

American

Horticulturist



Volume 58 Number 1 Late Winter, 1979

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Plant Explorers



By Tom Stevenson

A century ago azaleas were rarely seen in American gardens. There were only a few native species and a small group of hybrids developed in England from which to choose. Almost all of the evergreen kinds are native to eastern Asia. The first ones introduced in the U.S.A. were Southern Indian Hybrids at Magnolia Gardens, near Charleston, SC, in 1840.

Today azaleas are among the most popular plants for landscaping in areas where they can be grown. At the National Arboretum, Washington, DC, for example, 80,000 of them produce multi-colored blooms beneath a canopy of tulip, oak and dogwood trees in late April and early May.

Located on 412 acres in metropolitan Washington, the Arboretum is one of the great showplaces of the East, ranks among the major arboreta of the country and is one of the best known in the world. It is not only for looking but also a place of research and education. A staff of ten scientists conducts research on shrubs and trees, and other staff members develop methods for informing the public on culture, propagation and selection of better plants for gardens.

The Arboretum has become a leader in developing, evaluating and distributing new woody ornamental plants. Some 40 cultivars have been introduced in the last decade, and numerous seedling selections have been made which will yield superior shrub and tree cultivars for future generations.

Although the azalea collection at the Arboretum is a large one, it is known that there are many, many kinds that are not included; some could provide the possibility of plants that can be grown farther north, and perhaps many other improvements.

Three members of the Arboretum staff, Dr. John Creech, director, Dr. Frederick G. Meyer, curator of the Arboretum herbarium, and Sylvester G. March, Arboretum chief horticulturist, made a plant exploration trip to Japan in late October, made possible by a grant from National Geographic Society. They also visited off shore islands looking for azaleas native to China that may be useful for American breeding programs. Creech is a world leader in the field of plant explorations for ornamentals, Meyer and March also have made several exploration trips to various parts of the world. They returned to the U.S.A. in mid-December.

"The Japanese maples (*Acer japonicum*) were in full color and particularly beautiful," said March. "The Japanese Forest Service was of great assistance to us. We made more than 475 living collections of plants which were sent immediately to the United States (they will be in

quarantine for the prescribed period of time). Some of them look like wonderful possibilities."

One of the future projects of the Arboretum is the establishment of an area providing a display of fall foliage color. The Japanese maples will fit in very well with that.

"My plant press was filled with material for the Herbarium," said Meyer. "I think our trip was very successful. Of course, it will take time to determine the full value of the collections we made."

In Kyoto, with a population of about a million, Meyer talked with a cab driver who had been collecting herbarium material for many years as a hobby. He had a very good collection, Meyer says, and was determined to have them destroyed after his death. They were precious to him and he didn't want them to fall into unappreciative hands. Meyer made arrangements to have them sent to the National Arboretum, where, Meyer said, they most certainly would be appreciated.

Meyer was particularly impressed by the friendliness of the Japanese toward the Americans. He met some of the people who contributed to the bonsai collection given to the United States by the Japanese government and now on display at the Arboretum. They are very proud of it, he says.

John Creech is a world leader in the field of plant explorations for ornamentals. In his travels, he has specialized in the wild and ornamental trees and shrubs of the Far East, with particular emphasis on azaleas, camellias and hollies. He has undertaken eight explorations, including three trips to Japan, two to the Soviet Union, and once each into Nepal, Taiwan and Yugoslavia. In September, 1974, he was sent to the People's Republic of China as a member of the Plant Science Delegation appointed by the National Academy of Sciences. □

BONSAI BASICS

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When I first saw the little pine tree, in the spring seven years ago, it stood about four feet from the base of its potato chip can container to its topmost bundle of needles. It had been dug and brought into the building by a teacher as an aid to his lesson on "Michigan Week." The white pine has been adopted, symbolically, as the Michigan state tree.

"What are you going to do with it when Michigan Week is over?", I asked.

"I don't know," was the response, "do you want it?"

I did. Here was an unexpected and welcome opportunity to experiment with something I had heard a little bit about: Bonsai.

I had seen a few pictures and had read just enough to know that "bonsai," freely translated from the Japanese, means "plant in a dish," and that many normally tall species of tree can be dwarfed into exquisite miniatures which, if properly treated, can live for hundreds of years. I knew that part of the training technique is to prune roots and branches, and that another training device is to use wire to bend or contort the little trees to one's will. But what branches, which roots, I knew not, nor did I know which bending would result in harmony and grace or which cutting might very well result in disaster.

It was days before I mustered up enough courage to do anything but admire my prize. Then, suddenly, on impulse, I cut off the whole top! It was now about half of its original



A 33 year old Japanese maple

height. Then I attacked the roots ruthlessly and forced what was left of them, along with some of the native soil, into a thin metal bowl through which I had punctured a few drainage holes. My little pine tree lived happily on a table on my terrace all summer. I would come home each evening and examine its habit and assess it for design. Although I felt that some areas might be improved by pruning or wiring I did not want to press my luck.

Now, having one bonsai is like eating one peanut. Impossible!

The terrace to which I referred, has a flagstone floor which does not always get the best of care. There, in the grass filled cracks, grew a number of maple seedlings. These were undoubtedly the results of seeds which had blown over from a neighbor's tree, probably the summer before. Because I could not decide which had the best potential for a bonsai and because they didn't belong there anyway, I decided to uproot them all. I found a very shallow

light blue ceramic bowl. By now I had developed a bolder attitude, I bought a masonry drill bit and drilled two holes through the bottom of the bowl. Then, with the aid of some chicken wire to hold them in place, I planted six maple seedlings and called it a forest.

Upon learning about my newly found interest, a friend brought me a baby spruce from her woods. A search in my closet turned up a hand made pot which served as a planter for the young tree. It also gave it some class.

In the fall, my maple trees turned scarlet. I was thrilled. Now winter was coming and I began to worry about what to do next with my little friends.

My basement windows are built quite deep into the ground. Each one is fronted by a semi-circular window well to let in the light. A grate across the top, at ground level, prevents masses of leaves and other solid materials from falling into them. I am

Continued on page 25

Plantation Gardens

*Lorraine and Guy Burgess
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In these days of high inflation, the preservation and restoration of the Old South's grand plantations is a difficult and expensive task. The easy days of the gentleman farmer are no longer easy and plantation owners are having as much financial trouble as our dirt farmers. It is a continuing struggle to keep plantation acreages intact. To survive, some owners have turned to timber farming; others to plant propagation for commercial nurseries; and at least one, to boarding and swapping horses.

A few strive to reclaim the land for its original use as cotton or rice plantations. But there are pitfalls. The rice fields need to be flooded in seasons when the river water turns brackish, and that's not as easy as it once was. Many early irrigation systems were based on slave labor and collapsed after the Civil War.

The taxes on plantations still in private hands are so high that properties cannot just sit there in decaying splendor as remnants of our tumultuous past. To survive, they must not only regain their beauty, but provide a source of income as well.

In many cases, the best solution is in the overgrown and sometimes

ragged gardens that surround the plantation mansions. The restoration and enhancement is never easy, but because most of the gardens have strong design patterns, reflecting the talents and inspirations of early French and English landscape professionals, each renovation is a rewarding experience. Not only does an upgraded garden add to the value of the property, but it creates a handsome tourist attraction that helps keep the plantation legend alive.

Because many of the choice plantations are located along the shores of scenic southern rivers, twentieth century restorers start with the advantages of magnificent settings and ideal climate. The tired old garden plots seem to respond well to the ministrations of these dedicated plant people who work to revive the beauties of the land.

With so many plantations in so many southern states, Louisiana, Mississippi, Georgia and the Carolinas, you might think that the American Tourist would tire of these renovations, but not so. Each great garden—Magnolia, Middleton, Orton, Cypress, Boone Hall, Rose-down and Brookgreen—has its own special attributes, and gathers its own share of old and new devotees.



Left—Rose-coral azalea. (Magnolia Gardens, Charleston, SC)

Right—A redbud blossoms beside the Ashley River.



To the surprise of some, the procession of out-of-state, garden-oriented visitors increases each year. The North Carolina Chamber of Commerce has recognized this horticultural upswing, and admits that 'top gardens attract not only bees but visitors' to their state, and that's a good thing for them.

Through the rigors of the recent cold winters in the north, gardeners from Cleveland, Buffalo and New York dream of escape to the old South. They not only dream, they jump into their economy cars and head for the land where the living is easy. From late winter through spring, they are greeted by a progression of glorious bloom. Camellias, azaleas, magnolias and kalmias offer a series of spectacular displays on a grand scale in charming settings. Visitors can return home inspired, and still have time to introduce some of the ideas to their own gardens as the soil begins to warm.

Admissions to these fine plantation gardens run as high as 100,000 visitors per garden, per year. Fees range from two to five dollars per person. Middleton Place, northwest of Charleston, maintains a purist stance. Le Nôtre influences are evident in its reflecting pools and precisely-diagramed flower beds. To protect the Colonial image, visitors' cars are hidden in a grove of pine

trees some distance from the formal gardens. Tourists are invited to 'walk back into history' to view the plantation in the 1690s when it was first developed. The Middleton Oak stands beside the Sundial Garden. It is considered one of the oldest trees in the nation with a spread of 145 feet. Two, 200-year old camellias still stand on the grassy terrace, and still flower. Secret gardens are hidden behind an eight foot azalea hedge. The matching, wingshaped butterfly lakes are best viewed from the broad terrace where the main house once stood.

Magnolia Plantation and Gardens, also on Highway 61 and two miles closer to Charleston, is dedicated to the pleasure of its guests and urges visitors to enjoy the gardens, woods and water as their own. It counts itself as America's oldest man-made tourist attraction in continuous operation. Magnolia makes a point of catering to modern tourist requirements. It offers picnic areas, a petting zoo and a mini-horse ranch, plus a snack shop and gift shop. There are hiking trails through a waterfowl wildlife refuge, quiet electric-boat tours, bicycles, wheelchairs, and canoes, a plantation kitchen serving southern dishes, and torchlight walks in the evening. All this is in addition to the 30 acres of informal gardens beside the

Ashley River.

In this place of 300-year old trees and shrubs, the design of the garden is somewhat obscured by the foliage. Still Magnolia is a vital and thriving enterprise, a happy blending of old and new, designed to sustain the plantation.

Cypress Gardens, once known as the Dean Hall Plantation, is 23 miles north of Charleston on US 52. In 1963, the property was deeded to the city of Charleston. Once a rice plantation with a vast system of reservoirs in the cypress forest, the land was recognized in 1927 for its picturesque qualities. Forty different kinds of azaleas and a bright array of flowering vines—supple-Jack, cross vine, yellow jasmine and Chinese wisteria were added to mirror in the black water of the cypress pools. These additions made the gardens more beautiful, and a bit mysterious.

Orton Plantation, 16 miles south of Wilmington, North Carolina on NC 133, was a rice plantation as far back as 1725. The plantation was once owned by Roger Moore, known to some as 'King' Roger for his opulent and expansive way of life. Today Orton is noted in the guide books as 'famous for its gardens', and well it might. It's a beautiful place and, like the other large plantations a bit awesome to those who garden on a half-acre of land.

Brookgreen Gardens, at Murrels Inlet, South Carolina on US 17, is now a garden museum of American sculpture. The plantation on which it was superimposed dates back to the mid-1700s, but only one building remains of the original plantation complex. Yet, the Avenue of Oaks that once framed the main house still stands in all its monumental glory.

Development of the garden-museum concept was begun in 1930 by Brookgreen's owners, Archer and Anne Hyatt Huntington. They are credited with bringing 'a garden long since dead to life'. Then to in-



Left—Spring's prelude—daffodils.

Right—Ashley River cypress grove and rice plantation.

sure the perpetuity of the Gardens, the ownership of the 10,000 acre property was transferred to an eleemosynary corporation. The entire tract is now a wildlife refuge, with a distinctive garden in the heart of it.

A few fine plantations remain in private hands and are not open to the public. Medway and Mulberry are shining examples.

Boone Hall, north of Charleston, was originally a 17,000 acre cotton plantation. Today it has a valuable pecan forest. But its claim to fame rests on being the most photographed plantation in America. It was the set for the now-classic "Gone With the Wind," and is still a favorite among Hollywoodians. Oaks Plantation on John's Island in South Carolina has found another way to go. It functions as a campground, and advertises in the tourist brochures.

Two plantations, Middleton and Magnolia, have been designated as National Historic Landmarks. Such citation brings distinction, but little revenue. Drayton Hall, immediately south of Magnolia, is now owned by the National Trust for Historic Preservation and the state of South Carolina. The manor house is the oldest and finest surviving example of early Georgian architecture. The house was saved in the Civil War, either by ruse or by fact, because small pox flags that were set out turned the Union troops away. Today, the prime goal at Drayton is to restore the house to its original beauty. It stands alone, one of its flanking buildings destroyed by earthquake and the other by fire and hurricane. Emphasis here is still on architecture rather than horticulture, and the process of restoration will be difficult and time-consuming.

There are many ways plantation owners can go to save these fine old properties, but the way that seems most successful and pleases gardeners most is in the recovery of these ancient garden plots, for public enjoyment. □



Organic Gardening

A Misnomer?

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As a part of our present concern for a cleaner, more healthful environment, the use of organic foods is being promoted as a means to this end. This subject deserves the serious attention of all consumers because, if such foods are superior to those which are usually eaten, we should all adjust our menus and include more of these items.

The designation "organic food" is actually a misnomer because all foods are in fact organic—except for an extremely small amount of preservatives or flavoring components. The term organic food refers to foods which are produced without the use of inorganic chemical fertilizers, pesticides, preservatives, or flavoring ingredients. The organic enthusiast considers inorganic chemicals to be harmful to both man and his environment.

Foods consumed by the earliest, prehistoric human creatures were truly organic. Men roamed acres of land to kill wild game, catch fish and gather berries, nuts and other plant parts for food.



The Development of Modern Agriculture

As early man subsisted for many thousands of years by killing and eating wild animals and feeding on plants growing within his vast range of foraging, he filled a niche in the balance of nature. His increase in numbers was limited by the available food which nature supplied. Gradually, as man discovered ways to cultivate some of the wild plants and to domesticate livestock, he increased his available supplies of food. This allowed an increase in population and the establishment of family and tribal units in stable communities.

He soon discovered that the use of manure from livestock and poultry promoted higher yields of his corn and vegetables. Later he found that material from deposits of guano, marl, potash and nitrate of soda also improved crop production. As he acquired a knowledge of chemistry, he learned that nitrogen, phosphorus and potassium were the principal elements he needed to add to the soil to produce better growth. He then learned how to utilize natural deposits more efficiently and to synthesize inorganic commercial fertilizers.

It is this involvement with inorganic chemicals which disturbs the organic enthusiast. Organic compounds are those which contain carbon, whereas inorganic materials do not. The conclusion seems to be that inorganic compounds in general are harmful, whereas organic ones are beneficial.

In reality, we live in a chemical environment in which either type may be harmful or beneficial. Water, which is inorganic, is essential for life. Salt, also inorganic, is essential for most humans, but quite harmful to those with certain medical problems. Sugar, one of the basic organic components of food, is beneficial as a source of energy for most people, but detrimental to the diabetic. Many organic materials in excess may be harmful or deadly such as poison ivy, poisonous mushrooms, alcohol, marijuana, tobacco and heroin. Aflatoxins, complex chemicals produced naturally by certain fungi found on stored food, are the most potent carcinogens known to man. Entry of aflatoxin-producing fungi is encouraged by insects feeding on nuts, fruits and vegetables.

Some Facts About Organic Foods

In considering the advantages and disadvantages of organically and inorganically grown crops, it is necessary to understand how the plant absorbs its nutrient elements and synthesizes them into food. Regardless of the original source, fertilizer in the soil must break down into its ionic form before it can be used by plants. The ions, which the plants absorb, are identical whether they are derived from an organic or inorganic source. Therefore, in terms of benefits to plants, when similar quantities of nutrients are available, there is no advantage for either organic or inorganic fertilizer.

Green plants are the initial and ultimate source of human food. It is logical to conclude that, since these plants can absorb their nutrient elements only in the ionic form, the food value of agricultural crops would be iden-

tical when they received fertilizer from either inorganic or organic sources. This is, in fact, the case. Experiments conducted at several State and Federal Experiment Stations have found no differences in the mineral or vitamin content of crops grown with organic as compared to inorganic sources of nutrients.

The cost of foods produced organically may be 50 to 100 percent higher than the prevailing market price. There is no justification for paying these excessive prices. Such expenditures for food could bring financial disaster to low income families. Also, there have been many cases reported where merchants changed the labels on conventional produce or canned items and sold them as organic foods at inflated prices.

The organic enthusiast may become quite concerned about his diet and consume a greater variety of fruits, vegetables and whole grain cereals. This is superior to a more restricted selection of highly refined, unfortified foods. But, it must be realized, any improvement in diet is the result of consuming more healthful types of food, and not because an organic or inorganic fertilizer was used to produce the crop.

Some organic food fadists express concern that crops may be grown on soils deficient in certain minor elements and thus be less healthful. This is extremely rare because farmers know they cannot produce crops profitably on such soils. Agricultural crops are grown on relatively fertile soils with adequate reserves of minor elements. An outstanding exception to this situation is the production of citrus—a prized, healthful fruit—on infertile, sandy soils in Florida. The grower, however, must supply the needed fertilizer and minor elements to insure normal tree growth, productivity and fruit quality. This is typically in the form of organic fertilizer.

The Benefits of Organic Matter

Organic matter is extremely important for improving the physical condition and productivity of the soil. It makes plowing and cultivating easier. It also increases the nutrient reserve and water holding capacity of sandy or clay type soils.

The home gardener derives several benefits by mulching with organic matter. It reduces erosion caused by runoff of rain or irrigation, increases the infiltration of water into the soil and conserves this moisture by reducing evaporation. Organic matter helps suppress weed growth.

Some of the best organic materials to use as mulch are leaves, lawn clippings, fresh sawdust, fine wood shavings, pine needles, chopped straw, ground corn cobs, shredded tobacco or sugar cane stems, peanut hulls, or cotton seed hulls. These materials do not add important amounts of nutrients or have a significant effect on the pH of the soil.

The dead vegetable and flower plants in your garden should be chopped down and left on the ground as a protective mulch during the winter. This trash mulch

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Mrs. Delany's Curious Flora

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Anyone who, at the age of 74, can create a garden of paper flowers and have her work preserved and esteemed in the British Museum for some two hundred years is worthy of admiration for her genius. The gentle lady was Mary Granville Delany who was born in 1700 and lived a full life of 88 years. She was one of the great women of the 18th century. In addition to excelling in the social manners of her day with undisputed wit and charm, she could wield her pen to originate both poetry and prose, make paintings far from amateurish and was adept at the modern equivalent of landscape architecture.

Mrs. Delany's curious craft is known by several names. To her, it was her *Flora*, her *Book of Plants*, her *Hortus Siccus* or her *Paper Mosaiks*. Actually, it was a method of producing life-like flowers in paper mosaic form. The perfection of her work was so individualized that no one since has been able to rival her skill. Her art is protected now in ten volumes in the Department of Prints and Drawings in the British Museum. It is assumed that all of her paper flowers are there today, al-

though Mrs. Delany gave away a few of her precious floral creations. Whether or not they were ever returned to the original folios is a matter of conjecture.

Mrs. Delany began her hobby quite by accident. The elderly lady was sitting at her work table in the home of her dearest friend, the Duchess of Portland. She was listless and lonely, for her husband, the Dean of Down (Patrick Delany) had died five years before. She missed his encouragement and the pleasure he took in her diverse activities. On the table before her was a scrap of bright scarlet Chinese paper. Nearby happened to be a potted geranium of exactly the same color. The fact that the two reds coincided prompted Mrs. Delany to action. For amusement, she took up her scissors and cut the pattern of the geranium petals by eye from the brilliant red paper. Placing the paper petals one over another on a dark background, she was so pleased with the outcome that she decided to complete her flower. With green paper of various shades, she cut the calyx, stem and foliage. She then pasted them in correct proportion to the flower head. Her geranium mosaic was complete.

The Duchess of Portland saw the flower on the table and mistook the paper imitation for a real geranium!

Discovering the amazing truth, she urged Mrs. Delany to make copies of other blossoms. Thus from a mere happenstance, a new pastime was begun for the elderly lady. Her first attempt being so successful, Mrs. Delany was stimulated to make many more. That year (1774), she completed four flowers in her new art. Sixteen were made the second year and during the third year, one hundred and sixty were perfected. Her goal was to copy one thousand flowers. Unfortunately, when she was but twenty short of her plan, her eyesight failed and she could no longer see well enough for the precise cutting that her craft required.

It is difficult to imagine exactly how Mrs. Delany was able to achieve these accurate replicas of flowers in form, color, light and shade and perfection of perspective. To enlighten the reader as to the process of imitation, the following quotation by the editor of "Autobiography and Correspondence of Mary Granville, Mrs. Delany" of 1862 will serve as a true depiction.

"Mrs. Delany placed the growing plant before her or a branch of it if too large to be copied. At the back of the plant, but not to touch it, she put a sheet of black paper, doubled in the form of a folding-screen, which

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A Memorial to an Insect



Clockwise from top left—Moth borer caterpillars at work. Moth borer—adult stage. The author inspects stand of prickly pear. Fruits of prickly pears are full of seeds.



Photos courtesy of Dr. S. A. Pieniazek

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Memorials were built in the history of humanity most often to victorious kings and generals, to saints and political leaders, to poets and scientists. A memorial erected to an insect is something unusual indeed.

Much of the Northwestern Australian continent is sparsely settled. Soils are shallow and not very fertile; annual rainfall from 20 to 30 inches is irregularly distributed. The climate is too hot for sheep. When the land was cleared, it was used for grazing by beef cattle which became an important part of primary industries in the state of Queensland.

In the middle of the 19th century fencing was not easily available and some containment of the cattle on the vast tracts of land was desirable. Someone had a brain storm. Why not plant the prickly pear to form hedges around the grazing grounds?

There are about 350 species of prickly pear (*Opuntia*) in the South, Central and Southern regions of

North America. Several species were imported to Australia. Two species that played such a unique role in Queensland, *Opuntia inermis* and *Opuntia stricta*, were established there between 1840 and 1860. They were used for hedges and established easily with cuttings. The hedges proved so effective that the cuttings were distributed by farmer organizations. Fruits which formed abundantly each year, and even young cladodes of the prickly pear, were considered to be a good source of fodder for the animals in the time of prolonged drought and scarcity of other feed.

Fruits of many species of *Opuntia* are edible. One species, *Opuntia ficus indica*, is cultivated in many warm weather countries for its fruits, especially in the countries around the Mediterranean Sea in Europe and Africa. They are not the most tasty fruits, but are large and nutritious. Fruits of *Opuntia inermis* and *Opuntia stricta* are small and full of hard seeds, but in Queensland were often consumed by aborigines.

Both prickly pear species introduced to Queensland found an ideal home. They thrived in the Australian climate in an absence of natural enemies. Pear hedges proved to be effective, indeed. *Opuntia stricta* is armed with big, sharp spines. No beast could pass through the hedge. *Opuntia inermis* has, at most, very small and not numerous spines, but grows so densely that its hedges are nearly impenetrable.

Both species of *Opuntia* were easily propagated by cuttings, and seeds were disseminated by animals and birds. Soon seedlings began appearing all over grazing lands. There were instances in which a pasture of several thousand acres hedged with prickly pear became a dense forest of *Opuntia* three to five feet high within five to eight years. The cactus excluded all cattle by the sheer mass of its weight which amounted, in some cases, to 800 tons per acre. Only poisonous snakes found good hid-

ing places in prickly pear scrub. The snake population grew to alarming proportions.

The enthusiasm with which the farmers received the prickly pears soon gave way to apprehension and alarm. In 1887, prickly pear was recognized in Queensland as a major pest. Nobody planted *Opuntia* hedges anymore. A search has begun for a method to destroy the weed. Physical destruction was not realistic. Arsenic pentoxide proved to be the only effective chemical but it was too costly.

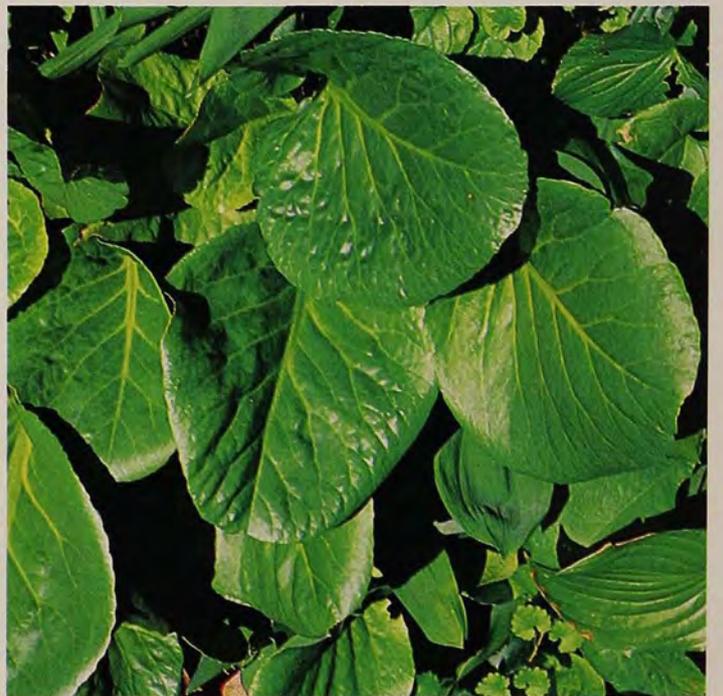
The problem was so grave that the Queensland Government called on scientists asking for help. After lengthy studies and deliberations, it was concluded that biological control of the pest was the only solution. The Prickly Pear Travelling Commission, composed of entomologists and phytopathologists, was appointed by the Queensland Government in 1912. The Commission made expeditions to the regions of America where *Opuntia* is native to look for its natural enemies. The work of the Commission slackened somewhat during the First World War. But soon, the prickly pear danger grew to such proportion that the Commonwealth Government took charge of the fight against the weed. The Commonwealth Prickly Pear Board was formed to cope with the problem. More scientists were sent to America to look for the natural enemies of *Opuntia*. By 1925, the weed occupied close to sixty million acres of land.

Opuntia inermis is native in the Southern United States, from Texas to Florida; *Opuntia stricta* to Florida and the West Indies. Australian entomologists found over a hundred insects feeding exclusively on cacti in America. They selected fifty odd species and after control investigations sent them to Australia. Extreme care was taken in order not to introduce an insect which would attack other native Australian plants.

Continued on page 29 13



FOLIAR FINERY



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Nature knows no boundary to the infinite variety of forms, size and shapes into which she fashions flowers and leaves. For most people a mass of flowers is the only satisfying part of a plant. A true plantsman appreciates the plant as a whole: particularly the leaves which have their own form and texture. They work to manufacture food from air and light. However important flowers are with their color, leaves are the visible ornament for the greater part of the year. Leaves show strength and beauty. They differ markedly in size, color, shape and manner of growth.

If a plant has elegant leaves it should be given space for development, so that it can be enjoyed in its entirety. The herbaceous large leaf and small leaf hostas with their superb form and eye-catching leaves have priority in my garden and woods. From such a bevy of charm it is not easy to choose particular favorites. This is such a noble and prolific genus that it may be unwise to single out any member as a favorite. There are the large-leaf, the small-leaf, the blue, the green, the gold and the variegated leaves. Variegations may be in the form of margins, lines or splashes with colors of green and yellow or green and white. All hostas flower triumphantly and after flowering the foliage remains splendid through the fall. Hostas prefer shade or half shade with moisture. They are noted for their hardiness, long-life and minimum maintenance. They can be used in any part of the garden and are effective along paths, stone walls or beside lakes or pools. The lily-like flowers bloom on scapes taller than the leaf mound and range in color from white to pink, deep blue or light purple. There are species and cultivars from which to choose. The species originate in Japan and the cultivars are mostly from chance seedlings or mutants and are given vernacular names. Hostas are among the flowers whose seed have limited viability. Only buy seed that have been gathered fresh the same year you buy. These seed will produce hybrids.

To obtain true plants, propagation must be by vegetative division of the root stock. The different greens all have their own quiet and proud beauty such as (*H. ventricosa*); but the gold illustrated by (*H. 'August Moon'*); the

blue by (*H. tokudama* or *H. sieboldiana 'Elegans'*); steal the limelight. The variegations may be green and yellow as in the case of (*H. ventricosa 'Aureo maculata'* or *H. sieboldiana 'Aureo maculata'*) or green and white such as *H. crispula* or the *H. undulata* cultivars.

Few plants are lovelier to look upon than the leaves of a group of distinctive hostas. They are so large that they give a mass effect like the sheen on silk under the shady light of the summer sky. When fall arrives, the leaves paint themselves into glowing colors of yellow and gold.

Another useful plant with ornamental leaves is *Bergenia cordifolia*. It is a tough, easily grown perennial. The large glossy, roundish, leathery leaves are decorative and ever-colorful for the entire year. In spring, the rose-colored flowers are borne on sturdy stems among the tender green leaves. In late fall, the bold leaves begin to turn reddish in preparation of their winter picture. These burnished tints add to the effectiveness of the leaves. The clumps multiply easily. Because of their shallow roots they can be divided for extra propagation after flowering. Once planted, they should be left undisturbed until it is necessary to lift and divide. They will grow in sun or shade. Since they come from Siberia and the Himalayas, they are hardy in our winters of -20 degrees F. They remain winter green.

Helleborus orientalis is a sturdy plant with rich, gleaming, deep green, polished leaves. It is handsome through the year in all its multitudinous forms. In early spring, the blossoms rise above the evergreen, palmately serrated leaves, deeply cut into seven lobes. The bowl-shaped flowers have a wide range of colors: white, cream, purple, rose, lilac. Many have lovely checker-rings and fleckings of color on the sepals. These flowers last six to eight weeks. Its foliage needs space and shade for growing, otherwise the full beauty and character cannot be seen and enjoyed. Plants will grow into vast clumps, and should not be moved once established. New colonies can be grown from fresh seed. Plant, and wait until the following spring for germination. Transplant young seedlings into cool, well drained soil. After flowering and seed harvest, cut down the stalks to ground level to make room for the new shoots that will carry the flowers the next spring.

A larger plant with a distinctive personality to be grown in the back of the border or in isolated clumps is *Macleaya cordata*. Once named *Bocconia* after the Sicilian botanist, P. Bocconi, this plume poppy, if grown in isolation, will always be enchanting. Growing up to eight or ten feet in height, they will dominate an area with their slender shapes. The stems are thick but taper toward the

Clockwise from top left—*Pulmonaria saccharata*, *Hosta crispula*, *Bergenia cordifolia*, *Stylophorum diphyllum*.

top. The gray, heart-shaped, blue-green, notched leaves are silver underneath and diminish in size as they reach skyward. Wilfrid Blunt writing in the Journal of the Royal Horticultural Society notes, "that the leaves look like ancient yellow chinese silk; a faint grape bloom adds patina to the upper surface while the under surfaces are silvered with innumerable white hairs." At the top of the plants are plumes of airy buff-colored, pinkish small flowers. They are secondary in importance to fine foliage. Plumes of seed heads form after the flowers are spent. A rich orange sap flows through the leaf veins and stems. If the plants are grown where the sunlight filters through, or where the garden breezes flick the silver underside of the leaves, the whole clump becomes very fanciful.

It is not always size that demands attention. Many plants only a foot or so in height have this attentive quality. Often loveliness of leaf is accompanied by beautiful flowers. For example, *Stylophorum diphyllum* is a dainty plant that demands admiration. A small patch of these poppies growing in dappled shade steals much of the scene. The yellow, bowl-like, four petaled flowers about 2" wide come in May. They resemble those of *Meconopsis* and are a delight for the eye. During flowering season they are admired but in smaller gardens, where color over a longer period is taken into account, it is important that a plant be decorative even when not in

bloom. It gives the air of permanence to the planting.

After blooming, these plants retain their large oak-like leaves covered with fine hairs, once or twice pinnatifid and bright green in color. Self-sown seedlings occur when soil disturbance is minimal. If it is possible to grow these plants, no effort should be spared to encourage them.

A colony of *Pulmonaria saccharata* is a fine sight through the entire growing season. These plants are useful in shaded corners or in full sun. They do not mind having to compete with the roots of trees. Although grown for its attractive foliage, the plant is among the first to bloom in early spring. The flowers, first pink and later a porcelain blue, are a beautiful picture among the dark green leaves. The pointed hairy leaves have bizarre patterns and splashes of silver-white blotches painted on them. This brings lighting effect into the shade where they like to grow. Spotting on the upper side of the leaves is caused by the stomata—little breathing mouths used for gaseous exchange. The species is invaluable for foliar display in any position where low growing plants are required. Division is the easiest method of propagation.

One of my favorite foliage plants for a hillside in the woods is the Ostrich fern; *Matteuccia struthiopteris*. In early spring, when the foliar fronds begin to unfurl, they provide the most exciting young growth with their fiddle-heads. The fronds grow tall and stately, reaching five to six feet in height. They are pale green in color, leathery, lustrous, 1-pinnate, deeply pinnatifid. They grow in a circle leaving an open center but spreading outward at the top like a giant shuttlecock. Unlike most hardy ferns, the spores are not produced on the back of the foliar fronds but carried on fruiting fronds which appear in late June or early July. They are about one half the height of the foliar fronds. In August, the spore cases open releasing millions of spores. As fall approaches, these fertile fronds turn to a bronze color, then to brown and remain like brown-black erect feathers all winter. As frosts arrive, the green fronds turn to a variety of colors . . . yellow, brown, mottled. Since ferns have underground stolens running far and wide, they are a marvelous ground stabilizer. This makes them ideal for a hillside.

The leaf of leaves, sparkling with vitality, belongs to the *Ligularia*. *Ligularias* are vigorous plants, and easy to grow. They produce large, thick, rounded leaves on foot-high stems. The bright yellow daisy-like flowers emerge from the curious pouches that form on the stems. They are a great asset to the garden even when not in flower. A few plants well spaced can alter the design of any planting. They are easily propagated from seed.

This list of a few particular favorites of ornamental foliage is very incomplete. It only gives an idea of the wealth of fine plants with distinctive leaves of character. Seek and you will find the right foliage plants with their sheer individuality, interest and variety to give solidity, form and design to your garden. □



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Organic Gardening

Continued from page 9

reduces erosion and improves the organic matter content of the soil when the garden is prepared for planting in the spring. Corn stalks, tomato vines and other tall plants should be cut into eight inch pieces with a sickle or pruning shears. Chop up low plants like beans and bushy flowers by running along the row with a rotary lawn mower. Unmulched areas in gardens and fields, not occupied by growing crops, should be planted to green manure crops such as rye, ryegrass, millet, sorghum, or crimson clover. They will reduce leaching of nutrients and increase organic matter for the next crop as they are worked into the soil.

Salvaging and Recycling Organic Waste Materials

Organic waste materials such as leaves, manure from livestock and poultry, treated sewage sludge and the organic portion of urban trash collections should be salvaged and used as fertilizer, mulch, or compost. Farmers and gardeners should use such materials whenever they are available.

In promoting our concern for salvaging waste, however, we must apply our efforts at the most effective place in the recycling process. For example, organic enthusiasts commonly suggest that bone meal, cottonseed meal, dried blood, fish meal and tankage should be used as fertilizer. The need for food by humans is much too critical to justify such a practice. These costly by-products should be recycled as food for livestock and poultry to produce meat, eggs, or milk and their manure then returned to the soil as fertilizer.

Some cities accumulate leaves in huge piles during fall collection periods. After several months of composting, the material is available at little or no cost to gardeners. This is a practical way to reduce environmental pollution and supply organic material for gardens and farms.

The solid portion of sewage may be effectively salvaged and used as fertilizer. Numerous cities now follow this practice, and all should be encouraged to do so. Composted sewage sludge has a composition of about five percent nitrogen and two percent phosphoric acid, and is an excellent organic fertilizer.

The solid waste from urban areas which is hauled away as garbage to be burned or buried should also be recycled. Processes are now available, and are being used by a limited number of cities, whereby glass, metal and paper are salvaged for use by industry, and the remaining organic portion is utilized to produce heat or is made into compost for crop production. Future generations may justifiably condemn us for wasting these valuable resources.

Losses by Insect and Disease Attack

Probably the greatest deterrent to successful growing of vegetables is the damaging effect or crop loss by insect pests and disease organisms. The severity of damage is greatly influenced by the weather which varies, not only

geographically, but fluctuates from year to year in the same region.

Winter temperatures determine how many eggs, pupae, or adult insects survive from autumn to spring. Cool or warm spring weather influences disease infection. Temperature also determines the time of emergence of pests from hibernation, their build up to damaging numbers on early planted crops and the development of parasites and predators of these pests. Prolonged droughts and high summer temperatures kill eggs or other stages of many pests by heat or desiccation. High humidity and rainy periods are favorable for rapid spread of plant diseases, but also enhance disease epidemics that suddenly destroy thriving infestations of aphids or caterpillars.

Time of planting is important in avoiding losses by diseases and pests in certain regions. Since seed corn maggots destroy early plantings of beans and corn, you should delay planting until the soil warms. Early maturing varieties of sweet corn can avoid the worst earworm problem. Likewise, delay plantings of summer squash to avoid early season activity and resultant damage by the squash vine borer.

Controlling Plant Diseases

During recent years, plant breeders have made tremendous contributions to agriculture by developing new varieties which are resistant to diseases. These allow large yields of high quality crops to be produced without the use of disease controlling sprays. When sprays are needed, be sure to select EPA approved biodegradable materials and follow all label directions.

When planning for vegetable production in a home garden or commercial enterprise, consult your local Extension agent or seed catalog for information on disease resistant varieties. Excellent new introductions are available each year and should be selected to improve the efficiency of production, and reduce the need for spraying. Comparable insect resistant varieties have not been developed.

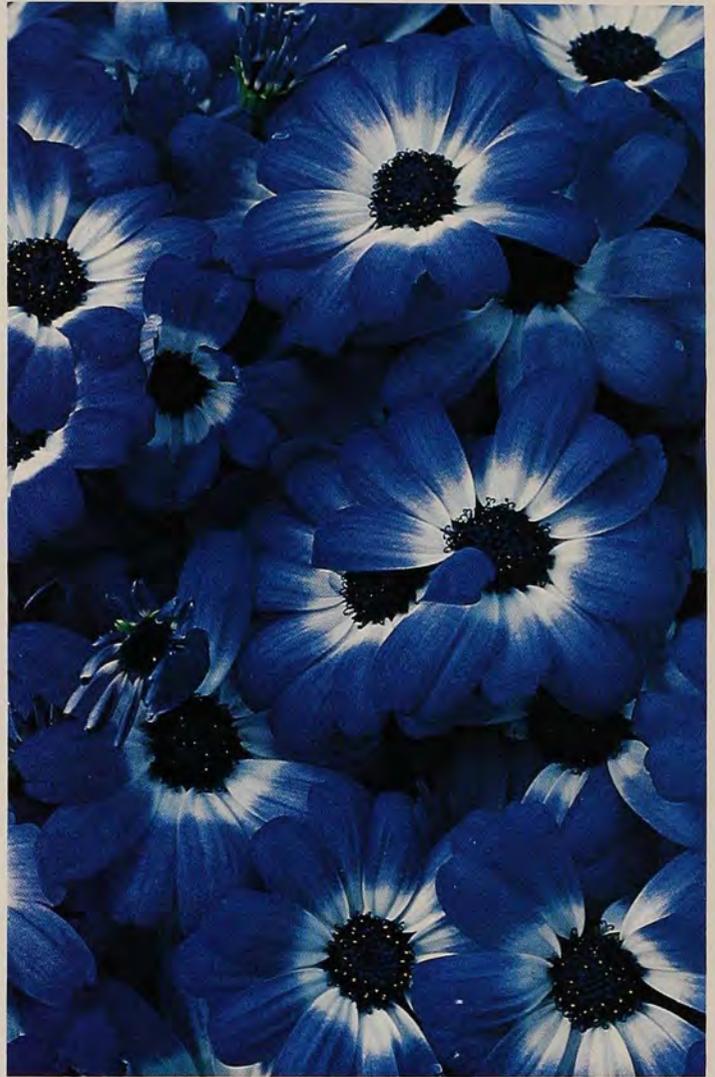
Some vegetable crops are highly subject to damage by pests or disease organisms and require special treatments by experienced growers to insure a crop. Others are relatively pest-free and may require no treatments in some seasons. The beginner should first plant only trouble-free crops, later trying the more difficult ones as he gains experience.

Mechanical Control of Insects

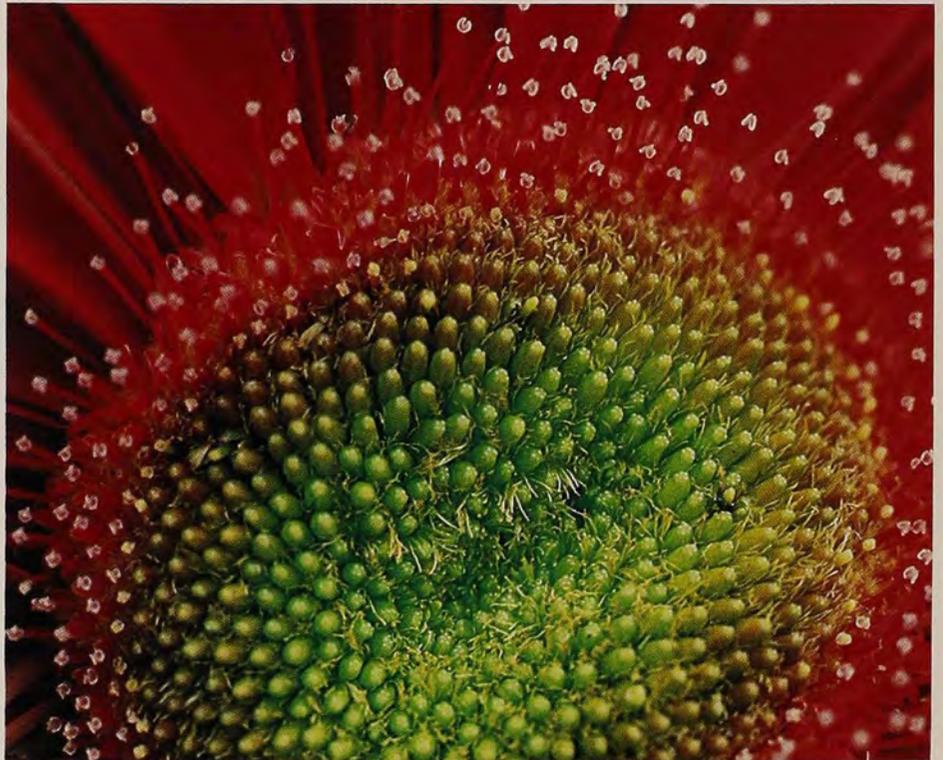
Attack by cutworms can be prevented by placing a simple collar of stiff paper (cut from a drinking cup or milk carton) around newly set tomato, cabbage and pepper plants—and even sweet corn. The collar should extend about one inch into the soil and two inches above ground.

Slugs that emerge at night from hiding places in wall crevices, loose mulch, piles of plant stakes or trash, can be trapped under pieces of board, shingles or flat stones

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Clockwise from top
right—Chrysanthemum,
African daisy, Daylily.

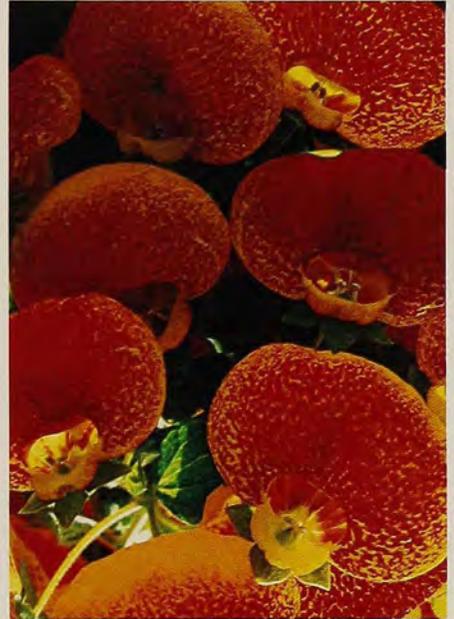


Essence of the Garden

Jon Ortner
37 Bellingham Lane
Great Neck, NY 11023

At one time or another, most of us have picked up a camera and attempted to capture the beauty of a plant or flower on film. To a certain degree, we have all succeeded. A few of us have excelled. Jon Ortner ranks among the few. He is an explorer, mountaineer, naturalist with concentrations in entomology, mammology and botany.

According to Mr. Ortner, "I try to use a graphic color impact. I feel that the 'essence' of a certain object can be shown; a sort of view from the mind's eye. I describe my work as almost impressionistic where the use of form and color evoke an emotional rather than intellectual response. I try to allow people to see things in a way that is unique and beautiful. I feel that people forget about the incredible beauty that surrounds us. They lose their sense of wonder about nature and the intricate web of life. Through photography perhaps the public can be persuaded to value this beauty, and to save our natural heritage in every possible way." □



Clockwise from top right—African pouch plant, Camellia, Grasses.



HERBS, HER

Herbs & Folklore

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Eighteen centuries before Christ, Joseph was sold by his brothers to a company of Ishmaelites. They had come from Gilead, with their camels bearing spices and balm and myrrh. These were the Arabs of the spice trade, already monopolists for more than 3,000 years. Their products came from the Indians, the Chinese and the Javanese who put into Indian ports.

Anise (Sweet Alice) was a favorite of the ancient Romans. Anise, a small annual of the parsley family, originated on the eastern Mediterranean, Fertile Crescent. The seeds are characterized as being comma shaped, pungent and similar in taste to shoestring licorice candy. Seeds fell from the Roman banquet tables and grew, thereby spreading throughout the countryside. According to mythology, anise has the magic powers of safeguarding one against an evil eye and keeping one free of nightmares. King Edward IV of England (15th century) cherished

its perfume and ordered his bed linens scented with sachets of anise seeds. Today in the Orient, anise is still used as a breath sweetener. Anise is used in breads, cookies and fruit dishes in the United States. Pimpinella bread is an example of bread with seeds of anise.

Basil, a member of the mint family, has been the number one herb used in the United States for many years. Basil is the most savory of the culinary herbs being used in all vegetable dishes. The ancient Greeks believed that only the sovereign himself should be allowed to cut the basil. He always used a golden sickle to cut it. It is the Greek word for

royal or kingly. According to Greek myths basil is called basilisk. A basilisk is a mythological lizard which breathes death upon its victims. Basil is called "Kiss-me Nicholas" in Italy and is a token of love. Girls used to wear it in their hair as a signal that they were ready to be kissed.

According to legend in Romania a boy who accepts a sprig of basil from a girl became engaged. Their bond is assured to last forever.

In India basil is called "tulasi." It is a holy herb grown in pots near every temple and dwelling of devout Hindus. The Hindus burn it as incense during religious ceremonies.

Herbalist Nicholas Culpeper wrote in 1652: "This is the herb which all authors are together by the ears about, and rail at one another like lawyers. Galen and Dioscorides hold it not fit to be taken inwardly, and Chrysippus rails at it with downright Billingsgate rhetoric. Pliny and the Arabian Physicians defend it."

John Gerard, Shakespeare's contemporary said, "A smell of basil is good for the heart and head it cureth the infirmities of the heart, taketh away sorrowfulness which cometh of melancholia and maketh a man merry and glad."

Caraway is a member of the parsley family. It is known as the ancient spice. It is an annual from Asia Minor and was scattered by the Romans. The English and Germans have used caraway seeds for the past 1,000 years. Shakespeare wrote "Pippin of my own grafting, with a

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BS, HERBS...

Urban Herbs

Linda Yang
505 East 79th Street
New York, NY 10021

You've never grown your own herbs? Then you've missed one of life's most sublime joys. To experience their fragrance and freshly harvested flavors just once is to risk a life-long addiction.

Botanically speaking, the word "herb" is not always used accurately. Herbs (short for "herbaceous plants") are technically those perennials with fleshy green stems. Some plants called herbs are actually woody perennials. But "herb" is the commonly accepted term for a number of plants with the unique characteristic of providing culinary delight. And make no mistake, some of them can raise the most simple fare to a level worthy of royalty.

Grow Them In Tubs

Herbs are very amenable to container gardening. They will thrive on a patio, rooftop, terrace, or balcony where they can be grown in large flowerpots, wooden tubs, plastic windowboxes, or any other containers you can spare. The only requirement is that there be holes in the



bottom for draining excess water.

Prepare your tubs or boxes by lining the bottoms with about half-an-inch or so of gravel, small stones, or broken crockery. Cover this drainage layer with some newspaper (to keep the soil from sneaking out past it), and then fill the box with a potting mix. There are many combinations possible, but a good basic mixture which will satisfy most herbs is as follows:

- 1/2 volume of an all-purpose potting soil
- 1/4 volume of perlite and vermiculite
- 1/4 volume of well-rotted compost or peat moss

Add a handful of ground limestone to this mix, and you're ready to plant. If you have no garden center nearby, a good source for these supplies is your local five-and-ten-cent store.

Basil

If you've room to try growing only one herb, then you must begin with sweet basil (*Ocimum basilicum*). As with most herbs, the folklore which comprises its long history makes it as fascinating as it is useful. A pot of basil in a window was considered to be a sign that a lady expected her lover. And farmers' wives were known to give basil plants to friends, not only for cooking, but to help keep away flies.

Young basil plants may be purchased at garden centers, but they're also easily started from seed in the spring. Basil isn't at all fussy in its growing requirements, and does fine with only a few hours of sun a day. Be sure to water generously though, at the first hint of dryness.

Basil is well known for its use in the sauce *pesto* and in other Italian dishes. But once you've grown the plant, you'll find its fragrant leaves improve a nearly limitless range of cooked or raw vegetables: spinach, zucchini, green beans and, especially, tomatoes. Salads, meat stews and meat sauces are also good with basil.

Scissors are preferable to knives for taking the leaves from the plant, as well as preparing them in the kitchen. Knives tend to crush the freshly harvested stems or leaves and generally are impractical be-

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British Gardens

American Plants

J. Stanley
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Garden design in the British Isles has developed through six major changes. The first gardens were formal, small and basically yards surrounding and protecting the house, gradually the Renaissance in France and Italy influenced the design and more flamboyant gardens were created on a larger scale, but still very formal. At the same time people became increasingly interested in plants, resulting in the first botanical gardens and commercial nurseries being opened.

In the 17th Century the English landscape garden was born, a result of a revolt against formality, influenced by the great painters, such as Salvator Rosa, Claude Lorraine and Poussin and implemented by designers such as 'Capability' Brown, William Kent and Humphrey Repton who used native and newly introduced exotic plants.

With the crowning of Queen Victoria and a return to formality, gardens were constructed with terraces, balustrading, 'Italian-Style' ornaments and glasshouses. This was also the period of the great plant hunters; Robert Fortune went to Japan and China, while David Douglas travelled America.

By the early 20th Century British gardeners had a great variety of plants at their disposal. The 'Surrey School' was born, led by William Robinson and Gertrude Jekyll who created the back-to-nature effect in a semi-formal arrangement using a variety of plant material.

The modern gardener is in debt to these past designers and to the plant hunters, especially people like David Douglas who between 1799 and 1834 travelled extensively in the United States, bringing back plants such as *Arbutus menziesii*, *Pseudotsuga menziesii*, *Ribes sanguineum*, *Mahonia aquifolium*, *Lupinus polyphyllus*, *Abies nobilis*, *Pinus radiata*, *Picea sitchensis* and many others to beautify



Liquidambar styraciflua

Photo by Pamela Harper

gardens.

A hundred years after his first expedition to America the Gardeners' Chronicle wrote "There is scarcely a spot deserving the name of garden, either in Europe or in the United States, in which some of the discoveries of Douglas do not form the chief attraction."

From these early introductions nurserymen in Europe have carried out further improvements to increase the variety of plant material.

A common tree for urban gardens is *Robinia pseudoacacia*, the False Acacia, a native of eastern U.S.A.;



Acer negundo 'Variegatum'

it is now common world-wide, a street tree in China, naturalized in France and common in British industrial cities due to its resistance to pollution. Many clones have been developed on both sides of the Atlantic, but the most common in English gardens is cv. 'Frisia' which forms a medium sized tree with bright yellow foliage; it is often used in association with purple leaved plants. This plant was raised in 1935 at W. Jansen's Nursery in Holland, obtaining an Award of Merit at the Royal Horticul-

Right—*Magnolia grandiflora*

Photos by Clarence E. Lewis



Ceanothus americanus



tural Show in 1964. It has now become one of the most popular trees for small gardens. An older golden form of this tree is *Robinia pseudoacacia* 'Aurea', the foliage of which turns green as the summer progresses.

A popular Maple in Britain is *Acer negundo*, the Box Elder, which was introduced in 1688; it is still growing at Kew, but the typical American form is now rare in English Gardens, being superseded by forms such as *Acer negundo* 'Variegatum' which appeared as a sport on a green plant in a nursery in Toulouse, France in 1845. This female form eventually grows into a medium sized tree, although it needs constant attention to prune shoots.

Catalpa bignonioides, Indian Bean Tree, is a common tree in the United Kingdom, many a tourist having admired them in London outside the Houses of Parliament. In gardens the best form is the Golden Indian Bean Tree, cv. 'Aurea' the golden colour intensifying as the summer progresses. The true origin of this clone is difficult to establish, although very fine specimens exist in Sunningdale Nurseries, Windlesham, Surrey and these could be original trees.

In late spring and summer, the best blues in the garden come from the species of *Ceanothus*, the Californian Lilacs, which in the United Kingdom require full sun and a well drained soil. Various forms have been developed in Europe, and these are now a common sight in many South of England gardens.

C. arboreus 'Trewithen Blue' originated in Cornwall at Trewithen Gardens. This form has deeper blue flowers on larger panicles than the species.

A common hybrid is 'Burkwoodii' which originated in the nurseries of Burkwood and Skipworth at Kingston-upon-Thames, Surrey. The parents were *C. floribundus* and cv. 'Indigo' which have produced a medium sized evergreen bush which will flower during the summer and autumn. In 1930, the raisers were awarded the Cory Cup for the best artificially raised hybrid of the year.

In the 19th Century French nurserymen and breeders were very keen on introducing new forms of *Ceanothus* which have been called the French Hybrids, the parents mainly the tender deciduous *C. coeruleus* from Mexico and *C. americanus*, a more hardy white flowered deciduous plant. The results of these crosses are now common in the English garden, including 'Delilianus', 'Gloire de Versailles', 'Indigo', 'Leon Simon' and 'Marie Simon'.

Liquidambar styraciflua, the Sweet Gum, is increasing in popularity due to its autumn colour and clones are now being introduced with superior colouring. This tree only grows to half its potential height in the United Kingdom, rarely being seen taller than sixty feet. Marchant Nurseries of Wimbourne, Dorset have introduced a form called 'Levis' which produces excellent autumn colour, but lacks the normal corky wings on its branches. Jackman's Nursery of Woking, Surrey found an excellent form in a local village, they propagated it and it is now a popular seller, still retaining the origin in the name, 'Worplesdon'. Hilliers Nurseries of Winchester also have a form

which has crimson-red foliage, 'Lane Roberts'.

One of the best evergreen Magnolias for the British climate is *Magnolia grandiflora* from the south east of the U.S.A. A more upright form with narrow leaves was discovered in the garden of Sir John Colliton at Exmouth, Devon. He used to rent the tree out to nurserymen to collect rooted layers, by this method the tree was released through the trade. Unfortunately, the original tree was felled by mistake, but 'Exmouth' is still available and sought after due to its flowering potential at an early age.

Probably the greatest American impact on English gardens and the landscape has been Douglas' conifer introductions. *Chamaecyparis lawsoniana* is still one of our most popular selling conifers and hundreds of forms have been introduced since the seed was sent to Lawson's Nursery, Edinburgh in 1854. Early clones were raised in Boskoop, Holland and this has meant introductions such as 'Columnaris' from Jan Spek's in 1940, 'Hollandia' and 'Triomf van Boskoop'.

English nurserymen were also busy raising new forms, 'Aurea Densa' was raised at Messrs. Rogers Ltd., Southampton; 'Aurea' at Waterer's Nurseries, Bagshot, 'Erecta Viridis' and 'Gracilis' at Knaphill Nursery, Surrey, 'Green Hedger' from Jackman's Nursery, 'Lane' a golden form from Lane's Nursery, Berkhamsted and 'Pembury Blue' from Baggesen's Nurseries, Pembury, Kent.

Apart from plants being purpose raised, sports were also occurring and being exploited by growers, these included 'Elwoodii' at Swanmore Park, Bishop's Waltham and 'Fletcheri' at Ottershaw Nursery, Chertsey and sold by Fletcher Brothers in 1913.

Probably the greatest impact made on the British horticultural scene in recent years has been the crossing in 1888 at Leighton Hall, Gwent, Wales of two American conifers. Six seedlings of a cross between *Cupressus macrocarpa* and *Chamaecyparis nootkatensis* resulted in the most common hedging plants, *X Cupressocyparis leylandii*. It is the fastest growing conifer in the British Isles, and the best seller for ornamental purposes. Several clones are now being sold including 'Green Spire' (Clone 1), 'Haggerston Grey' (Clone 2), 'Leighton Green' (Clone 11) and 'Naylor's Blue' (Clone 10). In recent years, we have seen the introduction of golden and variegated forms which are now proving just as popular.

One of the parents, *Cupressus macrocarpa*, the Monterey Cypress, has produced many variants in its own right. 'Donard Gold' was raised in Ireland, whilst another golden form 'Goldcrest' was introduced by Treseders of Truro. The best dwarf form 'Pygmaea' was raised in 1920 by Mr. Marcham from Carshalton Nursery in Surrey.

It is impossible in a paper of this length to include all the American introductions and how they have been manipulated by the European growers and climate. As gardeners, we are indebted to the great plant hunters who first introduced these plants and also to the nursery trade for providing a greater variety. Without their enthusiasm our gardens would be duller places. □

Bonsai Basics

Continued from page 3

able to open the windows from the inside and place my potted plants on the well drained floor of the window wells. They are rained on and snowed on, get plenty of light and air, but are well protected against zero temperatures and high winds.

I did nothing to them all winter but observe, from time to time, through the basement windows. It was exciting to see the crisp green needles, often poking through the snow. Toward spring, the leaf buds began to swell. I brought them back up to the terrace in early April and watched them behave like their adult counterparts.

Thus ended the first year of an engrossing new activity which, up to this time, had cost nothing more than the price of a masonry drill bit.

I enjoyed studying my little trees as I have studied pieces of sculpture, from all angles, trying to visualize how each would look with a stem off here or a branch wired there. It was after a great deal of cogitation that I further pruned the white pine and took the first steps to convert the spruce into a cascade.

It was at about this time that I began to expand my efforts. I bought a few small plants from local nurserymen and ordered a few more from bargain catalogs. I slipped a dozen or so into a large plastic bag and brought them home with me from New Hampshire where I had been given *carte blanche* in the woods behind my niece's cottage. I had found a tiny birch not more than an inch outside the lawn mowers path. I packed a six inch boxwood in my suitcase when I flew home from Williamsburg. I weeded a Chinese elm and a small oak out of my own rock garden and a twelve inch horse chestnut out of an inner city alley.

By this time I had long since run out of ceramic pots and bowls and had had to invest in some which are made specifically for bonsai. These already have holes in the bottoms and, fortunately are not very expen-

sive. I have not yet bought a plant already trained by a bonsai expert. I am sure that such a one would be more beautiful than mine, but not nearly as much fun.

Part of the pleasure of this collection is in studying the forms of these little treasures. Part of the excitement is in pruning, snipping, and wiring, and hoping that these steps will prove to be the right ones in my partnership with nature. I am heartened in the fall when I see evidence of next year's buds. I am ecstatic in the spring when I watch them open into fresh light green leaves or needles.

During the growing season the collection requires a certain amount of care. If one is to be away, the service of a reliable plant sitter is vital. Watering is, of course, the most urgent need. In the hot summer weather, the plants sometimes must be watered twice a day as the soil is so shallow and the roots so confined by the pots. This condition is one of the fundamentals of bonsai. As the roots of most trees spread underground to the perimeter of their branches, so with bonsai, since the roots are kept from spreading the branches will maintain a similar circumference.

The small trees need to be fertilized, some authorities say frequently. Although I am bold with pruning and wiring I am very cautious, maybe overly so, about fertilizing. Because I once lost five or six plants due, I am sure, to being overzealous, I now rarely fertilize more often than once a year. I do, however, lift them out of their pots at least once in every three years, cut away most of the hairy little roots and some of the larger ones, and refresh them with the addition of new soil. I use mostly ordinary garden soil on the premise that what is good for the flowers is good for the trees.*

With the frequent handlings and administerings a unique intimacy develops. Even so, since my collection now numbers between forty and fifty plants, it is impossible to remember what I did to "whom"

and "when." So I keep records. I take photographs of all except those least likely to succeed and keep each one in its own little clear plastic envelope in a photograph album. In the same envelope I keep an index card with the name of the plant, when and where I obtained it, and any pertinent information such as dates of pruning, repotting and fertilizing. As I only began this kind of record keeping two years ago I cannot yet ascertain the changes in maturity which I hope ultimately will prove to be of great interest.

In spite of my enthusiasm and what may appear, on paper, to be a meticulous approach to these fascinating problems, I lack the patience and discipline to hold strictly to the rules. I have gone to botanical gardens and exhibits and have been inspired by the masterpieces of bonsai in the same manner that I have gone to museums to be moved by the Rembrandts and Picassos. Yet I am happy to return to my own small efforts which grace a bench in the garden and which, on occasion I will bring into the house briefly, one or two at a time, to be admired as a centerpiece or to be placed at some other focal point indoors.

My approach is, after all, amateur, but it has opened up whole new areas of awareness. My absorption with the little trees has brought about a parallel interest in the names, shapes and growing habits of some of the big trees. My involvement with the little trees has heightened my sense of proportion and balance, those very qualities which cause some to consider bonsai to be an art form. However, I cannot become too serious about art and science in this connection because I know that, for me, the real value of my bonsai collection is simply that it is a pleasant pastime. □

**Editors Note: Some of the authors cultural practices would give a "professional bonsai practitioner" severe heartburn. Yet, Ms. Quint's technique works for her. For a more classical look at bonsai, please refer to American Horticulturist, Volume 55, 1976, page 22.*

the Garden's Foundation

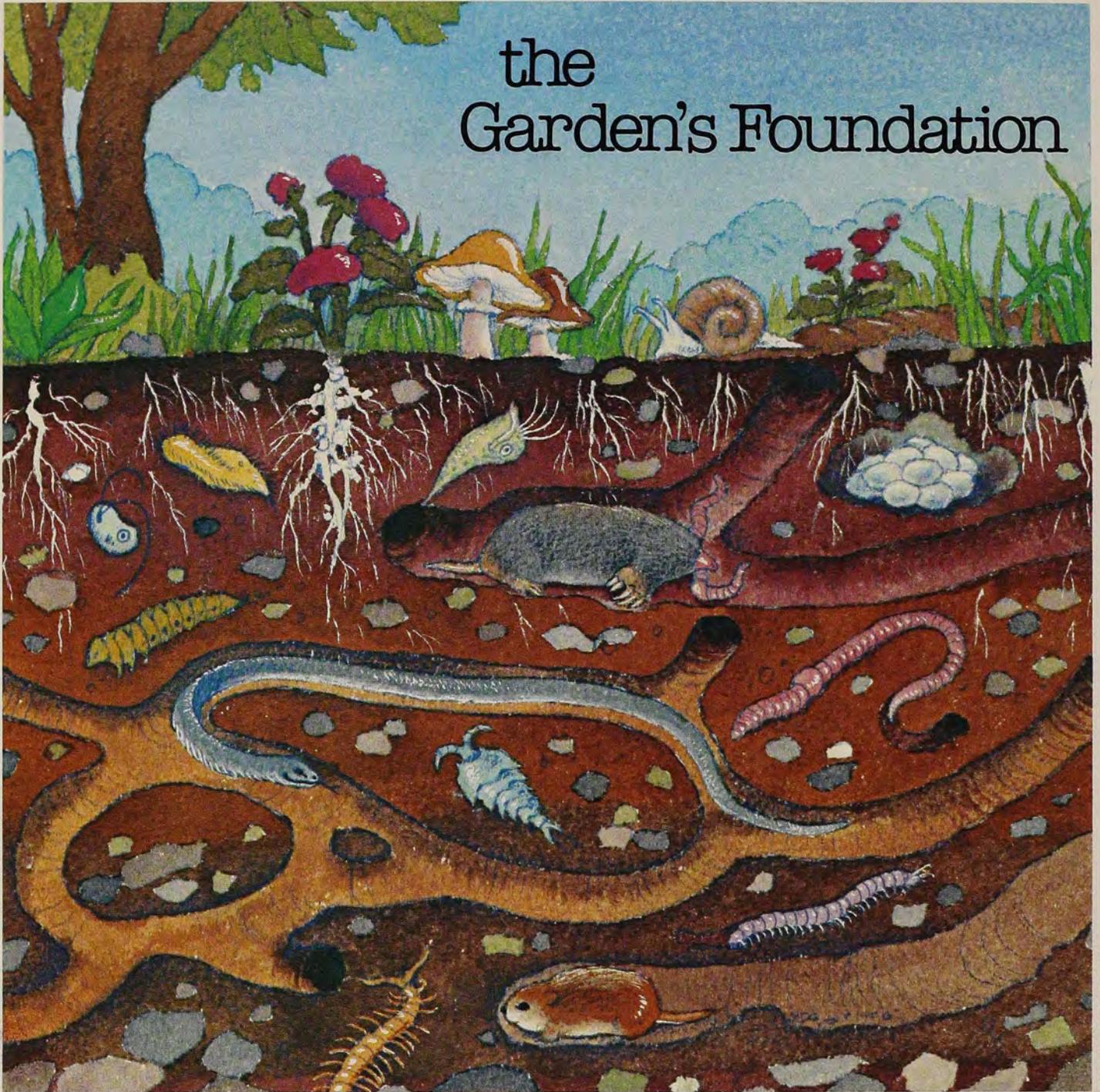


Illustration by Annie Lunsford

R. Milton Carleton
1938 High Point Drive
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Although soil is, obviously, the basis of all gardening, it is given far less thought than seeds, tools, fertilizers and other elements in the growing of plants. All too often it is described in contemptuous phrases such as "cheap as dirt," or "lower than the dirt under your feet."

Far from being simple and beneath contempt, soil is perhaps the most complex and least understood of any element with which Man works. It is vital to the survival of practically every living land organism, whether animal or vegetable, from microscopic bacteria and fungi to the giant redwoods and the larger animals.

Of all living creatures, the human animal alone manipulates and modifies soil to better serve him. Since

long before the beginnings of recorded history, without understanding its complex nature, he has managed to work it and improve its yields of food and fiber. But because of his lack of understanding of the actions and reactions within soil, false concepts have arisen which stand in the way of both further improvement and of conservation of its productive capacity.

The first of these concepts affecting present-day gardening is the

idea that soil serves only as a supporting medium for the plant—a mechanical mixture of sand, silt and clay, to which plant food elements can be added in the same way as money can be deposited in a bank and later withdrawn by check.

What is missing here is a lack of appreciation for two vital elements without which true soil is impossible. The first of these is organic matter, a subject so complex that the late Dr. Selman Waksman once wrote a book of nearly 1,000 pages on a single element of organic matter, humus, in which he had to leave almost as many unanswered questions as he answered.

The second neglected element, also an essential part of the organic content of soil, is biologic—the presence of microorganisms, tiny bits of life which make soil a living thing. It has been said that soil management is almost totally the culture of bacteria. If we add to that statement other forms of soil life such as fungi (including mycorrhizae), actinomyces, protozoa and rotifers, it about sums up their importance in soil.

The numbers of these tiny bits of life are impossible for the human mind to grasp. Turn over a spadeful of rich garden soil and you will disturb more living organisms in that single clod of earth than there are human beings in the world. In spite of their abundance and their contribution to soil fertility, they are all but ignored, while the less important role of earthworms is greatly exaggerated.

None of these earth-inhabiting organisms actually contribute any energy (richness) to soil; only green plants are capable of doing so. Through the magical, mysterious processes of photosynthesis, plants are able to capture energy from the sun, combine it with carbon from the air and water from the earth to manufacture starches and sugars—the energy foods on which the whole world exists. Non-chlorophyll organisms in the soil live on the starches and sugars; they do not cre-

ate them.

How do they serve as agents for contributing richness to soil? One of their most important functions is to digest highly complex organic compounds. The organisms use part of these for their own energy needs and exude the rest as simpler forms which plants can absorb and use. In spite of the claims made for the importance of pure organic matter in growing plants, no one has ever seen a cabbage consume a hamburger. It lacks teeth and a digestive system to utilize complex organic matter. Only after these simpler forms of life have reduced organic matter to near-elemental chemicals are roots able to absorb it. Whether you are an organic gardener or a non-believer, you must face one fact—no plant can use solid organic matter: it can only take up simple chemicals in completely soluble form.

This fact in no way diminishes the importance of organic matter. Space does not permit a discussion of the value of this soil ingredient in supplying certain growth-promoting substances, etc. In their claims of serious effects of the use of simpler forms of plant nutrition, organic gardeners have missed an opportunity to make a real contribution by investigating the effects of the use of plant extracts. At the 1966 International Horticultural Congress, I had a long talk with a Dr. Penningsfeldt from Germany about some astonishing improvements he had effected in plant growth by the use of peat extracts. At first, I was misled by his use of the word peat, but later when he described this as "white peat," I realized that he was talking about sphagnum moss that has dried after harvesting. Here is a field for investigation which would be a real service to horticulture.

To return to the functions of microorganisms: perhaps their greatest service to the gardener is in their conservation of plant food elements. When we apply a fertilizer—whether chemical or mineral, to a soil, only a fraction of this can be

used by plants directly. In spite of the complex mass of roots a single plant can produce, these do not occupy more than a small fraction of the soil in which that plant grows. As a result, any soluble food elements can be lost quickly in drainage waters, unless the soil contains both spongy organic matter and microorganisms that can absorb these elements and use them for their own nutrition.

When absorbed in this way, although some energy is used and lost to plants, much of it becomes part of the living cell. Fortunately for gardeners, as well as for plants, all microorganisms have a very short life cycle. Dying off, they release the food or energy they contain and it is again available to roots.

A word that has been more or less lost in recent times is "tilth." In a sense this means tillable, but it has further meaning as well. A soil in good tilth not only turns readily under the plow or spade, but when not too wet or dry crumbles to a spongy mass in which roots can find room to grow, moisture and plant food elements. The late Ralph Bailey described soil in the highest degree of tilth as a Gardener's Loam, a phrase worth preserving.

Unfortunately, practically all gardeners are forced to cultivate areas that they own. It is a rare gardener who buys a home with spade in hand, determined to find the perfect soil. This calls for the use of materials and tillage practices which will bring existing sand, clay or silt up to gardener's loam standards.

Clay presents the most difficult problem, yet when modified becomes a soil to envy. The problem is to somehow separate the microscopically-fine clay particles so they do not form a barrier to the penetration of water, roots and nutrients. A remedy often recommended for this purpose is the addition of sand, but this is a treatment to be used with caution. Unless the gardener is willing to add so much sand that the final mixture contains at least one-third sand to two-

thirds clay, the resulting combination will be worse than before treatment.

The clay particles surround the sand grains and form a compact mass resembling concrete. Sand can only be used successfully if the sand grains, which are much larger than the clay particles, are able to hold the latter apart without being completely coated.

Another remedy is to pull the fine clay particles into larger clumps so they will form a more porous soil. In soils that tend to be too acid, the addition of fine limestone particles will attract the clay particles (which are colloids and tend to stay in suspension) into flocules or tufts. In theory, one particle of lime attracts eight particles of most clays, but this ideal is seldom reached in practice. Spreading a two inch thick layer of either agricultural limestone or of the fine limestone used for topping driveways on clay and tilling it in to a

depth of several inches will produce a more porous soil.

Even more effective is the use of organic matter. Decaying manure or uncomposted vegetable matter tends to add acidity. Combining an early treatment of limestone with an application (about a month later) of compost, humus or other forms of organic substance is the ideal treatment.

The delay in applying organic matter is to allow the lime to become partially bound to the clay particles; otherwise a loss of nitrogen in the form of ammonia will result from interaction between the two applications.

Where clay soils are naturally rich, a simple soil modifier is the use of steam cinders, usually available free or at low costs from steam generating plants. Because these contain harmful but soluble residues, they should be exposed to weather for an entire winter before using. Screen-

ing through a half inch mesh sieve (four squares to the inch) will remove particles too large to be of much use in soil modification.

For small areas, the use of vermiculite and perlite is highly effective. These chemicals are expanded by heat to produce a porous structure which is capable of holding from five to ten times their weight in water, or a similar volume of air. They are chemically inert and not readily broken down by soil acids.

In thinking about garden soil, it is important to forget the idea that growth in the garden and in the wild are identical. Except perhaps for the culture of orchids, the growth of flowers, vegetables and lawn is the most artificial use of soil in existence. Our purpose is not natural growth, but accelerated, superior growth in which we discipline plants and make them produce at maximum. In order to do so, we must strive for the development of soil far beyond that we find in nature. □



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Insect Memorial

Continued from page 13

Travelling Australian entomologists spent most of their time in the Southern United States, the ancestral homes of the prickly pear species introduced to Queensland. These species did not become dangerous weeds in Florida because their spread was limited by natural enemies, mostly by red spiders and the cochineal insects. For some time, the cochineal *Dactylopius opuntiae* was most promising. It was brought to Queensland, reared in great quantities and released in prickly pear scrub. It destroyed the prickly pear plants but it worked much too slowly for the liking of the exasperated Australian farmers who were losing 3,000 new acres of land to the terrible weed each day.

Meantime, in 1914, a young entomologist Allan P. Dodd, a member of a Travelling Commission, had visited a Botanic Garden in La Plata, Argentina. He noticed there a moth borer (*Cactoblastis cactorum*) on an opuntia plant but did not pay much attention to it. *Cactoblastis* is native to Argentina and Uruguay. It seemed not to do too much harm to the plant. However, eleven years later Dodd knew much more about *Cactoblastis*. Research had shown that *Cactoblastis* spread like a fire on *Opuntia inermis* and *Opuntia stricta*, the two species that were acclimated in Queensland.

In 1925, Dodd shipped 2,750 eggs of the *Cactoblastis* to Queensland. The insect multiplied rapidly. Under controlled conditions Dodd and his people collected 2.5 million eggs in 1926. The first experimental release of the insects was made under Dodd's supervision in 1926. During the next two years more than two billion eggs were collected from open fields and distributed in the prickly pear scrub.

Cactoblastis is a grey inconspicuous moth with a wing spread of 1 to 1.5 inches. Caterpillars that hatch from its eggs burrow into the cladodes. They are rather beautiful, bright

orange red with black spots. They are very voracious and consume the soft tissues of the cladodes. As a result, the whole plant collapses. New cladodes sprout from the roots but they are attacked in turn. The plant dies after two or three trials.

To the amazement of the Queensland farmers, the spread of *Cactoblastis* was so fast that in 1930-1932, prickly pears simply vanished from the land. Regrowth occurred in 1931-1933, but the *Cactoblastis* put a speedy end to them. Sixty million acres of land returned to Queensland agriculture.

The Commonwealth Prickly Pear Commission was dissolved on May 31, 1939. Allan P. Dodd was awarded an Order of British Empire (OBE) for his accomplishments. He is retired by now and lives a quiet life in Brisbane as an amateur floriculturist. In 1936, grateful farmers built a *Cactoblastis* Memorial Hall for their meetings, socials and other activities. The Hall was erected in Boonarga, a little settlement about 200 miles west from Brisbane, the capital of Queensland, on the 10th anniversary of the first experimental release of *Cactoblastis*. Boonarga was the place where first release of the *Cactoblastis* was made.

I made my pilgrimage to Boonarga in August 1978 on the occasion of a visit to Australia to attend the XXth International Horticultural Congress in Sydney.

I found in the vicinity of Chinchilla near Boonarga some prickly pears, very sparsely scattered in the savannah bush forest. Fortunately, not all prickly pears were exterminated. Some survived through the years and thanks to them the *Cactoblastis* also survived. Wherever a few plants appear, the moth borer attacks and destroys them.

When I came to Brisbane I found that hardly anybody there remembered the story of *Cactoblastis*. Local horticulturists were glad to accompany me in my pilgrimage to Boonarga. They took as many pictures of the Memorial Hall and of the heroic insect as I did. □

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Woodland Groundcovers

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Pachysandra bores me. The more usual forms of ivy (especially *Hedera helix*, English Ivy) cover mile upon mile of suburban ground, in endless dullness. I do like the other one of the "Big Three" in ground covers, Periwinkle (*Vinca minor*); early spring is the brighter for it. Small blue stars, like bits of fallen sky, lie on neat, dark green leaves. I admit to having all three genera in our garden. However, we pull out Pachysandra (*Pachysandra terminalis*) by the bushel, chop helplessly at the ivy (which hides the lovely old-brick wall it was meant to enhance, and positively eats the driveway) and clip judiciously at the Periwinkle, when it threatens to obliterate a flagstone.

The other ubiquitous "ground-cover" (as I am using the word) is grass. If we had a gardener or two, grass would be marvelous! I enjoy kicking off my shoes on a warm day and walking barefoot on a soft green carpet. As there is no gardener, one small area near our terrace has all the grass with which we can cope.

Perhaps I should make clear that by groundcover I mean only really low, preferably creeping or spreading plants with which one can carpet an area, and within which other plants and wildflowers can grow. Such often useful covers as the pros-



Galax unceolata

trate cotoneasters (*C. horizontalis*, for example) or junipers (perhaps *Juniperus communis* 'Montana') do not come under such a definition. Nor do I include most wildflowers, which, though low, may be too treasureable to be tread upon, ever.

I find that Nature does a far more beautiful job of carpeting than we usually do. How often have I seen a lovely forest floor, and wished in vain that I could cut out a few square yards and bring them home, intact. Actually, many of Nature's most perfect low plants, in varying textures and forms, are quite practical for the home garden. May I tell you of a few woodland miniatures I love? All can be "domesticated", if your soil is acid and at least partly shaded.

One of the best, and easiest, of our native groundcovers is Partridgeberry (*Mitchella repens*). I find it in many pretty places, from New

England to Georgia. A completely flat little ground-hugging vine, Partridgeberry has tiny evergreen leaves, bears minute white blossoms in the spring, and is sprinkled with cheery red berries in autumn and winter. A typical habitat is along a stream I know; the waterside is edged with Dog-hobble (*Leucothoë fontanesiana*) and *Ilex opaca*. Partridgeberry covers the ground, interspersed with Christmas Fern (*Polystichum acrostichoides*), a few outcroppings of flat rock, and clumps of Trilliums (the big white one, *Trillium grandiflorum*). Here at home, we have a lovely large patch of it (started from one plant) growing under a Larch tree (*Larix americana*). Some of our most precious wildflowers are growing in it, *Shortia galacifolia* and the pink Lady's-Slippers (*Cypripedium acaule*), among others.

A southern delight, which will do well even on Long Island, is *Galax urceolata* (formerly listed as *Galax aphylla*). From Virginia southward, the glossy, serrated leathery leaves are one of the most distinctive of all the woodland plants. The leaves bronze beautifully in the fall. In one real "forest" of huge old *Rhododendron maximum* I have found the ground covered completely in double-size leaves. The heavy rainfall in part of the Nantahala Mountains of North Carolina brings forth gigantic Galax, that suggests that a heavily watered spot in your garden will make the plants happiest. A bonus is the burst of small white

flower spikes in the spring.

If you know any of the Wild Gingers, you may know *Asarum canadense*, one of our native "Little Brown Jugs." That strange name is appropriate, for the flowers are little brown jugs, hidden on the ground beneath the leaves. Pats of *A. canadense* grow in rich woods down into Georgia. I first knew it as a child, by a creek in a ravine clothed in pink *Rhododendron minus*. A more interesting species is *A. shuttleworthii*, which is mottled and has pointed leaves. Too often, alas, it grows as single, scattered leaves. For carpeting purposes, however, you can buy sturdy clumps from good wildflower nurseries. (Note: similar in shape to our *A. canadense* is *A. europaeum*, a glossier species. If you are not a purist on keeping American natives together, you will find it useful and handsome. It spreads beautifully for us, tossing its seeds about with abandon.)

You probably think of Trailing Arbutus (*Epigaea repens*) as a very special wildflower, you're right, and to use it as a carpet will prove expensive. However, if it "takes", it is remarkably hardy even under trampling feet. I never thought of it as a groundcover, myself, until I saw wall-to-wall Trailing Arbutus for an area of at least 500 feet by 100 feet! Part is in completely open sun (never recommended in any plant instructions) and part in a woodland filled with Flame Azalea (*Rhododendron calendulaceum*). Don't, and I emphasize this, try to dig plants in the wild. Not only would you have to move each plant with an enormous chunk of its soil, but if so treated it will last at most three years. Buy nursery plants, or experiment with seed. Tough ovate leaves are a foil for the most fragrant blossoms of early spring.

Arctostaphylos uva-ursi, Bearberry, is yet another small-leaved evergreen which has tiny flower-bells in the spring and red berries in the fall. It will happily take full sun if necessary, and likes a sandier soil than the previous plants, though still an acid one. Transplanting is extremely "iffy," so either buy pot-grown plants or propagate from cuttings. I first met Bearberry here on Long Island, in rather sandy, scrubby woods. By the way, the Indian name for Bearberry is kinnikinnick, a fact I first learned in Maine. I've often wondered what the word, means but I don't know which tribal language it is.

A lovely, though not evergreen, cover is Foamflower, *Tiarella cordifolia*. The leaves are somewhat maple-like, and the flower spikes are the "foam"—fluffy, white and very pretty. It is especially at home under and around *Kalmia latifolia* and other members of the Heath Family.

If you would like Christmas-in-August, I can think of nothing brighter or more spectacular than the little Canada Dogwood, or Bunchberry (*Cornus canadensis*). That it is not evergreen is beside the point! In spring, you can delight in miniature

white dogwood "flowers" (the shape of the white bracts is similar to *C. kousa*, being pointed). By the end of July golf-ball-sized clumps of red berries are everywhere. In Maine, or other New England spots, the Bunchberry covers acres upon acres of spruce and fir forest, interspersed with the grey tufts of Reindeer Moss, and perhaps groups of yellow Bead Lilies (*Clintonia borealis*) and ferns. New York is as far south as you can try it—and here it must have shade and plenty of moisture.

I have omitted many forest carpets. An easy one to grow I prefer to think of as an easily spreading wildflower. This is *Phlox stolonifera*; one of the best cultivars is 'Blue Ridge'. Although perfectly useable as an area cover, the masses of clear blue flowers, held erect on six inch stems, somehow seem more at home as a foreground for small spring azaleas, rhododendrons and dwarf conifers. We have looping ribbons of it, varying in width, before many of our best evergreens. A lovely view from the living room window is of the cerulean blue phlox fronting the soft, pink three-foot ball of the marvelous small-leaved rhododendron, 'Windbeam'. The ground-covering leaves are basal, and here on Long Island last well into December. This phlox spreads very rapidly.

I warmly suggest you go "shopping" in the woodlands to see the array of native groundcovers available. Unmentioned are the *Lycopodiums*, the first-rate Wintergreen (*Gaultheria procumbens*), *Vaccinium vitis-idea minus*, the little Mountain Cranberry (useable only if you live in a cold climate—although I have found it on a mountain-top in North Carolina as well as in Maine), and many more. Treasures, all. True, the wildlings are slower to camouflage bare ground than are the Same Old Three. This deficiency is offset by their special and enduring beauty.

If we ever build another house, I can promise you there will be no *Pachysandra terminalis*! To me, a groundcover of unraked leaves is prettier by far. □

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Urban Herbs

Continued from page 21

cause they're so unwieldy in the garden.

To enjoy maximum yield from a basil plant, cut off the small stem which is just below the leaves you remove for cooking. This will provide a clear growing area and branching can begin again. Basil is typical of many culinary herbs in that the more you cut, the more you'll grow.

If you've space, you can also try the "Dark Opal" variety which is a beautiful, purple-leaved plant. It's slightly more pungent than the green basil, but adds wonderful color to vegetable dishes.

Dill

The final herb in this selected collection, dill (*Anethum graveolens*) is wonderful to use in dressing cucumbers and other fresh salad vegetables, as well as in soups, on chicken, lamb, fish dishes and, of course, in pickles.

Dill was traditionally a favorite of magicians and sorcerers for use in their spells, and as a charm against witches. It has also served in a number of medicinal capacities, not the least of which was a cure for hiccups: boiled in wine, and inhaled.

If your gardening space is very limited, don't bother to try dill, since it can grow to between three and four feet tall. In addition to a large tub, it needs full sun and continual fertilizing. It grows easily from seed, but must be sown where it will mature, since it doesn't transplant easily.

Because dill lives for only one season, and the harvesting time is short, it should be stored for continued use later on. The feathery foliage of dill is easily preserved by quick freezing. Rinse and then dry the plants very well, and put them immediately into the freezer in a closed plastic bag or covered jar. Its tasty and aromatic flavor will be as good as the day it was stored.

This is a small sampling of some of the many herbal delights which you

can grow and use fresh. A final word of warning . . . they *are* habit forming!

Sweet Marjoram and Oregano

Sweet marjoram (*Origanum majorana*) and oregano (*Origanum vulgare*)—sometimes called "wild marjoram"—are two closely related and often confused herbs. Both valuable in the kitchen, the stronger flavored oregano is primarily associated with pizza, but is actually useful in many other sauces, stews, or vegetable dishes. Sweet marjoram has a more subtle taste, and is good in soups, or with chicken, pork, lamb, or eggs.

The seeds are often hard to start, so it's better to begin with small store-bought plants. Unlike basil, which lives for only one season, oregano and sweet marjoram can survive in the garden for years, where they do best in full sun. Since the stems become woody as they age, some cooks prefer to strip off and discard them, using only the tender leaves.

During the growing season, growth frequently exceeds need; therefore, it's useful to dry and store the surplus. (Some cooks insist that drying improves the flavor of marjoram and oregano). To do this, simply spread the fresh leaves on a pan or cookie sheet in a warm, dry place. Several days later, when they're completely dry, they can be placed in a sealed, labeled jar for future use. This drying method can be used for many herbs.

Rosemary

The delectable herb rosemary (*Rosmarinus officinalis*) was once believed to possess important infection-preventing properties. To control diseases among prisoners, the floors of courthouses and prisons were strewn with branches. It was also used at funerals, both for its scent and medicinal value for those attending.

An excellent, good-looking plant, rosemary does need several hours of direct sun each day. Although it can be grown from seeds, they are very slow to germinate, so it's best to

begin with plants from a garden center. Watering the plant properly can be a bit tricky, since it does best when kept a bit on the dry side. However, when grown indoors, especially in the winter, don't let it dry completely.

French Tarragon

Tarragon (*Artemisia dracunculus*), another essential herb to grow, means "little dragon," and in early times its fresh leaves were chewed to dull the taste of bitter medicines.

Although there is a Russian variety, the more flavorful French tarragon is the plant to seek out and buy. And that's the only way to start, since there are no seeds to be had, and propagation methods require a fair amount of gardening expertise. Once you own a tarragon plant, it's rather easy to grow, preferring part sun to full. After the first leaves are harvested, add some fertilizer, such as a dilute solution of fish emulsion.

While tarragon may live for years in the garden, it can also be grown as a houseplant in cold climate areas. If you decide to bring your garden plant inside, do so well in advance of the weather change. If it doesn't survive the adjustment period (which happens frequently) don't despair . . . for its aromatic leaves are excellent dried. Try tarragon rubbed on chicken, sprinkled on fish, or added to egg dishes. Vinegar flavored with tarragon for salads, or green vegetables sautéed with butter and a sprinkling of fresh tarragon are other ideas.

The pine-like, narrow leaves of rosemary are excellent on pork, lamb, chicken, or veal. And, if you absolutely hate peas, try adding a sprig of rosemary to the cooking water. I guarantee you'll change your mind! □

Linda Yang, author of *The Terrace Gardener's Handbook* (Doubleday, 1975), grows her own herbs on the terrace of her 19th-floor apartment.

This article originally appeared in the April, 1978 issue of *DIVERSION* under the name 'Growing Herbs: A Cook's Garden'.



Towers Topiaries & Trellises

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For some of us, the once exciting combinations of space and form, using trees, shrubs, and vines are becoming monotonous and static.

We can achieve new and interesting forms with plants if we learn to train vines and small-leaved plants to grow in *towers*, *topiaries*, and *trellises*. We will continue to use all of the techniques we have learned in growing plants in hanging baskets but will add the additional skills of pinching and training the branches to cover the frames.

Frames: Frames may be made out of wood, metal, or plastic stripping. Any design idea can be created if one only has the imagination. I classify the frames into three basic types.

Towers: Most gardeners have already seen towers in use for growing tomatoes in the garden. The tower is made out of welded wire, hot-dipped to prevent rusting. The wire mesh has a six-inch square (other sizes are also available) through which vines can be twined and twisted to cover the tower. Any size (diameter and height) tower can be made to fill any space. I anchor the wire cylinders into the container with thick wire rods which are tied to the frame. The vining foliage will quickly cover all of the wires.

Topiary Frames: Garden magazines list sources of topiary frames made out of wire about the thickness of a coathanger wire. The frames are painted a dull green and are available in all kinds of designs: peacocks, turkeys, rabbits, bears, parasols, columns, chairs, and tables. The frame is a welded-wire sculpture on which the vines and small-leaved plants can be trained.

Trellises: Simple or complex frames of rings, spokes, and bars are available in polyethylene coated wire, in either a green or white finish. The posts can be pushed into the ground to provide a support for training plants.

Container: Use any type of container that will hold at least one gallon of growing media by volume. Containers with less volume tend to dry out rapidly. Containers can be clay, ceramic, plastic, metal, or wood (redwood or your own design). Be sure to provide drainage holes in the container. Use a nail to drive holes that are three-eighths of an inch in diameter and are spaced 3 inches apart near the bottom of the container.

Growing Media: Bagged growing media is available in most variety and garden stores. These usually contain fertilizers in slow-release form. To make your own general-purpose mix use the following formula: To 2 parts of sandy loam soil add 1 part coarse sphagnum peat moss and 1 part coarse aggregate (vermiculite, perlite, or washed cinders). To each bushel of mix add 4 ounces of

pulverized dolomitic limestone, 4 ounces of 20 percent superphosphate, and 2 ounces of 5-10-5 fertilizer. Mix thoroughly and add just enough water to crumble the media in large masses; do not add so much water the media becomes soggy.

Drainage: Line the bottom 2 inches of the container with coarse aggregate. Shield the drainage holes with coffee filters to hold the growing media in place until the new root system meshes into a solid mass. Pack the aggregate loosely to leave air pockets that will permit easy drainage of water out of the container. Cover the top of the aggregate with a half-inch layer of aggregate that has been finely crushed; this will prevent the growing media from plugging up the drainage holes.

Fertilizer: Fill container to within one inch of the top with moistened growing media. Mix in 2 tablespoons of a coated, slow-release 14-14-14 fertilizer per ten-inch container. This concentration of fertilizer should last for about 3 months; plan to add a second tablespoon on the surface about 2½ months after planting. Continue to fertilize at regular intervals throughout the life of the plant.

Planting: Hold the potted plant on its side with one hand protecting the plant. Tap the pot gently until the soil ball and plant fall out. Remove the network of roots on bottom of soil ball. Dig a hole to perfectly fit the soil ball. The growing media of the soil ball and of the new container should be on the same level. Firm the soil ball and growing media to insure a good flow of water and the knitting of the root system.

Location: Plants that require at least 6 hours daily of direct sunlight should be placed in areas where they will be shaded for only part of the day—by a porch, in a window, or by the entrance to your home. Petunias grown in too much shade develop long, poorly-branched shoots with few flowers. Foliage plants as listed in the guide may be grown successfully with less light than flowering plants. Follow the guide for selecting location.

Watering: Of all steps in the care of an indoor garden, watering is most important. If plants do not get enough water, they dry and die. If they get too much water, they drown and rot. The proper procedure is to water thoroughly, but only often enough to prevent wilting. Specific water requirements are given in the plant guide. As soon as you put plants in the container, begin adjusting them to their new environment. Water the soil, clay pot and surrounding media to saturation, but do not flood the planter box. Allow the whole container to dry until the plants are near wilting. You can detect wilting early by watching the leaves; they change from green to gray-green and begin to droop. When the plants begin to wilt, water them thoroughly again. While plants are adjusting to the indoors, some of the oldest leaves may yellow. If so, remove them. Wash the remaining leaves with mild, soapy water, rinse with clear water, and stake the plants. They should now be ready for a long life in the indoor garden.

Set up a schedule for watering. If you are combining plants with different water requirements, label each type with small plastic tags. For example, green tags could be used for plants needing frequent watering (wet), yellow tags for less frequent watering (moist) and so on. Some plants need watering only every 10 to 14 days. Dry plants tend to have coarse roots and are well adapted to dark and dry conditions. They can be trained to withstand prolonged periods of slowed growth which delays rate of leaf formation, prevents death of old leaves, and helps maintain the size of the plant. More frequent watering will cause new leaves to grow at a rapid rate, and usually an old leaf will die for every new leaf formed. Less frequent watering will cause many leaves to die. *Moist* plants need watering every 4 to 7 days. These plants tend to have a fine root system that will die immediately if the soil dries out. *More frequent watering* or less frequent watering will cause same results as for “dry” plants. *Wet* plants need watering every other day. They must have a relatively uniform amount of water in the growing media at all times. Even one period of drying usually means damage to the leaves and the possibility that the plant will die. Do not let potted plants stand in saucers holding water.

Training Plants: Knowing what constitutes an adjusted or conditioned plant enables you to exert maximum control over its growth. Your plant has no native ability to live in the surroundings you have picked for it—whether home, office, or public area. It needs to be trained to adjust to its alien environment. To aid in this adjustment you must:

- Slow down plant growth.
- Permit leaves to get accustomed to dark, dry conditions in the area where the plant is to be placed.
- Permit the plant to accumulate mineral ions and carbohydrates to help maintain itself during periods of stress.

These procedures will assure a conditioned plant; they require much patience, but they are well worth the effort.

Conditioned Plants: A conditioned plant has the following characteristics:

- The foliage is dark green, thick, and lush all the way to the soil line.
- Growth is slowed and, consequently, few new leaves show. The little growth that does show is dark green. The stem at the top of the plant is thick in diameter.
- The net of roots is well established and fills most of the pot.

There are certain things you can do at the beginning that will make for well-adjusted or conditioned plants. Here are some points to keep in mind:

Choosing plants: The plant you pick depends on your taste, space available, and use. Every plant should be potted individually. It is almost impossible to train plants when they are planted together.

Washing and cleaning plants: All plants except those with hairy-surfaced leaves should be washed in warm soapy

Guide to Plants:

Decorative Plants for Training to Ascend

Name	Light Levels	Water Requirements
<i>Abutilon</i> species (Flowering maple)	High	Moist
<i>Achimenes</i> (Magic Flower)	High	Moist-in ground Dry-when dormant
<i>Aeschynanthus</i> (Lipstick plant)	Medium	Moist
<i>Asparagus sprengeri</i> (Asparagus fern)	Medium	Moist
<i>Beloperone guttata</i> (Shrimp plant)	High	Dry
<i>Bougainvillea glabra</i> (Bougainvillea)	Very high	Dry
<i>Browallia speciosa</i> (Browallia)	High to medium	Moist
<i>Campanula isophylla</i> (Star of Bethlehem)	High	Moist
<i>Chlorophytum</i> (Spider plant)	Medium	Moist
<i>Cissus antarctica</i> (Kangaroo vine)	High	Moist
<i>Cissus rhombifolia</i> (Grape ivy)	Medium	Dry
<i>Clerodendrum thomsonae</i> (Bleeding-heart vine)	High to medium	Moist
<i>Coleus</i>	Very high	Wet
<i>Columnnea species</i> (Columnnea)	Medium	Moist
<i>Davallia fejeensis</i> (Fiji Rabbit's foot fern)	Low	Moist
<i>Epiphyllum hybrids</i> (Orchid cactus)	High	Moist-in ground Dry-over winter
<i>Euphorbia milii</i> (Crown-of-thorns)	High	Dry
<i>Ficus pumila</i> (Creeping fig)	Medium to low	Moist
<i>Hedera helix</i> (English ivy)	High	Moist
<i>Hoya carnosa</i> (Wax plant)	Medium	Dry
<i>Lantana camara</i> (Trailing lantana)	High	Dry
<i>Passiflora species</i> (Passion flower)	Very high	Moist
<i>Parthenocissus henryana</i> (Ampelopsis)	Medium	Moist
<i>Petunia hybrida</i> (Cascade type)	Very high	Moist
<i>Philodendron oxycardium</i> (Common philodendron)	Low	Dry
<i>Plectranthus australis</i> (Swedish ivy)	Medium	Moist
<i>Senecio mikanioides</i> (German ivy)	Medium	Moist
<i>Setcreasea purpurea</i> (Purple heart)	Medium	Dry
<i>Syngonium podophyllum</i> (Nephtytis)	Low	Moist
<i>Tradescantia species</i> (Wandering Jew)	Medium	Dry
<i>Vinca major</i> 'Variegata' (Periwinkle)	High	Moist
<i>Zebrina species</i>	Medium	Moist

water of bath temperature, about 90 to 100°F. Wash all leaves, stems, and buds. Clean both sides of leaves. Be sure to support each individual leaf with your hand while doing this. Rinse with water, shake and allow to dry overnight in the sink or on a newspaper. This procedure removes dirt, insect eggs, and insecticides. Repeat at frequent intervals to bring out the natural shine of the foliage.

Locating training area: Pick a spot with bright light, but avoid places where direct sunlight shines on the leaves. Keep plants away from drafts, heating ducts, or open doors. Place them on a waterproof area; this may be a wooden frame covered with polyethylene which is then covered with a layer of coarse gravel or sand. Or use colorful inexpensive plastic trays, tubs, pans, and basins. Take care not to scar the underside of these containers—it ruins the waterproofing.

Light Level: Light level determines the types of plants that can be grown. Light is measured in foot-candles (a foot-candle is the light of one candle falling on a surface one foot away from the candle). Plants will grow in higher light levels than the preferred levels stated below, but they will *not* survive *below* minimum levels of light.

Low designates a minimum light level of 25 foot-candles and a preferred level of 75 to 200 foot-candles. Your hand will make no shadow under this lighting condition.

Medium designates a minimum of 75 to 100 foot-candles and a preferred level of 200 to 500 foot-candles. Your hand will make a shadow under this lighting condition.

High designates a minimum of 500 foot-candles and a preferred level of 100 foot-candles. Your hand makes a strong shadow under this lighting condition.

Very high designates a minimum of 800 to 1000 foot-candles. Your hand will appear very bright to your eyes as well as cast a strong shadow. You will find this condition will cause eye strain if you remain in the area.

The Final Steps: You will soon learn it takes time for the plants to cover the frames. At least at weekly intervals, twist and train the branches onto the frames. Fine wires (paper covered) may be used to hold the branches in place until the form is obtained. Plan to remove these wires at a later stage. The wires can girdle the expanding stems as the plants become older and larger. The leaves will turn and face the direction of the light. Rotate the position of the plant to encourage a symmetrical development. Remove tips of shoots to promote branching. Remove them individually by hand, avoid damaging any of the leaves or stems left on the plants. It may be necessary to remove some of the developing shoots to permit the maintenance of a uniform covering. Also, to preserve the appearance of the plant, pick off yellowing or damaged leaves and give the foliage a monthly wash with warm soapy water.

Reward: You will experience new forms and spaces for plants in your gardening designs. □

Mrs. Delany's Flora

Continued from page 11

forming a dark background threw out distinctly the outline of the leaves and flowers, and made the lights and shadows more distinct. Mrs. Delany did not draw the plant; but by her eye cut out each flower or rather each petal as they appeared; the lights and shades and tints were afterward all likewise cut out and laid on, being pasted over one another,—the stamens, style and leaves were separately done in the same manner, in various colored papers, which she used to procure from captains of vessels coming from China and from paper-stainers, from who she used to buy pieces of paper in which the colors had run and produced extraordinary and unusual tints. In this manner she procured her materials, and was enabled to produce the utmost brilliancy where it was required with the

greatest harmony of coloring from the various semi-tones of tint laid on. But that part of the work which appears likely ever to remain a mystery, because no other person possesses the same gift, is the way in which, by the eye alone, scissors could be directed to cut out the innumerable parts necessary to complete the outline and shadowing of every leaf, flower, and stem, with such exactness that they all hung together and fitted each other as if they had been produced instantaneously by the stroke of a magic wand, and yet without a fault in perspective or difficult foreshortening."

The backgrounds of all the specimens Mrs. Delany made were a uniform black. Each was carefully marked as to the common and Latin names and often the region from which the flower came and the date she made it. Her initials "M.D." appear on each mounting in different colored letters to represent a given year.

One of the last flowers made by Mrs. Delany in 1782 was the *Portlandia grandiflora*, a shrub named for her dear friend the Duchess of Portland. The branch to copy had been sent to her from the royal gardens at Kew on command of Queen Charlotte. But the queen and King George III were admirers of the mosaic flowers and their originator. Other famous 18th century contemporaries mention Mrs. Delany's unusual craft in their diaries or letters. Famous botanists such as Dr. Darwin, Dr. Solander, Lord Bute and Sir Joseph Banks esteemed her work so greatly that the latter wrote that her representations "were the only imitations of nature that he had ever seen, from which he could venture to describe botanically any plant without the least fear of committing an error."

It is inspiring to become acquainted with such a talented lady as Mrs. Delany, even if nearly two hundred years after her death. □

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Herbs & Folklore

Continued from page 20

dish of caraway seeds." Pierre Pomet, druggist to Louis XIV of France, said, "The Germans have such regard for it, they always put it into the pie crust, mix it in their bread and in great measure in all their sauces."

The Austrians use it in beef stew; Germans cook it with pork; and Hungarians make a soup with caraway seeds thickened with bread crumbs. Caraway seeds are used today as a "whiskey killer" because it serves to mask an alcoholic breath.

Chervil (parsley family) originated in Russia or the northern shores of the Mediterranean. It was distributed by the Romans. Legend has it that it makes one merry, sharpens a dull wit, prods the memory and gives the aged the spirit of youth. It is a good substitute for parsley.

Cumin (parsley family) is native to Egypt. Cumin discourages disloyalty of husbands. Cumin was carried by both bride and groom in medieval weddings in Germany for faithfulness, forsaking all others so long as they both lived. In Europe, a soldier leaving home carries with him a loaf of bread with cumin baked by his sweetheart, or drinks wine with her which contains cumin. To the Greeks, cumin was a symbol of greed. This verse is recorded in Matthew 23:23, "For ye pay tithe of mint and anise and cumin."

Dill (parsley family), an annual, is a native to the Mediterranean countries and Asia Minor. Folklore tells us that dill contains a magic potion used for and against sorcerers—"getting there fustest with the mostest" was common practice. Dill is used by mystics to combat an Evil Eye by carrying a bag of dried dill over the heart.

Fennel (parsley family) is a perennial and is known as the venerable panacea. Seeds smell like anise. Fennel is one of the nine sacred herbs that could cure the nine causes of medieval diseases. It rejuvenates,

excites sexual desires, aids slenderness, restores and sharpens eyesight, stops hiccups, frees one from loathing, cures wheezing, a body fortifier and improves the pale color of the face according to the herbalist Culpeper. Fennel supposedly makes people lean rather than fat and takes away pangs of hunger.

Garlic (lily family) originated in Asia. Legend has it that when Satan made his way out of the Garden of Eden after the fall of man, onions sprang up from the place left by his right footprint, garlic from the left. The Egyptians regarded garlic as food and medicine; they swore by it when offering some solemn vow. The Israelites developed a taste for garlic during their stay in Egypt and after the Exodus, yearned for it on their exhausting trek to the Promised Land. The Greeks of old disliked garlic; today they use it. Roman legions freely consumed garlic in the belief that it would make them better and fiercer fighters. It was used by the Romans through the middle ages. Pliny claimed that 60 ailments could be cured with garlic. Medieval doctors brought garlic along while visiting, as a charm and disinfectant.

Ginger (Ginger family) is native to India and southern China. Ginger was one of the first oriental spices to enter Greece. It was brought into Greece as early as 2,400 B.C. Greek bakers were the first to use ginger for baking gingerbread. Queen Elizabeth I hired artist bakers to make gingerbread cookies into the shapes of lords and ladies, etc., for serving to afternoon guests.

Marjoram (mint family) is known as the Herb of Honor and Happiness. It is a perennial from Western Asia and the Mediterranean. In the 12th century, King Stephen of England, spread fresh straw in the winter and Marjoram in the summer on the floor for his court to kneel and sit upon. King Stephen appointed a "Strewer of Herbs in Ordinary to His Majesty." At the coronation of James II of England, the Strewer scattered 18 bushels of Marjoram on the

courtyard. It was used by the Greeks and Romans as a crown for happy young couples. It was custom in Rome to plant Marjoram on graves to delight the souls of loved ones. In England it has been used as a charm against witchcraft, for it is said that: "He who had sold his soul to the devil could not endure the fragrance of Marjoram."

Mint (mint family) is the Symbol of Hospitality. It originated from the shores of the Mediterranean Sea. One of Ovid's tales of gods and goddesses written 2,000 years ago gives the following story. Philemon and Baucis lived in Asia Minor. Two strangers came to their home and asked for food. Philemon and Baucis prepared the best meal possible for their guests from their meager supplies. They rubbed the dining table with mint leaves just before meal time. At that point their anxieties of hunger passed. The guests were Zeus and Hermes, incognito. Zeus and Hermes transformed the lowly dwelling into a temple. Priests were made available to minister to all the needs of Philemon and Baucis for the duration of their lives.

Mint was once the nymph Mentha, a young goddess. Mentha attracted the eye of Pluto. Pluto's wife, Persephone, trod Mentha ferociously underfoot. Pluto was unable to control his wife's fury. He changed Mentha into a delightful herb (mint) to be sacred forever.

Mint was used by the Greeks as a body deodorant and perfume. Pliny the Elder had the highest regard for mint as a medicine. "The very smell of it re-animates the spirit," he wrote, considering mint to possess many virtues. It could stop hiccups, provide an antidote for the stings of sea serpents and, if consumed just before an oration, it would clear the voice. Mint was distributed into Europe by the Romans.

Oregano (mint family) is known as the Pizza Herb. It originated on the Mediterranean hillsides. In the practice of ancient medicine, Pliny prescribed it for indigestion, as well as a first aid treatment for spider and

scorpion stings. During the Middle Ages Oregano was used to "cleanse the brain" and improve sight. Culpeper, the herbalist stated in 1649, that: "Oregano soothes jittery nerves and to use it for treating bites of venomous beasts." He further stated that: "There is scarcely a better herb growing for relieving loss of appetite."

Parsley (parsley family) has its origin lost in Greek mythology. Hercules supposedly wore a garland of parsley. Juno's horses were said to have accelerated their speed after nipping parsley, as did the chargers of Homer's heroes. Romans fashioned it into crowns for banquet guests in hopes of preventing drunkenness and raucousness at the table.

Rosemary (mint family) has been a symbol of remembrances and fidelity since the days of the Roman Empire. Rosemary is native to the Mediterranean area. Legend states that when the Virgin Mary was flee-

ing from Herod's soldiers with the Christ child, she hung her skyblue cloak on a rosemary bush. From that day on the color of rosemary blossoms was changed to blue. The symbol of remembrance and fidelity comes from Shakespeare's *Hamlet*, when the tragic Ophelia speaks the immortal line: "There's rosemary, that's for remembrance." During the 17th century it was the custom for bridesmaids to present the bridegroom with a bunch of Rosemary on the morning of the wedding to ensigne wisdom, love and loyalty in hands, heads and hearts. Henry VIII's bride, Anne of Cleves, wore a wreath of Rosemary. Their marriage ended in divorce a few months later. There is an English superstition that "Where rosemary flourisheth, the woman ruleth." Rosemary has been used to decorate churches and banquet halls, as incense in religious ceremonies, as an omen against the Evil Eye and as a hair restorer. According to Culpeper, there was a

New Year's custom in England for each person to visit his neighbor or friend and give him a sprig of rosemary with a pomander. Culpeper also stated that sprigs of rosemary were used in courtrooms to expel contagion of the pestilence from which poor prisoners suffered.

Sage (mint family) originated on the northern shores of the Mediterranean. *Salvia officinalis* means to save or to heal. It has been said in England that sage is supposed to make men act wisely and to strengthen their memories. It has been an English custom on a Midsummer's Eve, just after sunset, for a group of young ladies to gather in a lonely garden collecting sage; at 12 midnight their future husbands would appear and use the sage to sprinkle on the smocks of their brides-to-be. Superstitions about sage include the saying that sage will thrive when all is well with its owner and droop when misfortune threatens! □

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Organic Gardening

Continued from page 17

laid in the garden. Lift them each day and destroy the slugs. Slugs are attracted to shallow vessels partially filled with beer into which they crawl and expire. Slug baits moistened with a teaspoon of beer will be twice as effective.

An aluminum foil mulch around low growing plants reflects the ultraviolet rays from the sky and repels flying insects (including aphids, leafhoppers, thrips, Mexican bean beetles and cucumber beetles) from landing on the plants. Summer squash, Chinese cabbage, lettuce and peppers have been protected from virus infection transmitted by aphid feeding. Roses, gladiolus, beans and cucurbits have been protected from chewing and sucking insects.

Black polyethylene mulches, used extensively by commercial fruit and vegetable growers, help to control weeds, conserve moisture and prevent leaching of fertility in the home garden. They also keep the produce from resting on the soil, thus reducing rot infection from soil contact.

Blacklight traps are frequently advertised for control of

insect pests in home gardens and on farms. Although great numbers of moths and other insects are attracted to individual black lights and captured in the attached traps or killed on electric grids, there is little or no reduction of the pest insects that attack your vegetables. Sometimes the insect pests in the vicinity of the trap will be greater than normal. Insects attracted to the light may not enter the trap, but linger to lay their eggs in the vicinity. Likewise, certain bait traps, as for the Japanese beetle, may actually increase the infestation in the vicinity of the trap.

Routine inspection and handpicking of tomato hornworms on your dozen or so tomato plants is highly effective and less time consuming than preparing and applying a spray. In some years, hornworms may not appear at all. Handpicking can also eliminate small infestations of squash bugs, Mexican bean beetles and potato beetles.

Interplanting of Vegetables with Repellent Plants

A recent calendar for home gardeners lists a number of plants that should be planted among your vegetables to deter cabbage worms, Mexican bean beetles, Colorado potato beetles, Japanese beetles, borers and tomato hornworms.

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tomologists at State and Federal Experiment Stations have shown no beneficial results from such interplantings except for the reduction of one type of nematode by marigold roots. Moreover, these experiments showed that Mexican bean beetles and Colorado potato beetles found their respective host plants in mixed plantings. Onions and garlic supported thriving populations of onion thrips and mites, and had no measurable repelling effect on cabbage worms, bean beetles, cucumber beetles and aphids that infested their respective interplanted host plants.

Parasites and Predators

Few gardeners ever see the most efficient parasites and predators at work among the pests on their plants. Examples of beneficial insects are: the yellow and black banded thrips; the tiny Orius plant bug; syrphid fly larvae; aphid lions—the ugly looking larvae of the delicate lacewing flies; and larvae and adults of our native ladybird beetles that suck and juices from plant-feeding thrips, spider mites, aphids, young caterpillars and leafhoppers.

Often during periods of cool damp weather, epidemics of insect disease, caused by bacteria, fungi, or viruses, will suddenly destroy thriving populations of pests—especially aphids, cabbage worms, cabbage loopers and other caterpillars.

Until recently, the Mexican bean beetle has defoliated beans, lima beans and soy beans over wide areas without the depressing effect of parasites or predators. A tiny wasp was recently introduced from India that lays 10 or more eggs in each bean beetle larva, and soon, the larva turns black and dies. This microscopic parasite disperses for 10 miles or more in search of bean beetle infestations. The parasite does not survive our winters for lack of food, but, if reintroduced each season from laboratory cultures, it has the potential for reducing the Mexican bean beetle to a minor pest requiring few or no sprays.

Each Orius bug destroys 20 or more flower thrips per day. He and his fellows are responsible for reducing high spring populations of this insect to low levels for the remainder of the season.

Our native ladybird beetles, that come into our gardens in late spring, lay their orange-yellow eggs among aphids on flowers and vegetables where each alligator-like larva sucks the juices from 10 to 20 aphids per day for a total of 300 or more during its growth period. Thus, thriving aphid colonies developing in early spring, virtually disappear for the summer and do not reappear until autumn when temperatures are lower, and the ladybird beetles are less active.

In contrast to these least recognized but highly efficient parasites and predators discussed above, much attention is given by amateur ecologists in their publications to the more conspicuous but least effective predators. They urge you to buy preying mantid egg masses and pints of ladybird beetles and release them in your garden for season-long insect control. You should realize that the

preying mantids hatch from the egg masses in late spring. The tiny mantids scramble for safety—usually into dense shrubbery—to avoid being eaten by their brothers and sisters. Of the hundreds that hatch in the spring, only a few survive until fall and they are usually found in the shrub border; rarely on the more exposed vegetables where you need them.

One authority has stated that “the chief benefit to be derived from the purchase of mantid egg masses is the feeling of virtue in believing that you have established a highly beneficial insect which will protect the neighborhood by destroying many harmful garden pests. Of the hundreds of young mantids that come tumbling out of a case, perchance a few will survive. With avid appetites and rapacious front legs they capture many insects; including their brothers and sisters, and harmful insects as well as beneficial insects. Nevertheless, the mantid is a handsome insect that is interesting to have around. So let us continue to protect it and encourage others to do the same, but do not depend upon it to rid our garden of all noxious pests.”

The ladybird beetles you buy are collected from their hibernating quarters in California canyons and are shipped to you. When you release them in your garden they usually disperse to other areas just as they disperse from their hibernating quarters in canyons or woodlands—often for several miles—in search of cultivated fields. Few, if any, remain for long in your garden. Ladybird beetles found in your garden are local, naturally occurring beetles which migrate from hibernating sources early in the spring.

The information set forth in this article will aid you in producing an abundance of many but not all kinds of vegetables in most years, and without resorting to use of chemical fertilizers or sprays. In some years with poor crops it will be necessary to accept foods of lower quality. Experience will enable you to select to grow only the more reliable, trouble-free vegetables. □

References on Organic Gardening

Many books, bulletins and articles have been published on organic gardening. The following may be of interest to readers who would like to have more information on this subject.

Natural Gardening Handbook. Brooklyn Botanic Garden Record Plants & Gardens. Vol. 21, No. 1, Spring (May) 1975.

The Encyclopedia of Organic Gardening. J. I. Rodale, Editor. Rodale Books, Inc., 1971.

How to Grow Vegetables and Fruits by the Organic Method. J. I. Rodale, Editor. Rodale Books, Inc., 1971.

Handbook on Biological Control of Plant Pests. Brooklyn Botanic Garden Record Plants & Gardens. Vol. 16, No. 3, 97 pp., 4th Printing 1974. Cost \$1.50.

Books

by Tom Stevenson

Mention the word Iris to the average person and he will think of tall bearded irises. There is good reason for this, as the tall bearded irises are truly the extroverts of the iris world. They are the largest of the bearded irises, with flowers

arranged in a magnificent architectural form in a series of three parts. They are flamboyant in a spectrum of colors that must be seen to be appreciated. In the iris growing world they command a most intense admiration and devotion.

The present classification defines the Standard Tall Bearded class as including all bearded irises over 71 centimeters (27 inches) in height, according to Melba B. Hamblen and Keith Keppel, authors of a chapter, "Tall Bearded," in a new book, "The World of Irises," edited by Bee Warburton with assistant editor Melba Hamblen, with by-lines by 34 specialists, published by The American Iris Society, 226 East 20th Street, Tulsa, OK 74119. There are 494 printed pages, more than 200 illustrations and 32 color plates, appendixes reviewing special methods of culture (meristem, young inflorescence and embryo), and colchicine induced tetraploidy, a selective glossary, an extensive bibliography and a complete index. The book can be ordered direct from the Society, \$12.95 including postage until Jan. 1, 1979, then \$14.95 including postage.

In the book the dramatic development of all garden groups, from the small bearded and beardless to their large counterparts, crested and bulbous, less well known types and novelties, is well documented.

Chapters on culture and propagation, on pollination and seed growing, on diseases and pests and pigments and genetics of irises, comprehensible to the average iris grower, yet invaluable to the more experienced irisarian make "The World of Irises" a book for every iris grower.

"The inheritance of the tall bearded is compounded of genes from nearly all of the bearded iris species including a few of the arils," according to Hamblen and Keppel.

"We are enjoying the result of a hundred years of breeding. We now see flowers of large size and full form, but with ruffles and lace to keep them from looking coarse. These have sturdy stalks to hold the blooms upright without staking, and the stalks carry branches that hold the flowers effectively so that their form may be enjoyed.

"Improved substance makes the flowers last for days, with brilliant nonfading color. We have clearer colors free from the veining of older varieties, colors that run the gamut of the rainbow and colors the rainbow never carried.

"Each year brings the charm of new color combinations as well as refinements of the old. No matter how com-

plete and up-to-date a collection of tall bearded irises may be, there is always something different and lovely to add. Many of these beautiful flowers are illustrated in the color pages of this book."

The stimulation of our sense of smell and its effects on the mind and emotions and behavior is little understood. It is thought that incoming odors are screened by the nervous system centers and automatically graded in such a way as to steer us towards or away from the stimulus. Noxious and putrid odors repel us, absence of odor produces no stimulation, pleasant ones attract us.

When what we smell is spicy and dry, we are excited to action; the narcotic scents of flowers and drugs relax us into reverie. The odors of food, except when we are ill or full, attract and please us, perhaps the only area where the sense of self-preservation through smell is still at work for man.

Other animals have a much more highly developed sense of smell. They are lured by the odor of a flower, or of a potential mate, and will travel great distances in search of the life-sustaining, life-continuing object.

The effect of fragrance on one person may be entirely different on another, says Ann Tucker Fettner, writer, filmmaker, director, teacher and scent-maker, and author of a new book, "Potpourri, Incense and Other Fragrant Concoctions," published by Workman Publishing Co., New York, NY, 139 printed pages, illustrated, \$2.95, paperback.

"Ten people inhaling the same aroma would probably perceive and be affected by it in as many different ways," she says. "If I describe lily-of-the-valley as having a beautifully sweet, delicate fragrance, there is no way to be sure that you will find this true for yourself."

How can one describe a perfume? People have tried for thousands of years. Fragrances have been equated with the musical scale, with the highest note on the treble clef assigned to civet, the lowest note to patchouli. Each cord formed a bouquet. The bouquet of C chord in the bass was formed of sandalwood, geranium, acacia, orange flowers and camphor, G chord in the treble was sweet pea, violet, tuberose and orange flowers again.

Although the musical equation doesn't work unless we all know music, and are in complete agreement on odors as well, there is a close analogy between the art of perfumery and music. The careful development and building of one note or fragrance on another should result in harmony.

Animal and other similar odors, such as costus root and amberette seed, have

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sex-stimulating quality in perfumes, she says. They are blunt and alkaline and may have a fatty or waxy overtone. Often, they are slightly rancid-smelling alone. In perfumes they impart a "low" base note, a "dark" quality.

Anti-sexual or refreshing fragrances are in direct contrast to the animal odors. They are the "green" resin fragrances produced by the saps and leaves of plants, by camphors, pines and some of the mints. Eau-de-cologne with its base of citrus oils is a good example. These fragrances, when used as the signature of a product, give it a "healthy," clean feeling. Most after-shave lotions are formulated with this in mind, the signature is a "wake-up" note rather than a relaxing one.

In her book, Fettner provides recipes and easy-to-follow instructions for making scented concoctions—potpourris, sachets, incense, pomander balls, toilet waters and other flowery things. Sources where materials can be purchased to make most of them are included. Many of them can be grown in your own garden.

Attractive, well planned and planted landscape is an investment that grows for you. Not only do you enjoy the beauty of trees and shrubs, flowers and fruit, but your property increases in dollar value. A well landscaped home will sell for as much as 20 percent more than a similar one without trees, shrubs, plants and a healthy lawn.

You can do the landscaping yourself, according to Allan A. Swenson, nationally syndicated newspaper garden columnist who appears on the "Good Day" TV show as America's Green Thumb Gardener.

Swenson is the author of a new book, "Plan Your Own Landscape," published by Grosset & Dunlap, New York, NY, 120 pages, well illustrated, \$6.95 paperback. The book provides 50 landscape arrangements you can adapt for your home with blueprints for step-by-step landscaping design.

It tells how to improve your soil, how to select the right plants for your design, how to place trees, flowers and shrubs for privacy, beauty and shade, how to fertilize, prune and propagate your plants and how to create an indoor plantscape.

Picking just the right tree for the right spot sounds easy, but deserves careful attention, Swenson says. Trees offer a wide variety of sizes, shapes, colors, textures and features. Some are short and hug the ground, others almost cascade. Any tree for your lawn should have branches high enough to walk under and mow under without stopping.

Although most trees and shrubs

bloom in the spring, you can arrange multiseason, long-blooming displays. The key to this is the choice of plants that bear their blossoms over extended periods, or choosing varieties that are showy in spring and summer into fall.

There are five basic steps to successful landscaping, Swenson says. The first is to develop a list of existing and desired outdoor features. The second is to draw a base plan. Then you should outline major landscape features in general. After that, locate desired features in their proper landscape areas. Finally, plot your finished landscape plan so it can serve you well as a guide as you dig to plant trees, shrubs, ground covers, beds and borders.

In the mid-19th century, orchid flowers, like other intricate structures in nature, were widely regarded as beauty fashioned solely by the Creator for the delight of man. One who doubted this notion was the great English naturalist, Charles Darwin, who felt there must be logical reasons why orchids had evolved in ways that called so much attention to themselves.

Not far from his country home in Kent he came upon what he called the Orchis Bank, where a variety of native orchids grew among the trees, and he began to study the ways in which insects pollinated the flowers.

Darwin demonstrated that orchids are almost perfectly adapted to specific pollinators, whether bee, fly, mosquito, butterfly, moth, hummingbird or bat, according to Alice Skelsey, and that the

pollinators in turn have evolved with the precise instincts and structures to obtain food from specific flowers, thus ensuring, not incidentally, that each orchid species will perpetuate itself.

Skelsey and the Editors of Time-Life Books are the authors of a new book, "Orchids," retail distribution by Little, Brown and Co., Boston, MA, 159 pages, beautifully illustrated in full color, including 82 orchid genera, \$8.95.

Despite the orchid's reputation as a fragile hothouse plant, most varieties of some 30,000 known species can be raised without a greenhouse. They do, however, require more humidity than the desert-dry artificial atmosphere found in many modern homes. But in raising the humidity to benefit their orchids, gardeners will find their own personal comfort improved. Moreover, "the orchid plants can be humidified locally using humidifying trays, misters or room humidifiers," Skelsey says.

As botanists poked into the private lives of orchids, they gained enough knowledge to begin hybridizing them, crossing two parent plants with different characteristics to create new plants with the traits of both. And it turned out that orchid crosses could be made not only between related species within a genus,



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but between species of different genera, almost unheard of in horticulture until then—like creating an entirely new bird by crossing a cardinal with a goldfinch.

Over the years hybridizers learned how to include as many as five genera in the cross-pollination process. With thousands of species to choose from, the number of combinations possible was astronomical.

Despite their discoveries in crossing orchids, growers still had one final major hurdle to overcome: growing new plants reliably from seed. The only method that had met with much success was to place ripened seed at the base of the mother plant in a bed of moist sphagnum moss and hope for the best.

Though this worked sometimes, disappointment was more often the case, the authors say. The obstacles were formidable. Orchids produce among the smallest of all plant seeds; scientists once counted more than three million in a pod of *Cycnoches ventricosum* var *chlorochilon*. The seeds are light enough to be wafted high on air currents, and there are enough of them so that a few will come to rest in spots where they have a chance to survive.

They are as fragile as their size might indicate, and they have no tough seed coats to protect them and no food reserves to nourish them until they germinate. To keep going they must land where they can coexist with a specific fungus that helps to nourish them.

When growers discovered this they tried introducing into the seedbed specific fungi found in association with the parent plants. But this was a tricky business because the fungi, or invading bacteria, often destroyed the seeds.

In 1917, a breakthrough finally came. Dr. Lewis Knudsen, a scientist at Cornell University, believed that the real role of

the fungus was to produce sugars that the germinating seed could use. After many experiments he came up with a new medium: basically a sugar, mixed with mineral nutrients, in a jelly-like extract of algae called agar-agar. Greatly increased numbers of seeds could be germinated using the agar-jelly method, though it still required care, sterile conditions and the sowing of the seeds in little incubators made out of stoppered glass flasks.

It took one more discovery, in the 1960s, to bring orchids truly within mass-market reach. A French scientist, Georges Morel, found that a laboratory technique called tissue culture could be used to produce thousands of plants from a single orchid's growing tip, called the meristem.

The implications were staggering. In the United States, the first mericlone—a plant grown from a bit of tissue taken from a meristem—bloomed in 1966 in a commercial greenhouse in Kensington, Maryland. It was an exact duplicate of its parent plant, and so were other mericlones that followed. Today, thanks to the meristem method, some of the most famous species of orchids of the past, as well as thousands of new hybrids, are widely available in quantity and at prices almost any gardener can afford.

A hundred years ago, or even 25, it would have been unthinkable that exotic orchids could become everyday house plants. Yet that is exactly what they are—and to those who catch orchid fever, plants that become more fascinating and more beautiful every year.

Since the range of choice is so wide, most orchid fanciers end up specializing, Skelsey says. Some gardeners shift from the showy, large-flowered hybrids to less common species, such as miniatures so small they must be admired through a magnifying glass. Other gardeners end up trying to push hybridization to the ultimate not yet reached by any orchid breeder. □

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