers and chemical pesticides, the cult of organic gardening has developed and flourished, says Dr. E. C. Borchers, Director, Virginia Truck and Ornamentals Research Station, VPI, Norfolk.

Organic gardening can be described, he says, as the production of crop plants with the aid of only "naturally occurring materials" for use as fertilizers and pesticides. Thus organic fertilizers and chemical pesticides synthesized by man are unacceptable for use in organic food production while such materials as bone meal fertilizer and rotenone insecticide are acceptable.

There is some confusion about the use of the term "organic." Chemists use the term to denote all carbon containing compounds no matter how they are derived.

Organic gardeners, however, use the term to refer only to those compounds derived from plants and animals. Thus such insecticides as malathion and Sevin would be classified as organic compounds by the chemist but would not be so classified by the organic gardener. For the purposes of this article we will use the definition of the organic gardener.

The image that has developed of the organic gardener is one who is interested in producing crops by maximizing the use of compost, green manure and stable manure for fertilizing and soil conditioning; the use of mulch to conserve moisture and control weeds; the use of crop rotation to help control insects, diseases and weeds and also reduce the need for additional fertilizer; the use of intercropping systems to produce higher yields and reduce the need

for additional fertilizer; the use of biological pest control to reduce or eliminate the need for pesticides.

Unquestionably, these are desirable procedures to use in food production. No one can argue that they are not protective of the environment and that the resulting food is not as healthful as can be grown.

It should be pointed out, however, that these farming practices are not new. They were not originated by the present-day organic gardener but actually have been established farming practices for a long time. In effect, the organic gardener has, in many respects, retained many of the farming methods of a bygone era while modern commercial agriculture has changed.

Change in commercial agriculture in the United States has come about because of the need to produce very large amounts of food, that is free from blemishes and insect and disease damage, to feed a highly industrialized and mechanized society that basically has an aversion to laboring in the field.

While the modern day farmer might wish to farm as his grandfather did, he finds it impossible in the United States of 1977. Where is he to find the stable manure for his fields and, if he could, would it be profitable to haul it?

Where would he find the large numbers of willing field workers needed to weed and hoe his crops if he decided to cease using chemical herbicides? If he could find these workers he probably could not afford to pay them satisfactory wages at present price levels.

Where would he find the additional field workers needed to harvest his crops if he decided to give up harvesting machinery? Once again, it is doubtful if he could afford to pay them acceptable wages at today's prices even if they could be found.

Where would he sell disease and insect damaged farm products if he ceased using chemical insecticides and fungicides? Actually many changes in commercial agriculture in the United States have been

forced on the grower because of changes in society. For example, mechanization of production has been hastened by difficulties in finding workers willing to perform field work and by the increasing cost of this labor.

Furthermore, the desire of the general public to purchase only perfect, undamaged and unblemished farm produce forces the grower to use every means at his disposal, including chemical pesticides, to raise such produce in order to operate profitably.

Just about every farmer will agree that organic farming methods are desirable and that the main reason they are not used universally is that, in many farming situations, they are impractical. Because of this, strictly orthodox organic gardening probably always will be restricted to gardens and a few small farms where special efforts are made to secure organic fertilizing material and where rather high levels of insect and disease damage are tolerated.

Commercial agriculture will continue to rely on many practices that are enthusiastically supported by the organic gardener including the maintaining of proper soil pH, rotating crops, using cover crops and the planting of pest resistant varieties.

However, the chances are that commercial agriculture will continue to rely heavily on inorganic fertilizers but there will likely be more widespread use of slow release types.

Also, we can expect closer monitoring of fertilizer needs of crops and more careful and timely fertilizer applications.

Finally, it appears likely that commercial agriculture will always require chemical pesticides. However, we are now seeing the development of less toxic and less persistent chemicals, biological insect control agents, development of disease and insect resistant crop varieties and development of integrated insect control programs. All of these developments should ultimately reduce the need for chemical pesticides.

Ornamental Grasses for Gardens

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Photos by Author

Just what is an ornamental grass? We are familiar with manicured lawns of turf grass growing thick and luxuriantly; they can be beautiful. The group of plants referred to as the 'ornamental grasses' are not used for lawns but are grown to their full form and encouraged to produce flowers. They are not mowed, fertilized, limed, rolled, aerated, and raked like lawn grasses. Conversely, their low maintenance speaks as highly for them as their fine textured beauty.

I have upon occasion, however, heard them referred to as "weeds". Perhaps it is because grasses are so common. There are more than 40,000 world-wide species, and to see them displayed in the garden is sometimes shocking. E. A. Bowles, an English horticulturist, writer and grass grower, insisted that if grasses were not so common they would be considered the most exquisite of all cultivated plants.

This exquisiteness results frequently from the textural contrast they bring to our gardens. In comparison to the majority of plants we use, their leaves and flowers are finer and more delicate. The leaves of most grasses are considerably more narrow than they are long - more so than those of most other monocots frequently grown such as *Iris*, *Narcissus* and *Hemerocallis*. This fine texture, besides providing a visual contrast, allows the wind to gently contribute motion and soft rustling sounds to our gardens. The inflorescences of the grasses are composed of very tiny flowers and contribute to the plant's textural contrast; the effect can be extremely soft and cloud-like.

Two grasses are particularly appropriate in a perennial border garden for this cloud effect. The weeping love grass, *Eragrostis curvula*, forms beautiful masses with its panicles of unusual dark olive flowers. The blooms appear in August, last into September and are excellent for fresh or dried arrangements. *Eragrostis* is well used in the foreground or middle ground of the perennial border. The panicles of the second grass, *Panicum virgatum*, commonly known as a switch grass, provide a soft purplish haze for the background of the border.

A grass which is perhaps the most famous of all ornamental grasses is *Cortaderia selloana*, the pampas grass. It was brought from South America to Europe by plant explorer James Tweedie in 1775, and was considered at the time to be his most valuable contribution. It was used extensively in the Victorian period as a center for circular bedding designs, in dried condition in parlor vases, and as soft plumes in ladies' hats. In the United States it is unfortunately not reliably hardy outdoors above USDA Zone 7. Within its range it is magnificently used in mass plantings or as an elegant specimen. The panicles are dense and huge, one to four feet in size. They bloom in August and persist well into winter. The color varies among seedlings from white, silvery grey, tan, to tints of rose or purple. The foliage is three to nine feet long with a glaucous, blue-green color becoming beige in fall and in its northern range dying to the ground in winter. One word of caution: it has extremely scabrous margins, making it not a plant for near walkways. Besides being a



Far Left—Grass border at Kew Gardens, England
 Left—*Miscanthus sinensis* 'Zebrinus'
 Above—*Miscanthus sinensis* 'Variegata'

hazardous plant on which to attempt division, it also does not respond well, preferring to be left undisturbed.

For northern gardens where pampas grass will not survive, an excellent substitute is plume grass, *Erianthus ravennae*. Like the pampas grass, it is tall and stately with large white to beige inflorescences persisting into winter. Its form is perhaps not quite as attractive, at least not as compact. It is more open with the inflorescence culms wide-spreading. It can be used very effectively as a vertical specimen in the landscape with a bit of careful staking. The foliage becomes buff in winter, retaining its form, and can be removed in spring just before new growth begins.

Miscanthus sinensis, Chinese silver grass, and its cultivars, are also of value in winter, and can be treated in the same way. All of the cultivars are easily available, sometimes in fields along the roadside. 'Gracillimus' has the finest texture with its foliage forming graceful clumps topped by interesting inflorescences of a

salmon-beige coloration in fall. After the first frost, the many finger-like projections of the inflorescence curl and take on a buff and very soft appearance which is magnificent against the blue sky. Without extreme winds and heavy rains they last into the new year. If cut early they make lovely additions to dried arrangements with the natural tones often emphasized in interior design.

Another grass which is ornamental in its dried state indoors and out is *Pennisetum alopecuroides*. Its common name, fountain grass, aptly describes its graceful flowing mound-like form. The leaves are fine textured and a medium green. The inflorescences resemble soft bottle-brushes which are held just above the foliage. Their color is usually beige with a slight tinge of rosy-purple. Fountain grass is one of the most versatile of the ornamental grasses for landscape purposes because of its medium height of two to three feet and its retention of form into the winter. It makes a welcome addition to the middle ground of the herbaceous perennial border garden, an excellent plant for bedding designs, a particularly interesting specimen near water where its form repeats the flow. It can be well used in masses as a contrast to ground covers on banks or in other sunny areas.

There are a number of grasses which are particularly valued for their foliage color. Most grasses are shades of green but others offer a considerable range of colors.

Three grasses with blue foliage coloration which are easily obtainable and suited to a variety of garden uses are *Festuca glauca*, blue fescue, *Helictotrichon sempervirens*, blue oats, and *Elymus arenarius*, lyme grass. Blue fescue is one of the few evergreen ornamental grasses. Its leaves are fine, threadlike, in compact tufts. It grows to eight inches, but its feathery panicles, which are also blue, reach a height of fourteen inches in May. It is frequently used as an edging plant and is ideal for containers or bedding designs. Blue fescue is also an excellent plant for rock garden plantings - its color blends so well with the grey tones of many rocks. Because it is evergreen it can be used effectively as a ground cover for general landscape use.

Blue oats grass makes another good companion plant in a blue-toned planting. Both combine well with blue rug juniper, deodara cedar, and purple-flowered Siberian iris. Blue oats grass is somewhat taller than blue fescue and not reliably evergreen. Some winters it turns buff-colored, but retains its form. The foliage is in stiff tufts to eighteen inches with open blue panicles in May reaching to three feet.

The most intense blue of all the grasses is *Elymus arenarius*. It was much admired by Gertrude Jeckyll who is noted for her contribution to perennial border design. She considered foliage to be as important as flowers, thus highly valued the blue of *Elymus*. It forms eighteen inch tall masses, has an irregular spreading growth habit and is one of the most invasive grasses. Unfortunately, it is without winter interest and not well used ornamen-

tally as a ground cover where an evergreen would be preferred. In the border it should be kept from encroaching upon its less vigorous neighbors. It does make an excellent container plant and will tolerate very moist areas in the garden.

Some of the most ornamental and interesting grasses have a variegated foliage, most with white, cream, or yellow combined with green. A few combine with pink or purple.

A delicate variegated grass is *Molinia caerulea* 'Variegata'. Its narrow leaves are finely striped with yellow and form a small eight inch tufted clump which is particularly nice in a rock garden. It is also useful for bedding designs or in containers.

Two cultivars of *Miscanthus sinensis* are outstanding. Both have leaves with a combination of cream and green and grow to four feet with the same upright arching form. The leaves of 'Variegatus' are striped as are most plants with the stripes running the length of the leaf. 'Zebrinus' is unusual with its variegation in horizontal bands. Both are excellent specimens in any landscape planting or useful in the background of the border or in containers.

There are many annual grasses which have value and can be tried and varied from year to year. One which I would choose first is *Lagurus ovatus*. This grass is known as rabbit's tail grass, a name which aptly describes its soft fuzzy appearance. It is lovely in the garden for only a short time. Its foliage dies immediately after it flowers in July. The flowers, however, can be saved for many years. They dry and dye very well. To save the flowers of any grass it is best to cut them just as they open. They can be hung to dry or placed in a vase to obtain a graceful curve. Some, such as pampas grass or the *Miscanthus* cultivars, will benefit from spraying with a lacquer hair spray to keep them intact longer.

All these grasses have similar cultural requirements. They prefer a sunny location and, all but *Elymus*, a well-drained soil. There are other grasses which will grow in water. They will tolerate some shade but their form will become less compact and therefore less attractive. Flowering will also be reduced with a decrease in light. Fertilization is not required except with extremely infertile soils. A very rich soil will encourage a loose, open, less attractive growth. Most of the perennials require division as the center of the clump dies. For some this will be as frequently as every three years; for others such as the pampas grass not at all. The annuals and many perennials can be grown from commercially available seed. Perennials are also available as plants from several growers which will result in a more immediate effect in the landscape and usually earlier flowering.

These grasses are only a small sample of ornamentals suitable for gardens. There are varieties of every height and color for every cultural condition and type of garden. Grasses create soft sound, gentle motion, and fine textured beauty. Why not give them a try?

Our Wild Eastern Treasures

Native Azaleas

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9 Winding Way
Locust Valley, NY 11560

The most joyous imaginable first introduction of a city gardener to a wild azalea would take place on a June day in the lovely mountains of western North Carolina. The azalea would be the Flame (*Rhododendron calendulaceum*), reigning monarch of our native eastern species. "Calendula" means marigold, and the name fits well. Colors vary from palest yellows through sun-bright oranges to firecracker red. For such an introduction, Nature provides, as background, a celebration of color. The Catawba Rhododendron (*R. catawbiense*) is in full display—pale pinks, soft lavenders, magenta. The Mountain Laurel (*Kalmia latifolia*) parades its intricate buds and flowers in pure white, in the usual calico, and in red-bud forms worthy of selective propagation. On grey rock ledges, clumps of blazing Fire Pink (*Silene virginica*) look down on yellow heads of Evening Primrose (*Oenothera biennis*), creamy plumes of Goatsbeard (*Aruncus dioicus*) and the peculiar pink of Beardtongue (*Penstemon canescens*). As an artist, Nature here splashes colors with an abandon and a gaiety quite alien to the small garden. Her background, however, is the soft and endless blue of the jumbled mountains. As painter, Nature heralded Miro and Matisse.

Our city gardener, meeting a native azalea for the first time in such a setting, could but come away bedazzled. I know. I, myself, grew up in azalea-country, but I have a city-bred Yankee husband. He was already a member of the American Rhododendron Society, and a knowledgeable gardener, when I first showed him the Flame azalea at-home-in-the-mountains. His reaction was a simple, unbelieving "Wow." Nature provides no equivalent spectacle anywhere else in our eastern American wildland.

What are our native azaleas? All azaleas are of the genus *Rhododendron*; *Hortus III* lists them as a subgenus, *Pentanthera*. In standard reference books on azaleas you will find subgenus *Anthodendron* instead, or (simplest for the non-botanist) just series *Azalea*. All are members of the Heath family (Ericaceae), and as such are cousins to multitudes of plants from blueberries to Trailing Arbutus. The subgenus, or series, is next divided into sections (*Hortus III*), or subseries; we have representatives of two. Both are deciduous. They are quite distinct, and a

gardener need not be a botanist to see the difference. The smaller of the two groups is section *Rhodora* (*Hortus III*), listed in most books as section or subseries *Canadense*. These flowers have the five petals of all azaleas, but the upper three are grouped together; there is little or no corolla tube, and the stamens number seven or ten. The larger group is called section *Pentanthera* (the same as its subgenus) in *Hortus III*, but you will find it more often as subseries *Luteum*. Here are five quite separate petals or lobes (the upper one often wider, blotched, and sometimes ruffled), the corolla tube is long and definite, and the stamens number five.

At this point comes the further division into species; at this point, also, the taxonomists begin arguing! America has seventeen species, or fifteen, or sixteen. "Someday these will be further divided", or, "Someday these will be further grouped." What is really important to grasp is that our azaleas form a shifting, hybridizing population, the shift going far back in time, yet continuing today. The bees have been promiscuous too often for any neat and permanent taxonomy. Sometimes a species has been listed as valid, then dismissed (for example, David Leach proved quite conclusively that a lovely pink called *furushii* was a recent hybrid). No matter what I write, I am sure to be questioned!

All but one of our species are eastern; I will write only of these for they are the ones I know. Together, these azaleas give us woodland treasures from Maine to northern Florida, varying in color, in fragrance, in growth habit, in blooming time. No one botanist, no one flower lover, could adequately explore them all in a lifetime.

I present the azaleas in a simplified arrangement, of necessity. Most writers group them by color, or by blooming time, or by geography. Each of these approaches can be confusing. Under a "Pink" you may note,, "One of the best forms for the garden is white." Blooming time depends on locality. A geographical listing stating that "*R. prunifolium* is a native of a very small area in midwest Georgia and mideast Alabama" might lead one to believe a New York gardener should ignore it. (Plants of *R. prunifolium* survived the brutal northern winter of 1976-77 with flower buds bravely intact). I will merely list them alphabetically, under the two subseries,

or section, groupings. Also, I do not adhere rigidly to *Hortus III*. I discussed this with Dr. Henry Skinner, the very knowledgeable former Director of our National Arboretum. He agreed that some nomenclature as used



Photos by Author

could be confusing. Name changes will take a long, long time to filter into the vocabularies of most gardeners. . . . By then, it may be time for a new *Hortus*, and a new language. I know that I, at least, cannot suddenly call an old friend by a different name!

I begin with the smaller, and less familiar-looking, section *Rhodora* (or subseries *Canadense*.) The nearest relatives of these azaleas are Japanese.

R. canadense is the *Rhodora* of New England poets. Emerson's words, "Beauty is its own excuse for being" were written about this small and much loved little flower. Some may call it scraggly, and even of poor color (the range is from a pale pinkish lavender to deeper shades of almost-magenta; there is also a lovely white). If you find it nestled in the crevices of grey granite, along Maine's coast, or filling a bog between the dark spruce trees, you can only call it perfect. It is low (as low as one foot in height in windswept spots, or three in bogs), twiggy, and the distinctive grey-green of the leaves comes after the flowers. The three upper petals are only separate at the very tips, and are speckled in a darker color. In Maine, the bloomtime is the first week of June. The natural habitat extends down to New Jersey. In a Long Island garden, where it is not native, I have found an approximate date of one month earlier.

R. vaseyi is known in its North Carolina home as the Pinkshell Azalea. Years ago it was not considered an azalea at all, but had a genus name of its own, *Biltia* (long

invalid). As with its northern cousin, the upper three petals are grouped, but not tightly so, and both species have no corolla tube. Whereas the *Rhodora* has ten stamens, Pinkshell has seven. Color? A good soft pink with a hint of green in the throat and a sprinkling of paprika-red dots at the base of the upper petals. An excellent cultivar is 'White Find',—the dots being green on snowy petals. One peculiarity of *R. vaseyi* is that it does not hybridize. It blooms at about the same time at home in its mountains or in a New York garden—May 1.

Next, we turn to section *Pentanthera* (or, subseries *Luteum*), which is the larger grouping and much more familiar to us as "looking like azaleas". The species *R. luteum* itself comes from near the Black Sea, another species comes from China, and another from Japan. The vagaries of botanical geography are fascinating! What a history of the physical world could be told by the distribution of plantlife . . . the spreading and receding of the glaciers, perhaps the drift of continents.

R. alabamense is a rare little azalea, pure white with a yellow blotch in the typical form. Alabama Azalea is its only common name. In its very localized home (part of Alabama and west central Georgia) it perfumes the air with a really delightful lemon scent. It is a stoloniferous plant, and spreads over the low hills. As with most whites, some forms are pink-tinged, probably from living too near *R. canescens*, so bees could exchange pollen. In Alabama, it blooms about May 10. My bloom dates for Long Island are nearer the 20th. Plants here bloomed well after a rough winter.

R. arborescens is the Sweet Azalea, and sweet it is. Books insist on calling the fragrance "heliotrope", but I, for one, have never smelled heliotrope. The florets are very star-like in form, and the white is accented by a red style. Often all the filaments are pink, and sometimes the corolla tube and the bud tips. In hybridizing it "throws pink", as they say. I have been sent a photograph of a good clear pink flower, but I have not actually seen it. My favorite plants are a group of pink-tube ones, with very large flowers, growing in the Nantahala Mountains of North Carolina. In height, *R. arborescens* is medium to tall. Locale? Georgia all the way to Pennsylvania, at least. I have photographed North Carolina mountain blossoms on June 20, and Long Island garden ones during the first three weeks of July.

R. atlanticum, called the Coastal Azalea, is another white -which-is-sometimes-quite-pink. It is coastal, going all the way up from South Carolina to New Jersey. *R. atlanticum* is aggressively stoloniferous, and one plant can grow to cover a huge area. As a very low azalea, it could be used to advantage in facing-down woodland areas in gardens, but it has not been much planted. In



Far Left—*R. speciosum*
 Above—*R. canadense* 'Rhodora'
 Below—*R. arborescens*



South Carolina, it blooms about the end of April; Long Island dates are not much later,—early to mid May.

R. austrinum is known as the Florida Azalea, although it grows all the way to Mississippi, near the Gulf Coast. This is a lovely yellow-blooming shrub, and one of the early signs of a bright spring in the South. The flowers are not large, but are very showy, indeed. Often pure yellow, it also has forms with red corolla tubes, which are even more gay. At "home," its blooming companions, in late March, are the pink and white forms of *R. canescens*. The garden photographs I have taken on Long Island have been in mid-May; unhappily, the plants I know here died in the bad winter of 1976-77.

R. bakeri is also called the Cumberland Azalea. It is usually red, and is one of the most recently classified.

The name was first given to plants found near Wolfpen Gap in the Georgia mountains; the area is only about thirty bird-flight miles from my home in Georgia, in a place I frequented as a child. I must have assumed, as did everyone else, that the bright azaleas were Flame. The colors are at the redder end of the Flame spectrum, but they vary. Also, they hybridize much more freely; there are many fine pinks which the bees bequeathed us. *R. bakeri* is, in general, a lower plant, stoloniferous, and later-blooming. The really positive identification is by microscope; *R. bakeri* has the normal number of chromosomes, and the Flame Azalea has a double set. Blooming time? At Wolfpen Gap, and on into the 3000 foot areas in North Carolina, approximately June 15; at one of the most glorious areas, Gregory Bald in the Great Smokies, July 1. The azalea grows into Tennessee and Kentucky. In Long Island gardens, it blooms at about the same time, sometimes saving its burst of firecrackers for July Fourth.

R. calendulaceum has to be the queen of them all. Are you familiar with the color fans of the Royal Horticultural Society? If you are, open the red-yellow fan to show the full range of colors from number 11 to number 44. The array is truly astonishing! I recently had to testify before the United States Forest Service in Washington, against clear-cut lumbering of a large area of the Nantahala Mountains; one of my "exhibits" was the opened fan. I have color catalogued as many as thirty-five distinctly different *R. calendulaceum* in two days, in those mountains. I began this article with a "poem" to my favorite flower; I will add no more adjectives. The Flame Azalea is a tall plant (up to fifteen feet). Botanically, the most interesting feature is that it is the only one of our eastern azaleas in the *Luteum* subseries which is tetraploid. That means there are twice the usual number of chromosomes; as chromosomes come in pairs (and the azalea number is 13), $2N = 52$. This accounts for the variety; the genetic "pool" is enormous. Until recently it had been thought that *R. calendulaceum* had two separate "phases". One group was low-elevation, early-blooming, and larger. A recent study in depth by Dr. Frank Willingham seems to have proved this theory incorrect. His study found all botanical characteristics randomly distributed, whether the azalea grew high in the mountains, or lower. At 5000 feet to 6000 feet in North Carolina, the bloom is best at about June 20, and on Long Island it is the same. The Cherokee Indians had a wonderful name for the Flame Azalea, "Sky Paint Flower."

William Bartram called it "the most gay and brilliant flowering shrub yet known."

R. canescens (the Piedmont Azalea) is probably the most abundant of all our azaleas. Masses of its pink blossoms grow all over the lower South, from Georgia, upper Florida, west to eastern Texas. A typical flower is a deep pink in its tube color, and pale pink in the petals or lobes. *R. canescens* is an early bloomer; you will find it by about March 20 in its southernmost home. On Long Island, a garden plant may be at its best around May 5 to 10.

R. nudiflorum (the Pinxterbloom, or "pink honeysuckle" to the farmers), has had a name-change decreed by *Hortus III*. It has been decided that Michaux's *periclymenoides* takes precedence. The problem is that this does not appear even as a synonym elsewhere. Bartram used *A. nuda*. By any name, however, it is a lovely plant. In appearance it is quite similar to *R. canescens*, but a more northern counterpart. It can be found in white (as can *R. canescens*), and Dr. Skinner once reported a purple one with a yellow blotch. Plants grow as far north as New England. On Long Island it is native, although it is hard to find nowadays. I have bloom-dates on it here from May 5 (on some photographs) to May 20 (Planting Fields Arboretum).

R. oblongifolium (the Texas Azalea), is an inconspicuous white, so similar to *R. viscosum* that some taxonomists would argue its inclusion. It grows in its name-state, in Arkansas, even in Oklahoma, and blooms in June.

R. punifolium, called the Plumleaf Azalea, is a rare treasure from a tiny area on the central Georgia-Alabama border. The plant is very handsome, with the leaves fully opened when the blossoms are. The red flowers resemble those of *R. bakeri* in many ways, but it is a very late bloomer. Around Fort Gaines, Georgia, different plants may spread the flowering season all the way from the end of June until the first of October. I have photographed some garden plants here on Long Island on July Fourth,—bright fireworks for the celebration. Planting Fields has listed their bloom-dates for me at August 1 to 15.

R. roseum, the lovely Roseshell Azalea growing from Virginia northward, has been demoted by *Hortus III* to a variety of *R. periclymenoides*. I am afraid I will go right on calling it *R. roseum*! It is pink, too, but has a shorter corolla tube (and wider). It has not only been demoted, but an earlier name now takes precedence; correctly, it is now *R. periclymenoides* var. *prinophyllum*. In range, it blooms from Virginia west to Ohio and Illinois, and all the way north to southern Quebec. The new classification presents *Hortus III* with one botanical difficulty; I will explain what glandular means when I finish this listing; as of now the description of the former *R. nudiflorum* has to say "Tubes variably glandular". *R. nudiflorum*, as we previously knew it, was not glandular; *R. roseum* was (and *R. periclymenoides* var. *prinophyllum* is). Do I sound unduly upset? I am! I almost feel I am defending a very beautiful friend against an army of taxonomists. What-

ever its name, the flowers are at their lovely best here on Long Island (it is not native) about the first of June.

R. serrulatum is also called Hammocksweet, and is another southerner. It is a white, with a very long corolla tube and small flowers. In range, it grows from the palmetto-country of mid-Florida, up through the Sea Island area of coastal Georgia, and westward to southern Mississippi. The virtue, to gardeners, is the lateness of the flowering; an average blooming date in its native area would be mid-July. I have a friend who grows a late form *en masse* with a late form of *R. prunifolium*, for his last azalea display. Here on Long Island, my photos are dated August 15. Unhappily, the plant proved unable to cope with the winter of 1976-77.

R. speciosum, the Oconee Azalea, is another victim of name-change. *Hortus III* gives precedence to Michaux's *flammeum*. Michaux discovered the plant on the Savannah River (1787), and his name for it is at least given as a synonym in most available reference books; this "new" name will thus probably be easy for us to use. The colors of *R. speciosum* are similar to *R. calendulaceum*. The range, however, is very restricted,—part of central Georgia and down along the river. In its native area, the flowers should open by May 1. On Long Island, the blooms appear nearer the 20th; I have photographed it here, but it is not reliably hardy.

R. viscosum (Swamp Azalea) is a white, fragrant azalea which seems to grow anywhere. It can be found from Maine to Georgia (and from mountain top to bog). Although the flowers are not conspicuous, a warm summer sun on a massed planting of them brings a pleasant spiciness to the air. The petals are so sticky (glandular) that they are unpleasant to touch. Boggy areas near the shore on Long Island are full of them. . . . but so are mountain tops in North Carolina. On Long Island, the bloom-date is late July.

As you notice, I have used little in the way of botanical terminology; there is just one "clue" used in botanical "keys" which I recommend all gardeners learn, for the sheer pleasure of it. Keys will say that the corolla tube is "glandular" or "eglandular". Glands are little round pinheads on the ends of setae, or hairs. The glands give the stickiness to the *R. viscosum*, which I just discussed. How to see them? A x8 flat-surfaced little hand magnifier is my accompanist in the field; a good one should not cost more than ten dollars, and will give you much pleasure, and a new look at the world of flowers. The glands on *R. serrulatum* are glistening diamonds on the tips of icicles; on *R. calendulaceum* you may find that the glands are rubies. Of what practical use is this? If you are in North Carolina in early May, and find a pink azalea, first decide if it fits into the *Luteum* or *Canadense* subseries. If *Luteum*, there are only two choices,—if there are glands, the flower is *R. roseum* (with apologies to *Hortus III*). If there are no glands, you have *R. nudiflorum* (*R. periclymenoides*). These are hairs, yes, but they rather resemble a pink fur coat when I project a close-up slide on the screen!

If you want to grow these charmers, whether you plan a wild garden or want a few specimens, you will be happily rewarded. I have seen *R. calendulaceum* and *R. nudiflorum* doing well in a Maine garden beside the native *Rhodora*. New York is just about borderline for including *all*, but it can be done, with protection for some. However, if hardiness is wanted, leave out *R. austrinum*, *R. speciosum*, and *R. canescens*; established plants of these species did not survive in 1976-77. There would also be little point in trying *R. serrulatum* or *R. oblongifolium* when the native *R. viscosum*, which is similar, does so well. If your garden lies much to the south of New York, forget *Rhodora*, but begin adding the others. A Virginia garden should have virtually unlimited choice (except for *Rhodora*). If you live in southern Georgia, you have lovely local species, which would make a beautiful garden even without any others. In Florida, the farther south you are the more you must omit . . . in southern Florida I would not even try *R. austrinum*, but would settle for *R. serrulatum* alone.

If you are presently growing any of the deciduous hybrids (Exbury, Knaphill, *et cetera*) you are already growing descendants of our native wildlings. American azaleas can shine as brilliantly as their titled offspring! All are acid-loving plants, doing best in the same conditions you would choose for any azaleas. Dappled shade, a pH of 5 to 6, humus-rich soil, moisture but good drain-

age, satisfy most requirements. Some seem more "fussy" than others (*R. prunifolium* for instance), but *R. viscosum* will tolerate practically anything.

I admit to loving our native azaleas with what amounts to a passion. My husband and I go south every June to photograph and study the Flame Azaleas; we head north (to Maine) at the beginning of the same month for the sole purpose of photographing *Rhodora*. Last summer, Maine was in a sodden week of rain and fog. We are stubborn photographers, however. My husband held my red slicker over the camera while I took pictures. I got wet—he, camera, and flowers fared beautifully. In North Carolina, I have been atop a slippery steep bank, only to be hailed by a ranger, "What the *hell* are you doing up there, lady?"

We enjoy it all,—the scenery, the adventures, the learning. I am sure equal joy awaits flower adventurers on other quests, but we still chase William Bartram's "fiery azalea". We will never find the ones he first saw, by the way. "Progress" encroaches on everything; the plants bearing the flaming blossoms about which he was so ecstatic vanished deep beneath the water of the Clark Hill Reservoir, near Elberton, Georgia. We must find our own!

I hope I have shared some of my pleasure with you. If so,— "Bon Voyage". An azalea quest is a never-ending one.

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Plants for Thought

Easy to grow, tough, adaptable, hardy, disease and insect resistant, with long flower production, the pansy is truly a remarkable plant

The pansy is a universal favorite, and as an early spring flowering border and bedding plant it has few peers.

Many gardeners don't realize how hardy most strains are. One, the Ice Pansy, will even bloom under the snow.

The word "pansie", a corruption of the French "*pensée*", meaning thought, first appeared in literature in 1587. John Gerrard, an English surgeon and plant collector, used it to describe a small wild violet which grew as a weed in the cool grainfields of Europe. Its purple, white-ish blue and yellow-colored flowers prompted the name *Viola tricolor*. The pansy, although quite different in size and form, is assumed to have developed from this wild violet. Its botanical name is *Viola tricolor hortensis*.

The first attempt to improve the small pansy of the day was done in England about 1812. Lord Gambier, his gardener, Thompson, and the daughter of Lord Tankerville, are credited with selection and cross breeding to produce a new pansy with face-like markings and perfection of colors. It was called the Show Pansy and was the "rage of garden fanciers" by 1840.

Over the years pansy breeders in Scotland, Switzerland, France, Belgium, Germany and other European countries, using the English stock, produced the giant flowering varieties. These were called the Fancy types. They produced new flower colors with dark center blotches and a velvety texture. Each country developed many different sizes, forms and colors.

Soon, specialists crossed the two pansy types (Show and Fancy) to increase the many strains available today.

Pansies are short-lived perennials, best grown as biennials (grown one year and flowered the next). Today many are grown as annuals by greenhouse growers and are offered for sale in the spring. These are small plants grown in flats with small root systems.

It now is almost impossible to find local pansy growers who have big field-grown plants for sale in the early spring, or even the finer and larger plants which are wintered in cold frames. These plants were common 20 or 30 years ago. The cost of seed, labor and soil preparation makes this practice unprofitable today.

A good pansy plant should be judged by the size of its root system, not just the size of the plant above ground or the beauty of its flowers.

The pansy grown as a biennial, sown in late July, transplanted to cold frames for wintering, has much more time to develop larger roots than any other growing method. In my latitude of zero and sub-zero temperatures, the plants will be in good bloom under the sash by early or mid-March, even though they have been frozen down in the frame during the cold months. Using a trowel, they should be lifted out with soil intact and transplanted to the outside bed or border as early in March as the ground is workable. They will have two more months of frost which they can easily stand without harm: frozen flat on the ground in the early morning freeze and up and looking normal before noon. By mid-April they will be in spectacular display.

Every serious gardener should

have cold frames. They are inexpensive and easy to construct. In Jim Crockett's fine book, "Victory Garden", there is the best and most simple design for construction of cold frames I have seen.

It is important to note that some fine seed mixtures contain beautiful giant flowers not quite hardy enough to withstand the cold outside conditions. In cold frames they will develop with no losses.

Without a cold frame, the next best method is to plant the small seedlings directly in the beds or borders where they are to bloom the following spring. This must be done in early or mid-September, and allows three months of growth and root development before the winter freeze.

Pansies are grown from Nova Scotia and northern Canada to southern areas near the Equator in high and cooler altitudes. In the southern states and California they may bloom throughout the winter and spring months with no harm. Occasional freezes seem only to harden them. The hot summers in the mid-west are fatal to pansies, although the F₁ hybrids developed by Sakata, of Japan, are said to withstand heat and sun and to continue blooming well into July.

The best growing location is a sunny one but where there is protection during mid-day heat. Pansies should get all the morning and late afternoon sun possible. Initially, my plants do well with all day sun facing south, but perish by the second week of July. The long blooming period of more than three months is very satisfactory.

These plants are cool-loving, heavy feeders, requiring substantial amounts of water and a loose fibrous growing medium. The soil where the plants are to grow should be

prepared well in advance. It should be made loose and friable with the addition of compost, peat moss, well-rotted manure, and sand. These additives should be spaded in to the depth of eight or ten inches. If the plants are to stay outside through the winter, it is wise to raise the beds three or four inches to ensure drainage during the cold, wet period.

After a month of heavy bloom, the plants will have exhausted most of the food in the soil and fertilizer must be added and watered in.

Now a word about mulches or winter cover. After outside plants are frozen, they should be covered lightly with any loose material which will not smother them. A very light cover of straw is satisfactory. Excelsior, I think, is the best because it will not pack down and allows plenty of air circulation. Small evergreen branches of pine or spruce are useful as a cover also.

Mulches are used to keep the ground frozen and prevent frequent freezing and thawing, which will heave the plant upward, break its tap root and kill it. Snow is a good mulch and rarely injures pansies. If you have a snow covering all winter, you need no other mulch. Mulches should be removed as early as possible in the spring.

One can also buy small plants at garden centers in the spring, but be careful: many centers do not get them from the grower early enough. The plants usually arrive with the tender annuals; by this time it is too late to plant pansies.

About March 1st last year, I found small plants in flats, well grown as annuals, in a small greenhouse truck garden concern. They had been seeded in December, grown cool, and for the last week or two, had been placed in a plastic house without heat and left dry to the point of wilting. This procedure "hardened off" the plants and prepared them to stand freezes outside without harm. I planted them on March 10th five or six inches apart (because of their small size). First blooms appeared

March 21st. There were 700 plants, three rows deep, in a long border facing south and full sun. By the second week in April there were hundreds of blooms with no damage by repeated hard frosts which would continue for the next six weeks. Even though the plants were small, they made a fine show for over three months. The point here is to get pansies planted as early in the spring as possible. They need a short hardening process before planting and should not be taken directly from the relative warmth of a greenhouse when they are still tender.

The pansy seed packets available in garden centers contain about a hundred and fifty seeds at a cost of approximately 50 cents. For the most part they are mixtures of good varieties, chosen well by the seed companies. Forty or fifty plants from 150 seeds would be a very good average as all seeds do not germinate. There are approximately 20,000—24,000 pansy seeds to the ounce, depending on the size of the flower type. If one desires several hundred plants, he can buy seed by fractions of the ounce. One-sixteenth of an ounce, 1,500 seeds; one-eighth ounce, 3,000 seeds, etc. The strain chosen should contain an abundance of yellows, blues and light colors which make a much better show than the Fancy types which generally have darker colors.

Flats, 20" × 13" × 3½", or shallow boxes, 3" or 4" deep, are excellent for seed planting. Seed can also be sown directly in the beds or borders where they are to bloom, or in cold frames. For seeding in flats, any good garden soil is satisfactory. It should be made loose and light by the addition of peat moss and sand. The soil should be thoroughly mixed and made uniform by screening through a coarse wire screen.

Add a handful of steamed bone meal to the soil in each flat, but no other fertilizer. Fill the flat within a half inch of the top and firm or tamp down with a brick or wooden block. Water in thoroughly and let the ex-

cess drain away at the bottom. The seed can now be sown evenly and thinly on the surface. Cover very lightly by sifting fine peat moss, sand, or the same soil mixture. Sprinkle lightly. More failures are caused by covering seeds too deeply than any other factor. A good rule of thumb for any seed is to cover no more than twice the diameter of the seed. Use up to four or five hundred seeds to a flat. Place the flat in a plastic sleeve and cover the top surface with dark cloth or paper. Pansies germinate better in darkness. The plastic sleeve will ensure moisture to the seed until germination.

An older, but excellent, way is to cover the wet seeded flat with a water-soaked piece of burlap, cut to fit the surface of the flat. Check the flat several times daily and lightly sprinkle through the burlap if dry. The seeds must be kept moist. Either way, the flat should be on a shaded, level surface. Seeds will germinate in seven to twelve days. Temperature is important and should be 60 - 65 degrees minimum. Nighttime temperature of 75 degrees will cause the seed to rot—a problem in the south. As soon as seedlings show, the covering should be removed and the flats given a place with good air circulation and gradual exposure to the sun. Watering should be limited.

Depending on the latitude and locality, seeding should be done from early July to early August. A good rule of thumb: two and a half months before the average date of the first fall frost. Keeping the seedlings a little on the dry side will stimulate the roots to reach lower moisture levels in the soil. This, and sufficient light, will keep them from getting leggy and weak.

Transplanting to beds, borders, or cold frames should be done when the seedlings have at least six to eight leaves. In transplanting, spread the roots and place the base of the plant exactly level with the soil's surface, firming each plant gently with both hands. The soil should be loose and not too wet.

Planting too deep stunts the plant. Too shallow planting results in a misshapen, floppy and weak plant. Pansies should be watered immediately after transplanting and protected from hot all-day sun for a day or two.

Throughout the blooming season, faded and spent flowers should be picked off at the base of the stem, not the base of the flower. This prevents the formation of seeds and keeps the plant blooming. Water frequently. Sprinkling foliage and flowers with the hose in late afternoon or early evening is beneficial during hot days.

Spraying will also wash off red spider mites which arrive with hot weather. They like pansy plants and can kill them if not controlled. Mites are found on the under surface of the leaves and are difficult to eradicate. Mite-infected plants show minute white spotting and loss of green color and substance. Systemic insecticides are your best control. Ask your local nurseryman for advice.

Pansy wilt disease is still a mystery and causes sudden death of the plant. Sterilizing the soil is a preventative, but sterilizing beds and borders around the home is almost impossible.

There are so many name varieties of pansies and so many types and strains available, space does not allow naming or describing them here. I should mention the great standards of the past and present: the Swiss Roggli Giants, which some authorities say is "a strain by which all others are judged"; Geneva Giants, Engleman's Giants, Maple Leaf Giants, Canadian Giants, Oregon Giants (which might well be the largest of all, five inches or more in diameter); Steele's Jumbos and Butterfly Hybrids, F₁ and F₂ hybrids, Trimardeau's French type, etc.

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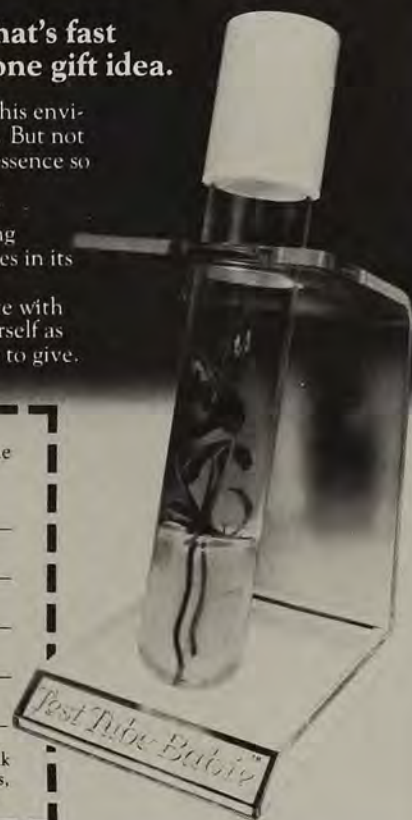
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Rhododendrons for All America

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Perhaps the excellent achievement of rhododendron breeders in producing plants with greater stress tolerances, as well as adding to the beauty of form and flower, is not fully understood and appreciated. Many areas of our country never would have known the rhododendron without the developed vigor of the hybrid. On the whole, hybrids are accommodating plants with elastic constitutions.

How often many of us have tried to uproot a native plant from the wild, carefully transplant it in our garden, only to fail! The wild rhododendron, accustomed to comforts of its environment in the mountains, strongly resents harsh urban surroundings. A dedicated diligence and persistence is required of a rhododendron breeder to draw out the best features from the multitude of native species around the world. Thousands of seedlings will have been generated over years of selecting and testing before his goal is reached.

Almost every garden in this country can reliably use rhododendron hybrids. In extreme subzero climates one might be required to resort to planter boxes transferable to a garage during the cold season. A decorative container adorned with a lovely rhododendron will enhance any patio. Tropical forms, somewhat unlike the typical rhododendron, are becoming available for outdoor culture in Hawaii, California and central Florida. Or, these beauties may be grown in a greenhouse anywhere.

By far the most important requisite for a successful rhododendron planting is the soil. Fibrous roots cannot penetrate a heavy clay condition. Requiring extra oxygen, the fine roots grow upward and outward from the rhododendron. Compacted soil, deep planting, or too much standing water, will deprive the roots of oxygen and snuff out the life of the plant. Therefore, rhododendrons should be planted at the surface of a light soil mix sufficiently porous to maintain a pleasantly moist root zone. Yellow leaves and other signs of distress, often blamed on too much or too little fertilizer, alkaline soil, or salt damage, frequently are the result of poor soil aeration.

The greater part of our country, notably the South and Midwest, does not have an ideal native soil. Gaining wide acceptance is the principle of planting on top of the ground, or using raised beds. In other words, without digging a hole, place the plant on the ground and mound up around the rootball a created soil mix most conducive to good root growth. Generally, a bit of soil mixed with ground bark, oak litter, pine needles, or forest humus, will be satisfactory. To improve the texture, some coarse peat moss may be added, but should never be a major portion of the soil mix. Attractive raised beds can be constructed using bricks, stones, treated lumber, logs, uncreosoted railroad ties, or simply by mounding in berm fashion.

In the breakdown of a raw organic material such as bark, excessive nitrogen is required. The planting mix should be supplemented by adding ammonium sulfate at the rate of one pound per one hundred square feet.

Since the roots of a rhododendron grow close to the surface of the soil a hoe never should be used to remove weeds and grasses. A 3" or 4" mulch of coarse bark or pine needles will reduce the weed population, maintain a moderately cool and moist root system, and provide winter protection.

Shelter from drying winds and excessive direct sunlight is the second most important requisite for a successful rhododendron planting. The evergreen leaves of a rhododendron transpire water vapor continuously night and day even in subfreezing temperatures. In general, larger leaves will desiccate more profusely and will require more protection. Wind has the effect of increasing the rate of transpiration. A burned leaf is the result of a plant's inability to pump moisture at a sufficient rate from the roots. A cold dry wind, likewise, will burn leaves when the ground is frozen.

A rhododendron planting with a northern exposure or on a slope facing north is ideal, assuming there is a wind shelter. An eastern exposure should be avoided in cold climates where rapid thawing by morning sun will damage flower buds and leaves. Unless shaded, the south and the west are usually too warm in summer months. An overhead canopy of trees is excellent if the

shading is not too dense. Avoid planting too close to the trunks of, or under shallow-rooted trees.

The American Rhododendron Society publishes cold hardiness ratings resulting from reports of members residing in all sections of the country. Newer hybrids cannot be rated until sufficient experience has been gained. Important is the understanding that these ratings apply to a mature, established plant in good health and with only reasonable protection provided.

Rhododendrons of proven cold hardiness are genetically sturdy plants and, likewise, generally are heat tolerant. As a consequence, some varieties can be grown in almost any section of our country provided temperatures do not remain below 25° F for a long period of time. Some of these varieties, referred to as ironclads, are 'Album Elegans,' 'America,' 'Boule de Neige,' 'Caroline,' *catawbiense* 'Al-

bum,' 'English Roseum,' 'Everestianum,' 'Ignatius Sargent,' 'Mrs. Charles S. Sargent,' 'Nova Zembla,' 'Parsons Gloriosum,' 'Roseum Elegans' and 'Windbeam.'

Residents of the colder areas of New England should select from this list, but in addition they may use 'P.J.M.,' 'Purple Gem' and 'Ramapo.' The latter two, almost identical in flower color, small leaves and dwarf habit, do not perform well in warm climates. 'P.J.M.' also is a smaller leaved variety of lavender-pink flowers bursting forth in early spring. A rich mahogany coloring decorates the foliage in the fall. 'P.J.M.' will thrive and flower after enduring temperatures as low as 30° below zero F.

The following rhododendron variety recommendations by area are not all-inclusive, and an effort is made to list only those hybrids which are generally available. Limited quantities of newer varieties

might be found by asking your nurseryman. Also, to clearly define lines of separation between the various climatic zones would be impractical and this final decision must be left with the reader.

The coastal areas of New England up to Maine, blessed with more favorable conditions, may use a considerable number of additional varieties including 'Beller Heller,' 'Blue Peter,' 'Chionoides,' 'County of York,' 'Dora Amateis,' 'Fastuosum Plenum,' 'Gomer Waterer,' 'Holden,' 'Ice Cube,' 'Janet Blair,' 'Mrs. Tom H. Lowinsky,' 'Pink Twins,' 'Scintillation,' 'Tony,' 'Wheatley' and *wilsoni*.

Continuing on down the coast, Long Island, through Philadelphia and to Washington, D.C., some excellent selections are 'A. Bedford,' 'Blue Diamond,' 'Blue Ensign,' 'Cadis,' 'Cheer,' 'Cynthia,' *daphnoides*, 'Lord Roberts,' 'Madame Masson,' 'Mars,' 'Mrs. Furnival,'

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myrtifolium, 'Purple Spendour,' 'Rocket,' 'Trilby' and 'Vulcan.' The bright scarlet 'Jean Marie de Montagu' may be used in the more gentle climates of this area, and those who choose to try this hybrid will find it most worthwhile. The same can be said of 'Unique,' a compact straw yellow, and 'Virginia Richards,' a pink-yellow bicolor with excellent foliage.

The next area is Richmond, through the Piedmont Belt of North and South Carolina to Atlanta, and then across southern Tennessee, northern Alabama, northern Mississippi to Little Rock. In addition to the varieties previously mentioned, use 'Anah Kruschke,' 'Anna Rose Whitney,' 'Antoon van Welie,' 'Betty Wormald,' 'Graf Zeppelin,' 'Kluis Sensation,' 'Lady C. Mitford,' 'Mother of Pearl,' 'Mrs. Betty Robertson,' 'Mrs. E. C. Stirling,' 'Pink Pearl,' 'Sappho' and 'Vulcan's Flame.'

In addition to using raised beds, rhododendrons will be much more successful in warm climates if most of the soil is washed from the rootball before planting. This can be accomplished easily with a jet nozzle attachment on a garden hose. Sharp drainage will be attained by planting in ground bark and some forest litter, if available. This is absolutely necessary on the coastal areas of the Carolinas, Georgia, northern Florida and along the Gulf Coast to Texas. Growing conditions are difficult but the more dedicated have succeeded with the ironclads, as well as 'Blue Peter,' 'Cynthia,' 'Jan Dekens,' 'Jean Marie de Montagu,' 'Lord Roberts,' 'Mrs. E. C. Stirling,' 'Mrs. Tom H. Lowinsky,' 'Pink Pearl' and 'Vulcan's Flame.'

Returning north to the mountains of Virginia and the Carolinas, and then across through Kentucky to St. Louis and finally to Oklahoma City, is Zone 6 area. Varieties suggested for Long Island may be used.

The Zone 5 areas of Pennsylvania, the Virginia mountains, across the southern parts of Ohio, Indiana, Illinois, through the middle of Missouri and down to Wichita, may

use the same list mentioned for the coast of New England. This list also applies to areas close to the Great Lakes from Buffalo to Detroit, and the lower western coast of Michigan around to Chicago. A few miles inland immediately becomes Zone 4 where only ironclad varieties should be used. This includes the colder areas of Pennsylvania, Ohio, Indiana, Michigan, Illinois, Missouri and Kansas; and the southern parts of Wisconsin, Iowa and Nebraska.

Except for 'P.J.M.', only the more venturesome should try outdoor rhododendron plantings in Zone 3, the northern portions of the Midwest and New England states.

The ironclads have been used successfully in the Rocky Mountain cities of Denver and Salt Lake City, as well as the coast of Alaska. Again 'P.J.M.' is quite good.

The eastern areas of Oregon and Washington and the western strip of Idaho will do best with the New England coast varieties.

Rhododendrons are well known and most varieties, except the very tender sorts, do so well west of the Cascade Mountains in Oregon and Washington that a variety list does not seem necessary. The same applies to the San Francisco Bay area where even more tender varieties are grown. Those interested in newer varieties should contact one of the many rhododendron specialty nurseries.

Rhododendrons have been gaining acceptance in southern California in spite of the adverse water conditions. Some varieties seem to accept this provided they are grown with bark in raised beds or containers. The culture is similar to azaleas which have been used for many years. Varieties include 'Anah Kruschke,' 'Anna Rose Whitney,' 'Betty Wormald,' 'Blue Peter,' *broughtonii aureum*, 'Jan Dekens,' 'Lord Roberts,' 'Marinus Koster,' 'Mrs. Tom H. Lowinsky,' *myrtifolium*, 'Pink Pearl' and 'Sappho.'

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Members of the genus *Fuchsia* have long been admired and prized as tender garden plants in northern climates. What is not generally realized is that *F. magellanica* Lam., the hardiest species, is hardy in many temperate climates as well. It is one of the few plants native to Chile that will grow outdoors in the eastern United States. Wyman rates it as being hardy in zones 5-6 (Arnold Arboretum Map). This is the equivalent of the expected annual minimum temperatures of Boston, Massachusetts and Cleveland, Ohio.

Generally, the hardy fuchsia is treated as a herbaceous perennial in the northern part of its range where it is killed to the ground annually. However, each spring it sprouts up from below the soil, reaching a possible height of three feet or more with the longer branches drooping gracefully. The leaves, in whorls of twos, threes, or fours, may be up to two inches long. From late June or July until frost, the branches carry hundreds of small 1-1½ inch flowers in the typical fuchsia form. The tube and sepals are bright red, the petals blue to violet-blue. The many varieties vary as to habit, height, flower color and size, and hardiness.

In milder climates, *Fuchsia magellanica* commonly forms a shrub 4 to 8 feet high, but may reach twice that height. The tan bark peels from the older stems in an attractive way.

This fuchsia is hardy throughout



Hardy Fuchsia

the British Isles as are many other Chilean natives. In Ireland and southern England *F. magellanica* is a useful hedge plant. Indeed, it is so well adapted to this climate that it has become naturalized along the roadsides in western Ireland. It is also hardy as far north as British Columbia in western North America.

In its native Chile, it forms thickets in low moist areas near water. The range of the hardy fuchsia is 1500 miles long, extending down even to the Straits of Magellan. It is found from the coast up into the lower elevations in the Andes Mountains.

Probably the first fuchsia in cultivation, it was introduced into England between 1786 and 1789 and was an important parent of many of the early hybrids.

Fuchsia magellanica would be a welcome accent to the front of the shrub border, blooming from mid-summer to frost when few other shrubs are in bloom. It is also well displayed above a low wall, particularly the prostrate habit of 'Globosa'.

The hardy fuchsia should not be difficult to grow. It is not particular as to soil and pH but prefers a rich, well drained mixture. Partial shade is recommended, but I have seen plants bloom sparsely even in heavy shade. A plant of mine in nearly full sun was very strong and bloomed profusely.

Most of the information about the culture of *Fuchsia magellanica* concerns the British Isles. However, over the years there have been a number of claims of success in the eastern United States. It has been

reported hardy in Freeport, Long Island and was grown and repropagated for 13 years in Syracuse, New York. I am told that it is also growing in Ithaca, New York at Cornell University. The cultivar 'Scarlet Beauty' has proved hardy in Painesville, Ohio. Dr. Donald Wyman notes that this clone and 'Senorita', though perhaps short-lived, have survived in Cleveland, Ohio. The Barnes Foundation on the south side of Philadelphia has grown a form of *Fuchsia magellanica* for many years. Examination of the records at the Arnold Arboretum has shown that of several trials over the years, none have proved extremely long-lived there. It seems that the home gardener can have somewhat better success where the plants get more personal care and can be repropagated every few years.

In most areas, particularly north of Philadelphia, care must be paid to winter protection. It is generally advisable to provide a mulch with a material such as salt hay or pine needles, which do not tend to mat down and lose their insulating capabilities. My experience indicates that it may be a good idea to set the plants slightly deeper in the soil in order to protect a greater number of the basal buds and provide a stronger start in the spring. A location next to the foundation of a heated building is likely to be highly beneficial.

Propagation is a simple matter in August. Softwood cuttings, 3-5 inches long, with or without a heel, root easily in vermiculite, sand, or other suitable medium. Young

plants should be given extra protection the first winter.

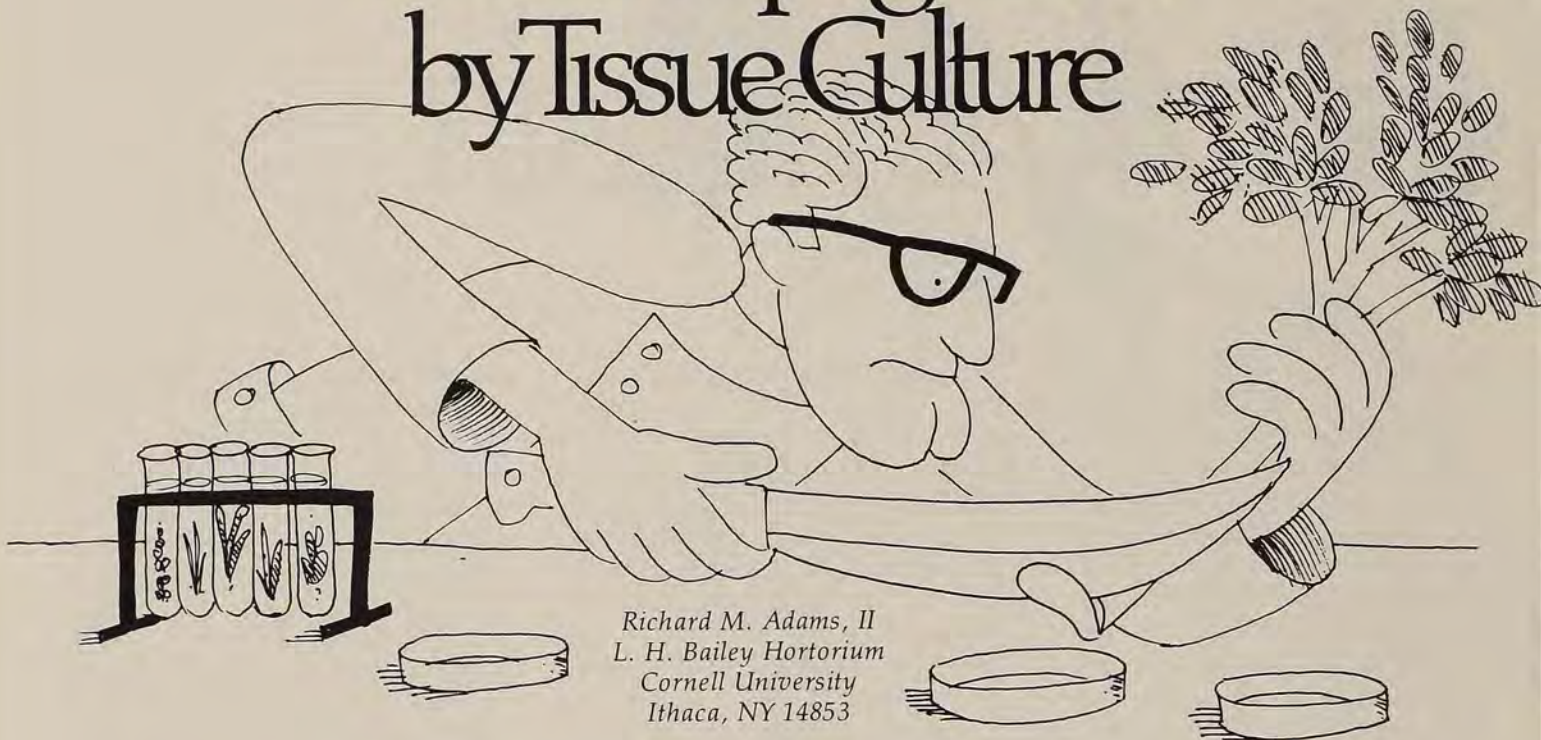
Surveying the literature or nursery catalogues, one is likely to be overwhelmed by the profusion of cultivar and variety names, many of which are synonymous. Generally, however, any variety of *F. magellanica* is worthy of trial. The landscape effects will be similar except for variations in habit or height.

The varieties *discolor* and *conica* are from the colder part of Chile and so may show greater resistance to cold temperatures. Variety *molinae* (*alba*), the white form, is mentioned as being one of the hardier forms. 'Maiden's Blush' is evidently a selection of this variety. Variety *gracilis* is reported to be hardy as far north as New York City. The variegated forms 'Variegata' and 'Versicolor' ('Tricolor') are both sports of var. *gracilis*.

There are a number of hybrids which, although they differ little from the species in landscape value, have reputations that recommend them highly for trial in the eastern states. 'Riccartonii' has proved to be one of the best of the *magellanica* types. It is both vigorous and floriferous, shooting up strongly after a hard winter. Wyman says it is hardy up to New York City. 'Globosa' may also prove hardy since it contains var. *conica* as one of its parents. 'Exoniensis' has flowers twice as large as the other hardy hybrids, but its comparative hardiness is uncertain.

I would be pleased to hear of the experiences of anyone who has grown any of these fuchsias.

Plant Propagation by Tissue Culture



Richard M. Adams, II
L. H. Bailey Hortorium
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Plant propagation would be easy for a sorcerer's apprentice. Think back to Walt Disney's *Fantasia*,² in which Mickey Mouse played this fabled character, and he found himself beset by the deranged, enchanted broomstick. At wit's end, he lopped the creature in half; but where previously there'd been one broomstick, there were now two! And when further cleaved, these became four, eight, sixteen, thirty-two . . . soon a whole battalion of comminuted servants, each as headstrong as the first.

The apprentice's bane, though, would be a boon to plant propagators; just think if plants could be severed, each half instantly regenerating anew. But this fantasy isn't too far from reality.

What plant cells (and perhaps the broomstick) have in common is the property of *totipotency*,¹⁰ meaning that each cell carries all the genetic information necessary for the formation of a whole plant.

Normally, individual cells do not reach their totipotential. If they did, the entire organization of the plant body would fall asunder as each cell

in the legion proliferated independently of the others. Growth is confined to specific regions of the plant, and growth of individual cells is regulated by their position in the plant body.

To fulfill its totipotential, a cell must be freed from its connections with other cells, and it must be nourished by a medium fully competent to support its growth.¹⁰ Theoretically, then, if a plant were separated into its component cells, each—under the proper conditions—could eventually generate a whole new plant identical to the parent.

Indeed, laboratory tests⁹ have shown that single cells of tobacco—a common plant “guinea pig”—can be isolated and grown into full-sized adults. This is a venturesome research exploit, for it's difficult to set up the proper test-tube environment to support such isolated cells, mere fragments of life that they are. For practical applications, it's much easier to start with a *group* of cells, as is the common practice in commercial tissue culture. Various

techniques of plant tissue culture (synonym, *in vitro* culture)⁷ derive their names from the plant part (the *explant*) with which cultures are started.

The apical meristem is a minute dome of tissue at the pinnacle of the shoot tip. This almighty aggregation of rapidly growing tissue gives rise to all the cells in the shoot. When explanted and grown *in vitro*, it will generate a new plant, and the process is dubbed “meristemming.” Most commonly some of the shoot tip tissue just below the meristem is also included with the part cut off, so “shoot-tip culture” would be a more accurate term for this technique.⁷ Other tissues that can be explanted successfully in some plants include leaves and leaf pieces along with flower parts—anthers, petals, and flower stalks.

Environment

Plucked from the plant body, with its elaborate provisions for nutrition and defense from the external environment, an explanted piece of tissue must be nurtured in precisely controlled surroundings. All the nu-

rients and growth factors found within the plant body must be supplied artificially.⁹ These include a variety of minerals: nitrogen, phosphorus and potassium (the three main fertilizer elements), plus calcium, magnesium, sulfur and iron. Micronutrients—boron, cobalt, and manganese, to name a few—may also be required, so they're routinely added. And an isolated piece of tissue can't photosynthesize enough sugar or vitamins to support its growth, so these too must be supplied. Aeration is also important, and this can be accomplished by agitating the liquid medium, placing the tissue on a paper support, or solidifying the medium with agar-gelatin.⁶

Within the plant body, growth is regulated by a variety of plant hormones, two important kinds being the auxins and the cytokinins. The plant detects these in faint concentrations—on the order of a few parts per million, the equivalent of a drop in a garbage pail.¹¹ Mighty powerful, they are! These hormones must be added to the medium in order to spur growth. But the proper concentration to use differs with each kind of plant; and unless the proper amount has already been determined for a given species, various concentrations must be tested beforehand. Commonly, test plants are laid out in a grid, with a series of varying auxin concentrations along one axis and different amounts of cytokinin along the other.

Just as the medium is favorable for nurturing plant tissue, so too could a host of microorganisms flourish, were the plant, container and medium not pre-sterilized.⁶ Explants are commonly soaked in a solution of clorox or alcohol to remove surface contaminants (although the shoot tip, enshrouded by developing leaves, is usually sterile).⁷ The medium and container must be autoclaved, and all subsequent manipulations are performed under a draft of filtered air.

Tissue cultures must be grown under the proper conditions of light

(either 24 hours or with a dark period) and temperature (generally in the 70's).⁷ Within a few days to a few weeks, explanted shoot tips will have proliferated to form a clump of tissue with multiple growing points which form tiny plantlets. These can be divided manually to effect propagation,⁴ or sometimes the process can be automated.¹ When grown in a continuously rotated medium, the plantlets will sometimes break off by themselves and initiate more plantlets, which break off and form more, *ad infinitum*. Not unlike the sorcerer's enchanted broomstick! Using this technique with carnations, it is estimated that one growing point can produce 100,000 plantlets within a six month period!¹ such an experiment was started at Cornell in 1969; and with this exponential growth rate, it's estimated that if all progeny had been allowed to survive, they would have numbered in the trillions by now!⁵

Applications of Tissue Culture

Rapid clonal propagation—Production of large numbers of plants in a short time is an obvious advantage of tissue culture, and the majority of florist's crops in the U.S. can be propagated this way. Plants so produced are all genetically identical to the original explant—that is, they form a *clone*—which makes them easier to manage: all prefer the same cultural conditions, grow at a similar pace, and flower at the same time.

Tissue culture could be used to propagate many species, once their preferences for growing media were determined. I think commercial growers tend to overlook people's growing interest in the "botanicals"—intellectually stimulating plants such as carnivorous plants, species orchids, unusual palms, ferns, succulents, and other foliage and flowering plants.

Large numbers of genetically identical plants (*monocultures*) can be threatened if they are susceptible to a particular disease which may wipe out the entire clone. In contrast, the genetic variability of wild

plants ensures against such mass extinctions. Such variability can be maintained in tissue cultures by starting them from numerous seeds rather than from genetically identical explants.

Obtaining virus-free plants—Many clones may become infected with viruses through many years of cultivation and vegetative propagation. But the rapidly growing shoot tip often stays one step ahead of virus infestation. When it's removed and grown separately, transmission of the virus may be avoided.

Storage of germplasm—Tissue cultures take up very little space, yet can generate multitudes of plants in short order; so the process has great potential for the long-term maintenance of stock plant material.

Tissue culture is a relatively recent development in plant propagation which is growing fast in popularity. I wonder what tales the fable-tellers of old would have spun had they seen the process in action!

References

1. Ben-Jacov, J., and R. W. Langhans. 1972. Rapid multiplication of *Chrysanthemum* plants by stem-tip proliferation. *HortScience* 7: 289-290.
2. Finch, C. 1975. The art of Walt Disney. Harry N. Abrams, Inc., New York, NY. pp. 96-106.
3. Hackett, W. 1966. Application of tissue culture to plant propagation. *Proceedings of the International Plant Propagators' Society* 16: 88-92.
4. Hanell, L. 1977. Report on the meeting: Plant tissue culture. Speaker: Bob Makeno. *Bulletin of the Los Angeles International Fern Society* 4(6): 146-161.
5. Langhans, R. W. (personal communication.)
6. Marston, M. 1970. Plant propagation using *in vitro* culture techniques. *Proceedings of the International Plant Propagators' Society* 20: 359-363.
7. Murashige, T. 1966. Principles of *in vitro* culture. *Proceedings of the International Plant Propagators' Society* 16: 80-87.
8. ———. 1974. Plant propagation through tissue cultures. *Annual Review of Plant Physiology* 25: 135-166.
9. ———, and F. Skoog. 1962. A revised medium for rapid growth and bioassays with tobacco tissue culture. *Physiologia Plantarum* 15: 473-497.
10. Steward, F. C., et al. 1964. Growth and development of cultured plant cells. *Science* 143: 20-27.
11. Tukey, H. B., Jr. (personal communication)

Lilacs

for Eight Weeks of Bloom

Owen M. Rogers
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Pity the gardener who says, "Lilacs? Two weeks of beauty and that's it!" That person sees only the common lilac with its admitted beauty of flower, but ignores other lilacs which extend the bloom season. Eight weeks of "beauty" is not at all difficult to obtain.

The first lilac species to bloom is *Syringa oblata*. It will open a week to ten days ahead of the common lilac, *S. vulgaris*; in fact, the flowers are so early that occasionally a late freeze will nip some of the buds. The species also has some fall foliage color so that this lilac's "beauty" extends all the way to autumn. The species *S. oblata* itself may not be readily available in all nurseries, but cultivars that have been developed from the hybrid of *S. oblata* and *S. vulgaris* (called *Syringa x hyacinthiflora*) are carried by many firms. Such names as 'Blue Hyacinth' and 'Clarkes Giant' (both blue), 'Assessippi' (lilac) and 'Esther Staley' and 'Necker' (Pink) are good additions to any lilac garden for their early bloom.

Following *S. x hyacinthiflora*, the bloom of the common lilac, *S. vulgaris*, dominates the season. This is the lilac of Lord Noyes who wanted everyone to "Go down to Kew in lilac time," and of Walt Whitman's, "When lilacs last in the dooryard bloom'd." The profusion of bloom and fragrance of these fabled blos-

soms overshadows most things that bloom at that time. There are too many cultivars of the common lilac; over 1,000 have been recorded, so the best recommendation is to go to one of the great lilac collections with pencil and paper, note outstanding plants, and match those names against the lists of lilacs available from a favorite nursery. Even if your nursery has only a restricted list, chances are that at least some of them will fit your needs for beautiful bloom.

After the common lilac, and frequently overlapping it, there are several lilac species to provide continued bloom, including *Syringa x chinensis*, *S. microphylla*, and *S. persica*. *Syringa x chinensis*, sometimes called the landscape lilac, is admired for its profuse bloom. It is smaller than the common lilac, and some consider it more graceful. In addition, it always blooms well—something that cannot be claimed for every lilac. The Littleleaf Lilac, *S. microphylla* is even more graceful and dainty than the Chinese Lilac. The plant will grow wide, but not tall, so it fits easily into shrub border plans. *S. microphylla* 'Superba' is a pink form of the lavender colored species. Both are equally fragrant, and both will produce a few small flower clusters in August. This fall rebloom is not as spectacular as the spring flowering profusion, but, in

August, any lilac flower can be a showpiece, especially if it is also fragrant.

Syringa persica is the finest textured of all the lilacs because of its small finely divided leaves and many small flower clusters. The Persian lilac was described over 300 years ago in Persia; however, it probably originated in China long before it was carried to Persia and India.

After the group of species listed above have finished flowering, most people think the season is over; but, now is just the beginning for the group of larger leaved species typified by *Syringa x prestoniae*. These lilacs are good landscape plants, excellent for large screens and enclosures as well as for an abundance of large open flower clusters. They do require a site with reasonable moisture, because in drought and stress times they suffer from lack of water. There are an increasing number of good cultivar forms in this group as the plant breeders continue to improve the forms. 'James Macfarlane' and 'Coral' are noteworthy because they have deep rose, almost red, buds and bright clear pink flowers. 'Royalty' is also an old favorite with deep purple flowers. This group of late lilacs includes several species and species hybrids that make fascinating garden subjects, but most are



carried only by specialty nurseries. Sometimes cultivars such as 'Rutilant' (purple), 'Lutece' (violet) and 'Hedin' (lt. pink) can be found through diligent search. New forms are being developed. One, which is not yet on the market, has been developed at the University of New Hampshire. This cultivar blooms in the New England area late in June, and when it is available commercially, it will extend the bloom season of the *Prestoniae* hybrids and overlap them with the tree lilac—the

be used a great deal more than it is, especially for its very conspicuous midsummer bloom.

There are a few lilacs that will put out an occasional small flower in the late summer. Even the common lilac will sometimes bloom in August, although it is unusual enough an event to warrant space in the local newspaper. If a lilac fancier would like such notoriety or just enjoys the fragrance of lilacs, more consistent early fall bloom can be obtained by planting *Syringa meyeri* and the one

New England), the contrast of green leaves with highly colored fall foliage plants highlights them both. When the leaves have finally dropped, lilac seed pods can extend the season of attractiveness. The tree lilac seed pods retain their clear straw yellow long into the winter and are especially effective in front of a dark background. Colored pods are known; one year I saw red seed pods on a plant of *Syringa oblata*. They must have resulted from an unusual combination of plant and weather, because the color has never reappeared with the same intensity. I am encouraged, and hopefully can enlist helpers, to look for more reliable performers. Maybe, somewhere out there, there is a lilac with seed pods that will rival the crabapple!

So, lilacs for two weeks? Nonsense, lilacs are for eight weeks. No! Lilacs are for all seasons.

Most Popular Cultivars of the Common Lilac *Syringa vulgaris*

(From a survey conducted by Mr. Frank Niedz in 1970)

Color	Double	Single
White	'Ellen Willmott' 'Edith Cavell' 'Mme. Lemoine'	'Vestale' 'Jan Van Tol' 'Mont Blanc'
Violet	'Violetta' 'Maréchal Lannes'	'De Miribel' 'Cavour'
Blue	'Ami Schott' 'Olivier De Serres' 'Prés. Grévy'	'Pres. Lincoln' 'Firmament' 'Decaisne'
Lilac	'Victor Lemoine' 'Henri Martin' 'Léon Gambetta' 'Alphonse Lavallée'	'Cristophe Columb' 'Jacques Callott'
Pink	'Mme. Antoine Buchner' 'Katherine Havemeyer' 'Montaigne' 'Belle De Nancy'	'Lucie Baltet' 'Macrostachya'
Magenta	'Paul Thirion' 'Charles Joly' 'Prés. Poincairé'	'Capitaine Baltet' 'Mme. F. Morel' 'Congo'
Purple	'Adelaide Dunbar' 'Paul Hariot'	'Ludwig Spaeth' 'Mrs. W. E. Marshall' 'Night' 'Monge'

last lilac species to bloom.

The main lilac bloom sequence ends with the tree lilac, *Syringa reticulata*, in late June and early July. Its compound panicles of creamy white flowers are very large, occasionally as much as 20 inches long and 12 inches across. The individual flowers are small, and without the characteristic lilac fragrance, although they do have a very rich, honey-like sweet smell. The tree lilac is, in fact, a small tree and an excellent landscape plant. It should

mentioned earlier in this article *Syringa microphylla*, either as the lavender colored species or the pink 'Superba' form.

Late in the fall, at least two lilac species produce effective fall foliage color. *Syringa patula* (*S. velutina*) turns a good burgundy while the hybrids of *Syringa oblata* also have fine purple-bronze tints.

Even the common lilac has fall value. Admittedly, it remains green until leaf drop, but because that leaf fall is very late (into November in

Prairie Grasses

Continued from page 5

stems, beginning in July, are unusual and directly responsible for the name "sideoats," because the seed spikelets do resemble oats, and are neatly arranged along one side of the stem. In late summer the seed stems turn whitish and remain that way until beaten down by winter. Although not showy, they are interesting, and last well in arrangements.

Western wheatgrass (*Agropyron smithii*) is a sod-forming cool season grass vegetating in spring and autumn with attractive silver-blue foliage. Its seed heads, which are not particularly showy, are produced from June until summer dormancy, growing up to about three feet. This grass is not tempting for gardens, but it has a useful place as a ground cover to prevent washing or blow-outs under difficult full-sun conditions. Sow the fresh seeds where you want plants to grow, in either fall or spring, covering lightly.

Buffalograss (*Buchloe dactyloides*) is a naturally short grass of the Great Plains whose possibilities have not been fully explored. The pioneers found one use when they built sod huts. Do not combine it with the taller kinds described here, or it will be lost. In a solid stand it forms a tough sod with a curly nap that repels weedy invaders. It never needs watering or fertilizing, and in a lawn needs mowing only two or three times a summer at most. Its disadvantage is that like other warm season grasses it goes dormant with frosts and stays that way until spring, as a light brown mat. In appearance through cool seasons it is no match for bluegrass, and it is not suited to sites that are shaded or damp. Also, after a few years the stand may begin to thin out unaccountably—a fault apparently related to the amount of rainfall.

To establish a buffalograss sod, broadcast pre-treated seeds in spring at the rate of 6/10ths of a pound of pure live seeds (abbreviated PLS in the trade) per 1,000 square feet on a very firm seed bed, and rake them in. If your seeds are not pre-treated, (to soften seed coat and break dormancy) it is best to sow them in autumn. If the amount seems very small, consider that buffalograss spreads fast by stolons, and sparse seedlings will quickly fill in, usually by the second year.

In growing only an experimental row of these grasses in a garden, weeds are no problem. But if you are trying to establish them over a sizable area, weeds are indeed a formidable foe. The topic of prairie restorations is too big to be detailed here, but the basic guideline is to start with a firm but scarified (not freshly plowed) seedbed, and one that preferably is in stubble from a previous season's crop to give protection from wind and water erosion.

Wheatgrass usually makes a fairly fast show, but the seedlings of big and little bluestem, indiagrass, and even switchgrass may be discouragingly slow to appear. In their first season more growth may go

downward into the soil than up into the sunshine. Meanwhile, you are likely to see a great flush of grassy weeds such as foxtail and crabgrass, and there is little you can do about them. By the second autumn and surely by the third, you should begin to see little tufts or clumps of the prairie species you planted. If they are no farther than a yard apart, the experts would say you have a stand, and nothing to worry about. Time will fill in the spaces.

The method of seeding may pose a problem. For small areas, hand broadcasting is practical, and will give a good random placement of the different kinds in a mixture. If the project is too large for this, the best way is to mix seeds with dry sand and scatter them with a fertilizer spreader. Unfortunately, in mixtures, the smoothest seeds such as switchgrass may fall through first, giving an uneven distribution. Draw a packer of some sort over the ground to firm seeds into the soil. In large acreages, planters use special implements developed for hard-to-handle seeds. Soil Conservation Service local offices are the likeliest sources of information about availability of such machines. The SCS Plant Materials Center at Manhattan, Kansas, where scores of strains of prairie grasses are planted each year, plants its small plots with a simple push-type (Planet Jr.) row type seeder with brushes on the feed mechanism.

Some of the current dealers (no endorsement intended) in prairie grass seed who will ship in small quantities at retail are:

Sharp Brothers, Healy, Kans. 67850

Miller Seed Co., Box 81823,

1540 Cornhusker Hwy.,

Lincoln, Nebraska 68521

Stock Seed Farms, RR, Box 112,

Murdock, Nebraska 68407

Small-quantity packets of prairie grass seeds are also available from Save the Tallgrass Prairie, Inc., 4101 W. 54th Terr., Shawnee Mission, Kansas 66205. Details will be furnished by that organization upon request.

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Pretty Plants Poisonous? It's Not Necessarily So!

William Carmichael
Society of American Florists
901 North Washington Street
Alexandria, VA 22314



Photo by Merchants Publishing Co.

Datura

The headlines are frightening, inflammatory, and they appear almost daily in newspapers throughout the country.

"*Pretty Plants Make You Sick*," announces the Danville, IL, Commercial News. "*Gardening May be Hazardous to Your Health*," says the Beaver, PA, Times.

"*Plants Poison!*" is how the Louisville, KY, Courier-Journal states the case, and "*Poison Plants Serious*

Threat" warns the Concord, NC, Tribune.

The Springfield, MA, Union recently posed the question: "*That Greenery On the Sill, Is It a Deadly Garden?*;" while the Paris, TN, Post Intelligencer stated with finality, "*Poison Plants Number Over Seven Hundred.*"

Is it any wonder that such headlines, and literally hundreds more like them, give even the most expe-

rienced horticulturists pause for thought? And there can be absolutely no doubt that such sweeping statements as "*Death Lurks In Your Garden*," "*Pretty Plants Are Perilous*," and "*Household Plants Pose Deadly Threat*" strike terror in the hearts of all parents with small children. Many read the headlines only, and have neither the time nor the inclination to check the facts.

Just what are the facts according to the experts? George Abraham, the highly-respected and widely-syndicated "garden" writer, says that, "Sweeping statements such as 'potential killers' (relating to household plants) have been made for years.

"We don't say that people should ignore the fact that certain plants, if eaten, can produce a toxic reaction in a child or anyone else. Nevertheless, the whole business of poisonous plants should be reviewed factually and without undue alarm. "In short," continues Abraham, "Nature's green growing gifts are taking a bum rap from people who don't want to look at the picture with common sense."

Abraham is critical of a recent story in a newspaper which read: "The most outstanding increase in human poisoning in recent years is a direct result of changing our homes into jungles. The plants that are now such an integral part of the home decor are potential killers."

Referring to this opening paragraph in an otherwise less than inspirational treatise on "poison plants" in general, Abraham says,

'Practically everybody knows that certain plants can produce toxic reactions, but I absolutely deplore the alarming manner in which the information is often presented to the public.

"For example, in a recent story in a magazine there was the statement that of the 13,000 persons stricken by plant poisoning last year, some fatally, 12,000 were children.

"When the American Association of Nurserymen checked this statement with the National Clearing House for Poison Control Centers, the 'some' . . . turned out to be one person!" Robert F. Lederer, Executive Vice President of the American Association of Nurserymen, concurs with columnist Abraham, "Those stories you've been reading about poison plants—they're a bum rap against Mother Nature.

"It's high time to call a halt to the spread of false statements about the plant life that mankind depends upon for survival on this planet," suggests Lederer.

"A lot of people, and I am sure some of them are well-meaning individuals, are spreading misconceptions about some sort of serious



Photo by Merchants Publishing Co.

Digitalis (Fox glove)

publicity. But there is no excuse for outright, even if unintentional, fabrications. "Some books on poisonous plants contain reports that are old and inconclusive and based strictly upon rumor and hearsay," Lederer says. "Whereas, the fact is that we can find no record for many years of a single registered fatality from being near, or from eating, cultivated plant material." (Lederer quotes as his authority the National Clearinghouse for Poison Control Centers in Bethesda, Maryland.)

"There is nothing more common in our world than plants," continues Lederer. "They are almost everywhere, and where they are lacking we suffer filthy air, ugliness, ravaged earth, noise pollution, emotional disorders, and energy waste."

Rumors and rumors of rumors disturb Lederer most of all. "Some years ago," he recalls, "there was an investigation of a widely distributed story about a little girl who was playing 'tea party,' and who supposedly ate a berry from a bush and promptly expired.

"It was a dramatic story," says Lederer, "and it made colorful reading. Nevertheless, after a long exhaustive investigation, it was eventually determined that the little 'tea party' never took place. There was no little girl, no berries, no death. The story was simply a figment of a writer's fertile imagination.

"Of course," continues Lederer, "as so often happens, this story was eventually reprinted without verification in a book of supposed 'facts' about poison plants, and not long after that, a less than careful publicist used the story in a 'poison plant' brochure which was published and widely distributed by a well-known chemical company. "Thus," concludes Lederer, "you have a typical example of a piece of fiction which was printed—with no verification—whatsoever."

According to John Walker, Executive Vice President, Society of American Florists, and Past President (1965-1967) of the American Horticultural Society, another



Photo by Pamela Harper

Lantana camara

example of a "poison plant" myth is the old familiar "poinsettia story."

Nobody knows how or where the myth originated, although according to one version of the story in 1919, the two-year old child of an Army officer stationed in Hawaii died almost instantly after ingesting a poinsettia bract.

Walker says the tale has never been substantiated. Nobody has ever been able to find out the name of the Army officer, of the child, and there is no record in Hawaii of a death certificate. Nevertheless, for well over fifty years the rumors persisted, and eventually came to be accepted as fact.

In an effort to scientifically resolve these totally unfounded charges



Photo by Pamela Harper

Solanum pseudocapsicum

threat from cultivated plants, and I'm afraid I can't be generous about this.

"I think the motive is oftentimes to sell books, or newspaper and magazine articles, or to get personal



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against the poinsettia, and to alleviate public fear concerning the plant's alleged toxicity, the United States floral industry launched an intensive investigation.

The Society of American Florists collaborated with the Ohio State University on a poinsettia research project. Studies resulting from these tests were accepted as valid by the U.S. Consumer Products Safety Commission and they proved beyond reasonable doubt that animals, even when given unusually high doses of various portions of the poinsettia plant, showed no mortality, no symptoms of toxicity, and no changes in dietary intake or behavior patterns.

Nevertheless, even though the Ohio State University findings might reasonably have been expected to effectively debunk for all time the old wives' tales about the alleged toxicity of the poinsettia, each year the headlines reappear as regularly as clockwork—*Beware of the Beautiful but Dangerous Poinsettia!*

The term, "poisonous plants" as presently employed in books, newspapers, and magazines too often conjures up images of death lurking in every corner of the house or garden. The truth is that hundreds of popular indoor and outdoor plants which are alleged to be highly toxic have never at any time been implicated in human poisoning.

There are many reasons for this. Chiefly, most "poisons" in so-called "poisonous plants" are so minute that great quantities would have to be consumed before even minor discomfort occurred.

John M. Kingsbury is the author of the book, *Poisonous Plants of the United States and Canada*, which is often quoted as the definitive study of plant toxicity. His observations on the subject have been the source of continuous controversy ever since the book was published in 1974. The result has been that Kingsbury has apparently had some second thoughts about the problem of plant toxicity in general, as well as

about the quality of poison plant information in general.

His change of attitude was reflected in a recent talk he made to the members of the Society for Economic Botany, portions of which should prove of interest to every horticulturist.

Kingsbury explained, for example, that "The quality of the information available about poisonous plants is as variable as it is in any science. Therefore, it is important to remember that all that appears to be dangerous is not dangerous. The fact is, a lot of poisonous plant literature—a good deal of which is counted as being authoritative—is not proved. Some of it even dates back to the 16th century.

"Some very basic elements must be considered in determining plant toxicity," says Kingsbury, "and it is important to understand these basics.

"For example, plant substances can be broken down into two broad categories—primary and secondary compounds. The primary compounds are employed by the plant to sustain life and growth, whereas the secondary compounds are the ones that are normally toxic."

According to Kingsbury, plants have developed toxic compounds as a defense mechanism, chiefly against predators such as insects. Insects, unlike vertebrates, cannot vomit and, therefore, usually die after ingesting plants which are protected by secondary compounds which are toxic. Human beings have a natural defense mechanism, and simply by vomiting they usually discharge what is unnatural or poisonous.

As a result of his recent studies, Kingsbury has concluded that, "The fact that a plant is known to contain toxic elements does not necessarily make it harmful to man or animals."

Nevertheless, in summing up, Kingsbury deplored the current language barrier which apparently exists between botanists and pharmacists.

"Each group appears to be con-

cerned with only one side of the toxicity problem. Consequently, the two groups, working apart, have been unable to establish a common ground upon which to explore all the questions."

The problem of toxic plants is not going away; and it may get even worse, if only because plants head the list for the number of reports made to poison control centers throughout the country.

In 1975, alone, the National Clearing House for Poison Control Centers, Bethesda, Maryland, received 7,710 telephone calls concerning the possibility of plant poisoning, with 5,727 children under the age of five reported as the most frequent victims of plant ingestion.

Most plants produced mild reactions, or none at all. Nevertheless, symptoms of toxicity did appear in 905 cases, and 186 children required hospitalization.

According to the National Clearinghouse for Poison Control Centers, adult poisoning by plants is a comparatively rare occurrence, and depends almost entirely upon the presence of unsuspected toxic agents which vary considerably from one variety of plant to another.

It is important to remember that in all cases of suspected plant poisoning, body weight must be taken into consideration, since it is far more likely that plant material which is toxic may harm a child who weighs less than a full-grown adult.

Mute and innocent as most plants appear on the surface, just how many are actually harmful, or even deadly, according to the experts? Factual evidence based upon scientific research is practically non-existent. As indicated previously, studies at Ohio State University have proved conclusively that the poinsettia is deserving of a clean bill of health. An even more recent study, conducted by Frederick W. Oehme, D.V.M., Ph.D., Professor of Toxicology and Medicine at Kansas State University, suggests that the chrysanthemum, Jerusalem cherry,

Continued on page 41

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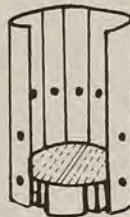
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Come spring, wander through history with a visit to the Tryon Palace gardens along the Carolina coast. The riverfront landmark was built in 1767-70 from designs by English architect John Hawks, burned in 1798, and restored by thoughtful citizens in 1952-59. Today the Palace and the gardens stand as a treasured and authentic restoration.

Originally Governor Tryon's residence for the royal Carolina colony, and then, during the American Revolution, the capitol of the independent state, the remarkable restoration of the Tryon Palace is a sight to behold. The gardens are a magnificent combination of formal plots, pleached allées, great greenswards, kitchen fruit and vegetable gardens, and a sprawling riverside wilderness. Cordoned and espaliered fruit trees grace the fences of many of the inner gardens. Double-layered vines define other areas. Most of the plants—flowers, shrubs, and trees are of varieties known in America prior to 1770.

In the spring, wild sweet crab, flowering cherry, English hawthorn, and flowering dogwood compete with tulips for attention. Weeping willow and French tamarisk mingle across the grounds with seven kinds of holly, sweet bay magnolia, and live oak. The spring-flowering bulbs are particularly beautiful in the Latham Memorial Garden, a walled garden honoring the restoration donor, Maude Moore Latham. The beds are outlined with boxwood, describing a variety of arabesque and scroll patterns. Within the boxed beds, the early tulips are succeeded by a mix of summer flowers and these in turn by an array of chrysanthemums in the fall.

A circular dovecote beside the poultry house and yard marks the architecturally-exciting home of doves and squabs, a favorite deli-

cacy in the 18th Century. These, together with game from the forest, and vegetables and fruit from the garden furnished food for the palace tables. A handsome old lathhouse in the work garden includes planting beds, hot beds, and shaded areas where many of the garden's plants were (and are) propagated.

Two privy, or private, gardens were especially designed for the enjoyment of the household, and intended for viewing from within the Palace. Today one of the out-build-

of this garden, accented by a tiered wall fountain. The Stevenson house is enclosed by yaupon hedges, and boasts a large pecan tree. A parterre garden with tree azaleas and an Italian well-head connects the Stanly and Jones houses. The Jones garden reflects a later garden period, with brick-bordered beds and patio, and the flowers of a Southern garden. Admission to the Palace and grounds is nominal (\$2.00, less for students). A combination ticket allows admission to the other histori-



Left and Above—Lathan Memorial Garden, Tryon Palace, New Bern, N.C.

ings on the grounds serves as a garden shop. Here 20th Century visitors can purchase plants, propagated from the Palace gardens, to try in their own gardens.

Three other historical houses and their gardens, adjacent to the entry gate, are open to the public. The Stanly house has four circular beds of tulips, one marking each corner of the house, and each bed has a tall Darlington oak in its center. Pretty ogee-roofed gazebos are in the rear

cal houses in the complex; this is just sufficient to sustain this worthwhile endeavor.

The historic city of New Bern, at the confluence of the Trent and the Neuse rivers, was named for the city of Berne in Switzerland. It dates back to 1710 and contains many fine examples of homes in a busy mid-18th Century river port. Allow yourself enough leisure time to enjoy all this city's historical and horticultural merits.

Daylilies

Continued from page 3

cultivars sink quickly into obscurity as a new load is poured forth each year.

Now we are faced with the adjustments necessary to accept the miracle of tissue culture. This pro-

cess has already shown that it is possible to develop hundreds of thousands of identical daylily plants in less than a year from a tiny piece of tissue a fraction of an inch in size. A new era may lie just ahead when a limited number of the latest and finest daylilies will be available quickly to many gardeners at little

cost, yet with much greater profit to the breeders. This could stimulate even more competition among the breeders leading them to greater heights of achievement.

Daylilies are nearly free from diseases and insect pests. We can skip over the subject of culture with just one important exception. Gardeners are realizing more and more that to get the best clumps with the most bloom over the longest period, the most important thing is to have ample watering at all times during the growing season.

It is pleasant to be able to recommend a large selection of daylilies for gardeners, hopefully satisfying a wide variety of desires and needs. Resisting the urge to turn to the clichés of discussing "my favorite dozen", "the author's fifty favorites", or "the most popular hundred", we will let the numbers fall where they may. After questioning several dozen gardeners who have purchased named daylilies for some time, we find that the dividing line between an "expensive" and a "non-expensive" daylily is around \$7.50.

Two listings follow. The first one includes daylilies most of which are readily available that have been listed recently in catalogs at \$7.50 or less. The second listing contains those that are being offered for more than \$7.50 a plant. In some cases, the prices may be as high as \$50.00 or more. All varieties marked with an * are favorites of the author. The lists reflect information especially valuable for New England and most of what we would call the "North". A very different list would be necessary if we were recommending daylilies for the "South", especially the "Deep South".

Readers are encouraged to visit horticultural shows featuring daylilies and to seek out the journals of the American Hemerocallis Society at local libraries to obtain addresses of dealers or display gardens where the newest cultivars may be purchased or at least seen.

New, Exciting, Rare and "Expensive"

Near White

Astolat *
Gentle Echo *D* *
Ice Follies *
Silver Tone

Yellow Shades

Evening Bell *
Gleeman's Song
Hudson Valley *
Look *
Yucatec Son

Melon

Mary Moldovan *

Red Shades

Barbarossa *
Bruce *
Chicago Rosy *
Ed Murray *D* *
Howard Goodson *
Lusty Leland
Mexicana *
Marion Broadnax *
Rubric *
Turned On *

Polychrome, Light

Dawn Ballet *
Prides Crossing *

Lavender and Purple

Aberdeen *
Chicago Bride *
Chicago Queen *
Chicago Regal
Chicago Royal
Grape Harvest
Helen Boehm *
Mokan Violet *
Rum Plum *

Wine

Tammas
Wine Bold *

Apricot

Ruffled Apricot *

Near Brown

Sable Night

Eyed

Brindlee Beauty
Chicago Maid *
Clifford

El Tigre *

Gay Cravat *
Mama Cha Cha *

Fringed

Chicago Lavender Lace
Creepy Crawler *

Bicolor

Highland Lass *

Very Early

Orange Prelude *

Picotee

Chicago Picotee Queen *

Dwarf

Little Hustler *D* *
Mumtaz Mahal

Double

King Alfred *

Small - Flowered

Doll *
Fever
D = diploid
All others are tetraploids

Older, Satisfactory, Popular and "Inexpensive"

Near White

Silver Fan

Yellow Shades

Bengaleer
Chicago Star
Crescent Moon *D*
Erin Prairie *
Galena Moon
Golden Prize *
Good Reason
Jade Bowl *
Mary Todd *
Party Mint
Winning Ways *D*
Yellow Crystal

Melon

Adela
Alison
Miss Peach *D* *
Queen Eleanor

Red Shades

Allegiance
Chicago Blackout
Douglas Dale
Fire Cup *D*
Joey Langdon

Pink Shades

Chicago Silkie *
Famille Rose

Heather Green *

Jane Austin
Kwan Yin *D* *
Pink China
Rose Revue
Shell Pink
Twilight Sky
Uncovered Treasure

Orange

Egyptian Spice
Manila Moon

Polychrome, Light

Heavenly Harp *
Noah's Ark

Polychrome, Dark

Autumn Tinge
Aztec Autumn
Bright Copper

Lavender and Purple

Caption
Catherine Woodbury *D*
Lavender Flight *D*
Oporto
Royal Flair

Eyed

Kempion
Polka Time *
Rocket City

Fringed

Golden Surrey *

Very Early

Esperanza

Spider-Flowered

Kindly Light *D*
Lady Fingers *D* *

Evening Flowering

Tetrina's Daughter

Miniature

Cinnamon Dew *D*
Thumbellina *D*

Dwarf

Little Cherub *D*
Little Wart *D*

Double Flowered

Arlow Stout *D*
Yellow Petticoats *D*
Zelda Stout *D*

Small Flowered

Child Bride
Club Scout *D*
Feather
Green Flutter *D*
Little Rainbow *D*

D = diploid
All others are tetraploids

Poisonous Plants

Continued from page 37

dieffenbachia, geranium, and philodendron, when consumed by animals at rates (small amounts) stipulated by the Federal Hazardous Substances Act Regulations of the Consumer Products Safety Commission, do not contain amounts of toxic material that produce any ill effects.

The most constructive and therefore the most helpful advice currently available on plant toxicity, and how it may or may not affect humans and animals, is contained in Dr. Donald Wyman's richly documented, fully illustrated, and carefully edited *Gardening Encyclopedia*, a monumental effort which deserves a prominent place in libraries throughout the country.

Wyman's comments on "poisonous plants" in general suggest that he has a wry wit. For example, he says: "Usually, one does not go to the garden and eat miscellaneous foliage." However, for the benefit of those who do, and leaving no doubt as to his ability to place the subject in its proper perspective, Wyman goes on to explain that in using the term "poisonous," he usually means "poisonous to man or animals, since many more animals than humans have been poisoned by eating the foliage of plants."

Wyman easily establishes a personal rule-of-thumb when it comes to the ingestion of the brightly-colored fruit of many indoor and outdoor plants which normally attract children.

According to Wyman, "One of the prime rules is to avoid any white fruits, both in the northern part of the country and in the tropics"; and he takes the further precaution of listing in his encyclopedia dozens of plants which may be found in gardens and woods, all of which are known to bear fruit which is toxic.

Equally helpful to the layman is Dr. Wyman's explanation of how federally-funded poison control centers actually work.

As he explains their operation, the Federal Government has set up poison control information centers in each state, usually in the land-grant college, or in hospitals where medical aid can be given and where advice on treatment for poisoned individuals can be given to the medical profession and the layman alike. These poison control centers are sponsored by a division of the Department of Health, Education and Welfare and are the places to call in cases of possible poisoning.

Which plants are poisonous and non-poisonous, toxic or non-toxic? The questions continue. And the answers, as in a jigsaw puzzle, consist of many pieces which must fit together before they make any sense.

Important research by scientists of recognized stature has already been accomplished—in a concentrated effort to establish, on the basis of sustained and intensive investigation, which plants do, and which do not, pose a threat to humans.

The news, thus far, is good, with many popular plants having already received a clean bill of health. Nevertheless, a great deal more research is obviously needed before all the pieces of the puzzle are neatly fitted together.

Meanwhile, the greening of America continues; and as indoor, as well as outdoor, plants increase in popularity, it behooves us all to remember the advice which was offered recently to all plant lovers by the New York Safety Council: "There is no reason to stop growing beautiful flowers and plants. Just keep them out of your mouth!"

"Train children not to chew on anything other than known foods, no matter how familiar it appears to be.

"Keep a close watch on little ones in the hand-to-mouth stage. And remember, too, that adults are not immune to unconscious nibbling." In other words, where plants are concerned: *Look, but don't lick. Admire, but don't pick.*



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Iris from Seed

Continued from page 7

pled in fantastic patterns. Some had large red pendulous falls, others were mottled with white lines and brilliant yellow throats. Still others were double white parasol-like with yellow centers; double flattish red purple with yellow centers; "selfs" of purple, red, pink, blue; double pale blue heavily veined with purple.

It has been noted by Kuribayashi and Hirao (2) in their book on "The Japanese Iris" that all the cultivars have the same chromosome number as the wild originals, which may explain why they intercross readily.

The foliage of these iris is erect and lance-shaped with a prominent mid-rib. They grow 2-3 feet in height.

Iris kaempferi demand an acid soil and are hungry feeders. It is surprising that one so rarely sees these iris in gardens, probably because they have a reputation for growing in water or under boggy conditions. This is a misconception. They can grow under ordinary garden conditions if their growing bed is made according to their nutritional demands and if they have sufficient water during their growing and blooming period (3). This property is no different from any of the border plants.

A growing bed can be made as follows: Remove the soil one foot in depth. Place either seasoned barnyard manure or commercial fertilizer generously in the lower part of the bed. Work in and replace the soil after it has been mixed with three parts of peat. After the bed is thoroughly watered it is ready to receive the young plants. This bed

should be in full sun for best results. Iris are sun-lovers.

These temperamental Japanese iris, easily raised from seed, can be grown in any garden and will repay you many times if their physiological needs are considered and provided. The time scale for raising them from seed is short. The relatively low cost of the hybrid seedlings make them desirable for anyone wishing to establish a fine colony. There are many cultivars on the market to tempt you. Any of the special growers can help you make a selection.

References

- (1) Perry, Frances, and Greenwood, Leslie. 1972. *Flowers of the World*. Hamlyn Pub. Co., London.
- (2) Kuribayashi, M. and Hirao, S. 1970. *The Japanese Iris*. Asahi Shimbun Pub. Co., Tokyo.
- (3) Perry, Reginald, 1975. *New Light on Irises*, Popular Gardening, Dec. 13, pg. 8-9. London.

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Books

Reviews by Tom Stevenson

THE GREAT AMERICAN TOMATO BOOK

The One Complete Guide to Growing and Using Tomatoes Everywhere

by
Robert Hendrickson
Doubleday and Co.
New York, N.Y.—1977

226 pages, well illustrated, \$8.95

The author unquestionably knows tomatoes. For the first time in half a century, more garden space is being devoted to vegetables than flowers in America, he says, and the vine-ripened tomato is without doubt the favorite of these vegetables.

"The truth is that only sweet corn (the second most popular home-grown vegetable) equals the tomato in taste when picked fresh from the garden. All vegetables are better fresh-picked, but fresh-picked corn and tomatoes taste like different species related only by name to celluloid, flannel-textured store-bought versions.

"This book is all about the tomato, solely about the tomato, its aim to make the best growing techniques, preserving methods, and tomato recipes available all in one volume to both experienced vegetable gardeners and the 2.5 million beginners who join their ranks every year."

THE COMPLETE FLOWER ARRANGER

A Comprehensive Guide to the Pleasures of Floral Design

by
Amalie Adler Ascher
Simon and Schuster
New York, N.Y.—1977

288 pages, beautifully illustrated, \$5.95, paperback

Whether a beginner or someone with experience, if you've wished you could become a really good flower arranger, this book is for you. The author is a national award winning exhibitor, judge and teacher, who has conducted a flower-arranging series on television.

Her book covers the entire field much better and more thoroughly than most other books, the step-by-step directions are clear and easy to follow, the large number of illustrations, some in full color, very nicely supplement the text.

There are directions also for using

dried material, weathered wood, making arrangements of fruits and vegetables, for forcing cut branches into bloom in late winter, for growing flowers useful for arranging, and for setting the table, among others.

If you become engrossed in the book and suddenly look up, you may visualize the author wagging her finger at you, and if you don't, you can be sure she is, just the same. Her father is an inventor, holding more than 60 patents, her mother a flower arranger of considerable skill. The book indicates she has inherited talent from both, and has added to it.

"I still remember the first arrangement I made," she says. "Having more nerve than sense, I entered it in a flower show, although I had never worked with plant materials before. Uncoordinated, unsuited in style to any purpose, or in size to its location, my creation, of course, won no award, nor even merited a sympathetic comment from my friends. But I didn't care. I had had the fun of expressing myself through flowers so to me my work was beautiful.

"In essence, that is what arranging is all about. It is fascinating to study differences in forms; to experiment with their interactions; to observe the effect of colors on each other; to discover the number of patterns that can be created with plant materials.

"In the process you become increasingly aware of your surroundings, sensitive to aesthetic experiences, curious about relationships, perceptive of potential in form and color, and driven to give these new dimensions.

"Beside its practical benefits, floral designing offers personal dividends. It imparts a useful skill, and also brings self-satisfaction, relaxation, even recognition."

LANDSCAPE IT YOURSELF

A Handbook For Home Gardeners

by
Harold Givens

Harcourt Brace Jovanovich, Inc.
New York, N.Y.—1977

239 pages, well illustrated, \$17.95 cloth cover, \$8.95 paperback

You don't have to be a skilled landscape designer to create a charming and lush garden, the author says. With your own ideas and some guidance you can have a personalized garden to suit your life style and to provide privacy and recreation, or for any other use. Doing your own landscaping adds new dimensions to the enjoyment of gardening.

"This book," says he, "is a clear and practical beginner's guide. It will show you how you can have a garden that will

live and grow with you.

"The approaches discussed have been developed during nineteen years of teaching landscape gardening and have been tested by thousands of students. Freedom of expression within the natural terrain is stressed. This means using natural forms and composition to achieve your own definition of beauty and function.

"There have been great changes in garden design in recent years. Established rules are now broken as often as they are followed. However, the knowledge of classical rules of design is a valuable tool for implementing your own ideas.

Featured in the book are plant selection charts for every part of the United States which can be used to choose the plants for your garden.

The descriptions include the height, shape, and usual use of the plants, flowers (when they can be expected and what color they will be), shape and abundance of foliage, pruning, propagation, cultivation, and specific ideas for plant use.

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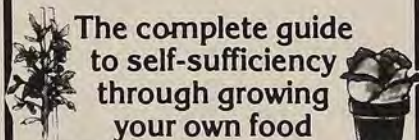
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