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an editorial

Horticultural Breadth and Depth

Gardeners are ecologists. The man, woman, or child with a hoe makes his immediate environment better; better to look at, more productive. Gardeners have a creative bent. This plant lover grows nice beds of flowering annuals while his neighbor grows bonsai trees and the lady across the way has assembled a fine collection of potted exotics with which she decorates her home. You are reading this magazine because you fit into that category which the American Horticultural Society intends to serve—advanced amateur gardeners. It is our goal to supply you with reading material that will make you stretch. American gardeners need to expand their ecological range; their creativity needs refining to make it more meaningful. It's no good reading more about marigold germination or taking geranium cuttings. These are amateur techniques. But wait. What about the refinements of marigold breeding; the genetics, cytology, and so on? What about callus formation of cuttings, the chemistry of rooting hormone functions, and other aspects of events in the sequence from cutting to new plant? Don't you wish to know about these things?

American horticulture tends to stay at a fairly superficial level, on the average. You would not believe that if you visited horticultural "hot spots" such as the Pacific Northwest or Lake County, Ohio, or if you attended conventions of the specialty plant societies. Nevertheless, it is true. Year after year one reads in household magazines how to keep the Christmas poinsettia from one season to the next, kalanchoe ditto, and what about that Dieffenbachia that has been dying in tens of thousands of overheated, arid living rooms over America for decades? Let's start a new trend. Let's brighten our environment with a plant we never have seen before. Let's expand our creative palette, adding colors and textures

that are new, at least, new to us.

Have you ever grown *Tricyrtis hirta*? It is a charming little lily-like affair with wide, funnel-shaped, speckled white flowers. It is hardy to -10° F. Seed is listed in the 1973 A.H.S. seed distribution list. Or *Gladiolus tristis*, that delicate, flaired floret species from Natal that has to come indoors over winter in the north but which stays out in southern gardens? It, too, is an A.H.S. offering. Seed lists and specialty catalogs abound in uncommon or unfamiliar species. Let's look into these.

What do you do when somebody hands you a packet of seeds or a living plant of a species you never have grown before? You can't just stick it in somewhere and hope for the best. Better consult a first rate garden encyclopedia—it still is hard to beat L. H. Bailey's *The Standard Cyclopaedia of Horticulture*—and find out about that plant. Sun or shade? Is the best soil humusy or gritty, neutral or acid, moist or fast-draining? What about winter hardiness? The point is, you need to know. And in getting to know, you refine your horticultural expertise.

When each of us polishes his gardening know-how, American horticulture benefits. As we demand something in our seed catalogs beyond forty selections of marigolds, uncommon but desirable ornamentals will be made available. As members of A.H.S. you and I have something to live up to; our Society now owns a beautiful eighteenth century house called Wellington sited on the George Washington River Farm. One of these days that property will be a horticultural mecca. Wasn't it Oscar Wilde who said that he had to live up to his fine porcelain dishes? One of these days we will have to live up to the gardens at the River Farm. Let's put some breadth and depth into American horticulture.—**J. P. B.**

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

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OUR COVER PHOTO—Sun-dappled walks and avenue bordered by broad-crowned live oaks dripping Spanish-moss, these are the key characters of gardens in the deep South. This photograph was taken at Rosedown Plantation.



WEED TREES in the CITY

horticultural derelicts or unsung heroes?

Russell A. Beatty*

Mulberry, green ash, soft maple, box-elder and other weedy species make a jungle among old inner city foundations.

*Assistant Professor, Department of Landscape Architecture, University of California, Berkeley.

**In *Rural Essays*, Andrew Jackson Downing wrote condemningly, "Down with the ailanthus . . . Its blossoms smell so disagreeably that my family are made ill by it . . . The vile tree comes up all over my garden . . . For if the Tartar is not laid violent hands upon, and kept under close watch, even after the spirit has gone out of the old trunk, and the coroner is satisfied that he has come to a violent end—lo, we shall have him upon us tenfold in the shape of suckers innumerable—little Tartars that will beget a new dynasty, and overrun our grounds and gardens again, with mercy . . ."

shrubs grew undisturbed, lower shade-loving plants returned, birds brought in seeds from other gardens and neighborhoods and the whole garden developed into a strange mixture of horticultural "roughnecks". They competed with each other, lived on little nourishment and adapted to the city environment very much like the street gangs of the inner city.

Who are some of these "Dead End Kids" of yesterday's gardens? Of course, the cast varies from region to region, but a few characters stand out clearly. The star (or villain) must surely be the dreaded tree-of-heaven (*Ailanthus altissima*).** Another tree frequently found especially in California is the rugged black locust (*Robinia pseudoacacia*) defying all to climb its thorny limbs. The white poplar (*Populus alba*) sends out its sprout-producing roots searching for water, creating new trees along the way. The less invasive relative, lombardy poplar (*Populus nigra 'Italica'*) occasionally is found. Other frequently found city trees are the silver maple (*Acer saccharinum*), common hackberry (*Celtis occidentalis*), plum seedlings (*Prunus sp.*), and the voracious siberian elm (*Ulmus pumila*). In milder climates such as California we find the black acacia (*Acacia melanoxylon*), blue gum (*Eucalyptus globulus*), silver wattle (*Acacia decurrens 'Dealbata'*) and a number of other imported exotics. Accompanying these trees are a host of shrubs, ground covers and herbaceous plants from the many cote-neasters to periwinkle (*Vinca*), from staghorn sumac (*Rhus typhina*) to acanthus.

These are the weed trees and shrubs. For the most part they are the scourge of the plant world, scorned by horticulturists and nurserymen. These are the bad guys, never to be used by any responsible arborist or landscape architect. Who among us would ever think of planting an ailanthus!

Horticultural research and the nursery industry have advanced greatly in recent years and have produced many fine new trees for landscape design and gardening. Newly developed cultivars of old favorites like the maples, oaks, honey-locusts, lindens,

beech, and ginkgo are highly praised for their outstanding visual and cultural characteristics. The landscape architect has a greatly improved palette of trees in a wide variety of forms and colors from which to select. Their use in new urban plantings along streets, in parks and in plazas is wide spread. These trees are the aristocrats and form today's 'Hit Parade' of trees—sweetgum, tulip tree, red maple, linden, pin oak, scarlet oak and many others. These are the trees that are used to replace the ill-fated American elms* and the undesirable trees that clog sewers, drop limbs and raise pavement.

Horticulturists and landscape architects have been searching for the perfect city tree for decades. The objectives of this search are low maintenance and safety, as well as superb visual characteristics. The tree must have deep roots not subject to invasiveness; strong trunk and limb structure; drought tolerance; hardiness; minimum leaf, fruit and twig litter; tolerance to air pollution; straight trunk and symmetrical form; long-lived; and disease and pest resistance. A SUPER-TREE!

Improved color characteristics and uniformity of size and form are the important visual characteristics sought for. To date three new cultivars of the familiar American sweetgum (*Liquidambar styraciflua*) have been developed in an attempt to achieve variations in fall foliage color and uniformity within each color range. Similarly there are some two hundred species and cultivars of flowering crabapple, varying not only in spring flower color, but also in form and in fruit color and size. The common Norway maple (*Acer platanoides*) can now be found in more than ten different forms.

These remarkable improvements in plant selection have provided the designer and the gardener alike with a great array of superb trees to fit virtually any type of landscape situation. The formerly troublesome lack of uniformity in symmetrical street plantings due to seedling variation is no longer a problem if a selected cultivar exists. A boulevard planting of *Magnolia grandiflora* 'Samuel Sommer' shows predict-

able uniformity of height, form, growth rate, foliage color and flowering characteristics. In the past, the same street planted with the seedling species of bullbay magnolia would exhibit as many variations as there were trees planted, disrupting the desired effect of uniformity.

Time and experience has taught us which trees are more suitable for city conditions than others. Those trees that once raised havoc by lifting curbs and



paving no longer are planted in restricted situations by experienced treemen. As cities and towns have grown, the spaces allotted to trees have diminished. Street widening and lack of foresight and sensitive planning have removed many adequately wide street tree planting areas in most cities. The normal street tree is relegated to a three- or four-foot square cut-out in the sidewalk, or a similarly-sized planting strip squeezed between the sidewalk and the curb. In my own town of Walnut Creek, California there are several street plantings of sweetgum in eighteen inch wide planting strips!

To be sure, this demonstrates bad

A forest of siberian elm seedlings springs up along an abandoned right-of-way. Other invasive species compete and a half-dead copse results. Would careful study turn up a non-seedling, indestructible specimen from this thicket?

*This author has observed that the honey-locust cultivars have been widely planted as the successor to the american elm. Visual similarity between the two is non-existent. The japanese zelkova makes a much better substitute. Why is it not being used more widely?



Something will have to give; the sidewalk, the retaining wall, or, less likely, the volunteer elm. Cut back once, as indicated by multiple trunks, it apparently is there to stay.

planning and the lack of commitment toward the value of street trees by many of our planners and politicians. This we must fight in every possible way. Nevertheless the urban tree of today has demands placed upon it that tend to prohibit the use of so-called undesirable species. We are attempting to plant trees in situations never dreamed of fifty or a hundred years ago. The conflicts of use and the demands for improved aesthetic and horticultural characteristics have eliminated many of the trees formerly used in great numbers.

Among those trees that have been black-listed are the weed trees we find in the old, neglected sections of our cities. Neglected and forgotten, they nevertheless persist. Many are not native, but have naturalized. While we have been busy developing and using elite new trees, these derelicts have been vigorously reproducing and have persisted against all odds in the most hostile areas of our urban environments. Drought, smoke, dust, heat and a host of other adversities seem to nourish these trees rather than discourage them.

A unique paradox begins to emerge. The plant climate of our cities has grown steadily worse. Drought, heat build-up, increased run-off due to more paving, wind channeling, decreased humidity, air pollution and smaller, more restrictive planting areas are the common characteristics found in city centers today. These environmental extremes are detrimental to many of the favored trees used now. Yet these conditions are the very conditions that the weed trees seem to thrive on. Can it be that these rejects of the past can have a useful place in our urban lives?

While I do not advocate planting the entire city with weed trees, I do advocate reconsidering the use of weed trees for certain situations. We know that most of these horticultural rejects are inappropriate to use as street trees or as major trees in plazas, on roof gardens or in small parks. But where and how can these trees be used?

Too often municipalities think of urban trees only as street trees or shade

trees in parks. This attitude necessarily limits their choices. It also unnecessarily limits other types of tree planting. If we were to assess critically the visual and ecological needs of a typical city, we could find a whole new range of planting needs that the outcast weed trees could serve. These areas are what Litton calls "the ordinary landscape". They might include vacant lots, industrial areas, drainage channels, bits of left-over land in shopping areas, certain types of parking lots, and perhaps children's play areas where little else can grow. In other words, we should look beyond the street tree and refined plantings to another hierarchy of planting needs that has fewer maintenance and horticultural conflicts. These areas have great environmental stresses and should be as maintenance free as possible. These pieces of ordinary landscape are like the neglected backyard. These are the areas where the weed trees are at home and can serve to bring a measure of amenity to otherwise ugly and unhealthy landscapes.

For example, let's take the typical urban schoolyard—vast stretches of monotonous asphalt desert, absolutely treeless and visually sterile. School districts typically are unwilling to integrate shade trees into the play environment. Those attempts that have been made frequently fail because of lack of maintenance or adequate cultural conditions for the trees planted (usually "desirable" trees). Why not plant selected weed trees? Better yet, have the students take on the project as a part of their studies and engage a landscape architect or horticulturist to assist in the design decisions to determine where the trees can be most effectively used. Perhaps there are a number of large areas of asphalt not intensively used that could be sacrificed to planting clumps or masses of trees. Or perhaps areas between activity courts could be utilized for rows of individual trees simply planted in holes in the asphalt. Student participation tends to engender success of planting merely by a sort of pride of ownership.

Similar situations exist in industrial areas of many cities. Huge tracts of

land are given over to vast seas of parked cars. In summer the cars bake all day in the sun, adding unnecessary discomfort to the tired workers at quitting time. Extensive plantings of Kentucky coffeetree or hackberry, for example, could be accomplished with little loss of useable space. As little as four to eight square feet per tree could be sacrificed with a resulting benefit far exceeding the relatively minor initial costs. If the trees are grown from seed in small cut-outs in the asphalt protected by steel bollards, the trees could conceivably survive with little further maintenance except for weed control.

Experiments in the direct seeding of woody plants conducted at the University of California have shown that amazing tree growth can be achieved in impossible planting situations. Black locust seeded in compacted fill earth along a freeway in the hot San Joaquin Valley have grown as much as three feet in the first year, with less than ten inches of rainfall and no additional maintenance. This low cost method of planting is particularly well adapted to more arid climates where weed control is not as great a problem as in areas with significant summer rainfall. Even there, easier weed control may be made possible by using selected pre-emergent herbicides applied after the seedling tree has emerged and hardened.

Industrial areas, airports, and warehouse facilities tend to have strips of unused land suitable for planting weed trees. Poplar trees, ailanthus, silver maple and, in California, eucalyptus trees are large-scaled trees that can greatly improve the appearance as well as the ecological conditions of such sites.

Utility easements where trees would not interfere, abandoned railroad rights-of-way, and other similar strips of land could be planted with various weed trees. These could be treated as "urban airbreaks" similar to rural windbreaks or shelterbelts for the purpose of filtering the sooty urban air as well as screening unsightly urban scenes. These buffer zones would be particularly important in cities where residential housing is adjacent to in-

dustrial sites or railroad lines. The environment would be greatly improved for both traveler and inhabitant alike. Obviously sterile or non-seeding forms of weed trees should be used near railroads. Railroad companies have spent fortunes fighting invasive species such as the ailanthus.

If our cities are to be made more livable, more trees and green areas are certainly one of the most important ingredients. The day of building large city parks planted with fine shade trees is long gone. We must look for alternative means to incorporate trees into the fabric of the city. All that is left in most cases are these rough sites—the asphalt school yard, parking lots, utility easements, vacant lots and leftover bits of land. Both private and public agencies should be encouraged to consider the planting of such areas.

At the same time, horticultural research should be encouraged to look at the weed trees as candidates for new cultivars. Instead of being so concerned with the search for a white marigold, let's offer \$10,000 to the person who discovers a sterile ailanthus. Imagine the possibilities of a non-seeding selection of tree-of-heaven.* Other possibilities for improvement are box-elder, catalpa, black locust and white poplar, to name a few.

In this day of surging environmental concern, we need to do all we can to reinvigorate our cities. As horticulturists, landscape architects and gardeners, we have much to contribute to the improvement of our cities through the creative use of plant materials. I do not advocate sprinkling greenery all over the city, but I do advocate planting where necessary and possible in rational yet imaginative ways. We need more trees in cities, along streets, in plazas, on roofs and in gardens. Clearly there are these other possibilities to use the ordinary trees in the ordinary landscape.

A weed has been variously defined as a plant out of place or a plant whose virtues have yet to be discovered. Weed trees are weeds only if they are in conflict with our needs. They just might be the unsung heroes of our cities. ☼

* The male-flowering *Ailanthus*, while not sterile, sets no seeds. Ed

Gulf Coast Gardening Notes from The Garden Show, WYES TV

Mrs. Lucius Mirabeau Lamar



“Hidden-lily”

From Malaya, an exotic member of the ginger family has come to New Orleans gardens. The plant, known commonly as “hidden-lily” is *Curcuma petiolata*; its relatives include species that supply ginger, East Indian arrowroot, and tumeric, so valuable as a stimulant, a dye-stuff, and a condiment. *Curcuma petiolata* is purely ornamental.

In subtropical gardens this plant thrives in high humus soils in partial shade. An evergreen plant in the tropics, in New Orleans foliage fades in late summer to gradually die back, and new leaves appear the following spring. When these leaves are parted in June the unusual flower spikes are exposed.

Flower spikes are about six inches long; the flower bracts vary from pale to dark green, or, in select strains, are pale lavender. Sterile bracts are deep violet to purple. The flowers, almost invisible as they are buried deep within the enclosing bracts, are pale yellow. Flower spikes of *Curcuma* make up into exotic arrangements.

The plants are quite ornamental; from tough rhizomes clusters of four to six leaves arise. The leaf consists of a glossy blade, pale beneath, about eight inches long, and borne on a twelve-inch petiole. Clumps of this bold foliage supply a strong accent to the planting. In a large garden *Curcuma* might be used as a sort of ground cover. In the small garden or court yard each clump becomes an important specimen.

Northern gardeners may use *Curcuma petiolata* as an ornamental in a small tub or large pot. Pot up in a mixture of two parts damp brown peat, one part loam and one-half part fine sand. *Curcuma* roots are easily damaged and are touchy about drainage. Reset plants in early spring, shaking much of the old soil from the rhizomes. To insure good drainage, fill the bottom third of your container with broken crock. Water plants sufficiently to keep soil from drying out, but the soil should never be soggy. Over winter in a quite warm, bright room.



Crinums

The crinums, relatives of amaryllises and hippeastrums, are among my favorite bulbous plants. I particularly enjoy growing *Crinum amabile* for its grandiose flowers. As many as twenty buds develop on a three-foot scape. Several flowers open at once, making a grand display. I cut a head of flowers with a short piece of the scape, mount it in a needle holder and center the flowers in an antique white tureen. The flowers arrange themselves most gracefully. As each blossom fades I snip it off and another bud opens. The flowers give off a delightful lingering perfume. The flowers of *C. amabile* are white with maroon to pink markings within the funnel, the outside being rosy pink to maroon.

There are more than one hundred species of crinums, natives of the warmer parts of the world, especially near coastal water. Hardy species need rich soil in a sheltered south border with plenty of drainage. The large bulbs may have long necks (the neck of *C. amabile* is about twelve inches long). We plant these in the garden in late May so they may become fully established before winter. It is a good idea to mulch bulbs deeply over winter.

Northern gardeners may have some success setting out crinums when danger of frost is past, lifting the bulbs to be stored like the Peruvian-daffodil over winter. Or grow them in a large pot or in a tub. Mix clumpy bits of composted sod, coarse brown peat screenings and wood charcoal for a fast draining unusually coarse potting mixture.



Liriope and Others

Ground cover and carpeting plants for bedding and for edging shrubberies are important in New Orleans gardens. Among the best are various forms of lily-turf. These have grass-like to strap-shaped leaves, usually leathery, in dense clumps. Plants may be only a few inches high or may send up longer leaves that form foot-high mounds with flower spikes standing well above the foliage. The flowers are tiny almost globular affairs, white, lavender, or purple. They may be densely crowded on the spike or sparse. The flowers are secondary to the year-round foliage. Leaves of lily-turf may be dark green, banded, or striped white or yellow. The variegated forms are especially valuable in dark, shady plantings though lily-turf thrives in full sun as well as dense shade. Considerable confusion occurs with these lily relatives; two genera share the common name of lily-turf. Species of *Liriope* and of *Ophiopogon* are very difficult to distinguish.



The strawberry-begonia, neither a strawberry or a begonia, is at home well into north temperate gardens. But it makes an especially fine display in coastal areas adjacent the Gulf. Once widely known as *Saxifraga sarmentosa*, today this plant is classified as *Saxifraga stolonifera*. Mother-of-thousands is a very nice common name for a plant as prolific as this is. With slightly hairy, round, scalloped leaves up to four inches across, the plant is showy. The dark green leaves are veined whitish above and are reddish on the under surface. From the crown come long runners bearing small plantlets, strawberry-fashion. In light shade, in moist, rich soil, the plants soon create a dense, low mat with a dappled appearance.

A special bonus are the flowers. These are born on wiry spikes to two feet. Each flower is about an inch wide, with two long petals and three shorter ones. The flowers float like small moths over the bed of foliage.

Other favorite southern ground cover plants include ajugas of various kinds, both green and variegated leaf forms of *Vinca major* (a bold, more vigorous version of the *Vinca minor* common in northern gardens), and woody plants such as the Confederate jasmine, *Trachelospermum jasminoides* 'Minima'. Botanically, the latter plant often is called Chinese star-jasmine, a name that has never been popularized in

southern gardens. From April to July fragrant, starry white flowers in small clusters spangle the rich green foliage. The type species is a favorite climber; the 'Minima' cultivar, with very small leaves, is more suitable for ground cover use.



Anemones and Ranunculus

Late winter and early spring visitors to New Orleans always are impressed by the drifts of brilliantly colored anemones and ranunculus bedded throughout the city. We treat these as annuals; some growers suggest planting the tuberous roots from mid- to late October, others recommend planting in November. I planted mine in mid-October last year; in February they were up and the foliage was covered with sleet and snow during an unexpected wintery storm. In March they bloomed beautifully, though not as well as in non-sleet years. I like to use these in my annual display beds; when they have finished the plants, roots and all, are discarded to make room for the summer-flowering annual plants. ☞

MAPLES OF JAPAN



J. D. Vertrees*

What does the term "Japanese maple" bring to your mind? Is it a tree about twenty feet tall of delicate limb and twig structure, small leaves five to seven pointed, nice gold color in the fall, but clear green in the summer? Or perhaps the tree has red leaves? Or is it a rather small, gracefully drooping tree with fantastically divided lace-like leaves, a beautiful red? Or are these green? Perhaps the tree is more upright with flaming red fall colors. Or, once more, are the leaves crinkled or puckered on a short shrubby tree?

Leaves mottled cream and pink—or how about finger-like leaves, one-half inch wide like a strap?

All of these are types of the desirable Japanese maple. Very few nonflowering trees have as many variations as does this one species of maple. It is certainly prone to seedling variation, for growers over the past decades have given us over two hundred named cultivars.

To begin with, we should spend a moment on nomenclature. I have described above some of the varieties of *Acer palmatum*, which is

*Mr. Vertrees, an Oregon expert on oriental *Acer* species, does not sell Japanese Maples. For plants, refer to catalogs of specialty nurseries.

Left below: *Acer palmatum* 'Dissectum Crimson Queen' fall tones. Below: *Acer palmatum* 'Corallinum' (synonyms 'Sango Kako', 'Senkaki'). Right: *Acer palmatum* 'Shishigashira'. Right center: *Acer palmatum* 'Butterfly'. Right below: *Acer palmatum* 'Hogryaku' fall color.



Photos by author.

commonly called Japanese maple in the nursery trade. This is misleading, in a way, for there are about two dozen species of maple, *Acer*, that occur naturally in Japan.

Nurseries also include *Acer japonicum* in the common term. It, too, has several named types, or cultivars, that are commonly sold. I will deal mainly in this discussion with *Acer palmatum*, slightly with *Acer japonicum*, and almost not at all with other equally interesting maples sold sometimes under the lump term Japanese maples.

Historically, *A. palmatum* varieties have been in cultivation a very long time. Carl Thunberg of Sweden described the species botanically in 1783. One Japanese author writes that the culture of *A. palmatum* began in the Tokugawa era about 1650 A.D. Certainly, since that time, the Japanese enthusiasts have been selecting leaf forms with discerning taste. How many accepted named forms now exist may not really be known, but a listing will show over 200 varieties, forms, and cultivars.

Synonymy abounds in this group of plants. As the Japanese-named new forms were introduced in the early days into Europe, then later into America, it can be seen how the names would become altered. Often this led to a "new variety" epithet which actually was a synonym. Several maple enthusiasts are attempting to untangle the duplicity of names. New cultivars, though, are being named every year here in the United States, as well as Europe and Japan.

The typical Japanese maple, *A. palmatum*, has green leaves, two to four-inches across, with five or seven-pointed lobes. The tree matures usually at twenty to twenty-five feet high. The delicate branches, twiggy, are mainly upright growing. A second common form, *A. palmatum*, 'Atropurpureum', differs only in having red leaves, which usually turn a greenish, or bronze-green later in the summer. The good named red cultivars probably have been selected from this variant. Both the type species and *A. palmatum* 'Atropurpureum' color well in the fall after sharp frosts. These two sorts

usually are selected from seedling grown young stock, and are the most prevalent nursery-grown Japanese maples.

Following closely in popularity are the cultivars probably derived from *A. palmatum* 'Dissectum', also called laceleafs. These are graceful, weeping forms. Old trees are perhaps eight feet high with possibly a fifteen-foot spread. The leaves are much divided nearly to the base (pinnatifid), lacy and green. These usually turn a rich yellow in the fall. There is also the red form, *A. palmatum* 'Dissectum Purpureum' that turns greenish in midsummer. From these, then, probably come many named selections.

'Ever-red' has long been a good selection of a red laceleaf form. It holds its red color longer than seedling forms, but tends to turn bronze in midsummer. A newer selection from the east coast, 'Crimson Queen' is a more brilliant red cultivar which holds its color through the summer. There are a dozen or more other named varieties of *A. palmatum* 'Dissectum'. One very noteworthy green form is 'Waterfall'. A great thrill for me was to stand by the original 'Waterfall', a magnificent specimen tree, located at the Willowood Arboretum at Gladstone, New Jersey. Dr. Benjamin Blackburn graciously showing us around the Arboretum, told us of the discovery of this cultivar, and of its description and naming by a leading authority on Japanese maples, Mr. Henry Hohman, of Kingsville Nursery.

There also are variegated leaf forms of laceleaf Japanese maples,

as well as other leaf forms not quite as divided as the common laceleaf.

The upright, stronger-growing, red leaf selections are always popular; to name a few, out of dozens, 'Bloodgood', 'Burgundy Lace', 'Oshio Beni', 'Sanguineum', 'Sherwood Flame' and 'Trompenburg'. These are thought to be selections from *A. palmatum* 'Atropurpureum'. They differ from each other in having varying degrees of color, from orange red ('Oshio-Beni') to a black-red, or maroon ('Bloodgood'), and indentation of edges ('Sherwood Flame', 'Burgundy Lace'). In full sun, the red forms often develop a bronzy hue in mid to late summer.

One of the most colorful in the fall is 'Osakazuki' (you will find this spelled several ways). This cultivar is notable for intense scarlet tones of the fairly large, lobed leaves. It is an upright form, somewhat spreading, but not a large tree.

Variegated forms in the uprights all present a delicate, lacy appearance and outline. 'Versicolor' (has several names) and 'Asahi-juru' both have green leaves with "breaks" of white or pink, or both. 'Sagara nishiki' has a more mottled spotting of cream or pale yellow. 'Roseo-marginatum' has leaves slightly crinkled, with white and pink markings blended with the green. With a little age, this is a very twiggy and lacy-appearing upright tree.

'Corallinum' (synonyms 'Sango Kaku', 'Senkaki') is becoming quite popular. The outstanding feature is the coral-red color of twigs and small limbs in winter time; a fine addition to deciduous plantings for color accent. The small leaves are

light green in the fall then turn a beautiful gold, often with red edging. Quite a desirable tree.

Another outstanding group includes the so-called finger-leaf forms. The leaves of these are divided into strap-like lobes, each finger being about one-half inch wide. 'Scolopendrifolium', 'Linearelobum', 'Filiferum' and others are green forms. A typical red is 'Atrolinere', Japanese name 'Akashime-no-uchi'. New introductions include red forms, such as 'Villa Taranto', developed in Italy, and 'Red Pygmy', developed in Holland. These trees are not as strong and large as those of the 'Atropurpureum' group, but not weeping, as in the 'Dissectum' cultivars.

Almost in a class by itself is 'Shishi-gashira' ('Cristata'). Usually a dwarf, slow-growing, shrubby tree, it occasionally will send out a strong shoot, and then revert to typical short node growth. The leaves are much wrinkled, crinkled, almost puckered; a beautiful green, often with reddish edge. In the fall they turn golden blended with red tones. This is highly desirable for a specimen plant.

'Reticulatum' is a shorter-growing upright form with striking foliage, when planted in part shade. The green leaves exhibit light yellow color in the areas between veins. In some cases, the leaves appear to have "windows" of almost clear tissue.

'Sessilifolium' ('Koshimino') is completely different. An upright grower, the leaves are three to five-divided, each lobe being a separate "feather". Coming from a common

base, on very short petioles, the whole appearance is quite different from any other form in cultivation.

A cultivar that never fails to attract attention is 'Butterfly'. This small upright form has irregular little leaves that are toothed, or notched. The base color is deep green, almost with a blue cast in some lights. The edges are cream colored with a pink tinge. In fall, the white edges become crimson. This is a most striking and delicate appearing little tree, and is unfortunately quite rare.

'Hogyuko' also is worth special comment. The pale green leaves, with lobes recurved downward, give a general appearance of a wavy pattern. In fall the leaves turn a very rich orange.

Always in demand, 'Crispum' ('Okushimo') presents an unusually shaped tree. An upright grower with erect branches making a vase shaped outline, the branches are quite twiggy, and broom-like. Edges of the tiny leaves are rolled inward, involute, and each leaf has a sharp, five-pointed star shape. The pleasant green of summer turns to a rich gold in fall. Inexperienced growers of some of these unusual leaf forms should note that often the spring flush of new growth may not have the character of the named form. Often new growth has foliage resembling the normal *A. palmatum*. Slower-growing twigs, but particularly two-year-old and older wood, carries the character for which a cultivar is named. Many of the variegated and linearelobum forms have palmate leaves on the new flush growth.

Acer japonicum also has

yielded some very desirable cultivars. The normal *A. japonicum* is a small tree, maturing at about twenty-five feet, round topped, and with twigs coarser than *A. palmatum*. The leaves have seven to eleven lobes with a round outline, similar to those of our northwestern vine maple, *A. circinatum*, which belongs to the same series. *A. japonicum* also is seedling grown for nursery stock. This species has a good yellow fall coloration.

Grafted sorts of *A. japonicum* show great variation. One of the most outstanding is the famous fern leaf maple, *A. japonicum* 'Aconitifolium'. The green leaves are three to five inches diameter, the lobes are cut into the center, and then recut, pinnatifid in form. The fall colors are brilliant crimson and yellow.

In contrast, the full moon maple, *A. japonicum* 'Aureum' has uncut leaves of yellowish green. Partial shade allows the color to develop best on these round type leaves with eleven small points. Fall colors here, too, are brilliant in reds and yellows.

Other green-leafed forms of *A. japonicum* vary in size of leaf. All are eleven pointed, mostly round in general outline. 'Junihitoe' has leaves smaller than the species, two to three inches across. 'Microphyllum' is a compact grower with leaves smaller yet, than 'Junihitoe'. These are mostly shrubs, or very small trees.

Large-leaf forms include 'Itayo', which has very good fall yellows. 'Vitifolium', as the name suggests, produces grape-like leaves. All have stiff, heavy twigs, and are upright in habit.



Left and below: *Acer palmatum* 'Crispum' (synonym 'Okushimo') fall tones. Left center: *Acer japonicum* 'Aureum' new growth. Left below: *Acer japonicum* 'Aureum' fall color.



The only drooping cultivar of *A. japonicum*, to my knowledge, is a beautiful form from Arthur Wright of Canby, Oregon. This is a weeping or low spreading selection of a leaf type similar to 'Aconitifolium', but with more finely divided foliage.

Some nursery catalogs dealing in specialties show forms of other species of maples from Japan. Not only are these sold as species, but besides the typical forms, there are variegated and mottled forms, also. Included in this list of maples, are *A. crataegifolium*, *A. sieboldianum*, *A. rufinerve*, *A. mono*. ☼



Pan Garden, Longue Vue Gardens.

Photo by C.W. Arny, Jr.



Louisiana iris 'Mrs. I. Nelson'.

horticulture in NEW ORLEANS

Tom E. Pope
and
Ola Mae Word*

Plants from the tropical and temperate regions often are grown as annuals in the coastal region of the South. Frost tender tropical plants such as *Cassia alata*, *Hibiscus chinensis*, *Ixora* species, *Acalypha* species, and *Codiaeum variegatum* (croton) are used extensively for summer and fall color. *Cassia alata* is propagated by seed planted in February. Seedlings are transplanted to outdoor locations in March or April, where they flower in September and October. Woody tropical plants may be carried over in pots or as rooted cuttings.

One tropical ornamental species that has adapted well to Gulf Coast areas is *Philodendron selloum*. While this plant often is burned by frost or freezing, it seldom is damaged enough by cold to kill it. More often than not, it outgrows the space allo-

cated to it and must be severely pruned. Due to very mild winters over the past decade many large specimens of *Philodendron selloum* can be seen growing in coastal gardens.

Tropical Trees and Shrubs

Other tropicals that survive winter conditions in the deep South are *Persea americana* (avacado,—some are of bearing age, having made a comeback following the 1962 freeze), *Jacaranda mimosifolia*, *Araucaria* (*A. excelsa* and *A. bidwillii*), *Ficus elastica*, and *Bauhinia* species (orchid tree). All of these trees are cold tender and are considered expendable by those who grow them. Of course, the banana grows everywhere, and it comes back from the roots after freezes. In protected locations, it is not uncommon to see banana fruits in late summer or early fall.

*Horticulturist and Director (respectively) of Longue Vue Gardens, New Orleans, La.

Spring-flowering, Bulbous Perennials

Perennials from the temperate regions, particularly spring flowering sorts of bulbs, are treated as annuals in the coastal areas. Tulips, hyacinths, crocuses, many daffodil varieties, bulbous iris and most lilies are grown for only one season. Long, hot humid summers result in little reserve food and consequently poor bulb production with these plants. They do come up and grow a second year, but generally produce foliage and few flowers.

Tulips and hyacinths require artificial chilling before they are planted in fall. This is accomplished by placing them in the crisper of the refrigerator for six weeks prior to planting. If this is not done, the flowering axis does not elongate and the blossoms appear at or near ground level. Artificial chilling is necessary since the Gulf Coast area does not receive sufficient natural cold to cause elongation of the flowering axis. Tulips, hyacinths and most other spring flowering bulbs are planted from late November through December.

Soil Management

Many rivers flow through the coastal plains region, and as a consequence the water table is high in many places. In addition, soil may be poorly drained due to soil structure and to elevations near or below sea level. Poor drainage makes raised beds necessary if one is to be successful in growing such plants as roses, bulbs, junipers, *Nandina* and other plants that do not tolerate wet feet. Raised beds, plant boxes, or planting on mounded terraces make it possible to have well drained planting sites. However, soil in these must be prepared of materials that are well drained, as rainfall in this area approaches sixty inches annually. Builders' sand, organic matter

(peat, compost, or leaf mold) and native soils are used in equal amounts to prepare soil for raised planting areas.

One way to avoid most of the problems of poor drainage and the additional cultural requirements of spraying as well as cold related problems is the use of native plant material. The Gulf Coast region is blessed with an abundance of native plants to supplement and enhance any landscape.

Wild Plants for Gardens

Native evergreen materials, including *Myrica cerifera*, (wax-myrtle), *Pinus* species (pines), *Ilex* species (hollies), *Quercus virginiana* (live oak), *Cliftonia ligustrina* (titi), *Illicium* species (star bush), *Magnolia* species, *Aucuba japonica* and *Prunus laurocerasus* (laurels) and *Cyrilla racemiflora* make southern winters seem less bleak and the promise of spring near at hand even in December.

The elusive fragrance and delicate flower colors of native rhododendrons (*R. canescens*) (in pink hues from near white to almost red) add magic to any spring garden. They are perfectly at home in shaded poorly drained soil, and demand only to be left undisturbed. *Halesia diptera* (silver bell) is a good companion plant for native azaleas, and serves as a substitute for the dogwood, since the latter does not tolerate the wet, alkaline soil in the lower south. Of course, *Chionanthus virginica* (fringe tree) is perfectly at home in situations too wet for most introduced species.

In May the beautiful *Hydrangea quercifolia* (oakleaf hydrangea) finds itself vying for attention with its oriental cousin, *H. macrophylla*. While the former bears white flowers, the flowers of the latter may be either pink or blue, depending on the acidity of the soil in which plants are growing. In the alkaline soil of

New Orleans pink flowers are most common, but in the acid soils of the sandy pine land, blossoms are blue.

Louisiana Iris Cultivars

Louisiana irises gradually are coming into their just place in local gardens. They were late in arriving on the scene, because it took so long for their beauty and ornamental potential to be realized. The late Ira Nelson and his associates at the University of Southwestern Louisiana in Lafayette brought these plants a long way through inter-specific hybridization. Now they are available in a wide color range, with a flower size that is a sharp contrast to the drab swamp "flag". Gardeners of the deep South should no longer bemoan not being able to grow bearded iris, since the hybrid Louisiana irises rival them in color, flower and size as well as dependable performance.

While Louisiana irises will grow in wet shaded areas, they flower better when given some sunlight. Even better results are obtained when they are also given fairly well drained soil and a little attention. Not only will these plants grow in southern swamps, but they will thrive in many areas of the country. Try them, they will like you and you will love them.

Sub-tropical fragrances

No visit to the south would be complete without seeing and smelling some of the fragrant flowers on plants growing in this region. With the first cool night of fall, the *Osmanthus fragrans* (sweet-olive) beckons you to stop and linger a while as it subdues you with its delicate, sweet fragrance. In the spring, *Jasminum polyanthum* and *J. sambac* (jasmine), *Michelia fuscata* (banana shrub), *Gardenia jasminoides*, (gardenia), *Citrus*, and *Malus angustifolia* (native crabapple) emit their alluring fragrances. The



Spanish Court, Longue Vue Gardens.

Louisiana iris 'Anne Caradine'.



Photo by C.W. Arny, Jr.

air of summer evening is perfumed by magnolias; if you get too close, you will be overpowered by the heavy aroma.

A Pineapple Relative

Another botanical experience of the coastal area is to view the ghost-like *Tillandsia usneoides* (spanish-moss) swaying on the limbs of live oaks, in the breeze of a moonlight night. This plant can be found growing in most species of trees in the area; however, it seems to prefer bald cypress and live oaks.

When you visit the coastal area of the South, you will see many familiar species that you know and grow. Other plants may be strangers to you. Stranger still may be some of the horticultural practices employed. But these are just adaptations to an environment not always best for the growing of certain plants. If you give it some thought, you will see just how you have applied similar unusual techniques in getting something to grow where it was not at home. ❖

Wall Fountain, Longue Vue Gardens.





When people who live in a plantless environment begin to work with plants something happens. It is more than gardening. It is more than pleasure in the plant's beauty. People actually change when they start growing plants. Specialists in mental institutions use gardening as a therapeutic technique; prison rehabilitation experts use gardening to recreate a socially-sensitive individual. Inner city authorities find that a garden designed and built by residents in the concrete canyon has sociological and psychological implications. A.H.S. has begun a program designed to discover people-plant interactions. Why does gardening comfort an injured intellect? What does having his own garden do for the inner city teen-ager that lifts him from gang life and anti-social behavior (we know that it does)? Come to think of it, why does the corporation president or the investment banker leave the office to work in his garden? Plants say something to people. In the accompanying condensation of an article by Charles Lewis is an introduction to the A.H.S. program that hopes to eavesdrop on people-plant interaction. For a copy of his original article, write: Mr. Charles A. Lewis, Horticulturist, The Morton Arboretum, Lisle, Illinois 60532.

PEOPLE-PLANT INTERACTION

a new horticultural perspective

Charles A. Lewis

Men have been gardeners for centuries, selecting and growing plants for food, shelter, or pleasure. Since green plants have surrounded us during the course of our evolution, it is perhaps their omnipresence that has made us focus mainly on their cultural or aesthetic qualities. We garden, arrange flowers, grow windowsill plants, mow the lawn, always aware that the plants need our care; but what of a reverse flow of benefit from plant to gardener?

Plants have served as a source of inspiration for creative artists since history began, but recent evidence indicates the existence of more subtle responses of people to plants. When a human being is under stress, it appears that the presence of plants and the opportunity for close association with them can exert a beneficial psychological effect. Subtle man-plant relationships become obvious in the extreme urban envi-

ronment, where field and forest have been replaced by asphalt and brick. We can explore these subjective qualities of plants by looking at examples.

In New York City, a tenant garden contest sponsored by the Housing Authority, has produced specific gains in terms of human and social betterment as well as aesthetic rewards. Mechanics of the contest are simple. Each spring the Housing Authority accepts garden contest entries from among its 600,000 tenants. Participating groups cover a wide range of age, ethnic, and social backgrounds and include senior citizens, Girl Scouts, Boy Scouts, day-care centers, and less structured associations of tenants. Each group is assigned a maximum of 300 square feet at its home project. The groundsmen prepare the plot; after that the tenants are on their own. Each group works out its own design and selects the plants to

be used. Some are started from seeds or cuttings on the windowsill, others are purchased partially grown in containers. The Authority provides a fund of \$25.00 per garden against which each group may draw, submitting receipts for plants and fertilizers purchased.

Contest gardens are planted in late spring and tended carefully all summer long. Maintenance includes the normal tasks of watering, weeding, pruning and fertilizing, plus the added responsibility of protecting the plants from vandalism. In August, judges—including garden writers, horticulturists, landscape architects and educators—are assigned in teams of three per Borough to select the winning entries. Prizes of scrolls, silver cups and trays are awarded at a September meeting before an audience of civic leaders and tenant groups. Excitement runs high as slides of the winning gardens are flashed on the screen and the spec-

Lafayette Houses, Brooklyn—411 Gardeners.



Pink Houses, Brooklyn—Picture Garden.

All photos from New York Housing Authority Contests.



Polo Grounds Houses, Manhattan—Cross of Beauty.



Mermaid Houses, Brooklyn—Senior Citizens Garden.

Brownsville Houses, Brooklyn—550 Club Garden.



Edgmere Houses, Queens—Good Neighbor Garden.



All photos from Philadelphia Neighborhood Garden Association Window Box Program.



A typical block in Philadelphia.

tators recognize their handiwork. Enthusiastic participants return home looking forward to entering the contest again the following year.

Unless one looked closely, he would see only the obvious: gardens in low-income areas, beautification, a cosmetic cover over social wounds. These were my impressions as I judged for the first time nine years ago. But in talking with contestants I began to hear echoes of a much deeper kind of involvement. Remember, the housing projects are in some of the toughest areas of New York, where crime and vandalism are high and life presents a harsh struggle from cradle to grave. One contestant told me, "This is the first creative thing I have done in my life", and added that she had gone to the library to study books on gardening. In lower Manhattan, a Spanish-speaking woman proudly said, "They told me that you couldn't grow flowers on Avenue D, but I wanted to try. Now you should see how the old folks come out every day to enjoy the flowers." I particularly remember an older woman who, with a group of children, had produced a garden with flowers, vegetables, and even a cotton plant. She had carefully labeled each type of plant because, she explained, it was important for children to know the names of all the plants. In letters to the Authority, tenants said, "... what is more important is everyone is getting to know each other, everyone smiles and discusses our garden, they ↪



Planting Day.



Exuberant window box gardening.

Entrance to garden in a former trash filled lot.



worry over too much rain, not enough rain, they're all so pleased that children are interested in caring, not destroying. From early morning till late at night you can see neighbors leaning over the garden fence. It has become the center spot of our court where everyone is a friend."

Over the years the contest gardens become a focus for social activities, with wedding and graduation pictures being taken at that favored spot. We always found that the gardeners and residents of a project were extremely proud of their display and, of course, all thought that their entry should win.

In ghetto neighborhoods well known for vandalism and other acts of depredation, I was puzzled as to how the fragile gardens were able to survive. Answers came from the participants themselves. One group said they know who the trouble-makers were and had assigned to them the job of guarding the plants. In other projects tenants had joined together, taking turns to patrol the gardens and sound the alarm if anyone tried to destroy them. One woman on the East side said that she expects no vandalism because "all the rotten kids are in the contest this year." This mutual effort by neighbors to protect the group's creation was typical in most projects.

Probably the most astonishing garden I saw was Japanese-inspired, complete with pond, bridge, stones and walks, constructed of bricks and cinder blocks. It was the entry of a teenage group, members of a street gang, who were guided into the contest by a social worker. He told me how diligently the boys had worked, bringing the building materials from across the city to construct the paths and edge the beds. Maintenance was meticulous and their pride was obvious. Each of these boys had a police record.

After a few years, the Housing Authority became aware of unexpected benefits emanating from the garden contest. Vandalism was reduced in areas where there were gardens; indeed behavior evolved

which is the very antithesis of vandalism. Tenants began approaching the Housing Authority for permission to help landscape the buildings. In several projects they contributed their own funds to create spring gardens for bloom before the summer contest plantings. Some asked permission to install planters which they would maintain in the lobbies of their buildings. As a result of the contest, garden clubs have been formed and the Housing Authority is looking for ways to develop indoor gardening activities through the winter. *It seems that the experience of gardening can help residents achieve a proprietary sense over their buildings and grounds.*

Potency of the technique does not depend on a particular urban structure. In Philadelphia's inner city, where dwellings are three-storied, single-family brick row-houses, the introduction of gardening has produced equally dramatic results. A window box program started in 1953 by Louise Bush-Brown led to formation of the Neighborhood Garden Association. Today, over 500 blocks participate, and again, as in New York, the neighborhoods reap more than flowers. Streets are clean, houses painted and curtains hang in the windows. Members of a block often join together to clean out debris-filled vacant lots and change them into small gardens or parks. All of these activities are spontaneous, not part of the contest, but somehow inspired by the window boxes. Comments by the participants reveal the human gain: "Before, it was just a house; now it looks like home." "I guess I'll wash my windows now."

In a devastated section of Chicago, the student garden program of the Benjamin Wright Raymond School has produced manifold effects. It is responsible for improving the social perception of the children and for decreasing the number of broken windows in the school each year since its inception. I was told that last year only one flower was picked from the garden—and that by

a pupil from another school.

In terms of human values, what is the meaning of cleaned streets, painted houses, reduced vandalism and new neighborliness? What effect has gardening had on the gardener to produce these results? Has the gardener, interacting with plants, caught a glimpse of new dimensions in his life and disclosed them in his actions?

There is a thread common to all these situations previously described: the introduction of gardening into an existing people—building environment stimulates a change in people who, in turn, improve their physical surroundings.

Mental and physical rehabilitation institutions find horticultural therapy a valuable adjunct to occupational therapy. The plant given to each patient entering the New York University Institute for Rehabilitation Medicine helps redirect his thoughts away from personal physical problems. At the Institute's greenhouse, the tasks of making cuttings or growing and potting seedlings are adjusted by a Horticultural Therapist to each patient's medical need for retraining mind and muscle. A four-year curriculum in Horticultural Therapy is now offered by Kansas State University in conjunction with the Menninger Foundation, leaders in developing this technique.

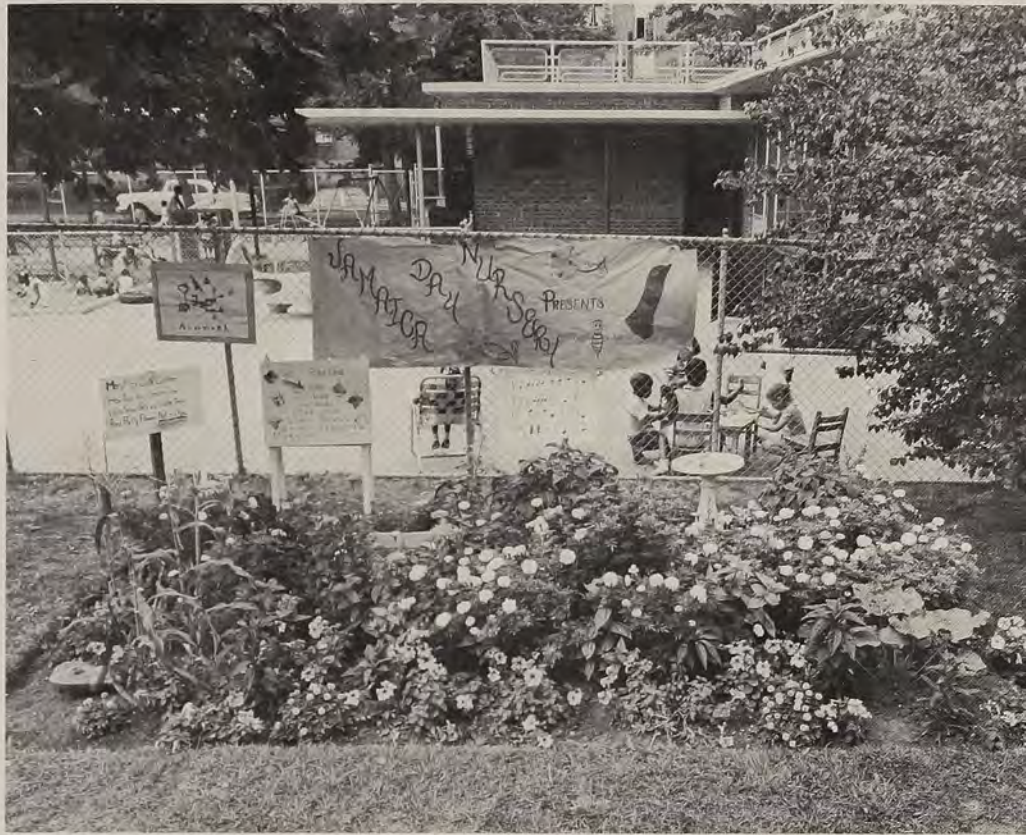
In homes for the elderly it is thought that the generous use of plants and their availability for personal contact produces a more harmonious atmosphere. Office landscaping, a new concept in office layout developed in Germany and gaining acceptance here, replaces the usual cubicle partitions with open areas in which separate functions are delineated by massed plants and curved screens. The new environment increases productivity and human satisfaction. Most recently correctional institutions have shown interest in using gardening for rehabilitation.

When plants are seen as therapeutic agents in hospitals, ghettos

and prisons, we must begin to explore the nature of people-plant relationships. Some scientists believe man has a primal need for plants. Perhaps as long as people lived in the presence of trees, fields and flowers, they were part of a natural environmental harmony. In relatively recent history we have built new environments, paving over the field with asphalt, replacing the forest with walls of brick and stone. Social and political systems operate the complex machinery of cities, but they have failed to meet the human needs of city residents. Today, there is a flight to the suburbs, a flight to green, which depletes the plantless city center of its middle class.

We must see inner city gardening in this context. What are the subjective values found in a ghetto garden? The life-enhancing qualities of plants and gardens are introduced into a life-negating urban situation, bringing people together for a joint venture of creative beauty. Gardeners work together to plan, tend, and protect their gardens. They come to know each other as partners in an endeavor that is wholly beneficial. A ghetto dweller, cut off from adequate means of self-expression and self-identification, finds that he can grow plants for all to see. What starts as a representation of self, becomes a generous gift as others share in its pleasure. In an ambience of failure, plants offer paths to conspicuous success.

Sociologists have looked at the city, trying to understand it in terms of needs of the city dweller. They have found that the city dweller has a need for *stimulation*, to break the monotony of daily life; for a *sense of community* which arises, not because people are forced to live together, but from some spontaneous action; and for a *sense of mastery of their environment*, reassuring them that they have a degree of control over what happens, and are not helpless cogs in the overwhelming machinery of living. Does not inner city gardening speak to all of these needs?



New York Housing Authority photo.

Jamaica Day Nursery.

From these perspectives, we can see that there is something more than cosmetic aesthetics in urban horticulture. Beautification has two faces, the obvious, outward physical improvement of an environment and perhaps more importantly, the potential for a personal, spiritual awakening.

Gardening may be an instrument for great healing in our troubled cities, and perhaps, in any human-stress situation. Horticulture may be seen from many different perspectives. To some, plants and flowers are objects to be acquired, arranged and moved, satisfying individual desires; to others, they are the source of subjective expressions of form, color, and fragrance; to others, flowers and plants represent an organization of cells to be studied, classified and understood. We are now asking for another viewpoint on flowers and plants: to see them as reflections of life-force, the "smile of God", expressions of the presence of beauty and harmony in the world, prehistoric partners with man in his



View of the "Forest Preserve".

Garden at the Benjamin Wright Raymond School, Chicago, is maintained by students and provides a learning experience for all grades.



A class works its garden plot in early spring.



Room 108's "Psychedelic Garden"—a class project.

evolutionary journey, guideposts to the harmonious existence of man and this planet.

It is through the latter perspective that we begin to see the potential for healing that exists in the garden. We can see that there are indeed sociological, psychological and spiritual implications in gardening. When fully understood in these terms, it becomes a potent tool for human improvement in untold areas. This is the new face of horticulture, a symbol of order in chaos, a sign of life in stagnating social systems, a participant in rehabilitation from mental, physical and social problems. This view lifts horticulture from a decorative amenity to an essential place in the future of our survival.

Through plants, can we and our children learn respect for the interrelationship of biological systems—necessary for survival of this living planet? A new world of understanding and perhaps a true under-

standing of the world can begin with an understanding of people and plants. All gardeners intuitively know this; can we bring it to the forefront of our consciousness and reassess existence from this perspective?

We are really talking about ecology of a most vital life-support system: the human spirit. Walter Hickel in a recent conference at Princeton University on "Ecology and Politics in America's Environmental Crisis" called for a "... personal kind of ecology,—call it ecology of the mind and spirit of man." He said, "There is a mystery attached to the variety and perfection of nature, a mystery which stirs wonder in a child, and gives a grown man perspective. If we help refresh the inner man, we would begin to answer such real problems as those of the inner city."

We of the horticultural world should answer this challenge with "Let us begin". ❖

AMERICAN HORTICULTURAL SOCIETY PROGRAM IN PEOPLE-PLANT INTERACTION

"There is something in the act of inner-city gardening that inspires individuals to perceive themselves and their surroundings in a new and better way. The underlying factors of this person-plant relationship can be utilized on a broad scale for social and human improvement in diverse areas."

(Presentation to the A. H. S. Board, 9/1/72)

The American Horticultural Society Board accepted this premise and initiated a program aimed at understanding and utilizing the interaction between people and plants. Findings of the program should reveal new horticultural guidelines for understanding man's fit in the environment and improving the quality of his life. We are asking for your participation in achieving specific goals of the program.

The project falls into four areas of action:

1. A survey of projects utilizing the people-plant interaction.
2. A university-based investigation by psychologists, sociologists, physical planners, horticulturists, and others, of the factors involved in people-plant interactions.
3. Encouragement of new urban horticulture and other people-plant programs, with A. H. S. developing operational and horticultural guidelines.
4. Distribution of survey and research findings to individuals and agencies concerned with physical planning, social development and human rehabilitation for their use.

We invite you to send information on any organized group gardening projects you know of, large or small, urban, suburban, or rural, which has functioned for at least two years. It would be especially helpful if you could provide data

covering all of the points outlined at the end of this article. A. H. S. will contact each project to obtain detailed survey information.

Before the study is completed we will seek out potential situations in which the technique might be applied. Conditions required for success include not only physical need, but also pre-existing local social structure—block association, church group, school organization, or other—to act as sponsor. Ideally the program is presented to leaders of the local organization as a possibility for implementation by their group. At that point the leader takes charge, developing and executing the program with his group, while the horticulturist serves as advisor, and does not become too intimately involved with daily activity. This is most important: each garden is a personal expression and must be respected as such. Vandalism and failure are almost certain when this type of program is imposed on a neighborhood from outside by well meaning individuals or groups.

If you find situations fitting these requirements, please send a description, address, and, if possible, the leader's name and address to A. H. S. Each situation will require the participation of an advisory horticultural group such as garden club, horticultural society, botanical garden, or other to supply the expertise needed. When sending information of potential recipient situations, include suggestions for horticultural resource organizations in the area that might be willing to serve as advisors.

This is a new program, in its formative stages, A. H. S. welcomes your suggestions and participation.

AMERICAN HORTICULTURAL SOCIETY SURVEY OF PEOPLE-PLANT PROGRAMS

Gardening Program should be an organized group-oriented activity, in operation for at least two years.

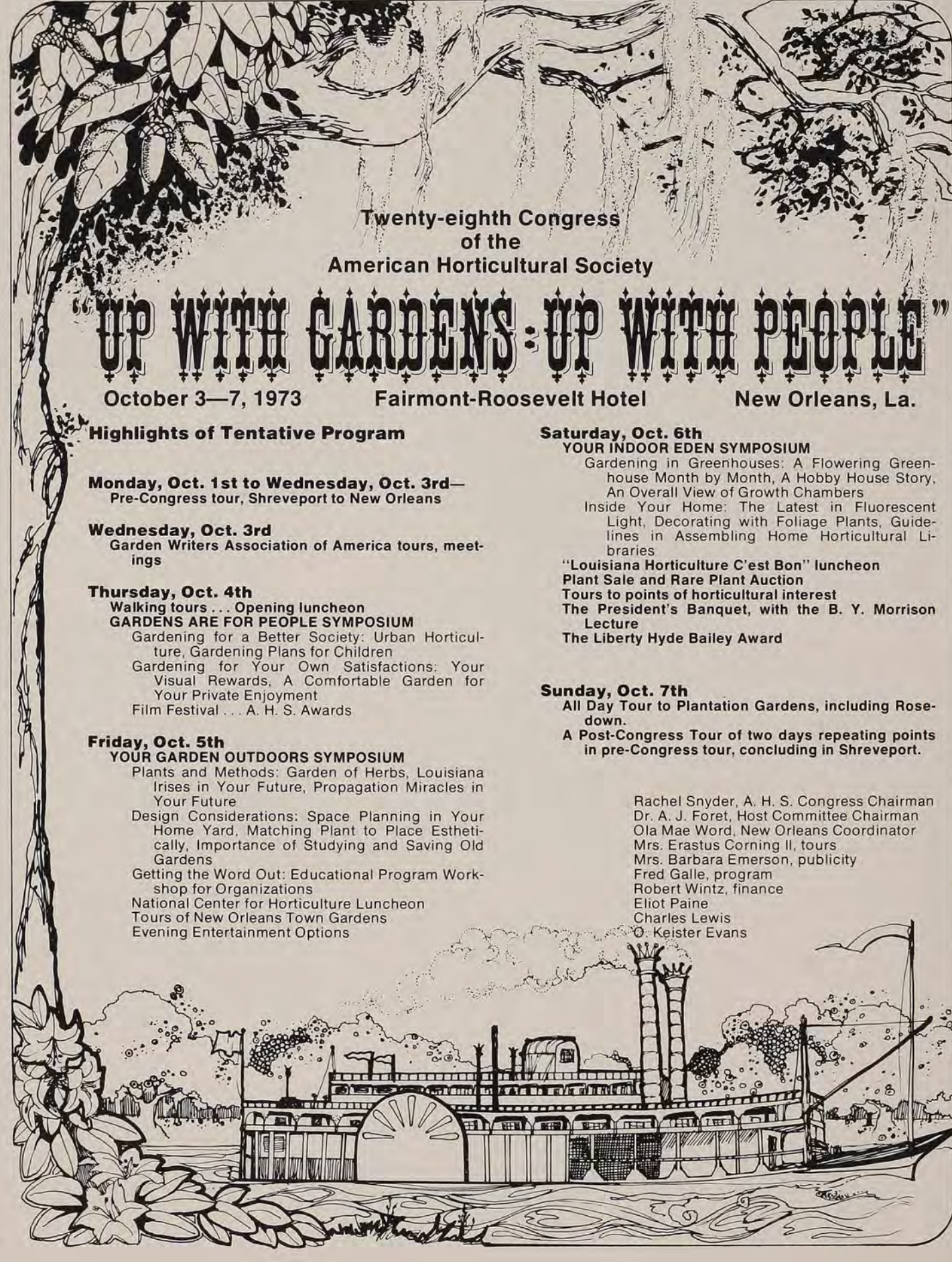
Please include as much of the following information as possible.

1. Name and address of person sending information.
2. Description of gardening project or potential project situation including:
 - A. Location of project.
 - B. Sponsorship of project.
Name and address of organization operating the gardening project.
Name and address of person in charge, or person to contact.
 - C. Affiliation with any institution, school, housing authority, church group, or other.
 - D. Type of gardening—window-box, plots, horticultural therapy, windowsill gardening, or other.
 - E. Approximate number of people involved.
 - F. Age groups represented.
 - G. Estimate of years activity has been in existence 19__-19__.

Send all information to:

PEOPLE-PLANT SURVEY

The American Horticultural Society
Mount Vernon, Virginia 22121



Twenty-eighth Congress
of the
American Horticultural Society

"UP WITH GARDENS - UP WITH PEOPLE"

October 3—7, 1973

Fairmont-Roosevelt Hotel

New Orleans, La.

Highlights of Tentative Program

Monday, Oct. 1st to Wednesday, Oct. 3rd—
Pre-Congress tour, Shreveport to New Orleans

Wednesday, Oct. 3rd

Garden Writers Association of America tours, meetings

Thursday, Oct. 4th

Walking tours . . . Opening luncheon

GARDENS ARE FOR PEOPLE SYMPOSIUM

Gardening for a Better Society: Urban Horticulture, Gardening Plans for Children

Gardening for Your Own Satisfaction: Your Visual Rewards, A Comfortable Garden for Your Private Enjoyment

Film Festival . . . A. H. S. Awards

Friday, Oct. 5th

YOUR GARDEN OUTDOORS SYMPOSIUM

Plants and Methods: Garden of Herbs, Louisiana Irises in Your Future, Propagation Miracles in Your Future

Design Considerations: Space Planning in Your Home Yard, Matching Plant to Place Esthetically, Importance of Studying and Saving Old Gardens

Getting the Word Out: Educational Program Workshop for Organizations

National Center for Horticulture Luncheon

Tours of New Orleans Town Gardens

Evening Entertainment Options

Saturday, Oct. 6th

YOUR INDOOR EDEN SYMPOSIUM

Gardening in Greenhouses: A Flowering Greenhouse Month by Month, A Hobby House Story, An Overall View of Growth Chambers

Inside Your Home: The Latest in Fluorescent Light, Decorating with Foliage Plants, Guidelines in Assembling Home Horticultural Libraries

"Louisiana Horticulture C'est Bon" luncheon
Plant Sale and Rare Plant Auction

Tours to points of horticultural interest

The President's Banquet, with the B. Y. Morrison Lecture

The Liberty Hyde Bailey Award

Sunday, Oct. 7th

All Day Tour to Plantation Gardens, including Rose-down.

A Post-Congress Tour of two days repeating points in pre-Congress tour, concluding in Shreveport.

Rachel Snyder, A. H. S. Congress Chairman
Dr. A. J. Foret, Host Committee Chairman
Ola Mae Word, New Orleans Coordinator
Mrs. Erastus Corning II, tours
Mrs. Barbara Emerson, publicity
Fred Galle, program
Robert Wintz, finance
Eliot Paine
Charles Lewis
G. Keister Evans

Remarkable New Race PEONIES

*Louis Smirnow**

Most common garden peonies, cultivars such as 'Festiva Maxima', 'Nick Shaylor', 'M. Jules Elie', 'Philippe Rivoire', 'Mikado', and 'Sea Shell' freeze to the ground each fall. The following spring new shoots rise from the tough perennial roots for the annual show of flowers and foliage. These are all called herbaceous peonies. Quite a different group of peonies develop hardy wood; they are shrubby, and the woody stems persist year after year. They shed their leaves in the fall but the following spring new shoots break from the old wood, and these bear flowers and foliage. These woody peonies are called tree peonies. Just as the herbaceous garden peonies have come from a long line of interbreeding of herbaceous species and cultivars, so the modern garden tree peonies probably result from crosses of a few woody species. One group of tree peonies is especially notable because the flowers of these "Luteas" are yellow. With the characteristic silken texture and quality of other tree peonies, blossoms of the yellow-flowering tree peonies are exceptionally handsome. To date, there has been no comparable color in herbaceous peonies commonly available for garden use.

The search for a yellow herbaceous peony has been on for over fifty years. Every hybridizer of note has been breeding in the hope of producing this elusive and desirable color. When I had the good fortune to introduce 'Oriental Gold' about ten years ago it was generally agreed that the first true yellow herbaceous peony had been found. There had been claims of other yellow peonies, but all of them were, in reality, cream colored and not a pure yellow. Unfortunately 'Oriental Gold' produces a small, double flower, beautiful, but not of exhibition size. Furthermore, for hybridizing purposes it has questionable value because of its peculiar petal-shedding behavior.

Now it is my great pleasure to write of the almost unbelievable discovery of several new fully double herbaceous peonies—large flowered, true yellow blossoms. Here is the story of their origin.

In 1948, Mr. Toichi Ito, a Japanese nurseryman, decided to use tree peony ↪

*85 Linden Lane, Glen Head Post Office, Brookville, L. I., N. Y. 11545

NEW RACE FAMILY TREE

♂



'Kinko' ('Alice Harding').

×



♀

'Kokoden'.

'Yellow Emperor'.



'Yellow Dream'.

'Yellow Crown'.



'Yellow Heaven'.



'Fairy Tale'.



TREE PEONIES

'Age of Gold'.



'Howraisan'.

'Stolen Heaven'.



'Golden Hind'.

pollen to fertilize the ovaries of a white herbaceous peony. He was not aware of the peculiarity of the chromosome count of the 'Alice Harding' tree peony (called 'Kinko' in Japan), but he felt that such a cross should be successful. Because of the lateness of the season in Tokyo, he sent his assistant to Niigata Prefecture for the 'Alice Harding' pollen. The cross was made with several hundred plants, using pollen of the tree peony on the herbaceous peony, as planned. The herbaceous parent was a white, semidouble cultivar called 'Kakoden'. Only a few fertile seeds were produced from the cross.

Nine of the seedlings were almost tree peony-like in appearance and the others more resembled a herbaceous sort. That is, they resembled a common garden peony in foliage. The seedlings produced buds in 1956 for the first time but the buds died immaturely. In the same year, Mr. Ito died and his assistant was left with the care and development of the plants. In 1963, these plants bloomed for the first time and the flowers created great excitement. They were yellow, pure and bright; the blossoms were carried upright on strong, straight stems. The foliage was almost tree peony-like, but the tops of these plants died to the ground each winter. Here were herbaceous peonies with bright yellow flowers. They were a new race of peonies; and that gave a name to the group. Some peony experts refer to them as New Race peonies, others call them the Ito Hybrids.

It is my hope that these new peonies will find their way into the hands of capable American hybridizers. I am confident that the New Race can be expanded, giving our gardens a whole new color spectrum of peony blossoms.

In June, 1969, at the National Peony Show in Mansfield, Ohio, three of these new cultivars were introduced. Miss Silvia Saunders, reporting the event, wrote:

My impression was that 'Yellow Heaven' has the deepest and largest red flares. 'Yellow Emperor' is the most regular flower, and 'Yellow Dream' the largest, and the least flared of the three. The blooms could well be taken for our usual "Lutea" hybrids, although they have no hanging or bending of the stems, but stand straight upright, but the foliage shows characteristics of both families.

At the show the peonies won the complete admiration of all peony lovers. Subsequently, we have made interesting discoveries regarding them. For example, they are easily divided. Today these are available on the American market because of ease of reproduction. How did they get here? We arranged with Mrs. Ito to let us handle the stock in America. Presently they are being patented under the names 'Yellow Heaven', 'Yellow Dream', 'Yellow Crown', and 'Yellow Emperor'. More will be introduced later as stock builds up.

It is almost universally believed that tree peonies cannot be crossed successfully with herbaceous sorts. Crosses had been tried many times with no success. But Mr. Ito persisted with his experimentation, selecting his pollen sources and seed parents carefully. Following the achievement of seed from the 'Kinko' × 'Kakoden' cross, he next crossed a fine pink tree peony, 'Kagura Jishi', with a white herbaceous cultivar, 'Kakoden'. Soon offspring from this cross will be available; already we have obtained two of them, herbaceous cultivars called 'Pink Perfection' and 'Pink Purity'. 'Pink Perfection' bears twelve-inch across flowers, fully double, with no stamens showing, bright pink with deeper pink toward the center, and with free-blooming quality. 'Pink Purity' produces blooms almost as large. Both plants grow to thirty-six inches, with strong stems. We have come to call these the Newer Race.

It will be some years before prices drop on these rare new peony cultivars; just now they are for the breeder and the connoisseur. But they look fine in any garden. ☞

A FINE SUMMER AFTERNOON

James Fanning*

It is a fine summer afternoon and Mr. Gables, the real estate agent, arrives at two—just the time he had said he would pick us up. My wife, Violet, and I are ready, since we believe in promptness, too, and have already sent the children off to spend the afternoon at the municipal pool. As we arrange ourselves in his car, Mr. Gables says: "Nice little house you've got here. I can see where you'd find it cramped, though. Anyway, I know I can get you a good price for it, and, frankly, I'd advise you to make the trade now, while the market is right."

Being cautious at this stage of the game I answer: "Well, we really don't know whether we want to make the switch right now." Gables smiles at this, and begins talking about the advantages of the house he is about to show us. This goes on until we arrive at the house itself—just the other side of town but considerably closer to the mountains than the place we are about to leave. The house is pretty enough; not too close to the neighbors on either side. Of course, what I want to do first off is inspect the plumbing. My wife, for her part, has to check everything in the kitchen, so we are both occupied for a while, with Gables shuttling back and forth between us, answering questions before we can ask them and all that sort of thing.

When the three of us finally get together in the living room, my wife goes straight to the planter in front of the picture window and looks down at the plants, sneering slightly. "They're sort of faded" she says. Gables bends over for a close look and smiles condescendingly. "Well, I guess you're entitled to a fresh batch."

Violet, not so easily pacified, rubs one of the leaves between her fingers and sneers again. "Light

weight material—no wonder it fades."

"All right, all right", says Gables, and writes in his notebook. Looking past the end of his pen I can see that he writes "Heavy duty plants" and underlines the words. "What about color" he goes on, "Different shade of green to fit your color scheme?"

"Well, yes", says Violet, looking at me, "What color is our couch, dear—Empire green?"

Of course, I don't know one color from another—not by name, anyway, but I say "Isn't it Colonial?"

"Oh, yes, of course" says Violet, and I can see Mr. Gables make another note. "Now", he says, "let's have a look at the outside". We step out onto the patio and immediately a question springs into my mind so I turn to Gables: "What about this paving? Is it real Simu-Slate?"

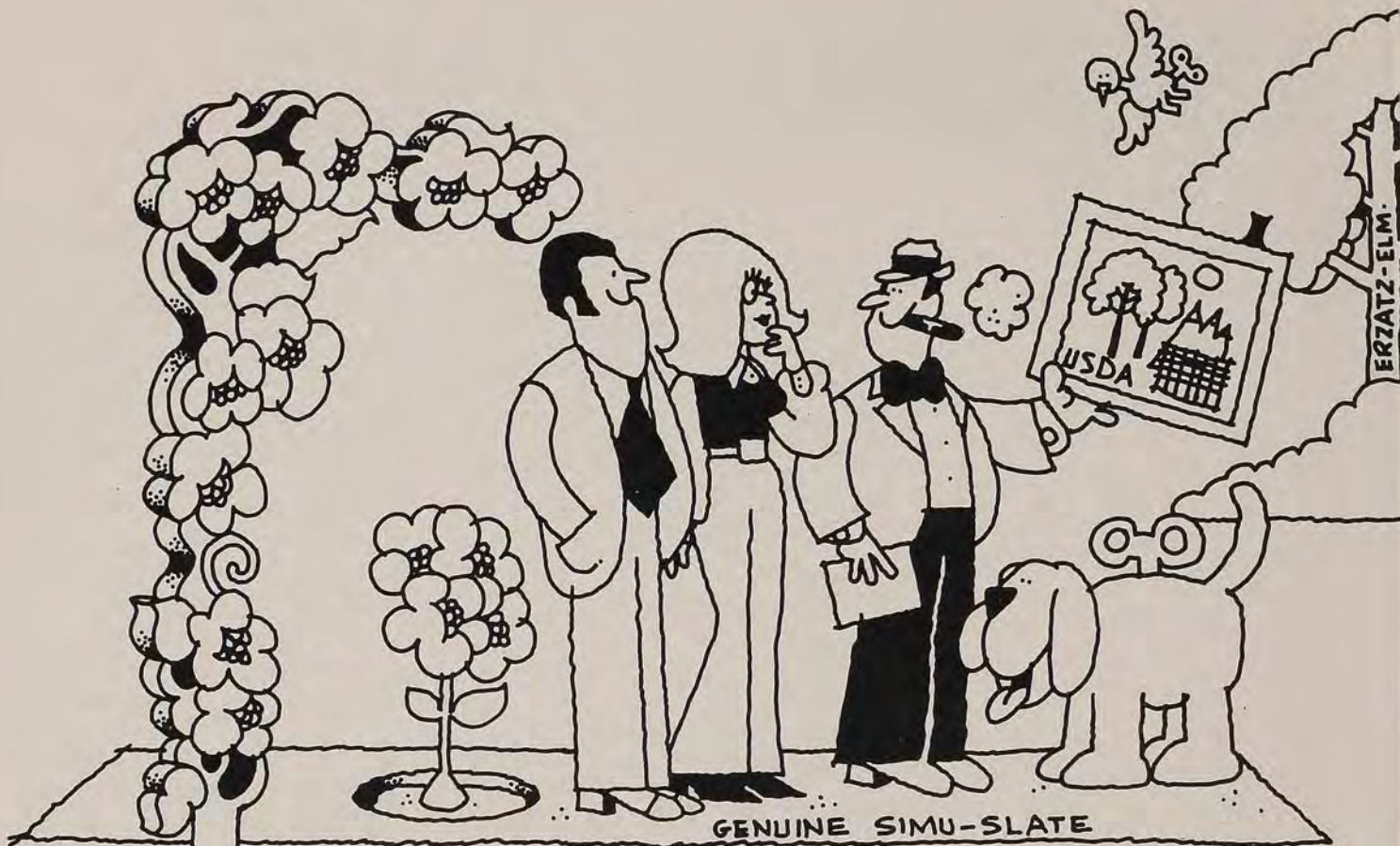
Without a word the real estate man strikes a match and drops it on the pavement. The match flares for a few seconds and goes out. Glancing triumphantly at me, Gables bends, picks up the burned match, and brushes his fingers across the spot where it had burned. "See, not even scorched! With the materials some builders are using these days that would have burned a hole as big as a dinner plate!" Having seen that very thing happen at a friend's house just a few days earlier, I know exactly what he means, but I don't do anything but nod.

Mr. Gables gestures out over the lawn. "Look at that yard! Ever see anything prettier? All top-grade material, too—trees, shrubs, grass—everything!"

"Any guarantee?" I can't resist asking.

"Two years—absolutely unconditional!"

I have to admit that I'm im-



pressed but I just say, trying to sound noncommittal: "That sounds O.K."

Violet lets out an exclamation. She has been crouching at the edge of the pavement feeling the grass, and as she raises one hand I can see a drop of blood on a fingertip. "This grass is too sharp!" she mutters, sticking the wounded finger in her mouth. "Oh my!" Gables seems genuinely embarrassed. "We'll have

to take care of that! Once over with a solvent spray will fix it all right." He makes another note but I feel I have to rub it in a little: "Be careful now, we wouldn't want the grass all matted down and melted looking".

"No, no—we have people who know how to take care of these things. Now, let me introduce Pupsy." Kneeling at the edge of the pavement, Mr. Gables claps his hands. There is a stir behind one of the bushes and a dog appears. Don't ask me what kind of dog. I'm not up on dogs either. Anyway, it's a medium-sized dog, sort of brownish, and it comes trotting across the lawn with its tail wagging, right up to my wife. Violet places her unwounded hand on the dog's head and strokes it gently. She turns to Mr. Gables, sounding a bit puzzled: "It feels like fur!"

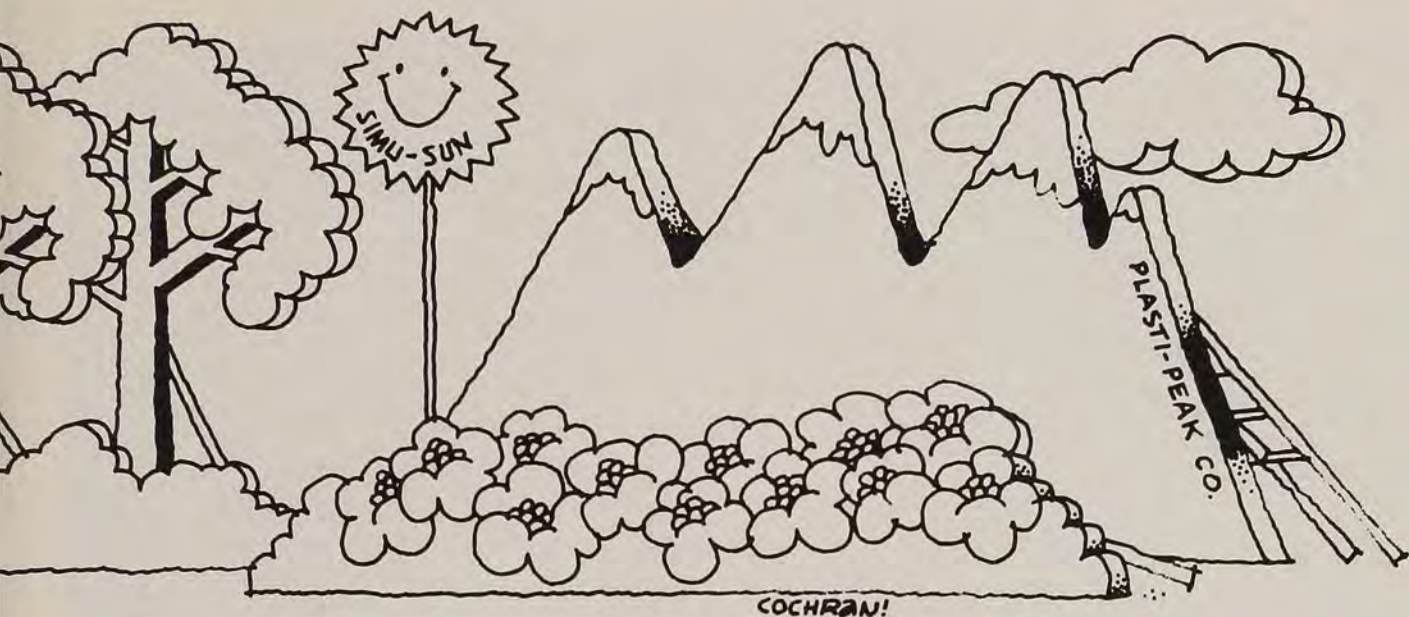
He grins at her: "You bet! Only the best for us!" "But..." She looks at me with that appealing little girl

look she has once in a while. "But I like plush so much better!"

"Oh!" Gables looks startled but makes a quick recovery. "I'm sure we can find you a plush dog if you really want one." Backing Violet up, I say to the real estate man: "My wife was brought up on plush dogs, and she still thinks they're the only kind to have."

"Sure, we can take care of that! But now, look! I've been saving the best thing of all! Take a look at that view, will you!" We follow his pointing finger. Out beyond the shrubs edging the lawn are mountains with a lot of sky and, off to one side, a clump of trees so big they must be real. It all looks pretty empty and desolate to me, but I don't say anything. Violet doesn't hesitate, though: "Pretty empty and barren, if you ask me! No houses, no people—not even a little bit of smoke anywhere!"

Gables smirks triumphantly. He



flips open his looseleaf notebook and holds a page under our noses. "Just look at that, now!" At the top of the page is a photograph and it doesn't take more than a second or two for us both to realize that it is the identical scene we are looking at. Same mountains, same trees—a few more clouds in the sky, perhaps, but there's no question—it's the view from right where we're standing. As if we couldn't see it for ourselves, Gables points to the stamp at the bottom of the picture: U.S.D.A. Prime. On the lower half of the page is a graph with a zigzag line showing the computer analysis of the scene.

"See what you've got here!" chortles Gables—"The U.S.D.A. rates it prime! What about that!" We look at the mountains again and, again, Violet is the first to speak: "Why didn't you tell us before! Of course, it's beautiful! Oh, my, what a lovely place!" She squeezes my hand ever so slightly and I know what that means, so I turn to Gables: "Well, Mr. Gables, it looks as though this is what we want. What kind of a contract have you got for us?"

But the real estate man is already at work filling in the blanks on the contract form at the back of his notebook. Violet and I, hand in hand, stand drinking in the view. Behind us there is the light clatter of

a pen falling on Simu-Slate. I turn just in time to see the notebook fall from Gable's hand and lie beside the pen on the pavement. He stands as he had been, but with hands hanging limply at his sides. His eyes are closed and his mouth hangs slightly open.

"What's the matter with him?" mutters my wife.

I step over to the motionless figure and, remembering my Red Cross emergency training, lift the lid of one of his eyes. The pupil is fixed, but not dilated, so I release the lid and the eye closes, rather slowly. There is no question what the trouble is but something else preempts my attention. The man's skin felt peculiar, so I quickly run the tips of my fingers across his cheek and cannot resist an exclamation: "It's Luxo-Derm! The guy's got a Luxo-Derm skin!"

"What!" Violet sounds really incredulous but she stretches out her hand and touches the cheek nearest her. "It is! It's Luxo-Derm! I never thought I'd meet anyone who could afford that kind of skin! See!" She looks at me with a note of accusation: "I always told you there was big money in real estate!"

Changing the subject quickly, I say: "But we've got to take care of the poor guy! There's nothing wrong really, just a run-down battery." I

pull up the cuff on his left sleeve to see the emergency number stenciled on his wrist and begin to dial on my own rap-box. I must be a little nervous, though, because at the third digit the dial goes flying off the box and lands with a clatter on the pavement beside the real estate man's notebook.

"Let me dial it" says Violet, always a cool one in an emergency—"let me see that number." So I hold up the man's arm for her to see the number and she begins manipulating the dial on her own rap-box. After the second digit, though, her fingers hesitate, then stop, and before I can even move the rap-box has fallen out of her limp hands onto the pavement. All of a flash I remember: Last night I forgot to plug in her battery charger! Boy, will she be mad when she gets charged up again! Right now, though, I'd better get busy. Best thing to do is get Gable's headquarters on his car radio. His car is right in front of the house, so no problem. But my feet! They won't move! Good God . . . I forgot to charge my own ba . . . *

**Author's Note: The foregoing dream occurred after reading United States Department of Agriculture Forest Service Research Paper No. NE-162, titled "It seems Possible to Quantify Scenic Beauty in Photographs."*



R. mucronulatum blooming in spring at the Arnold Arboretum.

LATE SUMMER INJURY OF KOREAN RHODODENDRON

a report of microclimates, frost pockets and cold air movement

Alfred J. Fordham*

Gardeners often assume that woody plants which fail to grow in spring have been winter-killed. The damage, however, actually may have taken place during a freeze in late summer or early autumn when the plants had not yet acclimated and were unprepared for even a light frost. Injury of this sort is characterized by rupturing of the bark and its separation from the wood. It usually occurs near the bases of plants and has been termed splitting.

At the Arnold Arboretum a rectangular bed of *Rhododendron mucronulatum* (Korean rhododendron) lies on a slope that pitches at the rate of twenty-nine inches in twenty-four feet. It is located at the edge of the meadow opposite the administration building. At fifty feet above mean sea level, the meadow is one of the lowest areas in the Arboretum.

In spring of 1971, a line of plants at the lower part of the *Rhododendron mucronulatum* bed failed to grow. (Figure 1). Inspection revealed that death had been caused by splitting of the stems near ground level. (Figure 2). In Rehder's Manual this species is rated as being hardy in zone IV. Why had this lethal damage occurred to plants growing in zone V? An explanation can be found in a study of microclimates at the Arboretum.

*Horticulturist at The Arnold Arboretum, Harvard University.

Microclimates

The Arboretum includes a wide variety of topographical features within the bounds of its 265 acre area. Elevations range from fifty to 233 feet and the terrain is comprised of summits, ridges, valleys, slopes of varying degrees, plateaus, and so on. These features create an assortment of exposures facing all points of the compass. With such extensive geographical variation, there is also a wide range of microclimates.

In November, 1934, Dr. Hugh M. Raup, then a member of the Arboretum staff, demonstrated the existence of these microclimates, by choosing eight locations in the Arboretum and setting up a station at each where temperatures could be recorded. Each morning during the winter of 1934-35, observations pertaining to the previous night's minimum temperatures were noted at about 9:00 A.M. Some interesting conclusions about microclimates in the Arboretum have been drawn from Dr. Raup's records. After nights of radiational cooling extreme variations in temperature between stations were noted.

Radiational Cooling

Table 1, composed of data selected from the Raup records, illustrates the phenomenon of radiational cooling. Radiational cooling is typical of calm, clear nights, during which the atmosphere loses heat to outer space through radiation. In the absence of wind, cold air settles to the ground and drains from higher elevations to lower levels, producing frost or cold pockets. Temperature drop is often greater during winter than at other seasons because the longer nights allow radiation to take place over a greater period of time.

Table 1. Minima Under Clear Conditions, Winds Light to Very Light

Station	1	2	3	4	5	6	7	8
	-16.0	-26.0	-16.9	-20.7	-25.1	-17.8	*	-7.5
	-6.9	-15.4	-8.3	-9.2	-19.4	-6.8		-5.3
	-3.7	-14.3	-2.9	-7.0	-12.0	-3.8		-6.0
	16.7	8.0	17.8	15.0	9.6	18.0		18.0

*At Station 7, in the isolated Peters Hill area, observations were recorded for about a month when they were discontinued with the notation "thermometer stolen".

The data in Table 1 were recorded following winter nights that were calm and clear. A comparison of the figures noted at Station 2 with those at Station 8, show the effect of radiational cooling at the two locations. Station 2 of the Raup project was situated on flat land in the shrub collection, one of the lowest areas of the Arboretum. The land slopes toward it from all directions making it an



A planting of *R. mucronulatum* showing a row of dead plants (sprayed white for visibility).

ideal location for a cold pocket. A low point within this bowl shaped cold pocket is the pond near the forsythia collection. Through the years, I have frequently observed frost damage at this pond in both June and August. Evidently a frost pocket forms within the cold pocket and July seems to be its only reliably frost free month.

Station 8 was near the Arboretum greenhouses, then located off South Street on property of the Bussey Institution. The site was a small plateau above the shrub collection where the land fell away on all sides. It proved to be one of the most favorable microclimates in the Arboretum. Differences as great as eighteen and one-half degrees were recorded between Stations 2 and 8 on a night of radiational cooling during the winter of 1934-35. (See Table #1). The figures reflect the flow of cold air from surrounding higher areas into the lower level beneath.

Table 2. Minima Under Clear Conditions, Estimated Wind Velocity Medium to Brisk

Station	1	2	3	4	5	6	7	8
	8.0	7.1	6.9	7.2	6.4	7.3		6.1
	11.7	11.2	10.5	11.3	10.3	11.5		10.2
	11.2	11.0	10.1	11.0	10.1	11.5		10.8
	17.8	17.0	16.2	17.0	16.1	17.4		16.1

Table 2, also extracted from Raup's data, shows minimum temperatures under clear conditions but with wind velocity medium to brisk. The brisk winds led to a mixing and stirring of the atmosphere. Therefore, temperatures were quite similar at all stations with a maximum difference of only one degree between stations 2 and 8.

Gradation of Cold

Since August 15, 1962, the Arnold Arboretum has operated a simple weather station in collaboration with the U.S. Weather Bureau. The equipment, located near the Dana Greenhouses, consists of a maximum and minimum recording thermometer and a non-recording precipitation gauge. Daily at 8:00 A.M. observations of temperature and precipitation are recorded, and some interesting data have been accumulated.

That temperatures vary at different heights from the ground has long been known, so it was decided to see what was taking place at our weather station. In early autumn of 1966, a recording thermometer was placed on the ground, five feet below the official thermometer. Each day when official observations were made, the temperature at ground level was also recorded. During calm nights with radiational cooling, temperature differences as great as seventeen degrees were found to prevail between the two levels.

Table 3 illustrates differences in minima which occurred between ground and official thermometer levels throughout the year.

Table 3. Some Extreme Differences in Temperature Between Official Thermometer Level and at the Ground After Nights of Radiational Cooling

	April	May	June	July	Aug	Sept
Official	27	38	48	50	52	41
Ground	14	23	37	36	36	29
	Oct	Nov	Dec	Jan	Feb	March
Official	31	26	29	-9	-9	0
Ground	15	14	12	-19	-22	-16

In January, 1968, additional thermometers were placed at our weather station so that temperatures at the ground and at one and two foot levels could be recorded. (Table 4) With the figures accumulated, we can predict the probability of damage to flowering plants such as forsythia, after a given winter. We can also draw conclusions about when the damage to the lower row of *Rhododendron mucronulatum* plants occurred.



Summer frost-killed plant of *R. mucronulatum* showing splitting and other symptoms of injury.

Table 4. Some Temperatures at Varying Levels in January, 1971

January	Ground	1 Foot	2 Feet	5 Feet
17	- 5*	- 16	- 11	- 7
18	- 3*	- 8	- 5	- 2
19	- 19 †	- 15	- 12	- 9
20	- 12 †	- 9	- 6	- 5

*Thermometer in path dug in snow at base of thermometer stand.

†Thermometer removed from path and placed on snow near base of stand.

When *Rhododendron mucronulatum* plants were killed

Temperature records for September 3, 1970 (Table 5) show minima of forty-four degrees at official thermometer level and thirty-six degrees at the ground. This variation indicates a night of radiational cooling. Since the *Rhododendron mucronulatum* bed is located fifty feet lower in elevation than the Arboretum weather station, lower temperatures than those officially recorded would be expected there. It is reasonable to suppose that the temperature in the lower part of the *R. mucronulatum* bed was much colder than the 36° F. shown at ground level at the weather station.

Table 5. Minima at Official and Ground Levels, 1970

	September 3	October 18	October 20
Official	44° F.	31° F.	27° F.
Ground	36° F.	23° F.	17° F.

Next to the administration building and opposite the *Rhododendron mucronulatum* bed there is an abrupt slope the crest of which is forty feet above the meadow. Cold air drains down this slope during nights of radiational cooling. Below the slope, the land pitches gradually toward the meadow. The water table in the meadow is about one foot below ground level and the vegetation is lush, forming a dense barrier. In summer, a path is mowed between the meadow and the bed of *R. mucronulatum*. Cold air, flowing down the slope, would meet this dam and build up in the space made by the path. On September 3, 1970, the cold air evidently reached a depth that led to freezing of the stems in the lower row of *R. mucronulatum* plants. The plants at this time had not yet acclimated and were unprepared for even a few degrees of frost and their stems froze and ruptured.

One plant in the row survived. This could be explained by the fact that *Rhododendron mucronulatum* is normally propagated by seeds and, therefore, this one plant was a genetic individual capable of surviving the temperature which led to the destruction of others in the row.

In the next row of plants seven inches higher in the bed, one plant failed and all others survived. Again, the dead plant was a genetic individual, vulnerable to temperatures which the other plants could endure.

Temperatures did not fall to below freezing at official thermometer level until the nights of October 18th and 20th, when temperatures of 31° F. and 27° F. were recorded (See Table 5). Radiational cooling prevailed during both nights and therefore, temperatures at the *R. mucronulatum* bed would have been much lower. However, the plants which were still alive at this time did not suffer, for they had undergone enough acclimation and were no longer vulnerable.

A detrimental aspect of mulching

The many benefits derived from mulching plants have long been recognized. However, what happened to the lower row of *Rhododendron mucronulatum* plants provides an excellent example of how a mulch can be highly detrimental. Wood chips about three inches deep had been applied to the bed and during the night of September 3, 1970 this layer would intercept heat emanating from the soil. If the mulch had not been present, heat from the soil would raise the temperature near the base of the plants a few degrees and thereby forestall the freezing and splitting which led to failure. ❧

GROUND COVERS

...labor-saving plants



Harold Epstein*

Have you ever visited a garden which left an enviable and indelible impression upon you? Almost twenty-four years ago this exact experience occurred when we met Mr. Arthur T. Johnson and his wife at their beautiful and distinctive garden in North Wales. Based upon British standards theirs was a small garden, only three acres, and filled with treasures from all the continents. Mr. Johnson had been a schoolmaster who became a horticultural journalist. His pre-war garden books and writings in British garden publications brought him to our attention.

His vivid description of plants and garden plus his horticultural philosophy made us wish to visit his garden. It was an unforgettable experience—not only for the unusual collection of plants, but the entire garden design and the extraordinary use of ground cover planting. The latter approach was most appealing for it could be easily applied at home. After the war Mr. Johnson wrote a booklet "Labour Saving Plants and How to Use Them." His expressions are applicable today and cannot be improved on.

"Garden economy is a matter that deeply concerns us all. For a quarter-century and more most of us have been faced by the problem as to how to reduce the rising expenses of maintenance, and this problem has now become an acute necessity. Everything we handle has increased in price, but the biggest bogey of all is labour. The wages that have to be paid for any sort of help have advanced several hundred percent, and, realizing with every justification that our garden, if it is to fulfil its destiny, must not be a drain on our resources and a disturber of our peace, we are confronted with the cold truth that it will have to be run on less money or given up. It may, of course, be argued that to do without paid labour is possible in a small garden. Very true, but, even so, one's own labour has to be considered. Our lives are so much fuller these days than they were, that the time available for the tending of even the most modest garden is too often wholly insufficient, and physical capacity has to be taken into account. Most garden folk are on the wrong side of middle age, and they discover soon enough, especially if they have been caught up by the pace of horticultural advance today, that their garden, instead of being a recreation and comfort, has become an anxiety and care."

How familiar these thoughts are today? Personal experience has since demonstrated that the proper use of selected plants for ground covers is the most efficient means of discouraging weeds and reducing labor to a minimum. As a result of my experiments over many years, desirable plants for varying sites and conditions are being recommended. The ubiquitous pachysandra, vinca and ivy are not included for they are all too familiar. An equal list of rampageous weeds commercially available could also be listed, but that is another subject. The recommended ground covers have been classified in the following four groups: (a) shrubs, (b) conifers, (c) herbaceous plants that spread by surface runners and (d) herbaceous plants that spread by underground runners.

This is far from an inclusive list for there are dozens of other worthy plants, but those listed are my personal favorites.

SHRUBS AS GROUND COVERS

Arctostaphylos uva-ursi, (*Ericaceae*), bearberry is the hardiest member of a genus of evergreens that are confined to western North American and Mexico. *A. uva-ursi* is the exception, ranging widely over the cooler temperate areas of the northern hemisphere. It is a trailing prostrate shrub with slender evergreen branches bearing oval shiny leathery leaves. The April to May flowers are small, urn-shaped, pink or white. The small globular fruits are brilliant red and smooth. It is an excellent carpeter in gardens in-

Opposite: Epimediums are ground cover plants for a woodland setting.

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Arctostaphylos uva-ursi. Photo by Roy Elliott.

creasing by rooting at the nodes of the prostrate stems. It will grow in full or partial sun and gracefully drape a slope or rock face.

Its cultural requirements are perfect drainage and lean soil. It can be found in mountain screes, the edge of dry conifer forests or in sandy coastal areas. The collection and establishing of wild plants is difficult; pot grown nursery stock is more dependable for establishing this excellent ground cover in many difficult situations. Tip cuttings from wild plants may be propagated.

There are a number of selected "superior" forms being propagated in the western United States, all designated as *A. uva-ursi*. Many are shipped to the colder climates of the East and invariably they have been found to be not hardy or not adaptable to this climate. These plants are actually hybrids of western parents one of which may have been *A. urva-ursi*.

Bruckenthalia spiculifolia, (*Ericaceae*), is monotypic, related to *Erica*, and occasionally known as spike-heath. It is a native of the mountains of East Europe and Asia Minor. A dwarf evergreen shrub rarely exceeding nine inches high, it is heath-like and forms close mats with short spikes of small pink to purple open bell-shaped flowers. It blooms in early June continuing for about a month. It is a pleasant evergreen ground cover which should be pruned immediately after flowering in order to eliminate the persistent dead dry flower heads and also to encourage a dense compact carpet. It will accept full or partial sun in a variety of soils and peat without any other requirements. It has persisted in my garden long beyond the life of many ericas, callunas and daboecias which were adjacent under identical conditions. It is useful as a ground cover on slopes, and as the foreground planting of shrub borders.

Gaultheria procumbens (*Ericaceae*)—Creeping wintergreen is selected from a genus of over 100 species which are spread over all continents except Europe and Africa. While there are many prostrate or dwarf species of neat habit, attractive foliage, charming flowers and showy berries, they have not proved hardy and dependable in the eastern United States where snow cover is seldom persistent. The selected species is native to a large area of the eastern United States. It is a slow growing evergreen shrub of three to six inches, spreading by creeping roots which produce upright shoots carrying a cluster of dark showy oval leaves about an inch in length. *Gaultherias* have a strong aromatic odor and taste; leaves turn reddish in winter. The summer flowers are nodding and pinkish, followed by bright red globose fruits. This native is adaptable to sunny as well as shady areas and is an excellent foreground cover for larger shrubs. Its soil requirement is merely a woodland or peaty condition. Again, pot grown nursery plants are recommended in order to assure a dependable introduction to the garden.

Mahonia aquifolium—dwarf variety, (*Berberidaceae*), Oregon-grape is one of the very few shrubs native to the western area of the Pacific States that is dependably hardy in the eastern United States. It is known from British Columbia south to Oregon and is the Oregon state flower. Of about fifty known evergreen species of *Mahonia*, the dwarf variety of *M. aquifolium* has been chosen as an excellent ground cover. Its height seldom exceeds fifteen to eighteen inches compared to the type species which easily reaches six feet, the lower portion usually being bare-stemmed. The

selected dwarf form grown here for thirty-five years has proven an excellent ground cover in deep shade as well as a dry condition. It forms thickets by spreading underground roots which produce upright shoots bearing glossy holly-like foliage. Unfortunately, it is partially browned by severe winter weather, but new foliage rapidly replaces much of this damage. The plant is in its glory in April with its fragrant, rich yellow flowers in dense terminal sprays. Occasionally blue-black berries are later produced which accounts for the common name, Oregon-grape. It is tolerant of a variety of conditions and exposures. When raised from seed it will vary considerably and many of the resulting plants will have the less desirable dull foliage.

Other western dwarf species, *M. nervosa*, *M. repens* and *M. pumila* are too slow growing to be classified as dense ground covers, but they can be very attractive for limited use.

Vaccinium vitis-idaea 'Minus', (*Ericaceae*); while the type species is a circumpolar plant, this dwarf miniature form (known as mountain cranberry) may be restricted to northern United States and Canada and also may be in Asia and Europe. It is only two to four inches in height, forming evergreen spreading mats by means of underground stolons. The arching stems bear many oval glossy dark green leaves and about May produce terminal clusters of pink-tinged, white, urn-shaped flowers. These are later followed by round, dark red fruits which are prominently displayed above the foliage. The berries, acid to taste, are useful for jellies and preserves. It is a superior evergreen ground cover for peaty areas, displaying all its virtues best in full sun, but is also adaptable for partial shade where there may be a diminution of flower and fruit. Nursery pot grown plants are the most practical method of establishing this first rate carpeter.

Rhododendron indicum cultivars, (*Ericaceae*); this group of late-blooming evergreen azaleas deserves more attention for ground cover planting. The species is native to Japan and the varieties described have proven hardy for over thirty years in the United States coastal area. Further into the interior in more severe winter climates (particularly where there is no dependable snow covering) there is a question of plant and bud hardiness. Actual hardiness can only be ascertained by experimenting with a test plants no less than three to five years of age since younger plants usually are more tender. These azaleas all are late bloomers—June into July—usually after the earlier Kurume and Kiusianum species and hybrids. They coincide with the flowering of *Cornus kousa* and *Kalmia latifolia* thus providing a fine combination for a second spring in the garden. This is an effective means of prolonging the flowering season.

Most of the varieties are dwarf, but if spaced over an area will provide a comparative quick and extensive ground cover. My experience has indicated a need to periodically lift and respace as the plants increase in diameter. Otherwise crowding will force more upward growth.

In modern gardens in Japan very large areas and slopes have been covered with these dwarf azaleas, with other taller shrubs occasionally protruding. But with the severe pruning practiced in Japan, the azaleas are continuously maintained at a dwarf height. This same general effect of mass planting is also practiced with *Enkianthus perulatus* either as a cover on a slope or pruned into hedges of differing heights. Dwarf evergreen varieties that have been utilized and which are available at domestic nurseries are as follows:



Convallaria majalis. Photo by M. Jean Cox.

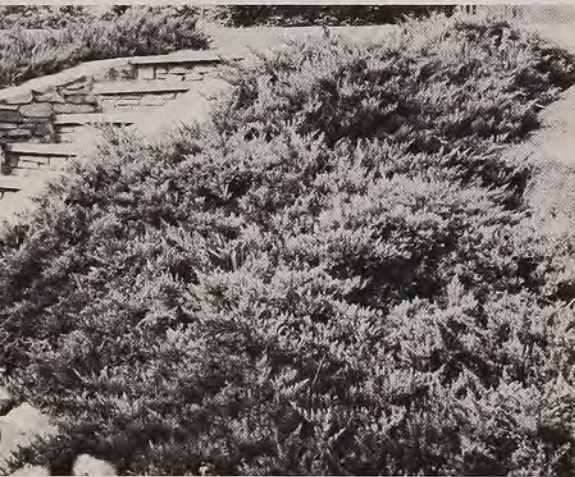
Rhododendron indicum 'Balsaminaeflorum' (Azalea rosaeflora) has been available in this country for many years. It is low and compact, blooming mid-June into July. The two-and-one-half-inch salmon pink flowers are double (about forty petals) without pistil or stamens. It is a comparatively slow grower and a charming, desirable shrub.

Rhododendron indicum 'Kok-in-shita', presumably is synonymous with the plant offered as 'Flame Creeper'. It has a habit similar to the preceding azalea but is more prostrate with large, single salmon-rose flowers, also blooming in June and July. This is another excellent dwarf carpeter.

Rhododendron indicum 'Kin-no-zai'—(syn. 'Laciniatum') is taller in habit than the two previous azaleas and is a curiosity. The five reddish, narrow, strap-shaped petals are widely separated. Occasionally some will revert to full size petals. It is an interesting novelty.

Rhododendron indicum 'Crispiflorum' (syn. Azalea macrantha) is a very hardy plant introduced over 100 years ago by Fortune. It has large bright pink flowers with slightly waved edges and blooms in late June into July.

Rhododendron indicum 'Eriocarpum Gumpo'—is a slow growing, dwarf form of dense compact habit. There are at least three color forms, white, pink and rose, all large and frilled blooming June into July. Having excellent shiny foliage, it has proven to be a superb ground cover when used in mass in partial shade.



Juniperus horizontalis 'Wiltoni'.

Photo courtesy of Stern's Nursery.

CONIFERS AS GROUND COVERS

In the maize of conifers now available, the junipers provide some of the most desirable forms of ground covers. They are extremely valuable both aesthetically and practically and are useful in various situations. Some maintain neat, prostrate growth and thus are suitable for formal as well as informal sites. Juniper foliage varies through shades of green, with many textures. Junipers are effective, long enduring covers for many difficult situations. The following varieties have been useful for problem areas in either full or partial sun.

Juniperus conferta—the shore juniper is a native of the sea coasts of Japan. It is prostrate with short, ascending, bright green branches which contrast with other blue, grey or dark green junipers. It is an invaluable undemanding carpet for many difficult areas.

Juniperus horizontalis is a North American prostrate shrub rapidly extending its long branches over many yards. Several named forms have been introduced, each slightly varied in color and growth habit. Selected favorites include: 'Bar Harbor', one of the oldest varieties which closely hugs the ground spreading in all directions. The very short ascending branchlets are glaucous, grey-green; annual growth may reach eighteen inches or more. *J. horizontalis* 'Wiltoni' later was renamed 'Blue Rug' and is one of the best forms, more compact than 'Bar Harbor', forming a glaucous-blue carpet.

Juniperus squamata 'Prostrata' is a slow growing, prostrate, billowy Chinese plant of excellent blue grey color throughout the year. It can eventually produce a wide-spreading specimen as evidenced by my six-inch plant inserted in a pocket in a huge horizontal granite outcrop. After twenty-five years of unrestricted growth the octopus-like mass now spreads about twenty-four feet.

Juniperus procumbens 'Nana'—the type species from Japan is a procumbent, billowy plant. But this selected compact form has shorter branches and is a much slower-growing type. The two plants have become confused in the nursery trade; the majority being offered under this name really are the species, a fast-grower.



Ajuga reptans.

Photo by M. Jean Cox.

HERBACEOUS PLANTS THAT SPREAD BY SURFACE RUNNERS

Ajuga reptans, (*Labiatae*); of all the stoloniferous ground covers I recommend, this European plant is the most invasive, particularly under ideal conditions of sun and moisture. But it can be effective and useful in wild, unrestricted areas. It is not demanding and also will do well in shady and dry conditions. It can be controlled easily, or even eradicated when desired. There are several varieties of this species; 'Atropurpurea' has the best color effect providing a shining metallic purple carpet of flat foliage. It bears five-inch blue flower spikes. 'Pink Spire' is similar to the type species but with pink flowers instead of blue. There also are at least two blue-flowering, variegated varieties, one with white, grey and green foliage and another with more brilliant variegation having some rose color added. These two require partial shade to develop full color.

Two other *Ajuga* species available are *A. genevensis* and *A. pyramidalis* neither of which have effective stoloniferous ground cover ability, but form only individual clumps.

Phlox stolonifera 'Blue Ridge', (*Polemoniaceae*); the species is native to the central Eastern States, its usual flower color is lavender to purple. The cultivar 'Blue Ridge', with light bluish blooms, was selected in the wild by Mrs. Mary C. Henry (a beautiful albino also has recently been introduced.) This is a creeping plant producing runners which quickly send down roots from the nodes. It is a rapid and wide-spreading carpeter which prefers woodland conditions. Its spring flowers, on six to ten-inch stems last longer in shade. All the forms are long-lived with considerable charm and are useful as ground covers among rhododendrons and other shrubbery. Propagation is simple, merely remove rooted stolons and replant. The carpet of broad oval leaves is not too dense; snowdrops and other vigorous bulbs may be planted beneath.

Potentilla alba, (*Rosaceae*), native to central and southern Europe, is a vigorous spreading perennial with smooth grey-green leaves and with white, orange-eyed, one-inch flowers from spring into autumn where exposed to sun. Being very adaptable it will provide an excellent five-inch high spreading carpet in the shade. The palmate leaves are silky-silver on the underside creating a glistening effect. It is excellent as an edging for a shrub border or intermingled in a woodland setting or in rock garden ledges or retaining walls. Propagation is easily accomplished by dividing the clumps.



Phlox stolonifera 'Blue Ridge'. Photo courtesy of J.E. Downward.

*Tiarella cordifolia.*

Houstonia serpyllifolia (Rubiaceae) is one of the daintier moss-like covers for moist but well-drained areas. This species, commonly known as bluet, has tiny round leaves or stems that creep and form dense mats. In May it is covered with blue flowers and is an excellent cover for spring flowering bulbs that can easily penetrate it. It also may be used between partially shaded stepping stones but should be slightly recessed to avoid abuse by traffic.

The more common species, *H. caerulea*, requires similar cultural conditions but merely forms small mounds without the ability to creep and spread. It is a shorter-lived plant but usually self-sows. Both are easy to propagate by division of the mats or clumps.

Saxifraga stolonifera, (Saxifragaceae), previously known as *S. sarmen-tosa*, usually has been used as a house plant under names of mother-of-thousands, aaron's beard, roving sailor or strawberry-geranium. This stoloniferous species from China and Japan has endured for more than a score of winters in my garden and is invaluable as a cover for shady, damp areas. It is perfect along moss covered rock outcrops or slopes where the stolons bearing young plants root readily. The fleshy, pale-marbled leaves have brownish red hairs. In summer flower stems nine to twelve-inches high appear bearing pink and white flowers. A closely related species in the same Diptera group is *S. veitchiana* (from China) which has smaller deep green foliage, but with the same stoloniferous habit. It is an even hardier plant and can be used in similar situations.

Tiarella cordifolia (Saxifragaceae)—the foam flower of the eastern United States is a beautiful, easy, woodland plant. It spreads rapidly by surface runners, forming large mats which can overrun smaller neighbor plants. Its aggressive nature does not make it a weed, but in average woodland conditions it should be given sufficient area to become a feature ground cover. A sea of foamy white, twelve-inch high flower spikes appear during May. This can be utilized in many gardens for slopes, bulb cover, underplanting rose beds and among rhododendron collections. It is a plant not sufficiently appreciated in its native country.

HERBACEOUS PLANTS THAT SPREAD BY UNDERGROUND RUNNERS

Asarum europeum, (Aristolochiaceae), European ginger is a useful compact ground cover for dense shade, even under shrubs, trees, and conifers. The leathery foliage is roundish, kidney-shaped, shining and dark green. The dull brown, inconspicuous flowers are set at the base of the foliage and have no decorative value. Under moist, favorable conditions, self-sown seedlings will appear, a simple means of increase. Division of plants is easy. If planted in a bright situation the foliage will lose its dark green, lustrous appearance.

Asperula odorata, (Rubiaceae); sweet woodruff is another European native and is known for its use in flavoring "May Wine". It is undemanding and while essentially a woodland plant will also accept more open situations if not too dry. It can become invasive under ideal conditions and thus should be allotted sufficient space to ramp. The six inch high foliage has leaves in whorls or eight, with pure white, fragrant starry flowers. It is easily propagated by division.

Ceratostigma plumbaginoides, (*Plumbaginaceae*); the requirements of this native of China (previously known as *Plumbago larpentae*) are the opposite of the two previous species. Ideal cultural conditions are full sun, lean, well drained soil, and as a cautionary measure, a restricted area for controlled growth. It spreads rapidly by underground runners, forming masses of dark green, round foliage on wiry twelve to fifteen-inch stems. In late summer the terminal clusters of indigo-blue flowers are profusely produced and continue into the autumn. Meanwhile the leaves take on a bright red autumn tint, adding to its decorative value. This species is easy to propagate; divide clumps as growth starts in the spring.

Convallaria majalis, (*Liliaceae*); lily-of-the-valley is too well known to require detailed description. It can become a nuisance when encroaching on neighboring plants, but there are desirable features which warrant its use in the proper setting. There are few ground covers that can provide bouquets of such delightful fragrant flowers for a month or more in spring. If some are planted in sun and others in shade the blooming season can be extended. A superior named form, 'Fortin's Giant', with larger flowers produced about two weeks later also extends the season. There are situations where *convallaria's* robust root growth will overcome hardships that cannot be endured by weaker plants.

Epimedium, (*Berberidaceae*), there are several species and hybrids of barrenworts in cultivation, but they are generally confused and improperly named in the nursery trade. Only occasionally are the correct names affixed; accordingly, personal selection when the plants are in the bloom is the ideal method of procuring the desired variety or color. The species are distributed over the north temperate areas of Europe, Asia, North Africa, with the best from China and Japan. They all will grow well in sun or shade, in any fertile loam, sandy or heavy. When established, the roots spread moderately so that the clumps become enlarged and plants then can be divided for increase. These are delightful and unusual plants for ground covers; the ideal position is in semi-woodland. The foliage is borne on wiry stems from ten to eighteen inches high, usually with three leaflets which are pleasantly tinted in spring and autumn. The spring blooms vary in size and shape and range in color from white, cream, yellow, orange-red, lavender, violet to almost red. Shear the old foliage in late winter to expose the flowers as they emerge in spring. Under whatever name you acquire an epimedium the cultural suggestions are applicable. They are all easy and almost of indestructible temperament in any cool situation. Why is a plant with such admirable attributes so seldom available and so lacking in fine gardens?

Shortia galacifolia, (*Diapensiaceae*), oconee-bells is native to the Southern Appalachian Mountains and is one of the finest native American evergreen plants. In nature this is found in the shade of massive rhododendrons in spongy leaf mold. Nursery established plants in containers are the most dependable means of introducing this choice hardy plant to the shady garden. Its preference is for soil well supplied with peat and or acid leaf-mold to retain moisture. Established plants will slowly enlarge, producing large mats which may be divided for replanting. The attractive leaves about three inches in diameter, are dark green, shiny, turning to bronze and dark maroon during the winter. The spring flowers are solitary one-inch white to pink fringed bells on about five-inch stems. The entire plant is durable and hardy and a most pleasing ground cover throughout the year.❖



Asperula odorata. Photo by M. Jean Cox.

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