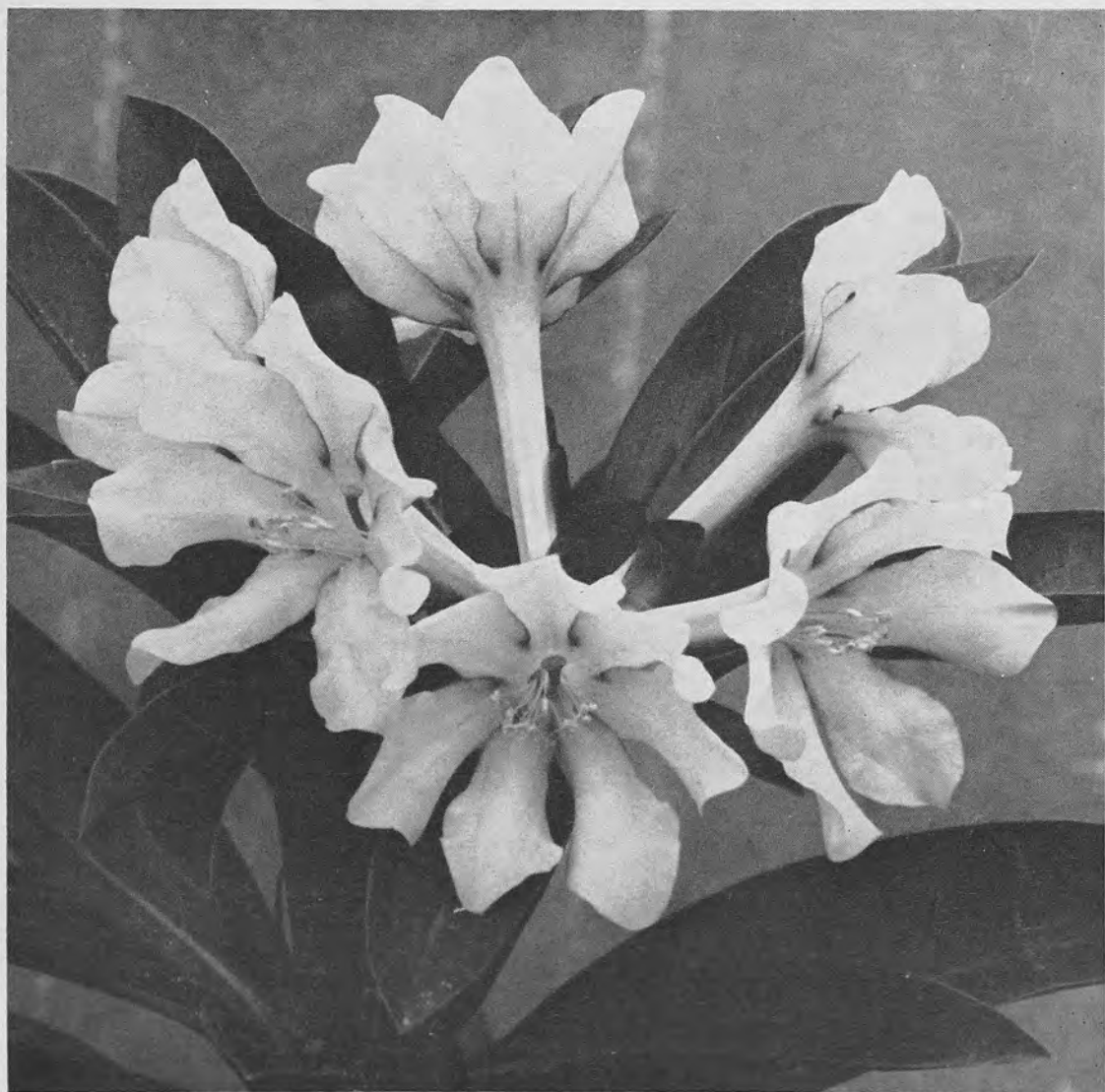


THE AMERICAN
Horticultural
MAGAZINE



AMERICAN HORTICULTURAL SOCIETY INC.

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For United Horticulture

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COVER ILLUSTRATION

Rhododendron leucogigas. A striking, recently described species from New Guinea with individual flowers 6 inches long and 5 inches wide, white, suffused carmine rose, with a strong carnation fragrances.

PHOTO P. H. BRYDON



*The Social
Significance
of
Horticulture*

There are few individuals who are not quickened by association with living, growing plants. Children are especially responsive to them but people of all ages find that a few seeds which develop into a plant of their own growing can have a profound and stabilizing influence upon their lives. All of us want to live near green grass and colorful flowers and leafy trees.

As civilization continues in its ponderous climb to urbanization we tend to think in terms of giant parks to relieve our steel and glass, and concrete and asphalt surroundings. Instead of the giant park, think how effective a hundred scattered, smaller areas might be! It takes such simple things, and so little, to quicken the spirit and bring light to a drab existence—a flower box on a fire escape, a potted plant on a window ledge, a small parcel of green grass nearby.

Here is where the greatest efforts of our American Horticultural Society should be applied—in schools and with civic groups—giving freely of our time and of our talents. In fact, it is a question whether the greater beneficiary in such an enterprise may not be he who gives rather than he who receives. It is clearly upon the stage of social and human welfare that we must focus our attention.

The social problems of our times will not be solved by material means alone. We speak of poverty and

think of material solutions, unmindful that many recipients of our largess are richer in spirit and more understanding of life than we who dispense the charity. Horticulture is much more than an avocation for leisure time. It is concerned with the enrichment, ennoblement, nourishment, and growth of the spirit.

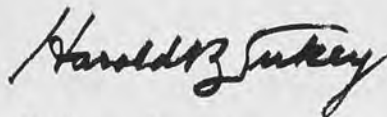
Then why should we not bring all of our tremendous knowledge and experience and skill in horticulture to bear on our pressing social problems! Simply bringing plants into the daily lives of human beings in all walks of life, young and old, country people and city people, those in poverty and those in affluence—this would be a major solution for many of our social ills.

The beautification program of the Federal Government is aimed in the right direction. So is the American Horticultural Society, and so are the thousands of garden clubs, the 4-H programs, the boy and girl scouts, the park and recreation people, the school programs, the botanical gardens and arboreta, and the thousands of plant lovers all over the country.

Environmental beautification is a great force with a great potential for good. All that is lacking is our own personal resolve to do some of this work ourselves. Let us offer our own green thumb skills to the fine programs in our own communities and do our part to make them green oases for *all* of our fellow citizens. If we cannot locate such programs let's start some!

The challenge for all of us who are gardeners, whether novice or professional, is simply this: To bring the benefits and the joys of horticulture to those of our neighbors who have not known them before.

May the inspiration of our leadership inspire all of us in horticulture to needed action. This is our hope and our prayer.



*Professor Emeritus,
Michigan State University
President,
XVII International
Horticultural Congress/1966*

August, 1968



OFFICIAL CONGRESS PHOTOGRAPH

Mrs. Lyndon Baines Johnson

The First Lady served as Honorary President of the XVII International Horticultural Congress which held its first United States meeting at College Park, Maryland, August, 1966.

B. Y. Morrison Memorial Lecture

INTRODUCTION

ORVILLE L. FREEMAN

The Agricultural Research Service of the Department of Agriculture recently established the B. Y. Morrison Memorial Lectureship honoring this distinguished scientist who was the principal founder of the American Horticultural Society, its president for four years and the editor of this Magazine for 37 years until shortly before his death in 1966.

The First Lady delivered the first B. Y. Morrison Memorial Lecture before the annual meeting of the American Institute of Architects on June 26, 1968 in Portland, Oregon.

In presenting Mrs. Johnson, Secretary of Agriculture Orville L. Freeman said, "It was to further man's search for beauty that the B. Y. Morrison Lectureship was founded. We want to recognize and encourage outstanding accomplishments in the science and practice of ornamental horticulture. The lecture is to be given annually by an individual chosen for his or her significant contributions in this field.

"B. Y. Morrison was a scientist, administrator, landscape architect, plant explorer, author, and lecturer. He advanced the science of botany in the United States and gave the American public new ornamental plants. He was the creator of the famed Glenn Dale azaleas, and the first director of the National Arboretum which is today one of the world's great centers for research and education in botany.

"The choice of Mrs. Lyndon B. Johnson to give the first Morrison Memorial Lecture was almost inevitable. She has been one of the single most powerful influences on ornamental horticulture that this country has ever known. She has generated unprecedented interest and support in this science, inspiring millions of people, through her travels, writings, and speeches, to discover the pleasure—and recognize the necessity—of growing and caring for flowers, trees, and shrubs.

"Once-bleak squares and parks have blossomed, barren school grounds have greened and bloomed as civic and professional groups, industry and business, the young and the old have taken a new look at their communities. They have found that the planting of ornamental plants can spark new and determined efforts to improve all aspects of the quality of living in their communities.

"These many projects across the land demonstrate that beauty has its utilitarian as well as its spiritual aspects. Mrs. Johnson and those who work with her have shown us how beautiful America has been and can be again. She has reminded us of what naturalists and artists have always known: that men's spirit cannot be shut off from Nature and from beauty unless civilization is prepared to pay a bitter price.

"She believes with Santayana who said, 'Beauty is a pledge of the possible conformity between the soul and nature, and consequently a ground of faith in the supremacy of the good.'"

B. Y. Morrison Memorial Lecture

MRS. LYNDON B. JOHNSON

The man whose name this lecture bears—B. Y. Morrison—was a horticulturist of great skill and knowledge and imagination.

I hasten to tell you that I am not an expert, but only a citizen deeply concerned about the relationship between the natural world and the world we are building. I am one of millions of Americans who are both troubled—and hopeful—about the physical setting of life in our country.

As you may know, my concern has been expressed in an effort called "beautification."

I think you also know what lies beneath that rather inadequate word. For "beautification," to my mind, is far more than a matter of cosmetics. To me, it describes the whole effort to bring the natural world and the man-made world into harmony; to bring order, usefulness, and delight to our whole environment. And that, of course, only begins with trees and flowers and landscaping.

If we are to obtain the vital balance of nature and architecture and man, the architects must become thoughtful political activists.

Years ago, when the white man came to barter with the Indians, the great chief, Tecumseh, asked this question: "Sell the country? Why not sell the air, the clouds, the great sea?"

His sharp inquiry reflects the rich sense of man's harmony with nature which the ancients felt. The Indians did not overwhelm the land; they lived as *part* of it. They were *in* nature—not alien to it. They were users and sharers

of their environment—not exploiters of it.

Far be it from me to yearn for a return to the lost past. But surely it is not wrong to hope that modern man—modern, urban, mechanized man—will somehow recapture that sense of balance between his life and his environment before it is too late.

Already, in our age, we have done many of the things which Tecumseh considered unthinkable. Too often, we have bartered away not only the land, but the very air and water. Too often, we have sacrificed human values to commercial values—under the bright guise of "progress." And in our unconcern, we have let a crisis gather which threatens health—and even life itself.

As a people, Americans have prized the virtues of the land: simplicity, honesty, hard work, physical courage, individualism, optimism, faith.

A preponderance of concrete and asphalt—of fumes, haze and screeches—goes against our grain in a cultural way, as well as a biological way. Both dimensions of our makeup have been offended and poisoned.

Today, environmental questions are matters for architects and laymen alike. They are questions, literally, of life and death.

Can we have a *building boom* and beauty, too?

Must progress inevitably mean a shabbier environment?

Must success spoil Nature's bounty?

Insistently—and with growing volume—citizens everywhere in America are de-

manding that we turn our building to a sensible human purpose. They are asking—literally—for a breath of fresh air; for pleasant precincts in the heart of the city; for relaxation as well as excitement; for more reminders of nature in the city center.

Public opinion is calling for these things. And in my nearly 34 years of living with a public servant, I have learned the value of heeding such a call—not only for Presidents, but also for Mayors and City Commissioners.

We are being asked to develop a wholly new conservation.

The Total Environment

For the American architect, I think the New Conservation means first, *a concern for the total environment*—not just the individual building, but the entire community. No one knows better than you that the loveliest building can be nullified if there is no sign control ordinance, or if it sits in a pocket of hazy gray smoke.

The answers cannot be found in piecemeal reform. The job requires really thoughtful inter-relation of the whole environment: not only in buildings, but parks; not only parks, but highways; not only highways, but open spaces and green belts.

When the New Conservation speaks of the vast rebuilding that America must undertake, it does not mean on the old terms of freeways ripping through neighborhoods and parks, or of drab public housing, so all-alike that it reminds one of Gertrude Stein's phrase, "There's no there there."

It means a creative environment where people's imagination and variety of choice can flourish.

In the realm of transportation, one has only to think of Williamsburg, where cars are the exception, or of EXPO where there were a half dozen charming ways of moving about, to imagine what our communities could be like if we applied all that we can do.

In a related field, Congress has been considering a modest measure, the High-

way Beautification Act, that would help states landscape their new freeways, build some picnic areas, and diminish the advertising that sprouts along public rights of way.

This spring Vermont passed a measure to ban all billboards in the state. Instead, they substituted an ingenious system of roadside information booths. As Vermonters know, tourists were not attracted by a forest of signs.

The great challenge now is to rally citizens outside the architectural community—so that not only designers, but city officials, businessmen, and plain citizens will share your concern for the total environment.

The Human Scale

Secondly, the New Conservation will ask that the architect *design with people in mind*—seek to build an environment on a truly *human scale*.

I earnestly hope that our civilization is remembered for more than its mammoth freeways and vast urban superblocks; for more than the isolated, impersonal, gigantic public housing projects of our cities. Too many of these great projects seem to me to be reproaches, not signs of progress.

The architecture which excites me most is made for delight and intimacy: for the enjoyment of those who inhabit it.

For instance, Philadelphia has found a way to depress its new Delaware River Expressway and will put a pedestrian plaza on top, binding the city to its waterfront. It says, "People matter—not just traffic."

Ghirardelli Square in San Francisco is a marvel of attractions and surprises for the strolling shopper.

Niccolet Mall in Minneapolis is an inviting, lively, commercial area built to make shopping a pleasure.

This concern for human values, human scale, human enjoyment, also means preserving what is historic and good.

Georgetown, D. C., of course, is a

famous example of how the past can serve the present.

And in Savannah, Georgia, history-minded architects have marked 1100 priceless old homes to be restored.

At HemisFair, the planners have built a great modern exposition area—but thirty old buildings have been lovingly preserved and restored, and they are among the most colorful punctuation marks at the HemisFair complex.

Natural Beauty

Concern for the whole environment; attention to the human scale—and finally, a new emphasis upon areas of *natural beauty*, both inside the city and beyond its borders, are three essential ingredients.

The twentieth century citizen, no less than his ancestor of another age, craves and needs to be reminded of his place in nature. The park, the public garden, the shady forest trail, the tree-lined river winding through a city; these are not only physical, but spiritual resources.

Fortunately, our ancestors realized this. So New York has its Central Park, and more than a dozen other cities once had their park systems laid out by Frederick Law Olmsted.

Who can imagine Washington without its hundreds of green oases—526 triangles and squares to be exact—the legacy of l'Enfant, its old Chesapeake and Ohio Canal, its thousands of trees and open skies?

Who can fail to delight in San Antonio's meandering little river, through the heart of the city, lined with walkways, terraced gardens, busy outdoor cafes?

Paley Plaza in New York—with its rushing waterfall—is more than a triumph of urban design. It is a reminder to the city dweller that there is a world beyond the asphalt and the concrete: it is a touch of nature in the city din.

It is a challenge to every public-spirited American architect—to every planner interested in the New Conservation: a challenge to provide such pleas-

ant lingering places wherever they are needed.

For too many of the youth in our cities the experience of nature has been polluted water, and a "no swimming" sign. The tensions and ill-effects of a poor environment will continue until there is enough open space, for challenge and refreshment, close to home.

In my own experience right now, nature is encountered most closely when I leave the city to go to our Ranch. I quickly then come in tune with the great rhythms of life. I always know whether it's a new moon or a full moon—or the dark of the moon. When storms come, I participate in them and thrill at the great black thunderheads, and the crackle of lightning, and the majesty of thunder. I rediscover a sense of hearing and I smell all the blossoms and grasses on the afternoon air after a rain. And it is good for my spirit.

This participation in the seasons and the weather is one of the most vital and renewing experiences of life—too important to be reserved for vacations or for the few.

Accomplishing all these things will require a major undertaking by America's architects.

So deep is the environmental crisis, so urgent is the demand for change, that architecture must become not only a profession but a form of public service.

When so many are affected by your work, you are serving not only the client who commissions your work and pays your fee: *the public is also your client.*

When so many need your help, it becomes urgent that you look beyond the usual market and find new areas of service.

That is why I was heartened—no, jubilant—when I learned that A.I.A. members are entering the ghetto and tackling urban blight—whether or not the client can afford traditional fees.

Three Problems

And now, I hope that I can enlist you in solving three specific problems which are very much on my mind.

First, there is the problem of *creating a "design conscience" in every major community.*

Well over a century ago, Henry Thoreau said, "It would be worthwhile if in each town there were a committee appointed to see that the beauty of the town received no detriment."

Washington has its Fine Arts Commission and its Committee for a More Beautiful Capital. Surely it might be a major step if other cities had similar public bodies—led by architects and planners—to act not as censors, but as educators and guides and leaders toward a sane and decent environment. I hope that each A.I.A. Chapter might consider this and persuade its local government to establish such catalytic groups.

Second there is the problem of *unsightly shopping centers.*

How many shopping centers are monuments to our lack of imagination, to our indifference? Too many suburban shopping centers offer a depressing spectacle: vast, desert-like parking lots, and dull and uninviting buildings. The shopping center has become a sort of "urban strip-mine," a place of exploitation, when it could be a vital and attractive village center.

Finally, there is one of the most difficult problems: *the ugly, ragged city fringes, the blatant neon jungles at the entrance to metropolis.*

If there is any place in urban America where the natural world and the man made world are at odds, it is at the city's edge. I hope that architects and planning commissions and metropolitan governments address themselves to this

blight *now*, and find some solutions before the visual chaos becomes irreversible—and unendurable.

We talk about "nature," about design, about the environment. But what we are really discussing is *people*—not abstractions, but human beings.

One day I was walking by a drab and crudely vandalized elementary school in Southeast Washington. One of your A.I.A. members was with me. Looking up at the broken windows, he made a remark I couldn't forget: "A rock through a window," he said, "is an opinion."

Today that school is a new place. A private donor underwrote the efforts of our Committee—and now, the school's community plaza offers city children delights once found only in the country: cascading water, hills to climb, a deep amphitheater for games, dancing and other diversions.

Seeing that hopeful place, I know that the nature we are concerned with, ultimately, is *human* nature. That is the point of the beautification movement—and that, finally, is the point of architecture.

Winston Churchill said, "First we shape our buildings—and then they shape us." And the same is true of our highways, our parks, our public buildings, the environment we create: they shape us.

You are shaping people—shaping lives. And so your countrymen are looking to you for creative insights, deep compassion, bold leadership.

I am sure you will give them nothing less.

The Strybing Arboretum and Botanical Garden of Golden Gate Park

SAN FRANCISCO, CALIFORNIA

P. H. BRYDON, *Director*

The Strybing Arboretum and Botanical Garden is owned by the City and County of San Francisco and operated by the Recreation and Park Department. It is located in Golden Gate Park, and borders Lincoln Way between 9th and 19th Avenues. The Arboretum was made possible by a bequest from the late Helene Strybing and had its beginning in 1937 when John McLaren, the creator of Golden Gate Park, appointed Eric Walther as its first Director. What was once a barren stretch of sand dunes is now a sixty-four acre Arboretum including over 5000 species from all over the world.

In 1960, a master plan indicating major roadways and topographical changes was designed by landscape architect Robert Tetlow. The first phase, completed in 1963, provides a new main gateway and several new areas which have been planted recently. One of the most popular is the Strybing Arboretum-Sunset Magazine Demonstration Home Gardens which is contained in a two acre enclosure to the right of the main entrance. The purpose of these gardens is to help home owners by demonstrating construction, landscape, and planting ideas. The gardens constitute a year-round display, planned to permit seasonal changes in plantings and structures and to demonstrate the best use of plants ideally suited to the climate of San Francisco. The gardens also serve as a showcase for new introductions by the Arboretum and horticultural establishments in the San Francisco Bay area.

Proceeding into the Arboretum from the Demonstration Gardens, a fountain is visible in the distance against a dark background of Monterey Cypress (*Cu-*

pressus macrocarpa). To the left, protected from prevailing winds by tall Monterey Cypress and Monterey Pines (*Pinus radiata*), is a long deep border containing a representative collection of the Magnoliaceae, including the spectacular oriental magnolia species *M. campbellii*, *M. sargentiana* var. *robusta*, *M. sprengeri* 'Diva', *M. dawsoniana*, and the hybrid *M. × veitchii*. Also included are interesting magnolia relatives. *Talauma hodgsonii*, *Michelia doltsopa*, *M. figo*, *Illicium religiosum* (*anisatum*), *I. floridanum*, *L. parviflorum*, *Liriodendron tulipiferum*, *Kadsura japonica*, *Drimys winteri*, *D. lanceolata*, and *Manglietia insignis*, the latter one of the most primitive of the flowering plants.

Nearby, and on either side of the fountain, is a collection of some thirty-five cultivars of flowering crabapples which provide a continuity of color to the earlier magnolias.

Across the way is the Garden of Fragrance which has been constructed for the recreational benefit and enjoyment of the visually handicapped. For them, the plants on display offer special sensory experience by their texture and fragrance. The statue of St. Francis, at the head of the water course, is the work of the San Francisco sculptress, Clara B. Huntington. This statue was featured in the courtyard of the San Francisco pavilion at the 1939 International Exposition on Treasure Island. The stones for the walls and water course were salvaged from the 13th Century Spanish monastery, presented to San Francisco by Wm. Randolph Hearst in 1941.

The second and final phase of the master plan, completed in 1966, is the "key" to a multitude of pending activi-

ties. The staff can now proceed with permanent plantings of new accessions which have been held in our nursery until suitable locations were made available. New vistas have been created which orient visitors much better than formerly as to the direction of entrances and exits. Apart from thinning, pruning, and a re-alignment of main roads, there has been little change in the older part of the Arboretum where a geographical arrangement is still maintained.

In the Australian Section, the lilly pilly tree (*Acmena smithii*), 25 feet tall, charms visitors with its masses of light purple fruits in April, May, and June. Close by, the curious brown flowers of *Boronia megastigma* fill the air with heady fragrance. In the nearby South Africa Section, a sizeable specimen of the silver tree (*Leucadendron argenteum*), some 40 feet tall, is lovely against a blue summer sky. Down the path in the Chilean Section, *Puya chilensis*, one of several species in our collections, sends up its huge "asparagus" stalks to fourteen feet and bears four foot inflores-

cences of greenish yellow flowers in April and May. The principal trees in this section are the mayten (*Maytenus boari*), the monkey puzzle (*Araucaria araucana*), *Nothofagus procera*, *Eucryphia cordifolia*, and *Drimys winteri*, some of which were planted in 1938 shortly after the opening of the Arboretum.

Along the main axis, which bisects the Arboretum below the Chilean Section, are some spectacular specimens of the Torrey pine (*Pinus torreyana*). The largest one has a trunk circumference of 43 inches at 2 feet above ground level and is now 60 feet tall.

To the west of the main axis is the China, Japan, Himalaya Section and here the staff is presently engaged in extensive thinning and removal of undergrowth and a few trees which, because of close planting, are no longer significant as plant specimens. The 45 foot dove tree (*Davidia involucrata*), never fails to attract attention in late April when it is covered with its white fluttering bracts so reminiscent of doves, or pocket handkerchiefs. It has some illus-

Fig. 1. Garden of Fragrance with a background of Monterey Cypress (*Cupressus macrocarpa*).

PHOTO MARTHA ROSMAN





PHOTO MARTHA ROSMAN

Fig. 2. Looking south toward the Redwood Trail.

trious neighbors in *Magnolia campbellii* 'Alba', 55 feet tall, *M. campbellii* 'Strybing White', 70 feet tall, and the original imported plant of *M. campbellii* which came from Stuart Low in 1924 and is probably the first of this species on the west coast.

There are few places in the United States where *Rhododendron* species and hybrids of the Maddenii Series do better than in Golden Gate Park. The glorious displays of *R.* × 'Fragrantissimum', *R.* 'Princess Alice', *R. maddenii*, *R. crasum*, *R. nuttallii*, and *R. burmanicum* delight the visitor in the spring. At present, we are particularly interested in a number of species which are being grown from seed collected in New Guinea by Dr. Sleumer, of the Rijksherbarium, Leiden, Holland. These species are popularly included in the so-called Javanicum group and, while considered tender in Great Britain, some of them have proven hardy out of doors in pro-

TECTED locations in the Arboretum. Since most of the species belonging to the "Javanicum Series" are lepidote and possess a wide color range, it is possible that they may cross with members of the Maddenii Series, the species of which are predominantly white and fragrant. Certainly, it is worthy of a try. In addition to the above, there are two hundred and thirty species under cultivation in the *Rhododendron* Section.

One of the conditions of Mrs. Strybing's bequest was that the Arboretum contain plants native to and characteristic of California. Consequently, five acres have been devoted to native plants and over 420 species are displayed in the recently installed California Section. Within its boundaries is a small grove of coastal redwood (*Sequoia sempervirens*) called the Redwood Trail which has been designed as an area for the study of the unique flora of our coastal redwood forests. It contains about one hundred



PHOTO P. H. BRYDON

Fig. 3. Portion of Rock Garden and James Noble Dwarf Conifer collection.

Fig. 4. *Rhododendron* 'Countess of Haddington'. A hybrid of the Mad-denii Series which thrives in the climate of San Francisco.

PHOTO P. H. BRYDON





PHOTO P. H. BRYDON

Fig. 5. *Davidia involucrata* var. *vilmoriniana*. The dove tree, or pocket handkerchief tree, flowers in late April and early May. Strybing's largest specimen is now 25 feet tall.

and fifty species of native plants which grow in association with the redwoods, each species clearly marked with its scientific and common name.

The Arboretum's In-Service Training Program for school teachers began here in 1962. The purpose of this program is to conduct a series of lectures and field trips to assist the teachers in the presentation of nature study classes at the grade school level. Its aim is to provide an opportunity for the pupil to become

familiar with the living things which inhabit the earth's surface and thereby gain an appreciation of their importance to our culture and economy. There are two courses presented each year, each consisting of fifteen two-hour meetings which are equally divided between lectures and field trips through the Arboretum. Courses include botany, ecology, and horticulture as well as additional information about plants and animals, their histories, native habitats and

legends, with literary references. Since 1962, 400 grade school teachers, 60 girl scout leaders, 20 compensatory education teachers, and 30 adult volunteers have completed the course. Through them we have reached over 50,000 children with this program in six years.

There are still twenty acres of undeveloped land adjacent to the California Section which were not considered under

the master plan. Some 50 years ago, this remaining portion of the Arboretum was planted to Monterey Pines (*Pinus radiata*). The land is gently undulating with an undercover of native grasses and a loose sandy soil. After careful consideration, it was felt that this area should be utilized as a nature trail to supplement the existing Redwood Trail. It is not our intention to landscape this area in

Fig. 6. *Michelia doltsopa*. An evergreen tree from the eastern Himalayas with white flowers 7 inches across and very fragrant. Closely related to magnolia.

PHOTO P. H. BRYDON





Fig. 7. *Puya chilensis*. The dense spikes of this huge Chilean bromeliad are greenish yellow and over 12 feet in height.

PHOTO P. H. BRYDON

Fig. 8. *Magnolia campbellii*. Flowers 10 inches across are deep rose without and paler within. This magnificent Himalayan species first flowered in the United States at the Strybing Arboretum in February 1944.

PHOTO P. H. BRYDON



the popular sense and there will be no manicured lawns nor brilliant displays of exotic plants, but rather a natural planting of California native trees, shrubs, and herbs with foot trails following the natural contours to each point of interest. Under the guidance of trained instructors, a Nature Trail can bring the natural world closer to the visitor, young as well as old, by demonstrating in a systematic way how living things are dependent upon one another and how they are influenced by the habitat in which they live. This phase of education cannot be easily demonstrated in a classroom, but out of doors, a properly organized Nature Trail can show in a dynamic manner, the inherent unity that prevails between all living organisms.

There are always interesting plants in the Rock Garden. Its principal feature is the James Noble collection of dwarf conifers. Rare and unusual dwarf pines, cedars, firs, and cypress amaze the visitor, who, more often than not, believe them to be artificially dwarfed in the bonsai tradition.

The Hall of Flowers is a splendid addition to the Arboretum and, with the Demonstration Gardens, constitutes the San Francisco County Fair area. Within the building is the office of the Strybing Arboretum. While the Hall of Flowers was designed primarily for flower shows, the facilities are available to civic and cultural organizations on dates which do not conflict with scheduled flower shows and garden club meetings. During the fiscal year of 1967-68, the total attendance was over 180,000 and represented 410 separate events.

In the last six years, great progress has been made in the Arboretum and this has been largely due to the interest and support which has been received from the Strybing Arboretum Society. Its members have contributed generously, not only of money, but also knowledge and skill.

Now that the Master Plan has been completed we look forward to the refinements which can now be carried out in the newly prepared areas in the Arboretum.

Hollies of the Canary and Madeira Islands

KORNELIUS LEMS

The original version of this article was published in the Proceedings of the 43rd meeting of the Holly Society of America and was based upon a talk presented at the University of Maryland, College Park, Maryland, November 9-10, 1967.

Professor Lems died on March 17, 1968 in an automobile accident. He was Associate Professor and Chairman, Department of Biological Science, Goucher College, Baltimore, Maryland. Professor Lems had visited the Canary Islands on several occasions collecting plants, including hollies, for a projected flora of the Islands.

The present article has been revised to some extent from the original with materials provided by Professor Lems for this purpose just before his untimely death.—Frederick G. Meyer

The Atlantic Islands of the Madeira and Canary groups have two species of holly. One of these, *Ilex canariensis* Poir., is found only on Madeira and on five of the seven Canary Islands (Gran Canaria, Tenerife, Gomera, Palma, Hierro). The other species, *Ilex perado* Ait., occurs on Madeira, on two of the Canary Islands (Tenerife, Gomera), and also on the Azores, and in southern Spain and Portugal. The present article reports on the natural conditions under which these two hollies live in the islands, and to present information about their ecological and genetic relationships to *Ilex aquifolium* L. and other species of horticultural interest.

The Species

Ilex perado

Ilex perado consists of several closely related varieties, which are regarded by

some botanists as separate species. In spite of all modern scientific techniques (chromosomal behavior in hybrids, chromatography, phytoserology, etc.), the problem of species definition remains a matter of taste. But perhaps more important than classification is our understanding of the process by which new species emerge.

Ilex perado is a good example of the emergence of new species. At the center of its distribution, on the island of Madeira, we find the typical variety, *I. perado* var. *perado*, growing to a height of 15 feet with ascending branches; its leaves are variable in shape and number of spines; usually the base of the leaf is narrowed gradually to the petiole while the tip is rounded and the margin bears forward pointing spines in the upper portion of the leaf; in other specimens, the leaf shape is broadly elliptical with numerous forward pointing spines, the base rather abruptly narrowed, and the tip acute; thirdly, there is an ovate form with broadly rounded leaf base, a few very short marginal spines or teeth, and abruptly pointed tip. It is the latter form that usually produces fruits in small clusters from the lower leaf. The flowers of this variety are reddish tinged. The variety in Madeira extends also to the Azores.

In the Canary Islands, another variety is present; originally it was described as *Ilex platyphylla* by Webb & Berthelot in 1836, but later it was united with the Madeiran species, and called *Ilex perado* var. *platyphylla* by Loesener. This holly is a tree to 30 feet high, with horizontal branches, bearing very large leaves, as much as 8 inches long; as on Madeira, there is much variation in the spines along the margin, but the leaf

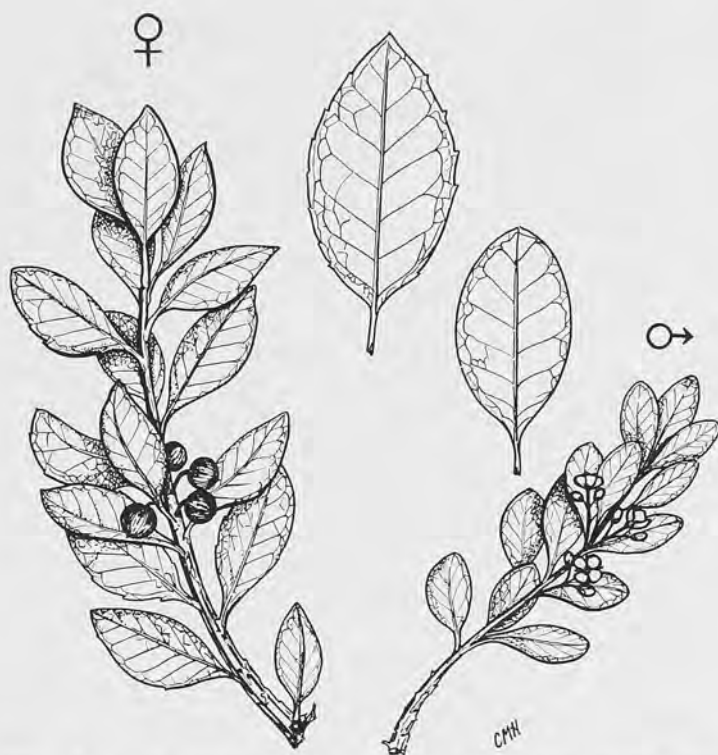


Fig. 1. *Ilex canariensis*—A drawing from specimens collected in the laurel forest at Taborno, Tenerife, 720 meters, Canary Islands. Approximately one-third of natural size.

DRAWINGS BY C. M. HOLZAPFEL

shape is more uniform, and much broader and rounder at the base than the Madeira type. This is the largest and best developed of the *perado* group; it produces abundant clusters of large red fruits in the lower leaf axils, on the older branches.

In southern Spain and Portugal a third variety exists, called *Ilex platyphylla* var. *iberica* Loesener. Apparently it is difficult to distinguish from *Ilex aquifolium*, which also occurs in Spain, but more to the North. *Ilex aquifolium* is reported from the Balearic Islands but it may not be distinguished from hollies in Sicily, Catalonia, Madeira, and even Tenerife.

It is evident that *Ilex aquifolium* and *I. perado* have a similar ancestry, and that the varieties found on the various island groups each developed their individual character after becoming separated from their continental ancestors.

Ilex canariensis

Ilex canariensis Poir. is distinguished easily from *I. perado* by its smaller leaves with bluntish point, by the lack of long sharp spines (usually the margins are entire), and by the fact that the flowers are produced in stalked clusters in the upper leaf axils, so that the mature fruits are found somewhere along the branches of the present year. The fruit color passes from green to yellowish to red, but the fruits continue to darken to almost black. There is essentially no difference between the Madeira and Canary forms of this species. It grows to a height of 30 feet, especially in the Canaries, where its wood is sometimes used in the manufacture of furniture, banisters, etc.

Climatic Conditions in the Atlantic Islands

The Canary Islands are located off the coast of N. Africa, just South of Morro-

co, at a latitude between 27° and 29° 30'N. The climate is considered subtropical, with a distinct Mediterranean influence, i.e. with the dry season in the summer, and a mild, rainy winter. At sea level, the mean annual temperature is about 70°F, with a summer maximum of about 85°F, and a winter minimum of 58°F. Frost is an unknown phenomenon at sea level, and bananas, tomatoes, grapes, and corn are grown the year around. Several of the islands rise very steeply from the ocean, culminating in the Pico de Teide of Tenerife, over 11000 feet. With increasing altitude, the temperature drops, at the rate of 1°F per 300 feet. It follows that at an altitude of 7800 feet frost occurs regularly, and indeed, the upper portion of the Pico de Teide does have snow on it during part of the year.

Rainfall

Rainfall is more irregularly distributed, and yet predictable. Clouds are brought in by trade winds from the northeast and envelop the mid-altitudes on the north and east sides of the islands; at 2000 feet elevation there are only about 80 clear days per year. Total annual precipitation is clearly correlated with altitude: near sea level it is 10 inches, with four very dry months; at 2000 feet it is 23 inches, with at least some rain every month; at 6000 feet, well above the level of most clouds, it is down to 14 inches, with three dry months. On the southern leeward sides of the islands, very little rain falls, and conditions near sea level are desert-like, requiring irrigation for most kinds of agriculture.

Cloud Belt

Hollies naturally require a climate which favors the development of forest vegetation. In the Canary Islands such conditions exist only in the cloud belt, from about 1000 to 4000 feet. Below that level, we encounter a vegetation composed of succulents (*Euphorbia canariensis*, *Aeonium* species, *Kleinia neriifolia*, etc.), mostly of African descent. Above the cloud belt, in the cool upper region, legume shrubs form an open

scrub (*Cytisus proliferus*, *Spartocytisus nubigenus*, *Adenocarpus viscosus*) mostly of Mediterranean descent, occasionally with a gnarled juniper tree (*Juniperus cedrus*). But most of the native tree species occur in three distinct forest types in the cloud zone.

Forests

The first forest type, for which the islands are very famous, is the Canary laurel forest. It is restricted to ravines and coves on the geologically older portions of Gran Canaria, Tenerife, Gomera, Palma, and Hierro. The main characteristics of this forest type are the following: All trees are evergreen, with entire shiny leaves; all trees produce berries or drupes, or some other form of fruit that is normally dispersed by birds. In contrast to forests on the continents, relatively few species of trees are represented; the principal trees are four laurels: *Laurus azorica* (*L. canariensis*), *Ocotea foetens*, *Persea indica*, and *Apollonias barbujana*; in addition there is one cherry (*Prunus lusitanica*), one myrtle (*Myrica faya*), one olive relative (*Notelaea excelsa*), two Myrsinaceae (*Pleiomeris canariensis*, *Heberdenia excelsa*), and last but not least, two species of holly (*Ilex canariensis* and *I. perado* var. *platyphylla*). It is rare to find all of these trees growing together, since some require more protected sites on deep soil, whereas others grow on more exposed crests.

Ilex perado appears to prefer the deepest, most shady coves, while *Ilex canariensis* grows on more dry, exposed soil. A fourth characteristic of the laurel forest is the presence of many fern species, some of them forming dense masses on shaded slopes, others growing on the trunks of trees such as (*Davallia canariensis*).

A second forest type, much more open than the laurel forest, is made of several small trees and shrubs. The most common of these are *Myrica faya* (the Faya, or Myrtle), and *Erica arborea*, the tree heath. Other typical associates of this plant community are the Canary Madroño, *Arbutus canariensis*, and *Ilex canariensis*. This "heath forest" is much

Fig. 2. *Ilex perado* var. *platyphylla* — A drawing from material collected at Cumbre de Anaga, 700 meters, Agua Garcia, and near Taganana, 650 meters, Canary Islands. Approximately three-fifths of normal size.



more extensive than the laurels, and represents a degradation stage.

The third forest type of the Canary Islands is the pine woodland, with *Pinus canariensis* dominant, and an undergrowth of native rockrose (*Cistus symphytifolius*), and *Adenocarpus foliolosus*. Holly does not usually occur in this plant community.

Plant Succession and Retrogression

The three forest communities, the laurels, heath, and pines have been seriously depleted in recent years by forest fires and systematic clearing for pasture and other uses. Some areas which only ten or twenty years ago supported giant laurels, are now sadly trampled. Famous forests, such as Agua Garcia, mentioned in all older literature as the best of the Canary laurel forests, are today nothing but pastures, *Eucalyptus*, and Mediterranean pine pastures.

From the point of view of the holly enthusiast, this forest destruction means that *Ilex perado* var. *platyphylla* is on the way out, unless forested areas are set

aside as permanently protected parts. But the population pressure, combined with lack of interest by the government of Spain in nature protection, makes it seem unlikely that any laurel forest will be preserved. Economic forces are at work here, and the forest service is more interested in the rapid growth of introduced pine trees than in the slowly growing hardwoods of the laurel forest. Happily, *Ilex canariensis* is more widely distributed than the laurel and heath, and is not in any danger.

Comparison with Madeira and the Azores

The climate of Madeira is much cooler than that of the Canaries, since the main island is located at a latitude of 32° N. At sea level, the mean annual temperature is 65°F, but like the Canary Islands, frost is an unknown phenomenon. The highest elevation is about 5600 feet, as compared with 11000 feet on the Canaries, so that the diversity of vegetation on Madeira is not as great. In fact, much of the island is occupied by

laurel forest, or various degradation stages, including tree heaths, *Eucalyptus*, pine, and *Acacia* plantations. As is true in the Canary Islands, most of the land is under cultivation (sugar cane, grapes, fruit trees, and planted timber), and to see real laurel forest, one has to walk precariously along the extensive system of water canals (*levadas*) into the deep ravines of the North coast. Once such a forest has been reached, a botanist is surprised by the similarity to the Canary laurel forest, 250 miles to the South, consisting of the same species of trees, the same ferns, and the same hollies. A few differences are noted with respect to the hollies: *Ilex perado* is more common here, even outside the dense forests, in contrast to its shade-loving habits in the Canaries. With *Ilex canariensis* the reverse is true. It is rare, and found only in open laurel forest, not as a member of the heath forest as in the Canaries. The two holly species never reach tree stature in Madeira.

The Azores, which have one holly (*Ilex perado*), represent an outpost in mid-Atlantic of the Madeiran flora, and authorities agree that the vegetation bears the stamp of the temperate regions. The laurels, myrtle, and holly all are low and shrubby. Neither *Erica arborea*, nor *Ilex canariensis* have survived, and may in fact never have reached the Azores.

History

Since the hollies of the Madeira and the Canary Islands are an integral part of the laurel forest, the origin of *C. perado* and *C. canariensis* can be traced best by examining the history of the laurel forest. The clue comes from the fossil record of southern Europe. G. Depape, in 1922, published a list of tree species whose leaves he found in fossil deposits of the Rhone Valley, where a forest of laurels existed in the Pliocene Era, about 15 million years ago. Among the fossil remains, Depape reported *Ilex canariensis* along with three members of the laurel family, *Laurus canariensis*, *Ocotea foetens*, *Persea indica* (an avocado relative), and *Notelaea excelsa* (an

olive relative). These plants are still found in the modern flora of the Canaries and Madeira. We can now conclude with certainty that the subtropical laurel forest of the Canaries and Madeira was once widespread in the Mediterranean region, from Italy through France and Spain, to Morocco.

Elimination of the subtropical flora from Europe began toward the close of the Pliocene Era, when a cooling trend set in, culminating in several waves of glaciation, which covered central Europe. Only some oaks and birches found refuge in southern Europe, and perhaps a few species of the laurel forest survived. In the main, trees that were not frost resistant became extinct in most of Europe. It is rather unusual to find broadleaved evergreens in the deciduous forest region of Europe. One rare exception is *Ilex aquifolium*, and one possibility is that it originated from an ancestor not unlike *Ilex perado*. The advance of the glaciers forced *I. perado* off the continent, except in a few sheltered places in Spain and Portugal, leaving *I. aquifolium* which spread northward following the retreat of the ice.

The story is not complete without mention of James Gordon, the British traveler, who in 1760 collected *Ilex perado* on Madeira, and brought it back alive to the Royal Botanic Gardens at Kew. Hollies had long been a favorite among the garden-loving English, and the advent of a new species of holly was welcomed by plant breeders. Although *Ilex perado* did not survive except in carefully sheltered places, the hybrid, *I. × altaclavensis* (*I. aquifolium* × *I. perado*) became widespread. Cultivars of the hybrid such as 'Camelliaefolia' soon became known.

A brief word must be said about *Ilex canariensis*, which has apparently not played a role in the production of hybrids, although its name occasionally appears in holly literature. Loesener in 1942 placed *I. canariensis* in the section *Cassinoides*, apparently on the basis of the position and type of inflorescence. In his view, *I. canariensis* would be a relative of our American holly, *I. opaca* and

the inkberry, *I. glabra*, neither of which cross readily with English holly. This relationship between the American flora and the Atlantic flora of the Canaries and Madeira remains a challenge to plant geographers, because *I. canariensis* is not the only trans-Atlantic connection. *Arbutus canariensis*, *Clethra arborea*, *Myrica faya*, *Pinus canariensis* are associated with closely related species found in Mexico, California, and southeastern United States. Some would explain this by means of land bridges, or

by continental drift, or by a much more extensive series of islands across the Atlantic. These are all matters of speculation, but, as shown here, there was a time when an evergreen subtropical rain forest ranged widely in the Mediterranean region, and perhaps it formed a world-wide subtropical belt. Its disruption by glaciers, deserts, and mountain ranges has left it scattered, with the Canary and Madeira laurel forests as the only remnants on the eastern side of the Atlantic.

Excerpts From Peter J. Van Melle

Peter J. Van Melle (1890-1953) was brought up in Holland, the son of a Dutch Reformed clergyman. Early in life he was a poet. Demand by the doctors that his health depended on outdoor life, he went to work in a nursery and soon he emigrated to America, where, like so many other Dutchmen, he found employment at Bobbink and Atkins Nursery in New Jersey. After a few years of absorbing plant knowledge, and our language, he moved to Poughkeepsie, New York to engage with a partner in the nursery business, where he specialized in rock gardens (under the inspiration of the noted Clarence Lown) and in which business he remained until his death.

Active in nursery industry matters, he was well known for his (in retrospect) antagonism to Standardized Plant Names. He was author of a monograph on cultivated junipers and a book "Shrubs and Trees for Small Places." Religiously he was an intellectual skeptic, yet one with a poet's mysticism. Indeed a rare person whose views and attitudes influenced my own.—Nelson Coon, Box 1, Vineyard Haven, Massachusetts.

On the Increasing Poverty of Available Plant Materials in Nurseries (1949)

Diversity is the life-blood of horticulture and the *sine qua non* of horticultural literature. To the extent that plants are not available the literature of plants loses the quality of realism, and thereby, most of its usefulness.

On Fragrance of Shrubs (1947)

To me, fragrance is as sound a criterion for the inclusion and exclusion of plants in landscaping as are stature and texture. It seems important, especially in the evening, when color and texture recede; the scene is translated into darkening masses and silhouettes, and one's mind is disposed for stillness and rest. It is then that the spices of the garden come forth and pervade our tranquility. If we value it we may well expend exquisite care upon the admittance of fragrant plants.

Sex and My Ruprechtia Tree

EDWIN A. MENNINGER

For 29 years I was secretary of the Board of Directors of the Martin County Hospital, Stuart, Florida. For many years keeping the door of the institution open was a rugged experience. But in 1940 a benefactor constructed a new hospital building for us with 20 beds and we were inordinately proud of it.

A few years later we undertook to landscape the property which had been given to us and from the nursery I was operating, I donated a dozen or more ornamental flowering trees.

One of these was planted near the front door of the building and it happened to be a Venezuelan tree known botanically as *Ruprechtia coriacea* (Karsh.) Blake. In its native land the vernacular name for the tree is *Bis-cochito*. Some 20 species of *Ruprechtia* are known in Mexico to South America but this is the only one which has ever been established in the United States. It is a 20 foot evergreen tree, in the same family (Polygonaceae) as buckwheat, rhubarb, and seagrape. *Ruprechtia* trees are dioecious, which means that the flowers of the two sexes are on different trees and it takes two to make a bargain. It is impossible to know whether a seedling tree is a male or a female until it flowers, which means a delay of anywhere from 7 to 15 years.

Of course, I had no idea of the sex of this tree. I had grown several hundred of them from seed obtained in Venezuela and today some are growing on the

Sunshine Parkway, a toll road from central Florida to Miami.

The little tree in front of the hospital prospered and grew. Nobody took any special interest in it until Christmas 1958 when it burst forth with quantities of beautiful red flowers. This was a first announcement that the tree was a female because the female flowers on *Ruprechtia* are beautiful, a brilliant red and produced abundantly. Contrariwise, the male flowers on *Ruprechtia* are tiny, red, so inconspicuous that one must approach close to the tree to even see them. All were happy that the hospital tree was a female and every Christmas it produced lots of lovely red flowers.

Many persons approached me on the street and asked: "Have you seen that beautiful red-flowered tree up at the hospital?" Usually I would answer: "Yes, I grew it from seed."

The flowering of the *Ruprechtia* tree was an annual event because in bloom it is very conspicuous. Female flowers look a lot like the samaras on a box-elder tree produced in great quantities; they are at first yellowish green but as the sun strikes them they turn an intense brilliant red and hang on for a month or more.

This was the situation until 1962 when the hospital directors decided to build a new and bigger hospital to accommodate the increasing load of patients. About this time I left the Board of Directors. When the contract for the new building was let, obviously some of the landscaping in front of the hospital building had to be moved and this included the *Ruprechtia* tree. It had to be placed where it would be out of the way. A nurseryman was called in to move it; he root-pruned it properly, cut it back

Author of numerous books which include *Fantastic Trees*, *Flowering Trees of the World* and *Seaside Plants of the World*.

Edwin A. Menninger, D. Sc.
Drawer 45
Stuart, Florida 33494



PHOTOS E. A. MENNINGER

Fig. 1. The beautiful, bright-red, female flowers of *Ruprechtia*.



Fig. 2. January 1965. Remains of male *Ruprechtia* flowers are scattered over the branches.

Fig. 3. January 1965. Forest of suckers obscured the 3-inch trunk of parent *Ruprechtia* plant.



severely, and at the proper time moved it to a different location in front of an auxiliary building, at one time occupied as a nurses' home. From here on the story must be told chronologically:

Christmas 1962. The new hospital building was being finished but the *Ruprechtia* tree was much as it had been when first replanted. It was still alive with a few leaves on it but it had not begun to recover from the move.

Christmas 1963. The *Ruprechtia* tree had definitely recovered from the move and was growing but not too enthusiastically.

Christmas 1964. I went by to see how our little tree was doing and whether it was going to bloom this year. I drove close to the tree but could not see anything; there was no splash of red. I got out of the car and went over to the tree and discovered that it was covered with tiny red flowers so small they could scarcely be seen. The tree had changed its sex completely. It was full of male flowers! Obviously, the hardships of being cut back, root-pruned and moved had upset the sex regimen in the tree's life and it was embarking on a new career.

I was horrified. I actually worried about this transformation, and tried to get some information from other plantmen but without much success.

I went back to see the tree again a month later and was startled to find an entirely new development. All around the tree in an area of 100 square feet, a whole forest of suckers or root sprouts had come into being. At least 40 young *Ruprechtia* trees were trying to spring up around the old tree. It had never suckered before. This time I called in my genetics friends and asked them a lot of questions. What they told me in effect was that in all plants both sexes are really present and although this one normally manifested the female dominance, when this got upset the male took over. My informants suggested that the suckers were probably all females protesting violently against the other sex hav-

ing risen to dominance. This was a possibility that I thought needed exploring, so I employed a nurseryman to go down to the hospital and put layers on each one of these suckers. This was properly done, incisions made in the bark to encourage root formation, a sphagnum moss compress impregnated with rooting compound was packed around each stem and a plastic casing fastened over all. This was in April. The stems had grown vigorously and were an average of an inch in diameter.

I left town for the summer, but when I returned in October, I was astonished to see that the moss compresses were still in place on the suckering trees. Some of them by this time were 6 feet or more high. I felt the nurseryman had neglected them, but on examination I found that no roots had formed. At each place where the nurseryman had put a poultice, a huge callous had developed, many of them as big as Irish baking potatoes, but there were no roots. I got a saw and cut them all off near the ground. I took them to a nursery and we planted these in 5 gallon cans, with appropriate chemicals, hoping this would force them to develop roots from the callouses. The shoots were all cut back to two feet high, all foliage was taken off and they were turned over to the nursery for suitable care. The cuttings all grew, they produced plenty of green foliage, and I thought we were on the road to establishing these plants. However I was too optimistic. One by one they died and we lost all of them. Not a single one of the cuttings became established. Consequently, I will never know whether they were females or males.

Christmas 1965. The "papa" *Ruprechtia* tree was in full foliage and it produced a lot of its insignificant flowers. It was just another tree of no special interest at all.

Christmas 1966. This time I was a patient in the hospital myself and I couldn't see anything, but visitors to my room told me of the beautiful red-flowered tree that was in bloom on the hospital grounds. Did I know about it?

Yes, I knew a lot about it. When they told me it had pretty red flowers I knew that "papa" had surrendered and that "mama" had again taken over her domain. My little *Ruprechtia* tree is once more a female.

The phenomena of changing sex in plants is not too uncommon.* But please don't ask me anything about sex

in plants. All I can tell you is what I have seen and I took pictures along the way so that you could enjoy this phenomenon, too.

*For a dozen examples of this phenomenon, see chapter on "Sex Switchers" in my book *Fantastic Trees* (Viking Press, New York, 1967).

CORRECTIONS

The following corrections are for the *Daylily Handbook*, Volume 47, Number 2 of *The American Horticultural Magazine*:

Front Cover: Change photo caption from BURIED TREASURE to GREEN VALLEY

Back Cover: Change photo caption from GREEN VALLEY to BURIED TREASURE

First page, bottom of page: Reverse words "Front Cover" and "Back Cover"

Change "Photo Steve Moldovan" to "Photo John A. Bartholomew"

Page 44, line: Insert "pages 46, 47, and 48"

Page 85, transfer first line of first column to first line of first column page 81

Page 174: Reverse photo identification symbols A and B

Page 246, Special Awards—1962: add Donn Fischer Memorial Award—'Golden Chimes'; Special Awards—1967: add Bertrand Farr Medal—William R. Munson, Jr.

Color Plate 27: Insert name FRANCES FAY for photo in upper right corner

Color plate 32: Change "Louise Rockett Garden" to "Louis Rockett Garden"

Horticulture Among the Old Masters

NOEL D. SMITH

Many first time visitors to the National Gallery of Art in Washington, D. C. are surprised to learn there are two living gardens on the main floor of the Gallery which comprise approximately fifteen per cent of the exhibition space. Most will readily agree that the gardens add much to the enjoyment of a visit to the Gallery and its priceless collections and to the concerts that are held in the East Garden Court on Sunday evenings in season. Indeed, it is doubtful whether there would be regularly scheduled concerts in the Gallery were it not for the Gardens.

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The wisdom of Andrew W. Mellon in insisting that the Garden Courts be included in the magnificent building he gave to the American people is proven daily by the great numbers of visitors who welcome the restful interlude afforded by a few minutes pause in these areas of quiet beauty. The always present flowers, the graceful fishtail palms (*Caryota urens*) and the bubbling fountains comprise an atmosphere of tranquility that helps greatly to alleviate "museum fatigue" and makes a visit more thoroughly enjoyed.

When the National Gallery of Art was officially dedicated by President Franklin D. Roosevelt on the evening of March 17, 1941, the Garden Courts were



Fig. 1. National Gallery of Art, Washington, D. C. A view of the East Garden Court on opening night, March 17, 1941, showing a portion of the Widener Acacia Collection.

PHOTOS NATIONAL GALLERY OF ART



Fig. 2. Same view of the East Garden Court twenty-seven years later, June, 1968.

aglow with yellow clouds of the fabulous *Acacia* collection of Joseph E. Widener, who also generously gave his great art collection. Since that evening, the Garden Courts have never been without flowering plants. In 1968 they will reach the 10,000th consecutive day of flower displays and will welcome their 40 millionth visitor.

The Garden Courts of the National Gallery are, in effect, rather deep wells with heavily frosted laylights high overhead with the same type of glass in skylights far above the laylights. In between these layers of frosted glass are many steel beams and other obstructions which together permit very little sunlight through to the plants below. The Garden Courts were the first and quite possibly are still the only gardens in the world in an air-conditioned building with such low humidity and low light intensity. With no research data for guidance, many mistakes were made in

the initial years. Experimental plantings are still made from time to time but it is now possible to predict with fair certainty the reaction of most types of plants to Garden Court environment.

In addition to the difficulties caused by the unavoidable physical shortcomings of the building with respect to plant growth, the control of insects and diseases poses many problems. Using a power sprayer in the gardens when there are untold millions of dollars worth of irreplaceable works of art within the spray drift area is not exactly conducive to making lasting friends with the Gallery director. The development of systemic insecticides has aided greatly in helping to keep insects under control and, hopefully, plant pathologists will soon be able to perfect efficient broad-spectrum systemic fungicides.

Daily syringing of the permanently planted fishtail palms and other foliage plants has been an established



Fig. 3. A view of the West Garden Court with Azaleas and Lilies.

procedure since the gardens were first planted. Fertilization is done through injection into the irrigation water. By maintaining a nutritional balance in this manner it has been possible to keep most of the original 1941 fishtail palms in excellent condition.

In addition to the plants and flowers in the Garden Courts, most special exhibitions in the National Gallery are

complemented with plants, usually with foliage plants only because of possible color clashes of flowers with a painting or of flowers which might detract from the interest in a painting. For the same reason, plant containers with subdued shapes and colors are the rule. The plants are used to add to the effect of a display of a work of art and not as a display themselves.

Quite often, plants are used to guide traffic in areas where velvet ropes would give a "busy" appearance. Thoughtful visitors respect such barriers and the overall effect is considerably more pleasing. Short-growing, large-leaf plants are frequently employed to camouflage lamps placed on the floor in front of a painting.

From time to time the United States Marine Band will play in the Rotunda and/or in the Garden Courts for a special opening or other official function, such as a reception for the distinguished ladies attending a Presidential Inauguration. Finding a flower that will match or blend with the scarlet of the Marines' dress uniforms is sometimes difficult. To meet partially the problem of Marine uniform color incompatibility with flowers, the Gallery's horticultural department is currently increasing the progeny of a Gallery-bred azalea seedling which comes close to matching the Marine scarlet and, hopefully, the Gallery will eventually possess at least one group of plants, other than white, which can be used with impunity when the Marines come marching in. On these occasions when one of the other military service bands plays there is no problem in this respect.

The Garden Court plantings have a completely different purpose than the arrangements used in conjunction with works of art or official functions in that they themselves are the principal attractions. The plant arrangements in the ever-changing panorama of the National Gallery's Garden Courts have employed nearly every conceivable type of ornamental flowering plant from the original *Acacia* through the alphabet to *Zygocactus*.

The lighter colors with their more reflective petal surfaces give the most pleasing pictures. Dark shades absorb so much of the available light that they often appear drab by comparison. Combinations are tricky and it sometimes happens that an attractive staging in daylight will backfire under artificial light.

Because of the interest shown by visitors in the identity of Gallery plants, unobtrusive labels are used on representative specimens in almost all stagings, giving the scientific name and a common name when possible. Inquiries come by mail, telephone and in person and are always welcome. Every effort is made to supply the horticultural information requested.

During Christmas week, Easter week, Gallery anniversaries, openings of Special Exhibitions and during the week of the Presidential Inauguration, the Great Rotunda is also arrayed in garden apparel, which requires hundreds of plants. These floral events have become traditional throughout the Washington area and attract many appreciative visitors.

To maintain plants continuously in good condition throughout the Gallery building, adjustments must be made in flowering plant stagings every day and complete changes undertaken on an average of about every ten days. During the course of a year, as many as 6,000 foliage and flowering plants may be used. The massive proportions of the Garden Courts and the Rotunda call for planting designs in kind. This would present a serious problem if the Gallery could not supply its own needs through a carefully timed production schedule in its own greenhouses and outdoor growing area.

The semi-automated Gallery greenhouse is tucked away between a moat wall and the building at the southwest corner. Within this area, in addition to a three-compartment greenhouse, is a cooling unit, coldframes, facilities for steam sterilization of soil and equipment and enough open space for summer growing of a limited number of tropical plants. At the northwest corner of the Gallery building, on the Constitution Avenue side, there is another simulated moat and most of the Gallery's large azalea collection is grown within this 8,500 square foot area.

The horticultural department of the Gallery plans, develops and maintains what it hopes will be beautiful effects through plants. The program brings re-

freshment and pleasure to the millions of visitors. It also teaches by demonstrating the importance of ornamental plants.

Its success can be measured readily by a stroll *incognito* among the visitors. The day may be cold and drab with a threat of snow but it is spring inside the Garden Courts and there one may find within a few minutes an elderly woman gazing at a bank of azaleas as she rests in a patio chair in quiet contentment; mini-skirted teen-agers rushing into the Gardens with a hushed "Wow-eee!"; young parents trying in vain to pose a toddler before another bank of azaleas for a snapshot for grandmother; three young Marines fresh from boot camp, identifying the azaleas as chrysanthemums; sharp-eyed home gardener pointing out to his wife a lone mealybug on a palm leaf;

a group of well-behaved youngsters from a less affluent section of the city fascinated by a close-up view of a living, formal garden, and soaking it up to stow away in their memory banks; an elderly couple strolling arm-in-arm and deep in a discussion of the plants with which they are not familiar; a middle-aged woman taking copious notes, perhaps for a garden club discussion back home; and others *ad infinitum*.

For many it is a first-time visit to an art gallery and the Garden Courts contribute to their comfort and enjoyment in unfamiliar surroundings. For all, the Gardens among the Old Masters provide a pause that refreshes body and mind for renewed interest in and enjoyment of the fabulous art collection which surrounds them.

ADVANCES in Horticulture

Gardening is the nation's leading adult hobby, yielding pleasure and profit in the culture of ornamentals, vegetables, and fruits. Surveys conducted for an Ohio garden implement company show that more than one-third of our people are gardeners. Reports of new plants, products, gadgets and methods overwhelm us and there is a continuing need for evaluation and application of the new information.

In Volume 47 of The American Horticultural Magazine we present a new section—Advances in Horticulture—composed of short reports and abstracts of papers describing new findings of interest to gardeners. We hope that these notes will provide enough information so that, if desired, they can be put to use by members.

The New Shape of Horticulture: A Look to the Future

SYLVAN H. WITTWER*

(From a paper presented at the Williamsburg Garden Symposium, Williamsburg, Virginia, March 17-22, 1968.)

Dr. Wittwer noted that we are witnessing remarkable increases in the productivity of many horticultural crops such as corn, tomatoes, and beans. These increases are due to the development of new strains and hybrids, changes in the form and shape of plants, new tech-

niques in culture, and mechanization of planting and harvest operations. The introduction of F₁ hybrid seed has increased production of many crops by 10 to 30 percent. Hybrid seed is now available for cabbage, corn, cucumber, sugar beets, tomatoes, petunias, and at least a dozen other important horticultural plants.

New strains of many crops have short stalks and thick stems that will not lodge when fertilized heavily and whose upright vertical leaves capture solar energy more efficiently. New genetic combina-

Fig. 1. The Wilde mechanical cucumber harvester in operation in Michigan, August, 1967. Dr. Wittwer notes, "Almost 50 percent of the total pickling cucumber acreage was harvested mechanically this past year. This is also reflective of the changing shape of horticulture because two years ago only one experimental machine existed in Michigan."

PHOTOS U.S.D.A.



tions possess disease and insect resistance, show a greater response to fertilizer, and have decreased water requirements and a higher nutritive value.

Changing cultural practices include minimum or zero tillage, earlier planting, prescription weed control, improved timing and placement of fertilizers including foliar applications, higher plant populations through narrow row spacing and equidistant planting.

Biologically active chemicals are having a tremendous impact on production, storage, and quality of horticultural crops. Gibberellin has revolutionized the production of Thompson Seedless grapes for table use. Approximately 25 percent of all navel oranges are treated with gibberellin to delay aging and rind senescence, and to prolong the harvest season. Gibberellin induces male flowers to form on female (gynoecious) cucumber plants, thus expediting mass production of hybrid seed that will produce plants bearing parthenocarpic fruit at every node. Growth retardants not only control vegetative growth and flowering of many ornamentals but now induce earlier flowering in tree fruits and promote fruit setting and fruit growth in several crops, enhance fruit coloration,

and reduce storage disorders of several fruits.

Carbon dioxide enrichment of atmospheres in greenhouses for flower and vegetable crops is a reality and has resulted in greater gains in productivity and improvements in quality than any other growth factor studied in recent years. An asphalt underlayer for sandy soils, 22 inches below the surface and one-eighth inch thick, has increased the yield of several vegetables (beans, potatoes, cucumber, cabbage) by 50 to 100 percent grown on semi-droughty soils.

Mechanical harvesting of apples, blueberries, cranberries, cherries, grapes, tomatoes, and cucumbers grown for processing has or will soon become a standard practice (Figure 1). Mechanization has reduced labor costs for harvest by one-half for tomatoes and from 3 to 1 cent a pound for cherries. With blueberries, one machine and three people are equivalent to 200 people picking by hand. Many experimental harvesting machines are now being evaluated for citrus crops, apples, pears, peaches, raspberries, strawberries, and asparagus.

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Repelling Aphids by Reflective Surfaces, a New Approach to the Control of Insect-Transmitted Viruses

(Adapted from a chapter for a forthcoming book, "Virus Vectors, and Vegetables," by Karl Maramorosch.)

Increased yields from aluminum or plastic mulches on vegetables, fruit, and ornamentals have stimulated the widespread use of these mulches in American agriculture. Over 3,000 tons of plastic are used on strawberries in California alone including some 7,000 acres of plastic mulching. Shel Drake (1967) lists as benefits obtained by mulching with plastic: weed control under black plastic sheets, changes in soil temperature, re-

duced soil water evaporation, less soil compaction, better aeration and microbial activity in the soil, reduced fertilizer leaching, less fruit rot, no root-pruning during cultivation, and more carbon dioxide available to the young plants. High levels of carbon dioxide build up under the plastic and the gas escapes through the hole made in the film for the plant. Shel Drake thinks that this "chimney effect" supplies carbon dioxide to the actively growing leaves and promotes growth.

Smith, Webb, and their co-workers find that by selecting appropriate mulches, additional benefits may be derived by repelling aphid vectors and thus reducing or delaying virus disease infections.



Fig. 2. Better growth of cucumbers on aluminum mulched plot (right), unmulched (left).

Entomologists have known for some time that pure yellow and, to a lesser extent, orange or green surfaces attract certain flying aphids. These aphids ignore blue, violet, white, gray, and black surfaces.

Kring (1964) reported that when he placed unpainted aluminum pans around yellow ones the aphids avoided the yellow pans. Kring thought that the repellency was due to the light being reflected from the aluminum surfaces. Smith and co-workers tested this observation by placing sheets of aluminum between crop rows. They obtained 96 percent aphid repellency when they covered 50 percent of the area with the sheets. With 30 percent coverage, repellency dropped to 70 percent. Other tests showed that the aluminum repelled equal numbers of aphids whether placed at ground level or suspended 18 inches above the ground near the top of the plants. Aluminum suspended vertically was less effective than when placed in a horizontal position on the ground.

Additional tests showed that squash, cucumbers, and cantaloupes, when mulched with strips of aluminum foil to repel virus-carrying aphids, yielded considerably more than unprotected plants (Figure 2). This was due primarily to keeping virus infection away from the young plants and giving them a tremendous growth advantage over the unprotected plants. However, watermelons

were not protected from early virus infection because the young vines grew rapidly and covered the mulch early in the growing period.

In gladiolus planting on Long Island, New York, Johnson and co-workers (1967) found that reflective soil mulches repelled flying aphids and reduced spread of cucumber mosaic virus in proportion to the effectiveness of the materials as repellents of aphids.

The home gardener stands to profit from these studies with mulching materials not only because of the potential of better plant growth, but also in some cases, through some protection from aphid-transmitted virus diseases.

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Recent Advances in Weed Research in Horticultural Crops

LORAN L. DANIELSON*

(From a paper presented at the Williamsburg Garden Symposium, Williamsburg, Virginia, March 17-22, 1968.)

Dr. Danielson commented that every language has an equivalent of the word "weed." Certainly weed control has been a universal and continuing problem for gardeners through the years. In King Richard II, Shakespeare has a gardener say, "I will go root away the noisome weeds which without profit suck the soil's fertility from wholesome flowers."

Different methods are used to control many kinds of weeds. The hoe and the cultivator are well known as some of man's oldest tools. Certain crop rotation patterns have been adopted. Gas flames have killed weeds in corn and cotton. Flooding controls some weeds in rice and cranberries. Broadcast seeding of "smother crops," such as soybeans and sorghum, controls several weed species and provides organic matter for the soil. Goats and sheep are used as brush killers

in wooded areas. Geese are used as grasskillers in nursery crops and strawberries. Laws to insure purity of crop seeds reduce the random and widespread distribution of weed seeds.

The needed breakthrough in weed control came with the introduction of synthetic organic chemicals as herbicides. The benefits have reached all levels of plant production from the large commercial grower to the home gardener. A wide variety of commercial herbicide formulations are available at garden supply stores. Federal and State extension specialists, farm advisors, county agricultural agents, and garden writers provide directions for use of the various herbicides appropriate for the several climatic regions of our country.

Recent research has included many studies on the biological control of weeds. Investigators are studying the use of combinations of biological, chemical, mechanical, and cultural methods of controlling weeds. Hazards to man and animal are minimized by these coordinated research investigations.

Dr. Danielson discussed a new method of herbicide application under trial that may ultimately be widely used by the commercial pot plant grower as well as

Fig. 3. Weed control with herbicide-impregnated cotton cloth. The treated cloth was placed just below the soil surface in the pot at the right and both were seeded with annual ryegrass.



the home gardener. One of the problems in using herbicides on small areas, such as ornamental and vegetable plantings around homes, is the lack of precise control in rates of application. In an attempt to improve the metering of herbicides in horticultural plantings, cotton cloth was impregnated with horticulturally useful herbicides. The treated cloth was fitted in pots or cans just below the surface and covered with soil.

Weed seeds were prevented from germinating and there was no injury to the flowers and ornamentals growing in the containers (Figure 3). Presumably the method could be applied to garden plots as well as containers when the materials become commercially available.

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Excerpts from Peter J. Van Melle

On Rock Gardens—(undated)

There is need of guidance in the design of a rock garden and, I would say, let us make the most of both Nature and of Design. I, for one, lift up my eyes unto the hills. The woodland and the field already have their share in our gardens. I am more desirous to see in what vital way this voice of the mountain may come to assert itself in our gardening manner, than how the present impulse (towards rock gardening) may be smothered in the amenities of Design. I hope that we may achieve something over and above the mere decorative use of the high-born wildings in walls and walks. I do not like the idea of speckled trout in goldfish bowls.

On Designing Rock Gardens (1933)

The values in rock gardening are distinct from those in other gardening pursuits. They are alien to the type of horticultural aspiration that goes in for mammoth flowers and double flowers and quality stem and whatever else there may be that makes dahlias, and zinnias, and peonies famous.

CRINUM SUBMERSUM Herbert Rediscovered

While attempting to identify a number of Florida garden crinums the writer encountered an unusually attractive plant which had the floral markings and features of *Crinum scabrum* from tropical Africa and foliage features not unlike the central American *C. erubescens*. An extensive literature search gave no clue as to the particular identity. The plant is commonly called *C. fimbriatum* or *amabile* in garden circles, but this is quite in error and we remained without a definite clue. The possibility of a *C. scabrum* × *erubescens* hybrid was considered and duly rejected since the crossing of two tropical species adapted to humid climates would hardly yield a plant which could thrive and flower under the writer's harsh, summer-dry climatic conditions of the Sacramento valley in California. Neither could such a cross explain the formation of a strap-like leaf with a blunt tip, since an F₁ hybrid is normally intermediate in character between the features and habits of the parents. Presumably, strap-like foliage would be characteristic in both parents.

Further study concerning the pollen and cell structure of foliage convinced the writer that we were definitely dealing with a species which was occidental in origin, that there was no African or Asian parentage present, that despite its apparent *Codonocrinum* floral features of curved tepal tubes and declinate filaments, the plant was actually allied to the subgenus *Platyaster*. The fact that some filaments tended to spread quite broadly also suggested this. The evergreen, bluntly tipped, strap-like leaves and growth habit indicated the plant was adapted to a climatic area with a moderate rainfall most of the year, that the foliage was adapted to a relative humidity appreciably less than

50%, and the bulb was semitemperate or mountainous in origin as cool nights did not curb the growth. In contrast, it is to be noted that Asian and African species of *Crinum* which go through yearly wet and dry cycles are deciduous and all have slender pointed foliage. We also established that the nearest related species was *Crinum commelyni* or *undulatum*.



PHOTOS BY AUTHOR

Fig. 1. *Crinum submersum* Herbert as found in gardens. Tepals snowy white with a deep pink keel.

Early nursery catalogues from Florida indicated that our so-called *C. fimbriatum* had been imported from Nassau around 1895; likewise the bulb had been listed by Holland bulb firms under the same name. It is presumably widespread in garden circles throughout the tropics as color photos of the bulb have been received from Carins, Queensland and Hawaii. As far as can be determined the true *C. fimbriatum* is not in the trade.

Our plant in question would have remained unidentified except that by chance we happened upon a description of *C. submersum* Herbert in the 1824 issue of Curtis's *Botanical Magazine*, t. 2463, and here was our plant growing in the Sierra del Mar back of Rio Janeiro. The interesting part was that Dean William Herbert had been puzzled by

the odd morphology of the flowers and foliage, thinking (quite like the writer) that he had encountered a possible *scabrum* × *erubescens* hybrid, which he had found most difficult to explain.

With our present day understanding of hybrids and subgenera we now know that the plant is definitely an American species. It is basically a member of the subgenus *Platyaster* but has declinate filaments due to the tepal tubes being curved. Fundamentally there are no major genetic barriers between the subgenera *Platyaster* and *Codonocrinum*. The division is purely artificial, as plants can cross between the two subgenera and give fertile or semi-fertile F₁ hybrids.



Fig. 2. *Crinum* × 'Peach Blow' a hybrid possibly involving *C. submersum*. Tepals pale lavender on the exterior, soft pink on the interior. Flowers with a spicy fragrance.

As Dean Herbert surmised, *C. submersum* could be a transitional species, but there are others in this class like some forms of *C. flaccidum* in Australia which are intermediate in filament arrangement between *Platyaster* and *Codonocrinum*. The present thinking is that the curved tepal tube of *Codonocrinum* is a rather new character to the genus and evolves in areas where rainfall is concurrent with the flowering period.

However, the importance of this find is that it confirms the validity of *C. submersum* Herbert as a species. J. G. Baker passed the bulb by in his monograph on the Amaryllidaceae due to the

plant's indefinite status. We are inclined to find it adapted to dryer ground than Herbert postulated, but this is of minor importance. As a garden plant the bulb is ideal for the subtropics and is unquestionably one of the showiest of the *Crinum* group with the blossoms resembling some of the *Lilium speciosum* var. *rubrum* hybrids.

Crinum submersum can be recognized by the following features:

Bulb ca. 3¼ in. in diameter with short tunicated neck; *leaves* 8 to 10, evergreen, semi-erect, strap-shaped, ca. 2 in. wide by about 2 ft. long, having a depressed midsection giving the appearance of two midveins, tips blunt like *C. augustum*; *scape* compressed, slender, ca. 20 in. long; *blossoms* sessile in umbels, commonly 5 or 6; *tepal tube* distinctly curved, ca. 6 in. long; *tepals* ca. 3¼ in. long, inner 1 in. wide, exterior ¾ in. wide, patent, slightly recurving, snowy white with a deep pink keel (coloring of keel is the same on the interior as exterior of the blossom); *anthers* dark, pollen bright yellow; *filaments* bright red, normally declinate but occasionally spreading, approximately two-thirds the length of the tepals.

On the basis of foliage similarities as well as other factors, it is very possible that the T. L. Mead hybrid 'Peach Blow' is a cross involving *C. submersum*. 'Peach Blow' differs quite significantly from known *Crinum* hybrids involving Asian or African *Crinum*. Until *C. submersum* flowered, 'Peach Blow' had been the enigma of the hybrid group.

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THE AMERICAN LOTUS (*Nelumbo lutea*)

The native American Lotus (*Nelumbo lutea*) is one of the most beautiful of aquatic flowers. The plant is known under several common names, including sacred-bean, pond-lily, lotus-lily, water-chinquapin, pond-nut and the Indian name, Wonkapin. American lotus is part of our national heritage. It does not grow naturally in any other country of the world.

At one time the American lotus could be found growing in ponds, lakes, still streams and wet lands across the eastern part of the United States from Canada to Florida and as far west as Texas. But it is fast disappearing from most of its once-wide range due to dredging in the east, trampling by cattle in the west, and extreme cold. Some streams in the north and northwestern areas where the plant occurred earlier are now so polluted with chemical and industrial waste as to no longer support higher vegetation. The American Lotus has disappeared from most of these areas.



PHOTO LONGWOOD GARDENS

Fig. 1. *Nelumbo lutea*

It is unfortunate that the American lotus has often been referred to as water-lily, because it is not a member of the lily family. The name lotus may have been confused in the public mind with another plant with this name as a genus of the pulse or bean family (Leguminosae). Although the American lotus (*Nelumbo*) and water-lilies (*Nymphaea*) are closely related, they cannot be confused once the main differences are made known.

Water-lily leaves float on the water and the native species have white to pink flowers. The flowers of the American lotus stand on stalks elevated three to four feet above the water. The leaves, nearly as tall as the flower stalks, are circular, one to two feet in diameter, and are depressed or cup-shaped. The many-petaled, cup-shaped flower is pale, golden yellow, eight to ten inches wide

with a sweet, faint fragrance attractive to bees. Flowering occurs in July in the south and August in the north and west. Lotus flowers present a most magnificent display, opening in the morning and closing in the heat of the afternoon. But the bloom will last four to five days. The seed pod develops after the petals and stamens have fallen, first gold then green. The mature seed pod expands into a brown receptacle four to five inches across, flat on top and tapering to the stem. The large cavities hold brown seeds about the size of hazel nuts.

Culture

American lotus thrive in deep fertile mud in slow streams and ponds, needing both sun and warm water to bloom. It is readily propagated by dividing the thick tuberous root stock in late September. They may also be grown from seeds. Pods should be covered with cloth bags to catch the seeds. Press the seed into balls of clay and drop into water one to five feet deep, or sow them one to two inches apart in pots immersed in water indoors at 60°F. Transplant seedlings as needed and set the pots outdoors the following spring in an aquatic location.

Location of native stands

To my knowledge the largest and most substantial stand of native Ameri-



PHOTO D. G. HUTTLESTON

Fig. 2. *Nelumbo lutea* in Crab Orchard Lake, Illinois, August 1965.



PHOTO CREZIA COVINGTON REED

Fig. 3. Lotus garden (*Nelumbo lutea*) near Virginia Beach, Virginia. The bloom-filled creek extends for more than two miles.

can lotus extant was flourishing two years ago in a natural stand growing in Tabernacle Creek and North Bay near Virginia Beach, Virginia. More than six acres of this plant in North Bay have disappeared completely and the lotus in the winding creek produces less and less bloom each year. Due to the proximity of the sea, the stand was flooded with salt water in 1933 during a tropical storm and almost disappeared. From surviving rootstocks and seeds, this stand was restored during a period of 15 years.

Fourteen years ago, the Cape Henry Women's Club initiated a measure to conserve the American lotus in Virginia. Their plan was presented to the late Raymond V. Long, Director of the Virginia Department of Conservation and Economic Development. This body approved the plan on October 6, 1954.

Since that time, the Cape Henry Women's Club and the Virginia Department of Conservation and Economic Development have co-sponsored an annual lotus festival for the conservation of the American lotus plant and to help fund the Club's other charitable and educational programs. Part of the fund goes toward establishing a small park at the site of the Lotus Garden which is dedicated as a living memorial to the first settlers who landed at Cape Henry.

Unfortunately, this beautiful natural stand of American lotus is in serious jeopardy because of high salt concentra-

tion of 1600 ppm. In fact, the entire Virginia Beach area is changing as a result of dredging operations and new housing developments. The wild duck and geese no longer make Back Bay a hunters paradise. Only a small percentage of the once vast hordes of wild fowl now make Back Bay their winter feeding grounds for they no longer find sufficient food for their needs.

The city of Virginia Beach has offered its assistance to help save the American lotus. We hope for success in the preservation of this unique and valuable plant.

Some other known stands of American lotus:

New York State—Cayuga Lake

Monroe, Michigan—Two small stands in the vicinity of Monroe, cared for by the Monroe County Garden Clubs. These garden clubs plant seeds each year in the Fermi Power Reactor plant. They are attempting to restore the LaPlaisance stand which has been badly damaged by high water and carp.

Boston, Massachusetts—A small stand in a local park.

Wabash, Minnesota—A small stand available only by boat.

Members of the American Horticultural Society can perform a valuable service by reporting any existing stands of the American lotus in their vicinities.

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THE CHAYOTE

Also called Mirlton or Vegetable Pear (*Sechium edule*)

The Chayote is a member of the Cucurbit family (Cucurbitaceae), a perennial with tuberous roots, native in tropical America. It is grown for its edible fruit, tubers and young green parts.

The Chayote has grown successfully for a number of years at Callaway Gardens, Pine Mountain, Georgia. It is adaptable anywhere in the southern United States, where the ground does not freeze more than an inch. It will grow as an annual in areas where the roots are killed in the winter. The entire ripe fruit is planted in the spring, after danger of frost has passed, with the stem end slightly exposed and the opposite end sloping downward into the soil.

Plants can be started in the garden or in the greenhouse (in pots) and transplanted if care is used in moving the plants. Plants may also be propagated from cuttings taken near the crown of the plant.



PHOTO CALLAWAY GARDENS

Chayote (*Sechium edule*) in fruit.

Chayotes seem to grow well in any good, well drained, garden soil, as long as the plants are well mulched, watered weekly during dry periods and fed heavily with compost and/or fertilizer.

The plants should be spaced 12 to 15 feet apart and trained on an arbor, trellis, fence or the side of a building. More than one plant should be grown to insure pollination. A long growing season is required and fruiting usually occurs about September in west central Georgia.

Most parts of the Chayote are edible. The fruit can be used in the same manner as potatoes with meats and other vegetables. They can be creamed, stuffed

and baked, or made into fritters, sauces, puddings, or used in salads. The tubers can be prepared in the same way as potatoes, and the young shoots and leaves can be prepared like spinach.

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THE RADISH

(More Versatile Than You Think)

All of us know that pretty spot of color garnishing a salad or brightening an appetizer or cocktail tray. Actually the "little red marbles" of the mustard family (*Raphanus sativus*) are far more versatile than that, and, along with the white and black varieties, can serve as a substantial vegetable. In fact the radish is one of the oldest cultivated vegetables known, and its origin, probably in China or western Asia, is lost in prehistoric times.

The radish has traveled widely. It is mentioned, for instance, on one of the pyramids of Egypt where it is listed along with tons of garlic and onions needed to feed the workmen. Later we hear of the Greeks making sacrificial offerings to Apollo of radishes presented in "dishes of gold." Still later in Europe in the ninth century, the great emperor Charlemagne included radishes among the plants that he wished always to be planted in the imperial gardens. Hundreds of years later and half a world away, in the 18th century, Moravian missionaries planted radishes and small turnips in a tiny garden at Nain in Labrador. Soon New Englanders, too, were raising radishes. From their gardens some plants even escaped to grow wild along roadsides and in abandoned fields.

Today red radishes, less often the white and the black, are available nearly every day of the year in our markets, but still nothing quite equals the pleasure and flavor of those picked from our own gardens. Radishes are, too, one of the best plants to give a child for his own first garden. They are almost foolproof

to grow, and they provide the unforgettable thrill of serving and eating one's own produce, home-grown.

Red radishes are so decorative that many cooks simply trim the tops and the root, cut the fleshy part half through to form "petals" (the French advise: *tailler avec fantaisie*), and serve them as garnishes or appetizers. Europeans, however, often eat them spread with sweet butter. For salad (without lettuce) any of the red, white, or black varieties may be sliced and mixed with a French dressing to which mustard and scissored chervil or basil are added. A German version grates the radishes. Sliced radishes may also be added to sliced cucumbers and mixed with seasoned sour cream. This combination is also good as sandwich filling. In Japan, where the radish is called *Daikon*, a large black kind which reaches a weight of several pounds is cooked like turnip, or is pickled, and the seed pods are used like capers.

As a hot vegetable all three types are good. Slice the red ones across, not too thin, but cut the "icicles" lengthwise. Melt a little butter, add a small amount of chopped onion, and sauté with the radishes. Then add a few tablespoonsful of water, cover, and simmer for ten minutes. Add a sprinkle of salt and a little finely cut parsley. This vegetable is good with roast pork. The black radish may be cooked in the same way but will need a longer time, about 15 minutes. Then, since it is stronger in flavor, add a little curry or ginger, along with the salt.

All three types of radishes may be cooked as above, and then added to cream sauce. All are reported as rich in vitamin C, provided with some vitamin A, some calcium and phosphorus and—no calories!

Cultivation

Radishes will grow under a wide variety of conditions and in almost all parts of this country. However, for fine texture and flavor, the soil should be loose, rich, and well worked so that growth takes place quickly. Sow in rows and cover lightly with not more than 1/2 inch of soil. Germination takes place within a week. When the plants are up, thin early

radishes to 1 1/2 inches apart. Allow a little more space for later sowings, and as much as six inches for the larger, winter types. Radishes may even be planted right along with slower seeds of other vegetables, for which they break the soil, and are removed before their space is needed.

Early and mid-season varieties can be sown as early as the soil can be worked, and additional plantings made at intervals until hot weather arrives. Then a gap must occur, but a last seeding can be made about a month before frost. Most red varieties mature within three to four weeks, and should be gathered promptly. The white "icicles" need four weeks, and should be no more than six inches long. A round white radish is ready in about 25 days.

Certain varieties are called "winter radish." A white type, for instance, usually called Chinese, takes 60 days to maturity. This is the mildest of the winter radishes and is from six to eight inches long when ready. Another type can be grown in the spring or else in late summer for winter use, and left for 45 days until nearly a foot long. Winter radishes can be used when ready, or else stored in moist sand in a cool place (40°F) up to two or even three months. When removed for use, soak for an hour in cold water, and use either fresh or cooked.

Black radishes are not often grown in this country, but in Japan, China, and parts of Europe they are popular. They make a pleasant change when served either fresh or cooked, and, to paraphrase a current ad, you don't need to be native to the above countries to enjoy these radishes. Several nurseries carry the seed, and the large, turnip-like vegetable itself is often found in metropolitan markets. Black radishes are sown in late summer, take about eight weeks to mature, and should be picked before frost. The long, black, Spanish type grows to nearly ten inches in length and two to three inches thick. Like the winter white radishes, the black ones can be used fresh, or stored under the same conditions.

Put radishes at the top of your next shopping list. Take home a good supply and cook them for a horticultural adventure which is certain to please the palate.

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TWO TEXAS MAHONIAS

Mahonia trifoliolata or agarita, as it is often called locally, ranges over most of central and southwest Texas. It is one of the most common evergreen shrubs of

***Mahonia swaseyi*. Native of the limestone hills of central Texas.**

PHOTOGRAPH FROM A WATER COLOR BY PEGGY BERG



central Texas. Dark green, stiff, spiny, trifoliolate leaves, small, yellow, fragrant flowers, small, red berries and dense habit of growth make it a good ornamental where it can be grown. On first seeing agarita, many think it is a species of holly. Its mature height is about seven feet and it may have that much spread. The tart, edible fruit makes good jelly. The spiny leaves make the berries diffi-

cult to pick and often they are gathered by thrashing the plant with a stick so the berries will fall on a sheet.

Mahonia swaseyi is much rarer but it occurs with agarita in the few localities where it is found on the limestone hills of central Texas. The leaflets number up to at least thirteen, and are smaller, softer and lighter green than in agarita. The fruit is produced on longer stems, is somewhat larger and easier to pick. The shrub has the same growth habit as *M. trifoliolata*. Although very rarely used, *M. swaseyi* would make a useful ornamental. Apparently natural hybrids occur between the two species, since *M. swaseyi* plants with fewer, stiffer, more spiny leaflets, resembling those of agarita, are found.

These native Texas mahonias thrive in sun. Good drainage is essential. Transplanting is easy in winter where the soil is not too rocky to dig an earth ball of reasonable size.

Locally, the two commonest mahonias in cultivation, *M. bealii* and *M. lomariifolia*, require shade.

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PHILOGLOSSA IN CULTIVATION

Philoglossa is a little-known herbaceous genus of the daisy family (Compositae) from the Andes of South America. The genus comprises several plant forms, perhaps all referable to the single species *Philoglossa peruviana* DC. In 1964, I found a variety of this species described by me as var. *sapida*. This plant is cultivated by several Indian groups of the northern Andes. More recently, this variety has been introduced in Hawaii and now it is growing very satisfactorily at the Lyon Arboretum in Honolulu.

Philoglossa peruviana var. *sapida* has several vernacular names in Kamsá and Inga, the native languages still spoken in the area where it is principally known. "Huacamuyu," the most widely used name in the Inga language, is a good one to perpetuate. In comparison with

the several Kamsá names, it is easily pronounced. The Inga language belongs to the Quechua family of languages, and is thus related to the Quechua of the old Inca empire, as well as to the Quechua extensively spoken in present-day Peru. Geographically, Inga lies at the northern extreme of the present distribution of this group of languages. Since there is a tendency for the names of useful plants to accompany the plants themselves on their migrations, we may find clues to the region of origin. In this case, the central Andes, the Inca heartland, is suggested as the region of origin.

The distribution of the plant Huacamuyu, as recorded by plant explorers and botanists, is extremely restricted. Huacamuyu was "discovered" by Miguel Bang in Bolivia in 1890, and about seventy years later it was encountered for the second time in Colombia, not far from the border of Ecuador. I suspect that it also grows in Ecuador and Peru, perhaps even in cultivation, but evidence of this is lacking.

Huacamuyu is known principally from the valley of Sibundoy, an ancient lake bed high in the mountains of southernmost Colombia within one degree of latitude from the Equator. The Valley lies at an elevation of 7200 feet. Rainfall is very great, reaching or exceeding 200 inches annually, while the mean temperature is about 60 degrees and frost never occurs. The fertile soil is a well drained sandy loam favoring a great variety of crops and horticultural subjects.

The Sibundoy and Santiagueño tribes of the valley practice a primitive form of agriculture or horticulture wherein most of their important food plants are panted in one garden-wide mixture. The land is never completely cleared, for scattered throughout are a large variety of cultivated and wild shrubs and trees. An exception to this general pat-

tern are the plantings of Huacamuyu which appear as small patches of ground cover. The leafy tips of the branches are gathered and cooked as a potherb, and also in other ways. Few of the natives continue to cultivate Huacamuyu today, for now they prefer the tree kale (*Brassica oleracea* var. *acephala*) of European origin. The Indians agree, however, that in earlier times before the kale had reached their isolated valley, a great deal of Huacamuyu was grown and that it was eaten every day in all households.

Philoglossa peruviana var. *sapida* has weak, herbaceous and repent stems that send out roots at every node. The ends of the stems are erect to a height of 8 to 12 inches and bear one or two axillary, long-peduncled, conspicuous yellow flower heads. The paired, ovate leaves are rather crisp, and the stem is somewhat succulent.

Vegetative propagation by cuttings is exceptionally easy, particularly since roots often have formed before the cutting is removed from the parent plant. Cuttings, with or without roots, may be set directly in the ground and daily watering will ensure their success. The flowers have not been observed to set seed, either in Colombia or in Hawaii.

Huacamuyu was originally cultivated as a food plant, and I can testify that it is quite acceptable to North, as well as to South American palates. Whether its future lies in cultivation as a ground cover or as a vegetable remains to be discovered.

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Reference

- Bristol, M. L. 1964. *Philoglossa*—a cultivar of the Sibundoy of Colombia. *Botanical Museum Leaflets*, Harvard University 20: 325-333. Illus.

Fragrance and Fragrant Plants for House and Garden

Nelson Coon. Published by Diversity Books, Inc., Grandview, Missouri. 1967. 235 pages. Illustrated. \$7.95 (Library).

The author, who has spent many years working with the blind, draws on his wide knowledge of plants and their fragrances to write a most interesting book. In the first chapter he tells of scents and their "use" and problems—scents in animals, use by ancient man, use in religious ceremonies, and, in day to day living. The gardener may be more interested in the author's comments on the fragrant scents in all kinds of plants such as trees, shrubs, perennials, annuals, house plants, roses, geraniums, fruits, vegetables, and the plants of the greenhouse. He writes from his experiences and observations with these kinds. These may include his reaction to the scent of the plant being discussed, some cultural information, or suggestions on where it may be grown or perhaps a paragraph on the origin and use of the plant.

The author points out that we all have different responses to odors, for some the odor may be pleasing while to others it may even be objectionable.

Oh yes, fragrance is a part of the book itself; a scent (lavender?) was used in the ink.

CONRAD B. LINK

Rare Orchids Everyone Can Grow

Jack Kramer. Doubleday and Company, Garden City, New York. 1967. 144 pages. Illustrated. \$6.95 (Library).

This new book has many full colored illustrations and line drawings and is written by an orchid grower widely experienced on a moderate scale with species and hybrids in his home, greenhouse or garden. It is a good book on the subject of orchids in general and worthy of any library for the amateur or the professional.

For anyone interested in orchids the book, while small, contains a wealth of information. The colored illustrations are pleasing to the eye and indicate what the amateur or experienced grower may expect when following certain clear and concise instructions in growing orchids for fun or profit. The author writes in a manner that is most understandable to the inexperienced grower and should do much to encourage such persons to grow orchids of their choice from the many kinds obtainable at moderate prices. The book is not involved with technicalities beyond the comprehension of the average

grower. There is a general index as well as indices to orchid pests, orchid societies, literature, where to purchase greenhouses, potting material and plant sources in this country and abroad. There is considerable information on such matters as plant diseases, viruses, feeding and watering of plants and the various types of growing mixes that may be used in the growing of orchids in the home or the garden.

LINNAEUS T. SAVAGE

The Complete Book of Growing Plants From Seed

Elda Haring. Diversity Books, Inc., Grandview, Missouri. 1967. 240 pages. Illustrated. \$7.95 (Library).

A good cultural guide for the starting of plants from seed. The author groups the plants into several chapters according to kind, e.g. annuals, perennials, vegetables, house plants, and trees and shrubs. In each case she gives general information about that particular kind and then follows with more specific information for the different genera, often giving some cultural information in addition to propagation instructions. She has written this on the basis of study and her experiences in gardening in Connecticut.

The book is well illustrated with sketches and photographs showing equipment, techniques, and many flowers and plants.

Mountain Flowers

Anthony Huxley. The Macmillan Company, 866 Third Avenue, New York, N. Y. 10022. 1967. 428 pages. Illustrated. \$5.95 (Library).

An illustrated guide to the flowers of the mountains of Europe, from the Pyrenees in the west to the Julian Alps in northern Yugoslavia including alpine plants found in Scandinavia and in Italy and plants of the hills and northern part of the British Isles.

Simple keys to plant families and a description of the genus and species is included. Twelve hundred kinds of plants are illustrated in 112 color and 36 black and white plates.

American gardeners will recognize familiar perennial and bulbous plants of which some are parents of the perennial and rock garden plants we grow. This would be an excellent handbook to carry in your pocket while climbing the mountains of Europe.

Flowering House Plants— Month by Month

Jack Kramer. D. Van Nostrand Company, Princeton, N. J. 1967. 128 pages. Illustrated. \$5.95 (Library).

For each month of the year, the author describes a few plants that flower at that approximate time. Many are excellent plants for their foliage effects alone. Some monthly suggestions include plants for the warm room, a cool room, for a challenge to the gardener and those from the florist. Later chapters discuss the fundamentals of growing plants indoors.

Pleasures of Wild Plants

Audrey Wynne Hatfield. Taplinger Publishing Company, 29 E. Tenth Street, New York, N. Y. 10003. 1966. 197 pages. Illustrated. \$5.95 (Library).

Fifty plants are described, some native to Great Britain and others introduced centuries ago. Emphasis is placed on the culinary use of these plants along with their history, and the ancient myths and traditions associated with each. Recipes are included for the culinary enjoyment of these plants as salads or as vegetables, in soups, stews, for jams and jellies and as beverages. For cosmetic uses they include suggestions for sachets, toilet water, lotions, and soaps.

The American Camellia Yearbook— 1968

Published by the American Camellia Society, Tifton, Georgia. 1967. 340 pages. Illustrated. \$4.00. (Library)

Another of the well-done yearbooks of the Camellia Society. It contains a variety of articles on culture, pest controls, flower shows, and judging. For the fancier of new kinds there are

articles on *Camellia* species, and on new cultivars and the 1967 registration list of new cultivars. For the breeder and those interested in the development of new cultivars there are research oriented articles on the use of gibberellic acid on camellia flowers; on breeding for more cold resistance; inheritance of flower form and color; and on interspecific hybrids.

Iris: Goddess of the Garden

Winifred Ross. Diversity Books, Inc., Kansas City, Missouri 64141. 1966. 180 pages. Illustrated. \$5.95 (Library).

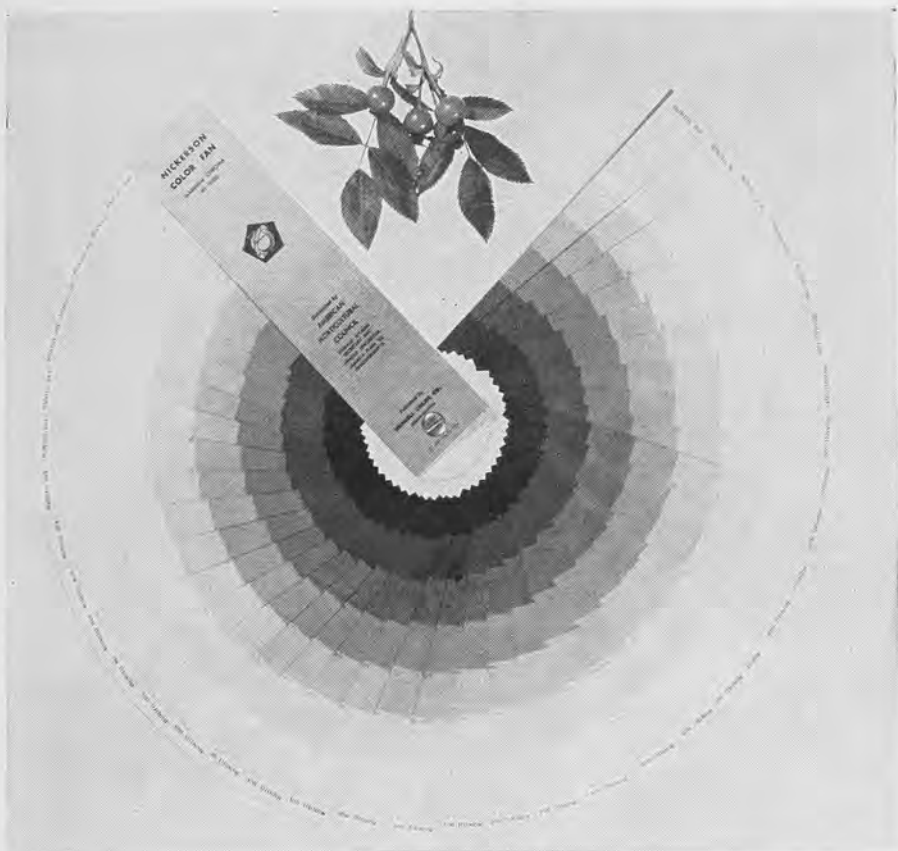
This book shows the enthusiasm of the author for iris and her interest in helping others know more about this satisfactory garden plant. It is chatty and non-technical. The culture of this plant is discussed, seasonal care, use in the garden, hybridizing, award winners, taking pictures of iris and comments on personalities of the "iris" world.

Nothing is said of the history or development of the present day iris nor of the genus itself. You just know from the pictures that the book is about the tall bearded iris.

All About Miniature Roses

Ralph S. Moore. Diversity Books, Inc., Kansas City, Missouri, 64141. 1966. 136 pages. Illustrated. \$5.95. (Library).

A book on the culture of the miniature rose with suggestions on their use and ways they may be grown. It opens with the story of the discovery and development of the miniature rose; later chapters tell of the present day development of new varieties. The author writes of his experiences and hybridization of these kinds. He has introduced several new kinds that are known in the trade as 'Eleanor'; 'Diane'; 'Fairy'; 'Princess'; 'Baby Darling'; and 'Jet Travel'.



Nickerson Color Fan

The American Horticultural Society has for many years been interested in making available to the horticultural public a popularly priced color chart that could be used as a standard in all phases of horticulture.

No color chart except those with a thousand colors or more can obtain all the colors needed by the various horticultural groups, but the Nickerson Color Fan, which has been approved by America's outstanding color foundation, can well become standard. The Fan is composed of 40 separate leaves fastened between a front and back cover of heavier stock in such a way

that any one leaf, any group of leaves, or all of them can be fanned or pivoted out for use. Each leaf has seven color chips ranging from the palest to the deepest hue of a single color. In its closed position the Fan measures one and a half inches by seven and a half inches and is one-half inch thick. Fully opened it measures fourteen and a half inches in diameter.

Included with the chart is a twelve page booklet explaining the use of the Fan in detail. Printed in small type on each color chip is the descriptive color name and its numerical designation in the Munsell sys-

tem of Color Notation which is fast becoming accepted as standard by many industries and societies dealing with color systems in America. The chart uses color names that have been selected as standard by the Inter-Society Color Council and by the National Bureau of Standards.

Judges who have used the Fan report that the color chips are so easy to handle, particularly when working with color classes, that they prefer it to any other color reference. Its handy, compact form makes it exceptionally convenient to use out-of-doors by gardeners, hybridizers, and growers interested in color.

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