

American

Horticulturist



Volume 57 Number 1 Late Winter, 1978

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American Horticulturist

Volume 57 Number 1 February, 1978

Editor: Murray Keene

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Publisher: The American Horticultural Society, Mount Vernon, Virginia 22121. 703/768-5700

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

AMERICAN HORTICULTURIST is the official publication of The American Horticultural Society, 7931 East Boulevard Drive, Alexandria, Virginia 22308, and is issued in February, April, June, August, October and December. Membership in the Society automatically includes a subscription to *American Horticulturist* and \$1.50 is designated for each issue of this publication. Membership dues start at \$15.00 a year.

Editorial Matters: Refer to Murray Keene, American Horticulturist, Mount Vernon, Virginia 22121

Advertising Matters: Refer to Publisher Services, Inc., 621 Duke Street, Alexandria, Virginia 22314

AMERICAN HORTICULTURIST is devoted to the dissemination of knowledge in the science and art of growing ornamental plants, fruits, vegetables, and related subjects. Original papers which increase knowledge of plant materials of economic and aesthetic importance are invited. For manuscript specifications please address the editor, Mount Vernon, Virginia 22121.

Replacement Issues of *AMERICAN HORTICULTURIST* are available at a cost of \$2.50 per copy, but not beyond twelve months prior to date of current issue.

The opinions expressed in the articles which appear in *AMERICAN HORTICULTURIST* are those of the authors and are not necessarily those of the Society. They are presented as contributions to contemporary thought.

Second class postage paid at Alexandria, Virginia and at additional mailing offices. Copyright © 1978 by The American Horticultural Society.



Cover Photo: A frosted Ponderosa pine bough by Guy Burgess.

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An Editorial

“Gardening for Food and Fun”

Early in October 1977 a package came across my desk from our friends at the USDA. With eager anticipation I removed the wrappings and—behold!—an advance copy of the Year Book of Agriculture plopped on my lap.

Its title was intriguing: “Gardening for Food and Fun”. Inside the cover a small green card said: “ADVANCE COPY. Please make no public mention of this book before its publication date, which is 6:30 a.m. EDT OCTOBER 19”. I could hardly contain myself. I took the book home, laid “Trinity” on the shelf, and placed the Year Book on my bedside table. After a quick review I was impressed. By four in the morning I was “sold”. I just had to tell someone, despite the 6:30 a.m. EDT October 19 warning. My roommate, a dog, was hardly interested, so I turned out the light and dreamed of compost, broccoli and home-canned tomatoes.

“Gardening for Food and Fun” is practical and informative for both the novice and experienced gardener. It has 432 pages, including an impressive color photo section. A total of 84 authors wrote or co-authored its 56 chapters. It is divided into four parts: Introduction to Gardening; Home Garden Vegetables; Fruits and Nuts; and Home Food Preservation. A number of chapters end with a section of suggested further reading. The book has a 6-page index.

“Food and Fun” is the 78th volume to carry the title of “Year Book”. This designation formally began in 1894, and a “Book” has been issued annually ever since, with a

few exceptions due to wartime suspensions.

Some of the annual Year Books are at best boring. The 1976 issue, “Face of Rural America”, is a crime against nature. Its editors should volunteer for Forestry Service to compensate for all the trees turned to pulp by its production.

Of all the Year Books in print, the leader in sales is “Consumers All”, 1965, with a total distribution of 750,000 copies. Another excellent issue is “Shoppers’ Guide”, the 1974 Year Book.

But back to “Gardening for Food and Fun”. We highly recommend it, particularly at this dormant time of year when one should be thumbing through seed catalogs and preparing for spring. Cecil Blackwell, Executive Director of the American Society for Horticultural Science, wrote the lead article, “Why Folks Garden and What They Face”. If for no other reason than this, the book is worth the price.

You can obtain a copy at Government Book Stores for \$6.50, or send a check in that amount to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Order by Stock Number 001-000-03679-3. In addition to the copies on sale, each Member of Congress gets a limited number for free distribution to constituents.

You should acquire a copy. Mine now occupies a prominent place in my study, where I understand visitors prefer it 3 to 1 over back issues of *BASSmaster Magazine!*

Murray Keene

A Charleston Preview



For those of you planning to join the American Horticultural Society's First Annual Spring Symposium in Charleston, South Carolina, April 9-12, 1978, here is a look at one of the gardens we will be visiting.

The landscaped gardens at Middleton Place are the oldest in America. Laid out by Henry Middleton in 1741, the terraces, allées and ornamental lakes reflect the symmetry and elegance of earlier French and English gardens. A hundred slaves labored for a decade to complete the work. Beginning in the winter months camellias create floral tunnels throughout the original gardens. Here André Michaux planted four of the first camellias in the New World nearly two centuries ago. Allées lead from the tomb of Arthur Middleton, signer of the Declaration of Independence, past the 1,000-year-old Middleton Oak and the marble "Wood Nymph", buried for safe keeping during the Civil War, to the shadowy Cypress Lake. Azaleas burst forth in the spring, illuminating the hillside above the Rice Mill Pond. In summer, kalmia, magnolia and crepe myrtle accent a landscape design magnificent throughout the year.

The plantation stabelyards recreate the self-sustaining world of a Carolina Low Country Plantation. As a liv-

ing outdoor museum, the "behind the scenes" story is told with animals, artifacts and crafts of the 18th and 19th centuries. Horses and mules, hogs and cattle, sheep and goats, chickens and ducks, rabbits and peacocks are all at home in the stabelyards. Blacksmithing and carpentry, coopering and tanning, corn grinding and candlemaking, pottery and shinglemaking, spinning and weaving—crafts so vital to early America—are displayed in working exhibits. On a busy day you might help feed the peacocks and grind corn, take a mule-drawn wagon ride, and try your hand at milking a cow. The stabelyard experience at Middleton Place is unique, informative and just plain fun.

The Society's visit to this unique property will occur on the second day of our Symposium and will extend through most of the afternoon and the evening. We will enjoy a sumptuous buffet dinner and musical entertainment and a leisurely stroll along the Ashley River by torchlight.

This year's visit to Charleston "sold out" in ten days. We are looking into the possibility of a return visit next year because so many of our members wished to join us. We will be giving you more details later. In the meantime, plan to join our annual congress in Nashville in October. You will be receiving a brochure soon.

Colonial Williamsburg invites you to take a fresh new look at gardening, April 2-5.



This year at Colonial Williamsburg, the 32nd annual Garden Symposium offers you an exceptional opportunity to learn first-hand many new and traditional gardening techniques while you experience the special springtime charm of our Historic Area.

During this exciting four-day event, presented in association with the American Horticultural Society, we invite you to participate in demonstrations of pruning, mulching and brickwork in our colonial gardens, as well as watch a master at work, the internationally-acclaimed English flower arranger, George W. Smith. You'll enjoy a special tour to nearby Norfolk featuring the Chrysler Museum and several historic houses, top speakers, award-winning films from the American Horticultural Society's film festival, an Early Risers' Birdwalk, a candlelight concert at Bruton Parish Church, and the delicious grand finale of the annual Gardeners' Banquet.

Since reservations must be accepted as they are received, we strongly recommend that you make plans now to attend what promises to be an exciting experience in gardening in the town where America grew.

Colonial Williamsburg's 32nd annual Garden Symposium April 2-5

Presented in association with the American Horticultural Society.
For a detailed program and registration information, write Mrs. Peggy W. Sabol, Registrar,
Williamsburg Garden Symposium, P.O. Box C, Williamsburg, Virginia 23185.
Or call (804) 229-1000; Ext. 2370.

Enjoying Herbs

Carol Hammond
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I beg your pardon.

I'd like to promise you an herb garden.

I'd like to see you sitting in the shade of a tall tree in August enjoying a glass of iced tea with a delicious sprig of fresh mint in it. I'd like to see you preparing a stew with fresh parsley and herb salt on a stormy winter day.

You probably already know that herbs require a sunny, well-drained area, as close to the kitchen door as



possible. There are many books telling how to grow and harvest herbs—a practice which is easy and very enjoyable. I would like to tell you how to use these low cost, easy care, old-fashioned plants to enrich your everyday life.

I have an old wagon wheel with different smaller herbs planted between the spokes. My favorite plants are parsley, chives, mint, basil, creeping thyme, sage and garlic. Dill is planted in one of our flower beds because it grows to greater heights. These furnish more than enough herbs for fresh use all summer and dried herbs for winter consumption. We like the taste of fresh herbs so well that each fall I transfer some parsley, chives, basil and mint into pots to bring in for my kitchen window.

Mint is one of the easiest herbs to grow, and can become a pest if not contained. There are several kinds of mint, spearmint, peppermint, apple and orange mint. They all have distinctive flavors. Nothing makes a glass of iced tea taste better than a sprig of fresh mint. I often freeze a sprig of mint and a strawberry in each ice cube that I use for iced tea. If you like sugar in your tea, you can dip little bouquets of fresh mint into sugar and perch them on top of each glass. Chopped mint can be sprinkled on new potatoes and peas, tossed salad, or baked apples for a new taste treat. An easy mint sauce—great with lamb—is made



Illustrations courtesy of American Spice Trade Association

by blending in a covered blender: 1/2 cup light corn syrup, 1/2 cup packed mint leaves, 2 tablespoons lemon juice and 1/8 teaspoon salt. This is also good on fresh fruit salads.

Parsley, another favorite of ours, has a very high vitamin C content and is terrific as a garnish, sprinkled over boiled potatoes, fish, omelets, eggs or stew. Chives can be used in the same way as parsley and also mixed with sour cream, cream

cheese, salads, soups and vegetable sauces.

Dill should be raised just for the sheer beauty of the seed heads—they must be nature's salute to the Fourth of July! If you grow cucumbers, of course you need the dill to



make pickles. Before the seed heads form, you can use the dill in salads, sauces and egg dishes.

If your fresh-grown tomatoes taste great, wait until you taste them with a sprinkling of basil! Basil is called the "herb of love". It is one of the easiest to grow. If you have one plant, you can just break sprigs off and root them in water. Soon there will be enough plants to share with neighbors and for use in the winter months. Basil is used in vinegar dressings, salads, pizza, and sprinkled over baked fruit—especially apples.

Other easy to grow herbs are thyme, sage, and garlic. We have creeping thyme growing between the stepping stones on one of our paths. When you step on the thyme, the fragrance is delightful. Sage is used for stuffing.

We use the garlic while it is growing by snipping off the green tops for use in salads and stews. When we harvest the bulbs we braid the ends and hang them in the kitchen for winter use.

Continued on page 17 5

The Dove Tree

Dr. Donald Wyman
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Weston, MA 02193

Davidia—or dove tree—may have been one of the favorite trees of Ernest Henry Wilson, that famous turn of the century plant explorer from the Arnold Arboretum. He made several important trips to China and Japan, hunting for new plants to introduce to the gardens of the world. Wilson had heard about the dove tree in his travels in China, and set up a special expedition to find it and bring back living specimens. At that time he thought it was not growing in Europe nor America. He found it, brought back viable seeds in 1901, only to be greatly disappointed to find that it had been introduced in France in 1897. However, only one seedling from this first introduction survived. Later the seedling bloomed for the first time in 1906. Fortunately, Wilson brought back a number of seeds which were widely distributed and produced healthy trees.

In any event, the tree is often seen now in gardens in America and it is widely grown in European gardens as well. There is a splendid mature tree in Providence, Rhode Island, which has been supplying seeds for decades. Another is in the Arnold Arboretum in Jamaica Plain, Massachusetts, and several large specimens are growing in the Pacific Northwest coastal area.

Davidia has been referred to as the Handkerchief Tree, but Dove Tree is the more popular name. Both names refer to the delicate creamy white flower bracts which appear when it blooms in mid spring. Actually the



Photos by author

true flowers are small, in a yellow to reddish globelike inch-wide cluster of stamens, surrounded by two (sometimes three) creamy white flower bracts. A small bract above the ball of flowers is only a few inches large but the large one gracefully hanging downwards may be as much as 7 inches long. A well-developed tree in full bloom is considered by some to be one of the most gracefully beautiful of all hardy woody trees in northern gardens.

Unfortunately, at least in the northern United States, this tree can not always be depended upon to bloom profusely. Occasionally a cold winter kills the flower buds, at other times it may bear alternately with a profuse crop of flowers and fruits one year, followed by only a few the next year. Although it may "miss" some years, many gardeners feel it is well worth waiting for.

The alternate leaves are 3½-5½ inches long, but do not have an outstanding autumn color. The fruits

are green nuts about 1½ inches long. If you wish to propagate the tree, nuts should be picked when mature, and not allowed to dry out. Mix them with damp sand or peat moss and place them in a tightly closed polyethylene bag. Keep at greenhouse temperatures for 5 months. Then, as the nuts begin to crack open, place them (still in the bags) in a temperature of 40°F for 3 months. They are then ready for sowing.

Supposedly the variety *vilmoriniana* (the one introduced into France) is hardier than the true species which Wilson introduced. It can be grown in Zone 5 (Arnold Arboretum Hardiness Zone). The two trees can be distinguished one from the other: the underside of the leaves of the hardier variety is glabrous, whereas the underside of the leaves of the species is pubescent.

Davidia is dense in its branching habit, and if grown in the open with plenty of room it will be well rounded, almost twice as wide as high.

It is offered by several nurseries which have access to the few seed sources in this country. Although the first seedling (in France) bloomed in ten years, others may take longer. For gardeners who are in a hurry and want results overnight, it may prove a disappointing specimen to wait for, especially if you live north of Rhode Island. Yet if you have the space, time and patience, the dove tree is worth the effort.



Quotables



Interesting and important quotes from
some interesting and important people

Tom Stevenson

There has been a good deal of publicity on English boxwood root rot and decline and now azaleas, rhododendrons and Japanese hollies are included. Many people are being led to believe this is a specific disease, says Prof. Albert S. Beecher, Virginia Tech Horticulturist. Beecher also is president of the American Boxwood Society.

After working with boxwood for the last 29 years, I have come to the firm conviction that much of the dying or declining of boxwood is due to faulty cultural practices, or to extreme periods of stress caused by unfavorable weather conditions, he says.

Here in Virginia we have had several extremely dry years where there has been a deficiency of soil moisture. The failure to water boxwood properly during these stress periods has contributed to the death or decline of much of the boxwood.

Another contributing factor is the lack of proper plucking or thinning of boxwood plants. This is especially true of English boxwood.

Healthy boxwood will have a green center and there will be leaves all the way up the stems. In order to obtain this condition, English boxwoods need annual thinning or plucking to allow light and air to reach the center of the crown. Even

though the plant appears to be growing exuberantly, this thinning or plucking is needed.

Another important step in the growing of healthy boxwood is to clean up each year the dead leaves that accumulate inside the plant close to the ground. If this material is not cleaned out, there will be a buildup of dead leaves. Very often aerial roots will develop in this accumulation. In stress periods these aerial roots can easily be damaged and when this occurs the top portion of the plant will die.

In much of the boxwood I have examined, where root rot or decline has been reported, I have observed that there has not been an active management program to keep the plant clean or properly thinned.

Here are some of Beecher's recommendations for taking care of boxwood:

The ideal soil for boxwood is fairly stiff clay, well supplied with organic matter.

It is not necessary to fertilize boxwood every year. Its requirements will vary depending on type of boxwood used, and soil and growing conditions. Fertilizer will not correct a bad physical condition in soil.

Boxwood will tolerate shade but will make stronger growth where it has sunlight for at least part of the

day.

Transplanting can be done anytime except when the plants are in active growth or the ground is frozen or too wet.

Boxwood plants that are too tall can be cut back several feet in early spring.

A light mulch helps maintain a more even temperature in the upper layers of soil and is helpful in preserving soil moisture. Roots may be damaged by mulching too heavily. Mulch to a depth of only one inch.

Oak leaves, sawdust, peanut hulls, pine needles and wood chips are good mulching materials for boxwood.

Do not neglect to water even during the winter months if the ground becomes extremely dry.

Avoid digging around boxwood because the roots are shallow.

Check to see whether you have an accumulation of dead leaves inside your boxwood. At least once a year clean out leaves or twigs that have accumulated in the center of the plants. Without such cleaning, fungus growth on leaves and twigs is promoted, the development of interior shoots is suppressed, and sometimes aerial root development along the branches is induced.

Boxwoods are susceptible to winter damage. The winter of 1976-

77 was especially severe and many boxwoods in a weakened condition suffered injury. Here were some of the causes:

An inadequate supply of soil moisture is often a contributing factor. Boxwood are potentially vulnerable during the winter to injury following an extreme dry summer or fall.

High winds during the late fall or winter may cause excessive transpiration which results in plants giving off unusually high amounts of moisture. If this moisture is not quickly replaced, damage may occur.

A sudden out-of-season freeze which hits plants when they are actively growing and are most vulnerable can cause damage.

A sudden drop in temperature may cause bark splitting. This is most apt to happen when a warm sunny day is followed by a bitterly cold night. Damage will be more severe on the side of the plant exposed to the sun.

A prolonged period of extremely low temperatures where the ground becomes deeply frozen and prevents roots from taking up moisture can be serious.

Low temperatures which exceed the normal hardiness range cause damage.

In mild or open winters plants that were properly dormant in the fall may be coaxed into cambium activity on warm days especially if they are exposed to direct sunlight. The recurrence of freezing weather may kill the new tissue thus formed and sometimes causes the bark to freeze and separate from the wood.

* * * *

Last spring and summer numerous azalea samples with poor growth and dying branches were delivered to my office, says Dr. Francis R. Gouin, University of Maryland horticulturist. Samples delivered in June had not initiated any new growth. Clusters of chlorotic small leaves at the ends of the branches were the only visible signs that the plants were still alive. The comments accompanying each sample

were that the plants had not responded to TLC (tender-loving-care).

In the past this problem has been most often called "Azalea Decline," a term used to mean that the azaleas are dying from some unknown reason. Plant pathologists and plant physiologists use the term liberally to say something that means nothing, however, it does impress a few people.

Over the years I have formed my own opinion as to the cause of azalea decline, based on observations made in nurseries, landscaped areas, and from samples delivered to my office.

Bark splitting is one form of winter injury to azaleas. However, this is generally limited to plants that have been planted for less than a year or where the branches do not form a solid canopy. A tight canopy of branches helps to maintain higher temperatures near the ground where bark splitting most frequently occurs.

Since bark splitting seems to occur during the first 2 or 3 freezes in the fall, it is important that the plants be given maximum protection at this time. In unmulched areas, the heat radiated from the ground is generally sufficient to reduce the occurrence of bark splitting. In mulched areas watering with a sprinkler when the temperature near the ground reaches 30 degrees can help (however, it is much easier to remove the mulch during that critical period of time).

When bark splitting is severe, the entire top of the plant dies as soon as weather conditions are favorable for growth.

Close examination of many samples revealed that mice had girdled the stems. Some of the samples exhibited symptoms of having been girdled by insects such as weevils (the symptoms closely resembled those of Pales Weevil on pine tree seedlings).

It is well recognized that azaleas and related species prefer growing in slightly acid soils. However, the

term acid soil has taken on different meanings over the years. To the commercial grower, it means a soil pH of between 5.0 and 6.0 but to the home gardener acid soil means fertilize with acid fertilizer.

There is such a thing as soils becoming too acid, increasing the possibility of azalea decline. Repeated applications of acid fertilizers on soils that are already sufficiently acid are creating nutritional problems. They reduce the availability of some plant nutrients while increasing the solubility of other soil elements that are toxic to plants. Recommending dolomitic limestone for azaleas often comes as a shock to many gardeners but not to Maryland nurserymen.

Manganese toxicity has also recently become a serious problem in some areas. This is especially common in container nurseries using hardwood sawdust or wood chips in their potting mixes or incorporated into their nursery soils. To correct this toxicity problem iron sulfate is generally recommended.

Over mulching can cause azalea decline. Yearly applications of 2 to 3 inches of mulch appears to suffocate roots of these shallow rooted plants. To survive, the plants must initiate new roots from the stems into the new layer of mulch.

Over-mulching requires several years to exhibit itself and it is difficult to diagnose without digging up the plant and examining the root system. It is not uncommon to find 2 or 3 different root systems at different levels on the stems of plants that are mulched yearly. The lower root system will be in an advance state of decay while new roots, initiated higher up the stem, are growing in the mulch. Mature plants that are having to grow new roots to survive generally appear chlorotic and in a state of decline.

When observing azalea decline symptoms, consider all of the above factors before developing a theory of your own. Simply looking at the plants with your hands in your pocket will not pin-point the cause.

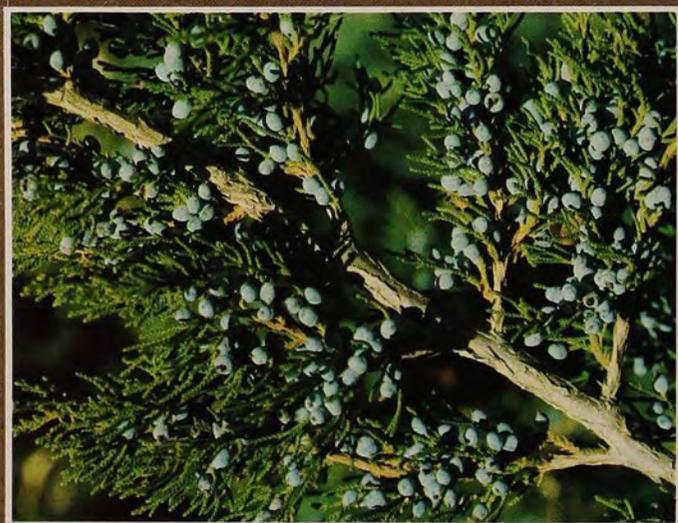
Evergreens

are all
different
colors



Above—Douglas fir tree with new cones forming in a smooth chartreuse

Below—Berries of Juniper are a favored food of birds
Right—Pinyon pine (*Pinus cembroides*) with new growth candles and pollen-laden male staminate



Lorraine Marshall Burgess
Photos by
Guy Burgess
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We know they're referred to as evergreens because they hold their needles all year around, but we tend to think they are forever green. This is not so. These durable trees have wonderful color detailing that often goes unnoticed by the home gardener. The conifers, or cone-bearing varieties are perhaps the most overlooked, the pines, the hemlock, the spruce, and the firs. Granted it is their winter persistence that makes them most admired, but the colors that appear with the male staminates and the female pistillates, the cones, and the berries are a true delight, spring into fall. The photos that follow suggest that we but pause and 'see'.



Left—New spring candle growth on a Ponderosa pine
Above—Blue spruce with male staminates—dusty pink in the spring
Below—Douglas fir with first and second year cones



FASTIGIATE TREES

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The term and name "Fastigate" may be confusing to a few readers, but it refers to the upright habit of branching. In some cases, it implies that the side branches tend to parallel the main stem or stems, creating a more or less columnar outline.

A tree of such form is a strong accent, and demands notice; often being very much alone with no compatible companions to aid it. This may cause you to wonder where such trees should be used.

Certainly where lateral space is limited, and extra height is needed. This occurs in cities where streets are narrow, but people insist on trees being a part of their every day environment. People like something that is alive, and the color of green, as well as the protection of something tall and sturdy as they walk down *their* street. We have grown accustomed to seeing streets, avenues and roads lined with trees, and this is what we expect. The street becomes a part of us and our families.

The same type of narrow-headed tree is the answer to landscape problems associated with business areas and malls. The branches on fastigate trees are well away from the heads of passersby. Everyone can see beyond them without having to be continually dodging a protruding branch.

The area for planting between walk and curb is often only 20 inches or less, yet people still expect a tree planting to enhance the beauty of their street. It is well to remember



that tree trunks grow in diameter, and in very narrow planting strips will, in time, reach to the curb and sidewalk. The selection of trees for such areas is important.

Most trees are not suited for such planting medias—but there are cases when the requests are so demanding that the home owner must be appeased. Fastigate trees fulfill part of the requirement; yet often there is no complete and final conclusion.

Tall buildings accept narrow-headed trees planted near the corners and sides, where height is necessary and width is unacceptable. Such narrow-leaved evergreens as the Columnar Chinese Juniper, Columnar White Pine, Columnar Scots Pine in the east, and the Erect Lawson's False Cypress in the northwest are possibilities. The deciduous potentials are many, and could include Armstrong Red Maple, Columnar European Beech and Columnar English Oak.

Narrow hedges or windbreaks of good height (15 feet or more) welcome such trees as Columnar European Beech, Columnar English Oak, Columnar European Hornbeam, Columnar White Pine, and others. Less drastic pruning is necessary in order to restrict the lateral growth.

Some of the fastigiate have attractive bark, even though it is not as readily seen as on more open trees. The following red maple cultivars have light gray bark: the 'Columnare,' 'Rancho,' 'Bowhall' and particularly 'Armstrong'. The fastigate form of European Birch has white bark. The Scots Fastigate Pine eventually shows orange bark coloration. The Columnar and 'Rancho' Sargent Cherries have prominent lenticels. So does the 'Amanogawa' Flowering Cherry. The 'Fastigiata' and 'Bolleana' cultivars of White Poplar have smooth, light gray glistening bark on the older stems.

If you are using fastigate trees in large areas (2 acres or more) and in-

tend to use a single specimen, it is often a good idea to add additional selections. The number is dependent on the design and size of the area. It is not necessary to repeat a fastigate European Beech if you have already employed it; a fastigate English Oak, fastigate White Pine or 'Armstrong' Red Maple can accomplish the same result. Even spacing of such attention demanders is not usually recommended, either, unless the setting is strictly formal.

No one can tell you exactly what tree to choose, and where to place it, because every landscape setting is different. Each has its own purpose and attraction. You have to feel the need of one or more additional columnar trees, and where they are to be planted. Unity and harmony must prevail.

Remember, too, that evergreen foliage may be needed to bring out a winter effect—but, there is nothing wrong with the vertical stems of *Fagus sylvatica* 'Fastigiata', *Quercus robur* 'Fastigiata', or *Acer rubrum* 'Armstrong' working their way skyward. There is beauty and interest to be found where you least expect it.

You might consider fall foliage coloration, too, because these tall sentinels will not let your attention wander, particularly if they possess colors of orange, red or yellow. Think for a moment of one or more columnar red maples, or even the slightly less brilliant sugar maples protruding well above the surrounding plantings. They can be magnificent. I have seen such trees on the corners of large buildings catch and hold the attention of passersby. Similar forms in the open landscape become just as captivating, or more so.

What is the availability of fastigate trees? How many nurseries sell trees with this type of growth habit and form?

I selected fourteen catalogs that included six retail and six wholesale nurseries from the following states: Ohio, New York, Illinois, Michigan,

Kentucky, New Jersey, Massachusetts, and the Province of Ontario. I also used the source list of the American Association of Nurserymen, and Hillier's Nursery catalog from England, to complete the fourteen.

I found the following readily available—that is, in five or more nurseries:

Acer platanoides 'Columnare'
Acer platanoides 'Cleveland'
 (not truly columnar, but generally upright in habit)
Acer rubrum 'Armstrong'
Carpinus betulus 'Fastigiata'
Crataegus monogyna 'Stricta'
Fagus sylvatica 'Fastigiata'
Malus 'Van Eseltine'
Populus nigra 'Italica'
Prunus serrulata 'Amanogawa'
Quercus robur 'Fastigiata'
Sorbus aucuparia 'Fastigiata' (not as columnar as the others)
Thuja occidentalis 'Douglasii Pyramidalis'.

Checking further, I found the following in two to four catalogs:

Acer rubrum 'Columnare'
Acer rubrum 'Bowhall'
Acer saccharum 'Columnare'
Acer saccharum 'Monumentale'
 (similar to, and probably the same as *Acer saccharum* 'Temple's Upright')
Ginkgo biloba 'Princeton Sentry'
Juniperus chinensis 'Iowa'
Juniperus chinensis 'Columnaris'
Pinus sylvestris 'Fastigiata'
Pinus strobus 'Fastigiata'
Populus simonii 'Fastigiata'
Prunus sargentii 'Rancho'

If I were to look in western catalogs, I am sure that the list would be more extensive, and would include *Taxus baccata* 'Stricta' (the Irish Yew); *Chamaecyparis lawsoniana* 'Erecta'; and *Cupressus sempervirens* 'Stricta'.

Those catalogs with just single representation were:

Acer saccharum 'Temple's Upright'
Fagus sylvatica 'Dawyckii'
Ginkgo biloba 'Fastigiata'
Juniperus chinensis 'Obelisk'
Liriodendron tulipifera 'Fastigiatum'
Picea abies 'Cupressina'

Populus alba 'Pyramidalis'
Populus alba 'Bolleana'
Quercus petraea 'Columnaris'
Sorbus x hybrida 'Fastigiata'
Taxodium ascendens 'Prairie Sentinel'

Ulmus americana 'Augustine'

There were several good narrow-headed trees not listed in these nursery catalogs I checked, but they may well be in others. This list would show:

Acer platanoides 'Erectum'
Crataegus phaenopyrum 'Fastigiata' (a good one)
Prunus sargentii 'Columnaris' (very good)
Tilia platyphyllos 'Fastigiata'
 and such elms as *Ulmus americana* 'Moline' and 'Princeton', plus *Ulmus carpinifolia* 'Sarniensis' and *Ulmus procera* 'Viminalis', all subject to Dutch elm disease.

There is the possibility of columnar trees being somewhat vulnerable to severe winter storms when wind, ice and snow prevail. The inner branches can be tied, and this proves to be part of the answer in keeping fastigates as fastigates. But many of these columnar trees maintain their forms for many years. It is a joy to watch the swing and sway of these uppermost branches—and then watch them all reassemble into their original tall and narrow heads.

Insects and diseases play their part. The two best columnar crab apples are *Malus baccata* 'Columnaris' and *Malus* 'Van Eseltine'; the first is somewhat susceptible to scab and fire blight, and the second is severely attacked by both. But I have observed these two over a long time, and have seen both last for many years without being afflicted—so?

No tree is without some kind of problem, whether it be insects and diseases, slow growth, subject to storm damage, short lived, or something else. We expect too much from trees, and think that they should live forever. If anyone can get 15 to 20 years enjoyment from a tree, then I think the tree has played its role in the world we live in.

Ever Try Espaliers?



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It's really lots of fun, especially for the gardener who gets tired of weeding and thinks there is little to show for such efforts. Training espaliers does take time and knowledge of plants and how they grow. But the result on a garden fence or wall can be a conversation piece worthy of display for all to see.

Although used in Europe for centuries, especially for growing fruits (one still sees pear orchards espaliered in France), the practice of growing espaliers was brought to this country by the colonial gardeners. Excellent examples remain at Williamsburg and Mount Vernon, Virginia. Today, people think they are too much in a hurry to take much time in the garden. However, as one mellows into those beautiful retirement years, training espaliers can be just the thing. In fact, one sees more and more of them in small modern gardens throughout the country.

You should have a design in mind, for without it you will not know where to prune. Pick a plant that goes with the design. For instance, yews are excellent in formal



Far Left—Fruit trees grown on a cordon are a feature of the garden behind the King's Arms Tavern in Williamsburg, Va. Left—The kitchen garden at the Governor's Palace in Williamsburg features a cordon of apple trees. Below—Cordoned apple and pear trees in the Palace garden in Williamsburg blossom and bear fruit. Espaliered figs grow on the trellis at the end cordons.



fan-shaped designs, the rockspray cotoneaster can be used in an informal design, while fruit trees are usually selected for growing in cordons or horizontal designs. A study of a few of the major designs will give you an idea where to start.

Years ago, we had a picket fence—nice in itself, but my wife thought it would look better with a fan-shaped espalier attached. Of course, I was all for the idea until I realized that I was elected to dig the plant, move it to its new home and start it on its way. At the time, there were many other things I wanted to do, so I gave the selection of the yew a lick and a promise, got it started the wrong way. There were more uprights on one side than the other. When this was pointed out to me I turned the project back over to my wife. As every gardener should know, some yews bear fruits, but the male varieties do not. In my hurried effort, I picked the non-fruiting type. Every Christmas thereafter the youngsters would go out and attach bright red buttons to that plant as a reminder that the old man should have been more discerning at planting time.

Select a plant that is young and supple. Bending the shoots into the right positions can be ticklish. Specimens about three feet high are best. They can be one-sided, but should have rudimentary branches to conform to the chosen design. Plant at least six inches in front of the wall or fence to allow a bit of air space at the rear. Remember that espaliers are grown with the foliage all in one plane, and that shoots extending too far in front (or to the rear) of this plane must be removed or pruned back.

It is advisable to have the design drawn on a card and available when major pruning is done. Sometimes it takes a year or so to grow a branch where it is needed. Such branches can be quickly removed when one is hurriedly trying to prune. Heavy pruning, when necessary, is done on deciduous plants when they are in dormant condition when all the

buds and unwanted shoots can be done any time the spirit moves. Remember that with deciduous plants there is usually a dormant bud in the axil of every leaf, and pinching the stem off just above this bud will force it into growth.

This is important: *when you are selecting new buds to force into major stems, the pruning should be done early in the season.* If it is done in August, the new growth may start but will not have time to mature by the time freezing weather kills it.

Pines, hemlocks, mountain-laurel and rhododendrons do not make good plants to train into formal espalier patterns. However, most of our deciduous shrubs do. Fruit trees and some of the small-leaved evergreens like the Japanese holly and *Jasminum nudiflorum* are good candidates. Some shrubs (mockorange is one) grow so fast that you must continually snip to keep them in form. Slower growing plants like pyracantha, abelia, Japanese quince and even forsythia are much better. Admittedly the forsythia is fast-growing, but its yellow flowers do make an outstanding display in some espalier patterns. Crabapples make excellent cordon designs and many others can be selected.

The training (i.e. bending) of the branches must be accomplished while they are still young and supple. If this not done, too large branches may break when they are bent is a 45° angle. If there is any danger of this happening, one can spiral a stiff wire around the branch and bend it partially, wait a few weeks and bend it some more until the exact angle is obtained. You may have to leave the wire on a year or two before you achieve proper results.

In selecting the branches for uprights or horizontals, always keep the selected design in mind. Branches should be about 16" apart, and pruning should be done between the branches in such a way that there is a vacant space with no foliage between the small shoots on each upright or horizontal. This

makes it possible to see the design. When all branches are allowed to grow together, there is simply a mass of foliage up against the wall, and though there may be some people who want this effect, most want to show the design.

Tying the branches to the wall or fence is also important. Soft string, raffia or rubber bands can be used. Never use fine wire. The ties should be done loosely. Temporary training ties may be made on a frame of bamboo, wire or wood. This prevents the need to bore too many holes in a stone or brick wall. Frame-making is a real job, and can deflate one's enthusiasm for espaliers more quickly than anything else!

Let us pause a minute and contemplate the permanent attachment of espaliered plants against a brick or stone wall. Most every active household contains a man with an electric drill (or a determined woman who can show him how to use it). A small hole $\frac{3}{4}$ inch deep can be bored to receive the lead expansion plug and screw. Sheet lead can be bought at the hardware store, and small strips three or four inches long can be cut, attached by the screw to the wall. The strips are then wrapped loosely around the branch at the proper place. This is far better than trying to attach the stems with wire which can strangle the stem and eventually cause it to break.

Once you master the art of attachment, you have really solved your major problem of growing espaliers. If the problem is to get the man of the house to do it, you undoubtedly have your own methods of accomplishing such things.

Finally, remember that all formal designs for espaliers usually look best if they are congruent. The ties should be done correctly, the major pruning on deciduous plants should be done early in the spring. All ties might be checked once each year to see that they are not broken, or are restricting plant growth. If one follows these simple suggestions, one has it made!

Enjoying Herbs

continued from page 5

If you have cats, by all means grow catnip. Dried and sewn into a small cloth bag it makes a great toy for a favorite feline. If a pillow case is filled with equal parts chopped camomile flowers and pennyroyal (a mint), it will keep your cat flea-free. Catnip is also good for sprinkling on ant trails. The ants don't like the smell and will not return.

Choose any of your favorite herbs—I prefer mints, lavender, and a few rose petals thrown in—and tie them into the end of an old stocking or cheesecloth bag. Tie this bag to the spout of your bathtub so that the water washes over the herbs. It produces a delightful herbal bath.

Herb vinegars—that add so much to a salad—are simply made by putting a sprig of fresh herb (basil, rosemary, chives) and/or several shallots or cloves of garlic into a small recycled bottle. Fill the bottle to the top with cider or wine vinegar.

One of our favorite ways of drying herbs is to make herb salt. Put a layer of non-iodized table salt on a cookie sheet. Wash and pat dry the herb leaves and lay them on top of the salt. Cover with another thin layer of salt. Place the sheet in a 300° oven. Stir every ten minutes, breaking up the clumps of moisture-laden salt with a wooden spoon. Most herbs except parsley and lovage will be crisp enough to crumble in 20 minutes. Remove the herbs from salt by sifting through a coarse strainer. Grind the herbs to use as dry herb powder. Use the salt with the fine particles of herbs as a seasoning salt. Chives make a delicately onion-flavored salt.

These are the easy ways that I enjoy my low cost herb garden. I feel that I must warn you, however, it's like eating popcorn: once you get started, you want more and more. I hope you get as much enjoyment out of your herb garden as I do out of mine.

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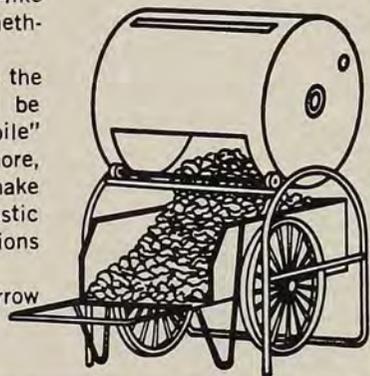
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Air Pollution Effects on Ornamental Plants

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and John B. Coppolino
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Air pollution has existed for eons. Ancient volcanoes have spewed out noxious sulfur dioxide and dusts since the beginning of the earth. Fires have swept forests, peat bogs, and prairies, generating tons of smoke containing various gases and particulates. Smelly marsh gases such as methane have long bubbled out of murky swamp waters. Conifer trees continue to produce hydrocarbons such as terpenes, the oceans emit carbon monoxide, and lightning splits oxygen molecules which reform to produce ozone.

Prior to man's emergence, these widely dispersed, naturally occurring atmospheric "impurities" could hardly be called air pollution. By definition, air pollution inconveniences man in some way. However, with the advent of man, things began to change. Man began to concentrate pollutants and his living area in the same space, since the pollutants were a direct result of his activities. The smoke from a caveman's fire was probably one of the first man-made inconveniencing air pollutants. As man became more "civilized," he began to congregate into villages and towns. Pollution from resultant heating and cooking activities was likewise congregated. As he lost his contact with nature, he compensated by surrounding himself with ornamental plants. Increased urbanization and the onset of the Industrial Revolution increased the population and pollution levels, side by side, until we reached the magnitude of the problem facing us today. Man, and his surrounding greenery, both suffered from the atmospheric insults. The majority of the pollutants are still produced in the urban, industrial areas, but we are also feeling and seeing the effects in rural areas hundred of miles away from the source. Thus, the current pollution problem is not restricted to local, urban areas, but has actually become a regional problem.

We know that the atmosphere is only a thin envelope of air surrounding the earth, not unlike the skin on an 18 earthly apple. Although the atmosphere serves to dilute

and disperse the pollutants, its capacity is limited. Fortunately, in many cases, it acts only as a transient medium, and the pollutants ultimately end up in "sinks" much as the ocean, soil, or vegetation. It is this latter receptor which concerns us in this article.

Although myriads of pollutants are emitted into the atmosphere, only certain ones are capable of injuring plants. Among the most important of these are ozone and sulfur dioxide. Other significant phytotoxic pollutants include ethylene, fluorides, chlorides, dusts, etc. We will discuss the sources of the more common pollutants and describe the effects on plants.

Ozone



Photos by author

Typical sulfur dioxide injury to leaves of broadleaved plants appears as brown, interveinal necrosis, as shown here on greenhouse-grown Poinsettia. (The sulfur dioxide came from the boiler heaters).

Sources. —Ozone is probably the most widespread, important phytotoxic (plant-injuring) air pollutant in the United States. This gas is a natural constituent of our air, existing in the upper stratosphere where it filters out dangerous ultraviolet radiation. (It is this belt of ozone

which is in danger of being depleted from fluorocarbons emitted from spray cans and other sources.) Ozone also exists naturally in the lower atmosphere, originating from vertical downdrafts from the stratosphere, lightning, or from natural chemical reactions.

However, naturally occurring, background levels of ozone are of minor importance regarding vegetation injury. The major source of phytotoxic levels of ozone is in our urban areas. In these areas of high traffic density, hydrocarbons and oxides of nitrogen are emitted into the atmosphere from numerous sources, but mainly from automobile exhaust. Once in the air, these compounds undergo chemical reactions in the presence of sunlight (photochemical reactions) forming photochemical smog, of which ozone is a major component. The ozone concentrations travel downwind, remaining in fairly high levels for many miles. In fact, higher ozone levels are fre-



Ozone-induced "stipple" on the *upper* surface (only) of wild black cherry leaves.

quently recorded downwind from urban areas, than within the urban area itself. This is apparently due to the presence of other reactive pollutants in the urban air which scavenge out the ozone. Ozone has also been monitored in high levels in very remote areas. The exact source of this ozone is unknown, but the ozone, or its precursors, probably originate hundreds of miles upwind in urban centers.

Effects.—Ozone is responsible for the widespread injury and mortality of native plants, such as ponderosa pine in the mountains east of Los Angeles. Ozone has also been implicated in the "chlorotic dwarf" and "emergence tipburn" diseases of eastern white pine, perhaps in some cases interacting with sulfur dioxide. "Weather fleck" of tobacco and "grape stipple" are also caused by ozone. Since this pollutant is so widespread, the effects are seen over large areas and are not restricted to local areas.

Acute ozone injury to coniferous plants, such as pines, usually appears as a death of the needle tip, or sometimes of the entire needle. In less severe cases, chlorotic mottle is observed. A mottle results where small patches of injured tissue turning yellow or brown alternate with green, healthy patches of tissue. As with most pollutants, premature defoliation may also occur, giving a coniferous plant a tufted appearance. This symptom occurs when the older needles abscise, while the current foliage remains on the trees. Among the coniferous plants, pines are much more susceptible than spruces, firs, yews, or cedars.

On broadleaved plants "classic" ozone symptoms appear as "flecks" or "stipples" of dead white-to-tan or pigmented reddish-purple tissue, often appearing only on the upper leaf surface. Individual spots of this type are usually less than one-eighth of an inch in diameter. Only the upper palisade cells within the leaf are usually affected, as evidenced by microscopic examination. In the more rare, severe cases, injury may be more extensive, and even extend through the leaf to the lower surface. As with conifers, long-term, low levels of chronic injury may cause the leaves to redden, or turn brown, and drop prematurely from the plant. This often resembles premature fall coloration and defoliation.

Sulfur Dioxide

Sources.—Oxides of sulfur, mainly sulfur dioxide (SO₂), arise from many sources, but the burning of coal accounts for 60 percent of the total. Most coal is burned for the generation of electricity, the remainder being used for home and space heating. The amount of SO₂ released upon combustion depends upon the sulfur content of the coal, normally ranging from 0.7 to 2.0 percent by weight, with extremes of 0.3 to 6.0 percent. The production, refining, and utilization of petroleum and natural gas yield another 20 percent of the SO₂. The smelting and refining of ores (principally iron, lead, zinc, copper, and nickel) adds 7 percent of the total SO₂ emission. The remaining SO₂ in the atmosphere originates mainly from industries which manufacture or use sulfuric acid and sulfur. Natural production of SO₂ results from various sources, including volcanoes.

Effects.—Unlike ozone, which is so widespread, phytotoxic levels of SO₂ usually exist only near a large source, such as downwind from a steel mill, smelter, coke works, power plant, or various other industries. Thus, the effects on ornamental plantings is usually restricted to a localized area.

Like other gaseous pollutants, SO₂ is taken into the plant leaf through the stomata along with the normal constituents of the air. Once inside the leaf, the SO₂ reacts with cells, causing injury or death of tissues. The resulting symptoms may be classified as chronic or acute depending upon the severity of injury. Chronic

Puzzle for a

Martha Prince
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Nature is the perfect mathematician, but even non-arithmetical gardeners can enjoy discovering for themselves some of her "secret formulas". Armed with an old Asa Gray *Introduction to Botany* (1853), the memory of an IBM exhibit Fred Galle used several years ago at Callaway Gardens, and a white pine cone (*Pinus strobus*), I spent a sleepless winter night trying to understand the Fibonacci Series, and its application to natural forms. By 5:00 a.m. I was, at last, victorious!

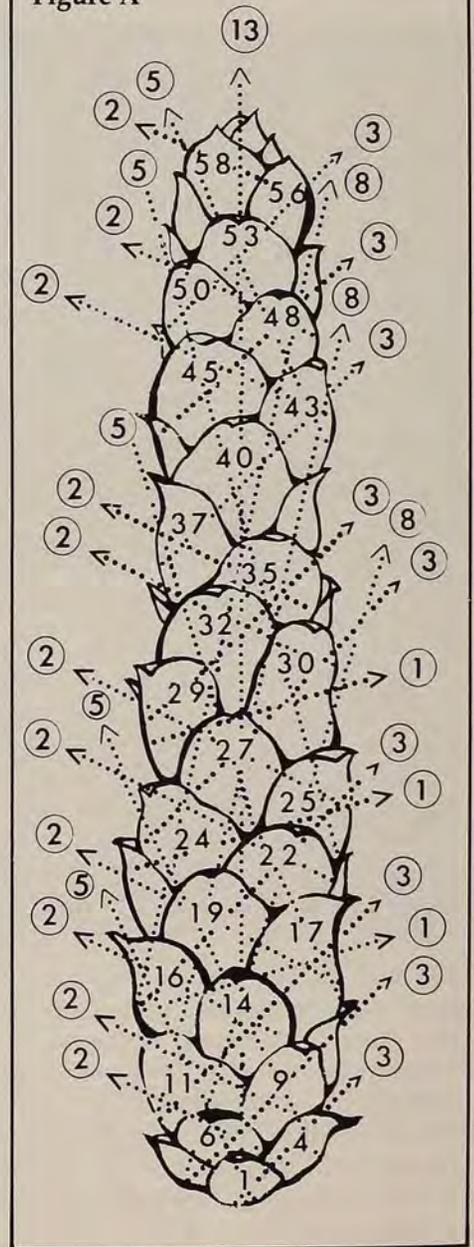
Fibonacci was an Italian mathematician (1170-1230 A.D.), and his series is this: 1, 2, 3, 5, 8, 13, 21, 34, 55, et cetera. You can see that $1 + 2 = 3$, then $2 + 3 = 5$, $5 + 8 = 13$, $8 + 13 = 21$, and so on. Each succeeding number is the sum of the preceding two. Nature uses this numerical sequence in all spirals; cones are "supposed" to be an easy example. If you study the white pine cone you will, eventually at least, find that there are five spirals made by the scale placement; when you reach the sixth number in the sequence (13), the scales are in a vertical position. I struggled along, using the very small stick-on circles from the stationer's, and numbering them. The "flattest" spiral, the basic one including all the scales, winds upward slowly to the right, and is the

"one" of the series. The next spiral is steeper, goes to the left, and proceeds by twos. Spiral three is of threes, and goes upward to the right, more steeply still. Spiral four proceeds by fives, and goes to the left. The final spiral, the steepest one, goes to the right, and is in increments of eight. When you reach the sixth number in the Fibonacci Series, thirteen, you have reached the vertical. Scale fourteen is directly above scale one, scale twenty-seven is above fourteen, and on to the top. As you notice, the directions of the spirals alternate.

In effect, I am giving you the puzzle solution, and try to make it plain in the two accompanying diagrams. However, play around with it yourself! After you have worked it out on a real white pine cone, try the cone of a different species or genus. Bigger, fatter pine cones, such as those of the Jeffrey pine, have more scales, more spirals, and the vertical interval is different. In other genera you may find some cones with the same sequences as the white pine; the black spruce, for instance. Others are simpler. The American larch is an easy one. Try whatever you have at hand. The numerical sequence will continue, no matter which cone you pick up.

It is an amazing world. Understand one little crumb of nature's workings, and you know there is a lifetime of adventure ahead for anyone who looks, and really sees.

Figure A



Winter Evening

The Spirals of Cones

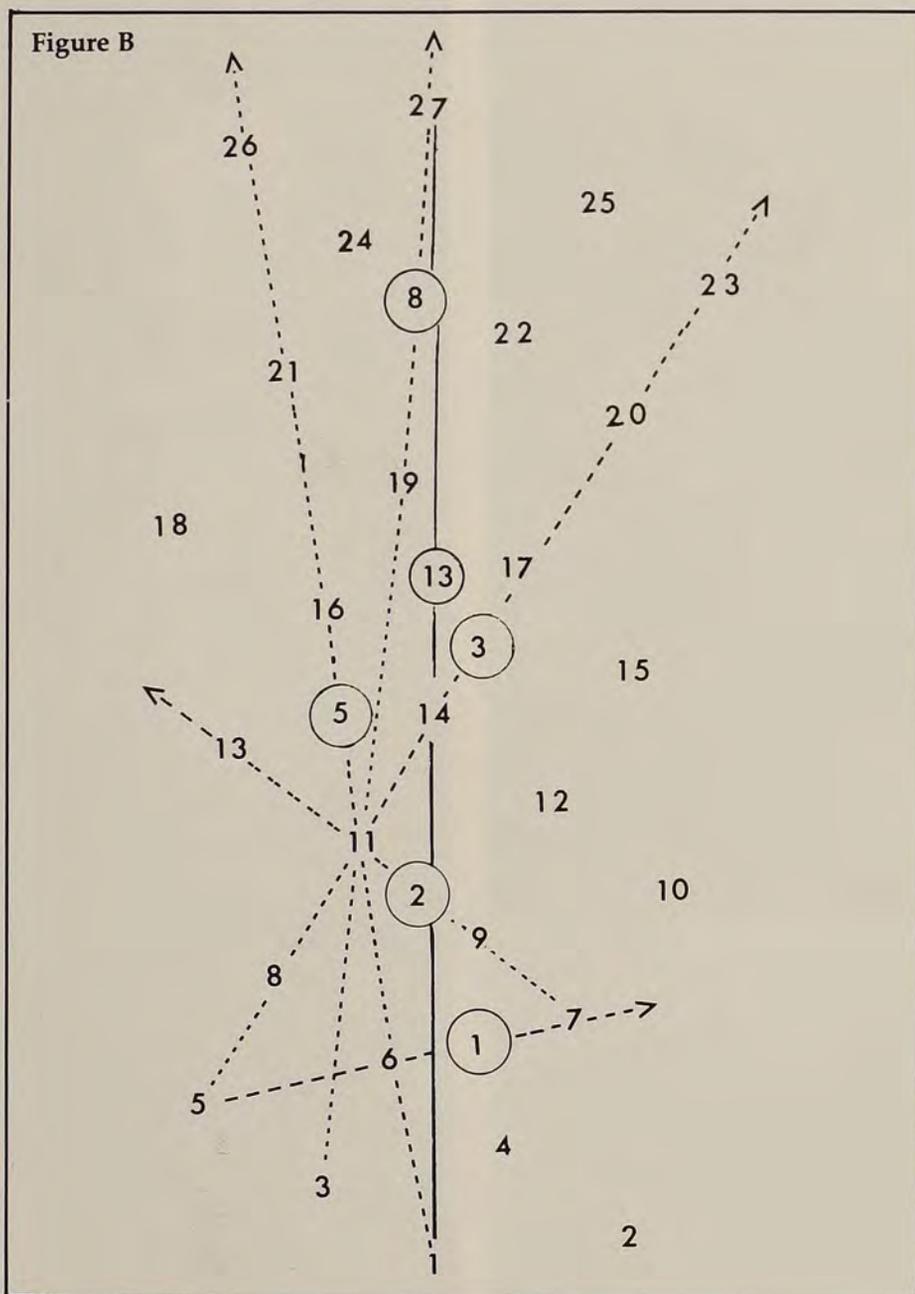


Figure A. For simplicity, here is an elongated and stylized diagram of the white pine cone, with all the scales as they are visible from one side only. The scales are numbered and all the spirals marked, with their directions indicated by the arrows. (Naturally, some scales disappear around the sides, and others are completely hidden.)

Figure B. This is a diagram of *all* the scales on the lower section of the white pine cone; I have laid it out as though the cone were really a piece of rolled-up paper and we have unrolled it. Each spiral is marked and numbered only once (in the circles), but you can easily find the continuations.

...and the



1

(1) 'Fantasy', a parrot tulip, is unexcelled in floral arrangements. Flowers open up to 8" across.

(2) 'Texas Gold' parrot tulips seem almost self-illuminating in the spring garden.

(3) 'Bonanza', a double peony-type tulip.

(4) 'Princess Elizabeth' tulips bloom in delightful shades of pink on 28" stems.

(5) 'Red Fusilier' tulip (*Tulipa praestans*) puts brilliant vermilion flowers on multi-flowering 8" stems.



2

mania continues



3

4



5



...and the

Text by Lorraine Marshall Burgess
202 Old Broadmoor Road
Colorado Springs, CO 80906
Transparencies by Guy Burgess

TULIPOMANIA is a word coined to describe a madness that spread through Western Europe in the early 1600s. The craze afflicted an entire population, prompting an otherwise sensible society to indulge in foolish and reckless behavior over the beauty of a rare, new flower. The flower of madness was, of course, the tulip. Today the mania continues as an arrested case, after 350 years of treatment.

Tulipa remains the favorite of all spring-flowering bulbs. By last count there were 4,000 named varieties of this genus, in 15 classes. It is difficult to name the newest and the best because hybridizers continue to develop fresh strains. The parade of species and hybrids is long and beautiful. The *T. kaufmanniana*, a water-lily type, blooms in late February and early March, together with early single and double varieties. These are followed by the Mendel, Triumph, and *griegii* tulips with green leaves striped in cinnamon and chocolate colors, then the larger *T. fosteriana* ('Red Emperor') and Darwin ('Holland's Glory') hybrids, 24 the Cottage, the lily-flowered, and

the Parrot strains. For novelty there is the 'Viridiflora' in green blends with fringed edgings, the big peony-flowering doubles, the bizarre, broken-patterned Rembrandts, and the multi-flowered bouquet tulips. With all these to choose from, the gardener can have tulips in bloom until late May.

It is too late to plant tulips this spring, but it is a good time to get acquainted with the varieties available. Study the flowers as they bloom now in public and private gardens everywhere, and choose your favorites for ordering this summer, and planting in the fall. Notice too the plants that keep them company and plan for underplantings of candytuft, golden or sweet alyssum, creeping phlox, or pansies close by. Or add a gathering of violets and forget-me-nots. The planning will make this an exciting year, and the planting can make next spring a season to remember.

Prepare your tulip beds in the fall by turning the entire area, adding humus and sand to enrich and to improve drainage respectively. Most varieties prefer full sun, although some of the late-blooming varieties last longer in light shade. In exposed planting areas add a winter cover of leaves, straw, or pine. Do not add manure to your planting mix. However, you can use it in spring as a top dressing, lightly

strewn.

The arrival of the first tulip in Western Europe dates from 1554. No known documents of western culture make mention of the tulip prior to that time; no western pottery or textile design makes use of this flower motif. The only possible exception is *Tulipa clusiana*, the Lady tulip. This delicate and graceful species was found naturalized along the Mediterranean coast during the Middle Ages, and has since been found in Iran and Kashmir where it is probably native.

The bulbs that prompted the mania in Holland first arrived from Adrianople, Turkey, in the hands of a Flemish ambassador. The flowers were described as turban-shaped (*dulban* in Turkish), thereby giving us the word tulip through a corruption of sounds. Surprisingly, the Dutch were able to take the bulbs from an arid, mountainous land and acclimate them to their moist lowlands. History records their starting with pointed lily-shaped flowers, and by cross-breeding developing flowers with rounded petals, double rows of petals, and multiple colors. With this the mania began. The Turks in turn welcomed return shipments of the new Dutch strains. They sent new varieties, and the excitement increased.

In the Netherlands hysteria, unprecedented, ensued. By the 1560s

mania continues

the rage had intensified to such a degree, what with the growing, breeding, and trading of the tulip bulbs, that new shipments from Constantinople were arriving in huge lots. Almost immediately the best of the bulbs were being traded for such varied and unlikely properties as a silver goblet, a mill, a brewery, 12 fat sheep, and a ton of cheese.

One byproduct of the hysteria was a universal new interest in gardening—reaching into the middle and lower classes. It became evident that anyone could play the game. New gardens sprouted up everywhere. A poor man with one unique tulip bulb could provide the dowry that would elevate his daughter to a new station in life. All of Holland became a tulip garden.

Scoffers explained away the tulip fad as a kind of celebration of victories won by the Dutch in recent religious conflicts. It was also a time of colonial exploration and of reckless speculation in remote real estate in such far away places as the South Sea Islands and the Mississippi River.

Around 1610 bulb growers, by chance, produced a series of new tulips striped in yellow and white. This generated further inflation. The process remained a mystery to the growers, but they were able to repeat it by dusting the bulbs with

the crushed remnants of earlier bulbs. (The strange streaks and frills have since been attributed to a virus that was moved about with the help of aphids. Luckily the virus affected the color but not the health of the plants.)

The genetic misfire caused by the virus created a situation since compared with the peculiarities of postage stamps. 'The price is cheap for ordinary ones, but rare ones are worth a fortune!'

One red and white tulip that was exchanged through several seasons brought the equivalent of \$1,200 the first year, \$3,000 the second, and \$30,000 the third. If a person discovered a new strain it became customary for him to invite friends over to see the beauty and to partake of a glass of wine in celebration. (We might follow this tradition in the celebration of our own floral triumphs.)

Still it was a puzzling kind of prosperity. Tulip futures were recorded on bits of paper, and bought and sold at ever-increasing prices. Houses were mortgaged; jewels pawned. Wild inflation prevailed, bringing the provinces of the Netherlands to the verge of bankruptcy. The Turk's *dulban* became the fool's cap. The year 1637 was remembered as the era when one fool outdid another. The people became bored with the manipulations. Sud-

denly the market was glutted with lesser rarities and the boom collapsed. Rich men became poor. Suicides were reported. Finally there arose a new breed of bitter non-gardeners known as tulip haters. Alexander Dumas wrote of tying two cats together and tossing them into a tulip bed to destroy it. A Flemish botanist whose tulips were envied was robbed during the night of his precious bulbs. Some people carried canes, the better to lop off choice flowers in passing.

Finally the government stepped in to stop the speculation and the hostility. Slowly the mania subsided, but the people never forgot their fascination with the tulip. Today, 3½ centuries later, the Dutch are still involved. For them tulips are now a major industry. They continue to grow and sell millions of bulbs each year, and we are among their most satisfied customers. Fascination with the flower continues without the madness. Tulips are no longer vital to financial markets. They are not listed as a prime commodity for exchange, still they give promise of high futures in our spring garden plans. But best of all, because of the tulip fad every segment of society has discovered that gardening is an enduring and pleasurable institution. That bit of knowledge is the best after-effect we could ask for.

A Few Dwarf Deciduous Shrubs

Dr. Donald Wyman
59 Jericho Road, Weston, MA 02193

Dwarf plants are becoming valuable garden additions to many who are growing plants on a smaller scale than they used to. Certainly there will always be the need for large-growing lilacs and forsythias and for tall trees to provide shade and screens for the garden, but the care of some of these plants is excessive. When one contemplates some of the dwarf plants (under three feet tall) one can find specimens with interesting shapes, bright flower colors and good autumn foliage. These, once established, take practically no care whatsoever.



When we moved into a condominium-type home a few years ago, we were at first disappointed because we did not have a large shrub border and space for particular specimen shrubs of great size. Now, after several years of gardening on a reduced scale, we see the value of dwarf plants. With the right selection, we can create the interest and beauty of different colors and shapes, without the constant work that some of the larger plants cause.

My daughter has a group of very large forsythias which she likes when they are in bloom, but they increase so fast that every few years she has to cut them to the ground to make space for other things. This means the pruning and hauling away of nearly two truck loads of brush - quite a job! When you are young and vigorous you can take this in your stride. A garden with dwarf plants needs no such care.

Take for instance the 'Crimson Pygmy' Japanese Barberry, just as hardy as the species but never over three feet tall and with reddish foliage throughout the entire growing season, when grown in the full sun. Plants eight years old are only two feet tall and three feet across. This not only can be used as a low specimen but also makes a low hedge plant that seldom needs clipping. It originated in the Netherlands in 1952.

There are two similar and colorful brooms that will grow in poor, dry soil in hot, sunny situations. The Prostrate Broom (*Cytisus decumbens*)



Photos by author

Above—February daphne (*Daphne mezereum*)

Below—*Potentilla fruticosa* 'Mandshurica'

Right—*Cotoneaster horizontalis*



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grows flat on the ground and produces brilliant yellow flowers in mid-spring. It has the habit of growing evenly on all sides so it makes a large circular mass of foliage. The Ground Broom (*C. procumbens*) is somewhat the same but it grows about thirty-two inches tall, and blooms usually between June and August. Both are excellent in the front of the shrub border or the foundation planting about the house.

Larger, more upright shrubs include two daphnes (*Daphne genkwa*, and *D. mezereum*) which are about three feet tall. Both bloom very early in the spring on wood formed the previous year. The former, the Lilac Daphne, is rather difficult to grow sometimes and has a bad reputation of suddenly dying for unknown reasons, but the lilac-colored flowers are about a half inch in diameter. The more common February Daphne (*D. mezereum*) bears rosy purple flowers in February or March. It later produces bright red berries. These are about the first fruits to appear in the garden and are quickly eaten by the birds. The white-fruited form 'Alba' makes a conversation piece anywhere.

Two Indigos are not common in the nurseries but are worth searching for. The smaller of the two, the white Chinese Indigo (*Indigofera incarnata alba*) grows about a foot and a half tall, with white pealike flowers in upright racemes 5-10 inches tall. Since it blooms in July on wood formed the current year, it can be expected to bloom even if it is cut to the ground in the very early spring. The Kirilow Indigo (*I. kirilowii*) is twice as tall with rose-colored flowers in June, also produced on the current year's growth. It is not as good a ground cover for establishing on banks as is the white Chinese Indigo, but nevertheless makes a bright spot of color in the border.

Clavey's Dwarf Honeysuckle is often used as a rounded specimen in a low hedge. Its fast growth, grayish foliage, yellowish flowers in spring and red, globular fruits in August

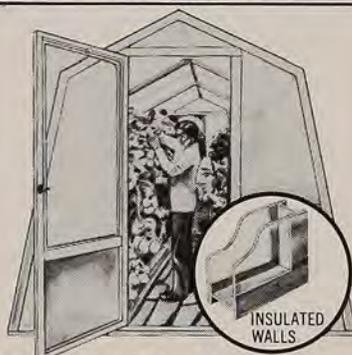
and September make it of value. Like other bush honeysuckles it has few, if any, pests.

Don't forget the Bush Cinquefoils (*Potentilla fruticosa* varieties) for they are of merit in any garden, anywhere. Hardy way up into Canada, the Arnold Arboretum grew nearly fifty varieties at one time. The small, five-petalled flowers are similar to those of strawberries. The colors are yellow or white, depending on the variety. Not all varieties are under three feet in height at maturity. 'dahurica', 'Mandshurica' and 'Snowflake' have white flowers; 'Lady Daresborough' and 'Maanley's' are pure white; 'Gold Drop', 'Friesengold', 'Pumila', 'Rigida' and 'Pyrenaica' are bright yellow.

These are all sun-demanding shrubs, native throughout North America. I have seen small plants of this species growing at the top of the Olympic Mountains in the Pacific Northwest. They seem to withstand poor, dry soils. The fruits are merely dried capsules. The foliage is of fine texture though without autumn color. However, plants have been known to be seventy years old, with a dense well-formed mass of foliage, yet require no special attention.

The Coast Azalea (*Rhododendron atlanticum*), hardy up to New York City, has been used in borders for its fragrant white flowers and its ability to increase by stolons. It is native from Delaware to South Carolina and is popular especially in naturalistic plantings.

The many varieties of the Scotch Rose (*Rosa spinosissima*) were popular a century ago. There are still some interesting ones available. The stems are very prickly but the plants are low, dense and mound-like in habit, bearing profuse flowers in June. They are pink, white or yellow, single or double according to variety and about two inches in diameter. 'Alba Plena' has double white flowers. The three popular yellow-flowered varieties are 'Altaica' with very pale yellow flowers, but almost 3 inches across; 'Lutea'



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the most popular with single flowers about as large; and 'Lutea Plena', a double.

The Memorial Rose (*Rosa wichuraiana*) is a semi-evergreen ground cover, one of the parents of the popular rambling roses. It hugs the ground and bears deep lustrous green foliage. In late summer it produces small white flowers 2 inches across, followed by dark red fruits in the fall.

The summer-blooming *Spiraea x bumalda* varieties have been popular for a long time, with flat clusters of small pink to red blossoms. A newer variety 'Crispa' has clusters up to 6 inches across and leaves slightly crinkled at the edges. Another new spirea is *S. japonica alpina*. It is scarcely over 10 inches tall and creates a dense round mass of foliage with bright pink blossoms for several weeks in the early summer. Although a native of Japan, it was apparently not introduced into America until 1958. It also is free of pests.

Two coralberries are well worth growing, especially *Symphoricarpos x chenaultii* and another hybrid known as 'Hancock'. Both bear small pink flowers on spikes in mid July, followed by bright red to pink fruits in the early fall. They are vigorous, bushy plants, easily grown under almost any conditions. 'Hancock' is the lower of the two, being only about two feet tall. It increases rapidly by stolons and makes a fine bank cover. Neither has any serious pest problems.

A good plant for edging purposes is the Dwarf European Cranberry Bush *Viburnum opulus* 'Nanum'. It is only about two feet tall and seldom bears flowers or fruits. It is a dense mass of thick foliage, rounded in shape, with reddish autumn foliage.

Two cotoneasters should always be considered, the common Rockspray (*Cotoneaster horizontalis*), and its close relative, *C. adpressus*, the Creeping Cotoneaster, the latter being only half the height of the Rockspray. The Creeping Cotoneaster is not as vigorous in growth, but

its branches do root wherever they touch moist soil. An old plant of this species can be a circular mass of foliage nine feet across. The bright red fruits of both species are most attractive in the fall, and the profusely pink flowers are interesting in June.

Some of the St. John's-worts are worth using. These upright shrubby plants produce golden-yellow flowers two inches in diameter from June to mid-October. I recommend the varieties 'Hidcote' and 'Sungold'. In the colder parts of the country the stems may die to the ground, but usually they will send up new shoots that flower the same year. In the South, leaves may be semievergreen.

Finally, another new recommended plant is the Dwarf Cut-leaved Stephanandra (*Stephanandra incisa* 'Crispa'). It is valued for its very strong growth, and the ability to root its gracefully arching branches wherever they touch the moist soil. Naturally a rounded, dense plant, the inconspicuous flowers are not important, but its fine textured foliage is attractive. It is excellent for planting on rocky banks as a ground cover that needs no attention whatsoever. If used in the shrub border, one may have to restrain its vigorous growth on occasion. Its cut branches make a lacy filler in flower arrangements.

These are only a few of many dwarf deciduous shrubs under three feet tall at maturity. If one adds the dwarf conifers and certain dwarf broadleaved evergreens (boxwoods, cotoneasters, *Euonymus*, hollies, *Leucothoe* and others) one can construct a garden of dwarfs that will have all the beauty and seasonally changing colors and forms of the larger shrub border. But what is even better, such a small garden is far easier to care for.

Dr. Wyman is author of "Dwarf Shrubs—Maintenance-free Woody Plants for Today's Garden." MacMillan Publishing Co., Inc. NY. 1974. The book is well-illustrated with color photographs and highly recommended.



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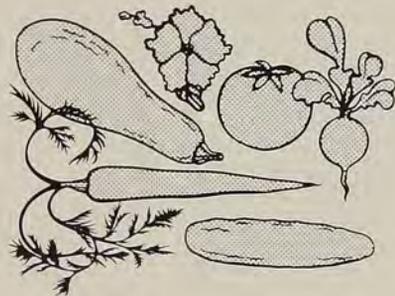
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Sex and the Single Tulip

Carla Wallach
136 East 57th Street
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"Queen of Sheba", lily-flowered tulip

Maybe you think romance is only for the bedroom, but look around you; more specifically, in a garden. Of all the flowers you'll find there, the tulip is the queen of sensuousness, the Cleopatra of flora. It takes little to see why it has captured the romantic imagination of man for centuries. Notice the voluptuous curves of the satin-smooth petals forming a perfect rounded head sitting on top of an erect, proud stem . . . the petals slowly opening as they mature to allow their full beauty to be admired. It surely is no coincidence that in temperate climates, tulips choose to bloom in the spring, just when nature renews itself and the sap rises in man and beast.

The origin of the tulip is full of facts and fancy as befits any self-respecting sex symbol. It originally grew wild in Persia (now Iran) as a lovely single-petalled flower covering the countryside. It was quickly domesticated and grew to become the star attraction of the famous Persian gardens. The mass displays of red tulips caused a sensation that was to change the world of horticulture. It also became the emblem of consuming love. When a man gave a tulip to his mistress, it conveyed the understanding that the vivid coloring of the flower represented her own spectacular beauty, while the black base of the flower-cup depicted his heart burnt to coal.

Tulips were next spotted in India, where the first Mogul emperor, Babur, an avid gardener on a grand scale if ever there was one, discovered his own hills covered with tulips and proceeded to propagate what was then called the Indian tulip varieties. For some reason, the flower typified unhappy love to the Indians. A Hindu poem quotes: "The tulip immersed itself in blood because of the jealousy it entertained of her charming lips." Not so the case in Turkey where the tulip was next seen and became the coun-

try's national flower. In fact, it was held in such high esteem as a love symbol that a fabulous feast in its honor was held annually in the Sultan's seraglio. The whole harem awaited this event with frantic anticipation—the year's highlight in their otherwise dull routine. The "Feast of the Tulips" continued until the flowers faded. The eunuch gardeners tenderly cared for the



"Compostella", a *griegii* tulip

beautiful tulips, making certain that they were all of the same height, even if it meant swiftly transplanting a few here and there to satisfy the Sultan's exacting eye. After every fourth tulip, a candle was placed at the same level as the flower

head, and lit each evening. Trees surrounding these gardens of dreams were similarly decorated, and flowers were massed everywhere, as were huge mirrors, the better to reflect the breathtaking beauty of the setting, not to mention of the maidens.

The Mistress of the Harem (the major domo really, and usually a long-ago discarded favorite of the Sultan) would nightly line up the concubines for inspection. When the Sultan dropped a handkerchief at the feet of one of these fair damsels it indicated that she was his choice for the night's revelry among the tulips. Banquets were served among the flowers, and everywhere were cages of canaries merrily singing. It all sounds like something out of a "Thousand and One Nights" and the tulip inspired it all.

Any flower capable of firing such passion in these vast Eastern empires was obviously destined to find its way to Western Europe. It happened when Emperor Ferdinand I of Austria dispatched Ogier de Busbecque in 1554 as his ambassador to Solyman the Magnificent, who was then Sultan of the vast Turkish empire, which reached its peak of power under his reign. De Busbecque not only couldn't get over the abundance of flowers blooming everywhere in the middle of winter, but he was fascinated by one he had never seen before, the tulip. The Turks called it "tulbend" which meant turban, for they thought the flower head resembled an upside turban with its petals overlapping one another. The Persians called it "thoulyban," meaning the same thing, so the French (the language spoken at that time in all the courts of Europe) opted for "tulipan" being as close as they could come phonetically.

By 1559, tulips were in Europe, blooming for the first time in Vienna, in the garden of a prominent international banker. The rest is his-

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tory. But the passion this flower evoked continued to increase each year, reaching a fever-pitch in 1634, when such a staid, level-headed, conservative country as Holland went totally berserk over it. The next four years have come to be known as Tulipomania. Tulips were thought to be "moon-struck" because of their unearthly flamboyant coloring. Bulbs, or "roots" as they were called, were traded with wild abandon. Many were frequently purchased and resold without ever having been seen by their owners. All classes were caught up in this craze for a brand new flower from the exotic Middle East. It was a horticultural "first" and as such made history, so that merchants, princes and servants all offered their worldly belongings to possess a few of these priceless bulbs, which were sold according to their weight.

Can we not repeat the famous case of one passionate soul who gave two loads of wheat, four loads of rye, four fat oxen, eight fat pigs, twelve fat sheep, two hogsheds of wine, four barrels of beer, two barrels of butter, a thousand pounds of cheese, a bed with mattress, pillows and hangings, plus a suit of clothes and a silver jug (the whole lot valued at 3,500 guilders) for just ONE bulb of the very rare "Viceroy" variety. With his bed, he no doubt might have thrown in his wife as well had there not been laws to stop him. At one time only two bulbs were known to exist of a certain species "Semper Augustus," one in Amsterdam and the other in Haarlem. A Dutchman bought one of these for 4,600 guilders PLUS a new carriage, 2 grey horses and complete harness, a total of 13,000 guilders. And there's the story of the man who was offered 12 acres of good building land for his one bulb and turned it down.

The craze for tulips must have had some comic moments. One book reports the case of an elated buyer, rushing to the dock to await the unloading of the ship that carried his precious cargo of bulbs. A sailor on

board, noticing an open box of "onions" and being very hungry at the time, proceeded to eat them. He was happily munching his seventh, when the unbelieving owner discovered him. P.S.—the bewildered sailor was dragged to jail for a few months and God only knows how the owner drowned his sorrow. Every town in Holland had a tavern especially designated as the exchange center for this national passion. In three years, more than ten million bulbs were traded in one town alone.

Throughout the centuries, poets and writers perceived the tulip as an erotic symbol. The Jesuit poet Rapin wrote about a Dalmatian nymph (he was much given to writing about nymphs) who was transformed into a tulip to preserve her virginity from the lust of the Greek god Vertumnus who pursued her ardently. In part Rapin wrote: "Bold with desire his passion he revealed/ Confessed the secret god and force applied,/ To heaven for aid the modest virgin cried:/ 'Ye rural powers, preserve a nymph from shame/' Others, notably Robert Browning, Elizabeth Barrett, Tennyson, Victoria Sackville-West also wrote about the voluptuous tulip. And Dumas Sr. did pretty well with his "The Black Tulip."

Tulips created their own folklore. They were depicted as the special favorites of elves, fairies and pixies. Tulips were used as cradles for pixie babies who were put to bed at night inside the cozy folded satin cups. Not even religious authorities ignored the tulip. According to Hone's "Everyday Book," which is a saints' floral dictionary, the Anglican Church dedicated *Tulipa gesneriana* to St. Philip for his feast day on May 1st, and the Clarimond Tulip, *Tulipa praecox*, went to St. Mark for that saint's feast day on April 25th.

Tulips flourished as artistic inspiration for designers of pottery, metal work and embroidery. Tulips were used symbolically in most Dutch and Persian art. But the tulip really came into its own as an erotic form

during the Art Nouveau period. Artists of this era were especially attracted to any object with sensuous lines. They embraced the tulip as their very own. It turned up in dozens of ways, both creative and commercial: lamp shades, vases, bowls, candlesticks, book illustrations, frames, textiles, prints.

And now we come to the present, the best part, for tulips have lost none of their beauty. To the contrary, thanks to the hard work of hybridizers and growers, tulips now come in so many dazzling color combinations, shapes and sizes that were those passionate Sultans to return to earth, they would no doubt decree a year-long "Feast of the Tulips," with each day dedicated to a different tulip and maiden. But lucky us. We can have our private Garden of Delights right in our own backyard by simply planting these luscious bulbs. Our harems may have dwindled to a precious few, but let's be grateful that the magnificent tulips have multiplied to gratify our eternal craving for beauty.

To enjoy the beauty of tulips in your garden next spring, you must plant them this fall. They require the cold of winter to develop good root systems. So start planning now which varieties you prefer and how many you'll need, and place your order early so you're sure of getting what you want. Stroll around your garden. Visualize where a bed of colorful tulips would look best. It needn't be a large area. Even just a couple of dozen tulips add a vivid touch to the garden. Choose a well-drained soil, follow proper planting directions, and then just sit back and await your own private "Feast of the Tulips." Of one thing you can be certain: whatever the size or location of the area you set aside for tulips, there are varieties that will be just ideal for it. The many kinds, sizes and colors available make possible this assurance.

Carla Wallach is author of: *Gardening in the City*, *The Reluctant Weekend Gardener*, and *Interior Decoration with Plants*.

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Except for the higher mountains, southern New Mexico is desert. The average annual precipitation decreases slightly from east to west. In the south central portion, the average rainfall is 8.01 inches with extremes of 2.9 inches to 19.6 inches. The precipitation usually comes in the winter and summer seasons. Winter precipitation often falls as slow, penetrating rains or snow, while summer rain accounts for slightly over half of the annual total. Often it comes as violent, localized thunderstorms with considerable run-off.

New Mexico is considered to be in Hardiness Zone 7 (average minimum temperature 10°F) but occasionally it has temperatures near 0°F. Summer temperatures can go as high as 105°F but generally are in the low to mid 90's, particularly after the summer rains begin.

Soil problems are generally salt-related. Insufficient rain does not leach the naturally occurring and fertilizer salts from the root zone. Irrigation waters generally contribute additional quantities. Leaching with copious amounts of water is a partial solution, providing drainage and water quality are satisfactory. Omit manures in your maintenance program. Mulches are valuable additions to a desert garden, and good drainage is essential.

In transplanting, overwatering causes considerable native plant losses. Many cannot be successfully moved, and should be grown in con-



Desert marigold and verbena

tainers. Fall planting produces better results of survival and future show.

In such a seemingly hostile environment, one would expect to find very little plant life—perhaps an occasional cactus, yucca or creosote bush. We do have many of these, but other plants survive in the desert as well. Many plants are well adapted by various means to this environment and are common

throughout the area. Others, that seem to require a bit more water, have found their niche here and thrive. It is some of the latter that we would like to mention as possibilities for growing in areas with greater rainfall.

The Desert Willow (*Chilopsis linearis*) is not a willow but a member of the Bignoniaceae. It normally grows as a large shrub or small multi-trunked tree to about 15 feet.

Some grown in local gardens, where they receive supplemental water and pruning, have developed into beautiful trees up to 25 feet tall. The catalpa-like flowers are produced most of the summer. They are about 1½ inches long and 1 inch across, white with the lip and throat streaked or spotted with pink or purple. This deciduous tree has long, narrow leaves that resemble willows, thus giving it its common name. It ranges from western Texas to southern Nevada, and is also found in California and northern Mexico, mostly along arroyos.

An arroyo is a wash or stream bed that is dry most of the time. After a rain, it will carry run-off for a few minutes to a few hours, depending on the amount and extent of the rain. Often, an arroyo will carry water to an area receiving little rainfall, thus enabling plant life to survive.

Another interesting riparian plant is the Apache Plume (*Fallugia paradoxa*) of the Rosaceae. It forms a much branched, somewhat straggling shrub to 7 feet. A bit of pruning improves the shape. An infusion of the small, more or less evergreen, pinnately divided leaves is used by the Hopi Indians as a stimulant to hair growth. We make no claims as to the efficacy of the treatment. The charm of this plant is in its flowers and seed. The one-inch "wild rose" flowers appear abundantly in spring and sparingly throughout the remainder of the growing season. These are followed by clusters of seed with long, purplish, plumose persistent styles, strikingly similar to clematis in fruit. The plant appears to be covered with down after heavy flowering. It grows from southern Colorado to western Texas, and in southeastern California and northern Mexico.

The Bird of Paradise (*Caesalpinia gilliesii*, not *Strelitzia reginae*) was introduced from South America but has adapted so well that we often think of it as a native. This deciduous shrub to 10 feet is widely

planted as an ornamental in the Southwest and has escaped cultivation and become naturalized in places. The large, bipinnate leaves with many small leaflets give the plant a delicate appearance. The spectacular flowers are produced in large terminal clusters, each flower being about 2 inches across with yellow petals and 4-inch long, bright red pistil and stamens. There are two minor drawbacks with this plant. One is that the bruised leaves and the sticky, glandular flower buds and seed pods are ill-smelling.



Aster tanacetifolius

The other is its ability to reseed itself. When the pod matures and dries, it springs open with an audible snap, throwing the seed some distance from the parent plant. This can be prevented by snipping off the spent flower heads before the pods mature. In extremely cold winters, the plant may be killed back to the ground, but it will usually produce rapid new growth from the base and flower on the new shoots. Often, a

compact, more attractive plant results from severe pruning before growth begins in the spring.

One of the favorite herbaceous plants in this area is the Desert Marigold (*Baileya multiradiata*). It generally grows in sandy areas with little or no run-off from heavy rains and where evaporation from the soil is minimal. It also thrives where the run-off from even light showers adds considerable moisture to the soil. The low, silvery, wooly plants produce the 1½-inch bright golden-yellow flower heads on long stems most of the summer. This plant grows in favorable spots throughout most of the Southwest.

There are many species of aster throughout the Southwest. Some are annuals, others biennials, and still others perennial herbs. The ¾-inch to 1-inch flower heads are produced in great numbers on plants up to 2 inches tall in late summer and fall. Colors range from several shades of blue through lilac and lavender to purple and violet. Asters grow in the same situation as the Desert Marigold, and in favorable years the roadsides are quite colorful when they are in bloom.

Of the many species of *Penstemon* in the Southwest, one, *Penstemon ambiguus*, seems to have been completely overlooked by horticulturists. Unfortunately, it has no common name. It is an herbaceous, or slightly woody, densely branched perennial, forming hemispherical mounds to 18 inches in older plants. This plant grows from Kansas and Texas to Nevada and northern Arizona. Like the aster and desert marigold, it is generally found in sandy areas or along roadsides. The ½-inch wide flowers are a delicate pink and cover the plant most of the summer.

These are but a few of the many interesting and colorful plants from the deserts of New Mexico and the Southwest. All grow in full sun. They are tolerant of, or require alkaline soil, and thrive with little water. We think all have potential as horticultural subjects.

Screening Vines on Walls and Buildings

J. Robert Nuss

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There are a variety of vines that can be planted to aid in the screening of walls and buildings. However, it should be kept in mind that one can never totally obscure an object or view with plant materials. When the plant growth becomes dense or massive enough to completely block out the problem it is often large and unsightly. This in itself is a problem. It is more effective to think in terms of using plant materials to soften and modify the landscape. When using vines on walls and buildings consider their value in reducing the harshness or massiveness of the structure. When used properly, vines should complement and not dominate the landscape.

When vines are considered as screening plants for a wall or building, one should understand how a given plant climbs a structure. To function as a screen the plant should be able to hold itself in place. There are three basic mechanisms by which vines attach themselves to a surface. Some vines send out rootlets, discs or similar holdfasts which attach the plant stem directly to the surface. Their support mechanisms have amazing tenacity, and they are often so strong that they remain on the surface when the vine is removed. Plants in this group include



Campsis radicans—common trumpet creeper

Campsis species (Trumpet Creeper), *Euonymus fortunei* varieties (Wintercreeper), *Hedera* species (Ivy), *Hydrangea anomala petiolaris* (Climbing Hydrangea), and *Parthenocissus tricuspidata* (Japanese Creeper).

Other vines bear tendrils or small threadlike stems that twist around objects, attaching to them and enabling the plant to climb. Some tendrils are petioles of the leaf, others are a continuation of the leaf

and some are independent parts of the plant. With this group of plants, trellises or similar structures have to be provided on which the plants can climb since they are unable to attach directly to a smooth surface. Plants in this group include *Ampelopsis* species and *Clematis* species (Clematis).

A third group of vines use twining stems which encircle a support, winding round and round it until a

fast hold is obtained. Supports for twining plants should not be so thick that the stems are unable to coil around them, but they should be strong enough to support the total plant. Plants in this group will not adhere to the support surface. Some examples are *Akebia quinata* (Fiveleaf Akebia), *Celastrus* species (Bittersweet), *Lonicera* species (Honeysuckle), and *Wisteria* species (Wisteria).

Proper selection of vines for the garden will be governed to a large extent on the size of the area to be softened and the composition of the structure: wood, stone, brick, etc. It is advisable to match the heavier, coarse textured vines with the larger structures. This is important for aesthetics as well as the structure's ability to physically support the plant growth. Smaller, more graceful vines are suited to lighter structures and smaller areas. Keep in mind that in time even the smaller vines can develop considerable stem growth and weight. All vines will require periodic maintenance for optimum effect in the garden.

The composition of the building or wall is an important consideration in making a final vine selection. Vines that attach directly to the surface are better suited to stone, brick, or similar materials. The holdfasts used by this group can damage most non-stone type sidings like wood, vinyl and aluminum. With vines that need a support to climb, air space should be provided between the vine and surface. Otherwise the dense foliage layer may retain enough moisture against the surface to promote decomposition of the wall or building.

It is advisable to select vines that supply seasonal periods of interest. The appearance of an attractive flower or fruit crop on the vine will add aesthetic value to the landscape. Some vines with attractive flowers include *Campsis* species (Trumpet Creeper), *Clematis* species (Clematis), *Lonicera* species (Honeysuckle), *Hydrangea anomala petiolaris* (Climbing Hydrangea) and

Wisteria species (Wisteria).

Colorful and interesting fruit can add an extra touch in the fall. There are a variety of fruit types ranging from rounded berry-like, to plumed, to elongated pods depending upon the specific vine. Vines with colorful fruit include *Ampelopsis brevipedunculata* (Porcelain Ampelopsis), *Celastrus* species (Bittersweet), *Clematis* (most species) (Clematis), *Euonymus fortunei vegetus* (Bigleaf Wintercreeper), *Parthenocissus* species (Virginia and Japanese Creeper) and *Wisteria* species (Wisteria).

One factor of concern in the selection of a vine for cover is its potential growth rate. Where fast cover is needed it will be important to consider those species with the greatest potential. Keep in mind, however, that some of the fast growing vines may not be the most attractive or appropriate for structure coverings. Site and environmental conditions where the vine will be grown will also affect its growth rate.

For comparison, the approximate yearly growth rates of the following vines may be helpful in selecting one suited to your needs.

- Akebia quinata* (Fiveleaf Akebia) 3'-15'
- Ampelopsis brevipedunculata* (Porcelain Ampelopsis) 15'-20'
- Campsis radicans* (Trumpet creeper) 10'
- Celastrus orbiculatus* (Oriental Bittersweet) 14'
- Clematis montana rubens* (Pink Anemone Clematis) 6'-10'
- Clematis paniculata* (Sweet Autumn Clematis) 15'
- Hedera helix* (English Ivy) 4'-8'
- Lonicera japonica* 'Halliana' (Hall's Japanese Honeysuckle) 18'-20'
- Parthenocissus quinquefolia* (Virginia Creeper) 6'-10'
- Wisteria floribunda* (Japanese Wisteria) 5'-7'

This short list is by no means complete, but it does serve to indicate the range in potential growth rates among some vines. The Akebia may only grow 3' a season while something as aggressive as Hall's

Japanese Honeysuckle may develop stems 20' in length and go to the top of a tree in a single season. Growth rate may also serve as a guideline on the potential maintenance problems associated with the type of vine. For the smaller and more confined garden setting it may be well to consider a slow developing vine even if a special support must be prepared to hold its growth.

One factor governing a vine's growth rate is the quality of the planting site. Vines like other plants will respond to optimum site conditions.

Since vines are generally planted with the idea of rapid cover and development it is important to supply all the necessary factors needed for good growth and development. If the soil at the planting site is compacted or physically poor it should be worked up to a depth of 15 to 18 inches to allow for root penetration. When preparing the area make it large enough for the roots to spread. Keep in mind that a plant's root system is often equal to its top in volume.

Also during the bed preparation, the addition of decomposed organic matter will greatly improve the physical quality of the site. The total quantity to be used depends upon the quality of the soil; however, 3 to 4 bushels of organic matter per 100 square feet of bed is a good starting point. Organic matter is effective in improving minor drainage problems as well. However, if the entire area is poorly drained you may have to consider a more extensive drainage system to dry the soil and improve water movement.

In addition to the organic matter, you should also consider the incorporation of any needed lime and/or fertilizer before actually setting the plants. A soil test of the area will give you a clear picture of the nutrient content.

If the site is dry, the added organic matter will also be effective in moisture retention within the soil. In addition, a dense layer of suitable

A Model for Corporate Landscaping

Joan Jones
Basking Ridge, NJ 07920

Like many urban dwellers, America's corporations today are headed for the suburbs. And with fairly predictable results.

Along highways and in small communities, multi-storied, glass-sheathed office buildings (surrounded by flotillas of cars on a sea of asphalt) have become a common scene. All too frequently, landscaping is treated as an afterthought.

Not so in Basking Ridge, New Jersey. As if proving exceptions do exist, this quiet historic community of 5,000 residents has reaped the economic benefits of commercial development without losing its semirural character. For in the midst of rolling hills dotted with old homes, estates, farms and suburban dwellings, its newest corporate resident, the American Telephone and Telegraph Company, has erected an office facility for 3,400 administrative employees, designed specifically to harmonize with the surrounding countryside.

"From the beginning, it was our intent that this structure provide the best possible working environment for our employees while retaining the unspoiled quality of the area," AT&T spokesmen are prompt to point out. Completed in mid-1977, the new facility which supplements AT&T corporate headquarters in New York City, was constructed in efforts to consolidate administrative departments scattered throughout Manhattan's financial district over the years since World War II. Basking Ridge was selected because 70% of the corporate personnel already lived in New Jersey.

Landscaping a new home, as any serious gardner will acknowledge, is a challenge. But, when "home" is a complex covering nearly 2.7 million square feet of offices and garages set on a 140-acre site, landscaping resolves to a fine art.

AT&T's exterior and interior landscaping plans were formulated at the same time the building was being designed. During the height of the design and documentation for the structure, as many as six landscape architects were assigned to the project. "It was truly an exercise in coordination between the building and landscape designers," says Robert Heilig, a landscape architect with

the Kling Partnership of Philadelphia, AT&T's architects. Actual construction was supervised by the 195 Broadway Corp., a subsidiary of AT&T.

Unlike more conventional office buildings, the AT&T complex is horizontal in conformation, with only 4 floors of office space rising above grade level at its highest point. Far from offering long, monotonous perspectives, it is broken into clusters and wings connected by a series of corridors which serve as pedestrian "streets" uniting the interior. Constructed of natural materials, the



building's precast wall panels which have been sandblasted to reveal the aggregate's warm earth tones, are exposed to light and shadow created by overhanging, sloping terra-cotta roofs.

Surrounding and interspersing the building clusters are 14 acres of richly landscaped inner courtyards and terraces which seemingly nestle the complex into the natural contour of the land. Because the terraces and buildings conceal 30 acres of indoor garages, capable of accommodating 3,000 employee and visitor vehicles, not one parked automobile is visible on the site. As seen by those approaching the building through the trees, it has a residential character. This perspective was achieved through careful landscape planning which treated the



complex as having three distinct, yet totally integral, areas.

Natural areas on the periphery of the site were meticulously preserved. Constructed on former farmland, the building is surrounded by meadows and marshland where stately old trees were permitted to dictate the outline of the final structure. Rather than stripping the site, trees were carefully protected, including a 48' white oak which continues to thrive within twenty feet of the building. Others, up to 6" and 9" in diameter, were relocated on the site where excavation was deliberately limited. Land disturbed by construction will be returned to its natural state with plantings of meadowgrass and native wildflowers.

Existing vegetation from the marshland was also transplanted to the bed of a stream flowing near an overpass constructed by AT&T to meter traffic from its 2½ mile interior roadway system onto local streets and Interstate Highway 287 which borders the property. The overpass, faced in Delaware Quarrystone, is enhanced with graceful plantings of native ferns, azaleas and other small shrubs which are dominated by Deodara cedars, destined to reach 40-50 feet.

Closer to the building in the second landscaping area, the natural image is maintained. Rather than planting trees a rigid 50 to 75 feet apart, several species of ash, maple, cherry, willow and oak have been grouped to blend with existing stands of trees. Clusters of evergreens, including Canada hemlock, white pine, Japanese black pine and Serbian spruce form a backdrop for extensive plantings of red twig dogwood, inkberry, winterberry, mountain laurel, viburnum and blueberries, as well as a variety of azaleas, and rhododendron, specifically selected to lend color and interest throughout the year.

Another attractive addition to the natural beauty of the site is Bariatt Pond, a seven-acre settling basin constructed for flood control and surface water runoff. Excavated in the path of an existing stream, it has a dam running across the center which reaches to within one foot of the surface. Water entering the pond drops its heavier particles behind the dam before flowing toward the marshland on the property and into the Passaic River and Osborn Pond.

Beyond Bariatt Pond, the building's terraces form the third, transitional landscaping area. Here the natural planting pattern gives way to more rigid groupings in keeping with, yet softening, the building's geometric outline.

Dogwood, *Sophora* and five varieties of crabapple trees thrive on the terraces, many planted in 10-foot-diameter precast concrete planters located directly over the building's structural columns which furnish support. Fill, ranging from 2½ to 4 feet in depth, supports some of the 25,000 shrubs, 8 varieties of ground covers 39

and hundreds of spring and fall flowering bulbs to be found both on the terraces and the grounds. Throughout the property, AT&T has planted a total of over 1,000 trees in 47 varieties. Softly lighted walkways, seating benches and picnic tables line the terraces and inner courtyards which are totally accessible to those inside the building and are often enjoyed during a noonday respite. Most are pierced by light wells which penetrate into the indoor parking garages beneath, ushering in natural light. Here honey locusts, some up to 10" in diameter and reaching 35-40 feet high when installed, have been planted in order to introduce landscaping into this understorey area and mark the position of elevators leading from the garages to office areas above.

This basic concept of bringing the outdoors inside the building dominates the interior spaces. In the lobby, for example, windows scale two stories providing a panorama of the surrounding countryside. Schefflera trees, many well over 12 feet tall, tower over ferns and other fine leafy plants which surround the lobby's focal point, a 32 foot waterfall. Color accents are provided by abundant chrysanthemums centered in round tables serving each of the lobby's four semi-circular lounges.

While the periphery of the building offers views of the courtyards, terraces, wooded areas and the pond, natu-

ral light is also introduced into the core of the structure through a series of nine skylights. The most dominant of four skylights serving the 40,000-volume corporate library rests over an informal reading area shaded by *Ficus* trees and surrounded by grape ivy.

Natural materials used in the exterior of the building are repeated indoors. Floor tiles used on exterior walkways and pre-cast wall panels with their warm aggregate finish are found throughout the commons area where the cafeteria and grill provide dining facilities for 1,000 people. In the grill, small *Dracaena fragrans* and *Spathiphyllum* rest in stone-lined beds, as though forming an extension with Swiss stone pine and weeping Norway spruce to be found in planters on the grill's terraces which are frequently used for warm weather dining.

AT&T intended to provide the best possible work environment for its employees. At the same time, through its architectural and landscaping design, it has reaffirmed the fact that an office structure can live in harmony with its environment.

While some people may still be reserving their opinions on this building, at least one group has seemingly pronounced its final verdict. For out on Bariatt Pond, within some 500 feet of the building, a flock of Canada geese has tenaciously taken up permanent residence.

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Air Pollution

continued from page 19

symptoms imply tissue injury but not death, while acute injury signifies tissue death. Chronic symptoms usually result from exposure of a plant to low levels of pollution for a long period of time, or occur when a plant is fairly resistant to a pollutant. Acute injury is observed after a short-term high level of pollution, or when a plant is very sensitive. Acute SO₂ injury on conifers usually appears as a reddish-brown discoloration of the needle tip. Depending upon the severity of the fumigation, the discoloration may progress towards the needle base. Bands may appear on the needle when successive fumigations are involved, each band representing a distinct fumigation. Chronic injury may also involve some tipburn, but mainly is observed as a general mottling or yellowing of needles, with premature defoliation of older needles. This premature defoliation may give the crown a sparse, tufted appearance. If a seedling is involved, after repeated assaults the entire plant may become severely dwarfed over a period of time.

On broadleaved species, "classic" SO₂ injury appears as areas of injured tissue located between green veins. The injured tissue may appear yellow, if the damage is light. If the case is severe, however, the interveinal areas will turn ivory to tan as the tissues die. The cells and tissues adjacent to the veins remain alive, yielding the characteristic pattern of green veins and brown interveinal tissue.

Ethylene

Sources.—Ethylene (CH₂=CH₂) has been recognized as an air pollutant for one hundred years. In the early days, the main source of atmospheric contamination by ethylene was leaks of illuminating gas. Vegetation damage was generally restricted to localized areas adjacent to the leak. In recent years the threat to plants from ethylene appears to be more widespread since it is now known that ethylene is emitted from automobile exhaust. Additional ethylene is also released in the burning of nearly any organic substance including agricultural waste, and residential trash. Incomplete gas combustion in greenhouse heaters and CO₂ generators has caused severe ethylene injury to a wide variety of greenhouse crops. The complete combustion of propane, or kerosene, should yield only carbon dioxide and water. However, if the burner is not adjusted properly, large amounts of ethylene can be produced. The fumes are often trapped in the tight, plastic greenhouse and cannot escape. If possible, propane or kerosene greenhouse heaters should always be vented to the outside.

Effects.—Ethylene is also a natural plant hormone, and as such it plays an important role in regulating plant development. This compound appears to play a dominant role in many growth processes, including shoot elongation, fruit ripening and coloration, leaf and flower senescence and abscission, root induction and lateral

growth. Therefore, when ambient levels of ethylene become excessive in polluted air, the above processes are those which are affected. (The effects are sometimes similar to those of certain herbicides.) Thus, symptoms of excess ethylene include: growth reduction, decreased apical dominance, bud abscission, and flower deformities or failure to open properly. Leaf symptoms often include growth abnormalities along with yellowing, death of tissue, and premature abscission. Tomato plants produce a characteristic downward curvature of the petiole, resulting in a condition known as "epinasty." Tomato plants are thus useful indicators of excess ethylene in greenhouses.

This is not a complete treatment of this subject. Other pollutants such as fluorides, are very toxic to gladiolus, iris, and other spring flowering bulbs. Severe injury to entire gladiolus fields has been observed downwind from sources of fluorides, such as aluminum, or glass manufacturing industries. Particulates from cement or lime industries, hydrogen chloride from incineration of PVC plastics, chlorine from leaking swimming pool cylinders, ammonia from spills, etc. all can cause plant damage in localized areas.

If more information is desired, such as tables listing the susceptibility or tolerance of various plants species to air pollution, please write the author for the free, color booklet "Air Pollution and Trees," and lists of useful references.

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Screening Vines

Continued from page 37

mulch over the planting site will greatly improve the moisture content of the soil. Often gardeners overlook the value of mulch when planting vines. It seems they feel the vine will grow and cover fast enough to make mulching unnecessary. Even with vines, the extra moisture in the soil is helpful. Equally important, the mulch will reduce unsightly weed growth, prevent erosion, moderate soil temperatures and improve the appearance of the area until the vine is able to establish and cover.

Once a vine has been planted and established, pruning is its principle cultural requirement. Without periodic pruning most vines become unsightly and overpowering. Vines are best if pruned, thinned and shaped at regular intervals to remove dead or weak wood and suckers. It is beneficial to cut some stems from the center of the vine so that air may circulate freely through the plant. The important point to keep in mind is the necessity for annual pruning to prevent the vine from losing its decorative value and becoming a garden pest.

The choice of a vine will be determined by your specific needs and what you expect the plant to accomplish on the wall or building. The following vine descriptions will serve to point out the varieties commonly available to you.

Akebia quinata (Fiveleaf Akebia) is a native of China and Japan. It is a woody plant with a fine, graceful habit but does need annual attention. The dark green leaves each consist of five small leaflets arranged finger-fashion on purplish petioles.

It grows as a twining stem and can soar to heights of 15 to 20 feet with adequate support. In milder climates the vine is semi-evergreen well into winter. The flowers on Akebia are not too common, but when present they are fragrant, purplish, 1/2 - 1 inch in diameter in loose clusters to 4 inches long in the

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axils of the leaf. Flowering occurs in April to May but fruit is seldom developed.

Akebia prefers a sunny location but will tolerate partial shade. Optimum growth occurs in a rich, light, well-drained loam.

Ampelopsis brevipedunculata (Porcelain Ampelopsis) is native to Northeastern Asia. It is a strong-growing vine with heavy and coarse features. The leaves are bright green, 3-lobed and heart-shaped in outline.

It climbs on supports by twisting tendrils and may go as high as 10 to 20 feet. The plant is deciduous, thus the stems and branching pattern is attractive in winter. The flowers are greenish and inconspicuous. The fruit is ¼ inch in diameter, and bright blue in fall.

Ampelopsis does well in sun or shade, tolerates wind and adapts to a variety of soil types.

Campsis radicans (Trumpet Creeper) is a native of Eastern United States. It has limited use in a small garden because of its heavy, coarse growth. It attaches to structures with aerial rootlets and by twining. Its foliage is dark green and coarse. It is deciduous. Once established the plant may climb to 30 or 40 feet.

Its flowers are attractive from July through September. They are trumpet-shaped, 3 inches long with the tube bright orange and the lip scarlet. The blossoms are borne in clusters of 6 to 12. The fruit is not as interesting but develops as stalked capsules 3 to 5 inches long in fall.

For best growth and flowering *Campsis* should be located in full sun where the soil is rich, moist and well-drained. However, it will tolerate a variety of soil conditions and may escape cultivation.

Euonymus fortunei (Wintercreeper) and its varieties is native to Central and Western China. The plants are shrubby vines with evergreen or semi-evergreen foliage that is ½ - 2 inches long with a rounded shape. It clings tightly by means of rootlike holdfasts. The vine will spread

evenly in a neat mat and completely cover a surface. It will climb as high as 20 feet on a wall.

The flowers of Wintercreeper are inconspicuous whereas the fruit is a small capsule which splits open to expose an orange-ish inner portion. The fruit is present from September until frost.

If planted in a shady location it will not spread as rapidly, yet it adapts well to most sites. Moist, well-drained soil and a sunny location will produce the best growth and cover in the shortest time.

Hedera helix (English Ivy) is native to Europe. Its uses in the landscape are almost unlimited. It climbs by aerial rootlets which allow it to attach easily to most surfaces, or it may be trained over a trellis or similar support to construct specific forms. If allowed to grow on a structure it may climb 50 to 75 feet.

Ivy foliage is dense, dark green and 3- to 5-lobed. The leaf is 2 to 4 inches long and equally wide. The plant is used mainly for its foliage. Only very old and mature plants develop fruit.

English Ivy and its varieties are best suited to shady locations. Too much sun can injure the leaves and retard its development. The site should be cool, with a moist, well-drained soil. Hot, dry locations are not well suited to Ivy.

Hydrangea anomala petiolaris (Climbing Hydrangea) is a climbing vine with root-like holdfasts. It is a native of Japan and is planted for its flowers and attractive foliage. It can climb as high as 50 feet or more but develops heavy woody stems in the process. Its holdfasts may damage wooden supports.

The leaves are a bright green, 2 to 4 inches long and heart-shaped. The white flowers are borne in large flat clusters, 6 to 10 inches across during June and July. Its fruit is not very attractive. The orange-ish colored stems do add interest to the garden in winter months after the foliage drops.

Climbing Hydrangea is slow to establish even when set in a sunny

location with a rich, moist well-drained soil. It will flower only in full sun.

Lonicera japonica 'Halliana' (Hall's Honeysuckle) is a native of Eastern Asia but has escaped cultivation in many parts of this country. It climbs by twining stems and has grown 30 or more feet. It may completely surround trees and shrubs. It is not a plant for small areas.

The leaves of the plant are dark green, 1 to 3 inches long with an oblong shape. They are deciduous but turn a bronzy color in fall as cold weather begins. The flowers are fragrant, tubular, 1-1½ inches long and creamy white from June through September. Its fruit is a black berry.

One reason for its rapid growth and development is its ability to tolerate a variety of site conditions. This Honeysuckle withstands drought, heat, sun or shade and will grow very rapidly if placed in optimum soil and site conditions.

Parthenocissus quinquefolia (Virginia Creeper) is a native vine that climbs by rootlike holdfasts or tendrils that attach directly to its support. It is an open growing plant that sends out slender, drooping side branches. It often climbs to 50 or more feet. In time it forms a dense mat on the structure.

The leaves are palmately compound with 5 coarsely toothed leaflets 3 to 6 inches long. In summer, the leaves are a dull green but become a brilliant scarlet in the fall before dropping.

Flowers of Virginia Creeper are inconspicuous among the foliage. The fruit, however, is ornamental and turns bluish black in the fall. Berries are about ½ inch in diameter on red-stalked clusters which contrast well with the red fall foliage.

The plant adapts well to most sites (even light shade).

If you wish to try climbing plants for use as screens, evaluate your needs and conditions carefully. Then proceed—the proper plant well maintained can turn an eyesore into an area of beauty.


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Books

by Tom Stevenson

GROWING PLANTS INDOORS

by

Dr. J. Lee Taylor

Burgess Publishing Co.
Minneapolis, MN—1977

150 pages, well illustrated
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Dr. Taylor is a professor of horticulture at Michigan State University where he has taught since 1960. His book is a very good one for beginning indoor gardeners and also for most of those who have been growing plants for years.

It starts with basic information on parts and functions of plants and flowers, covers cultural requirements such as lighting, humidity, watering, fertilizing, and the identification and treatment of common plant problems. In addition, there are directions for making and caring for dish gardens, terrariums, and hanging baskets.

For example, the author points out that most houseplants are grown in greenhouses or nurseries where watering, temperature, light and humidity are usually at optimum levels. Taking a plant that was produced under almost ideal conditions and placing it in the atmosphere of most homes, apartments, dormitories, or offices is a great shock. Some plants never survive this move. Others respond by dropping lower leaves and/or flowers (or buds); some die back from the top.

There are several things that indoor gardeners can do (the process is called acclimatization). Even if the plants have received such treatment by the commercial grower, most flowering and foliage plants should be given special care for the first few weeks after purchase.

To help them adjust to low humidity, try to raise the normal level of humidity indoors for a few days to a couple of weeks (one way is by misting them occasionally).

To help new plants adjust to different levels of light intensity, gradually expose them to the levels at which you plan to grow them. If their new home is in a south-facing window, start exposing them to full sunlight for only a half hour or so, early or late in the day. After a few days start increasing the length of exposure until they are receiving full sunlight for the entire day.

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