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For United Horticulture

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THE AMERICAN HORTICULTURAL MAGAZINE is devoted to the dissemination of knowledge in the science and art of growing ornamental plants, fruits, vegetables, and related subjects. Original papers which increase knowledge of plant materials of economic and aesthetic importance are invited. For manuscript specifications, please consult the chairman of the Editorial Committee.

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COVER ILLUSTRATION

Viburnum × *burkwoodii* 'Mohawk' (N.A. 28181, P.I. 315889) resulted from a cross of *V.* × *burkwoodii* (*V. carlesii* × *V. utile*) × *V. carlesii*. 'Mohawk' has dark red buds which open to white flowers with red blotched reverse, abundant inflorescences, strong, spicy clove fragrance, compact growth habit, and foliage resistant to bacterial leaf spot and powdery mildew. The semi-persistent, glossy, dark green leaves turn a brilliant orange-red prior to defoliation. The brilliant red bud coloration, which is retained on the reverse of the flower, appears several weeks before the flowers begin to open, and extends the ornamental period of the plant to several weeks rather than a few days as with other *V. carlesii* types. The plant develops into a compact shrub about 6 feet high.



Critique On Communications

The prestigiousness of a publication usually reflects that of its parent organization. We have here the reciprocal situation, for it is fair to say that the growing reputation of the American Horticultural Society is derived in no small measure from the distinction of its publication. Since before 1934, when I first subscribed to it, this *Magazine* has been regarded by many as the American horticulturist's equivalent of a *National Geographic Magazine*—and, the two having been printed in earlier years by the same establishment, much of the typography of the older rubbed off on the younger.

With the merger in 1959 of the nation-wide American Horticultural Council with the functionally more regional American Horticultural Society, and the change in name of the latter's publication from *National Horticultural Magazine* to *American Horticultural Magazine*, there was assumed simultaneously the responsibility to serve more adequately the horticulturists of the country as a whole. That merger, representing union with an organization that was both a body of individual members and in effect an affiliation of national, regional, and state societies, carried with it the opportunity to take on a responsibility in behalf of amateur horticulture throughout America. That opportunity, far from realization, remains within reach. The *American Horticultural Magazine* has rendered yeoman service in behalf of the individual. It has given little if any service in behalf of or in recognition of other organizations that could come under its umbrella.

Horticulture is international. Organized horticulture for the amateur exists in this country to a degree that to individuals or officers of societies of other countries is scarcely conceivable. Yet, at the international level, we in America have no effective leadership. Such leadership is needed. The American Horticultural Society is the organization to provide it. Its journal is the vehicle by which to reach its membership as well as the leaders of sister organizations in other lands.

These ideas of leadership potential are not new to either past and present administrations of this Society. One barrier to their activation is the relatively small size of the Society and the lack of support from the leaders of the 70 or more other amateur organizations in this country. However, this barrier does not prevent a revision of corporate structure if needed to create places for effective representation from these organizations. This barrier does not prevent

editorial policy modification whereby two new and distinct departments could be established in the *Magazine*: one would provide domestic news of activities of organizations eligible for Society affiliation, and reports of outstanding papers in their publications; a second department would focus on news of international significance and interest, representing that generated within this country, and that from other countries. Each would have its own departmental editor.

It is my conviction that support can be generated when leadership becomes evident. No other American publication now provides national and international horticultural reports. It has been said that the Society's *Gardener's Forum* meets this requirement. It does not. It has been said that this *Magazine* would sacrifice its prestigiousness by becoming in part a news vehicle or house organ. It need not. The *Gardener's Forum* seemingly was intended to be read and discarded, for its format precluded the satisfactory binding and preservation of its issues; thus its contents were fugitive and their record is lost to future historians of American horticulture. Its typography was such that by many it was more scanned than read. I have failed to find it preserved in any but one of six major European horticultural libraries, and even there the holdings are fragmentary. One may conclude fairly that its effectiveness was limited as a medium by which the above objectives could be achieved.*

When news reporting is presented succinctly and with critical selectivity, and in appropriate format, in a publication such as this *Magazine*, I believe that the Society will present to its membership, and simultaneously will have added to the permanent record, a body of continuing record that is informative, educational, interesting, and readable for everyone. Such an innovation should help to lessen an existing criticism that a major part of the contents of average issues of the *Magazine* too often fail to interest the lesser informed of amateur horticulturists, and that they are directed more to the interests of the advanced amateur and the professional.

The Society will grow, and will serve more effectively, only when it reaches and meets the needs of that echelon of amateur horticulture that seeks, but has yet to attain, the knowledge, experience, and competence of the advanced plantsman. Through this service they in turn become advanced plantsmen. The opportunity and the challenge is present. Will it be met? When met, the prestigiousness of this publication will in fact reflect that of its parent organization.

* (Ed.: Dr. Lawrence is pleased that editorial experience on the Society's staff now makes it possible to publish from headquarters the newsletter which was previously produced by faithful volunteer members. The first issue of *AHS News and Views* appeared in Spring of 1968.)



GEORGE H. M. LAWRENCE, *Director*
The Rachel McMasters Miller Hunt
Botanical Library
Carnegie-Mellon University
Pittsburgh, Pennsylvania 15213

IN MEMORY



Frederic P. Lee

1893-1968

Frederic Paddock Lee died on October 2, 1968, after suffering a heart attack at his home in Bethesda, Maryland. Born in Lincoln, Nebraska, but raised in Rutherford, New Jersey, he spent most of his professional life in the Washington, D. C. area.

In the passing of Fred Lee the American Horticultural Society loses one of its staunchest workers, its best friends, and one of the greatest benefactors of its forty-seven-year history. He served as an officer of the Society for four years, a Director for eleven years, and for 20 years as an inspired member of the editorial group responsible for this magazine. In the last capacity he combined a professional knowledge of horticulture (in spite of the "amateur" status which he enjoyed pointing out) with an eye for good material. Many of his own excellent articles on daffodils, lilies, hostas, and other plants will be found through the magazine's pages. In writing, as in his conduct of a meeting or even in conversation, he impressed through clarity of thinking and through his innate ability to separate the chaff from the basic or essential. It may not be surprising that a later hobby was the study of modern approaches in mathematics—which greatly intrigued him.

In his 1958 production of the world-famous *Azalea Book*, Fred Lee provided so complete an information source on this segment of the genus *Rhododendron* that it is unlikely to be superseded for many years. Through his characteristic generosity, the royalties from this book accrue to the Society and, in a continuing stream, they have contributed handsomely to its operation and programs. With similar generosity his legal counsel has helped the Society over many an obstacle, from matters of its incorporation and by-laws through organizational and financial problems of many kinds.

Essentially modest, unassuming and averse to sham or ostentation in any form, Fred Lee exercised a quiet directness of approach which won him affectionate respect across a broad spectrum of work and interest contacts. By profession he was a specialist in administrative and constitutional law. Following undergraduate studies at Hamilton College, Clinton, N. Y.,

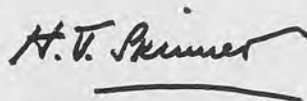
he acquired degrees of M.A. and LL.B. from Columbia University (1918) and served as Legislative Counsel of the U. S. House of Representatives and the U. S. Senate (1919-30) before entering private practice in Washington, D. C., latterly in the firm of Lee, Toomey, and Kent. He was a member of the bars of New York, Maryland, the District of Columbia, and the U. S. Supreme Court and taught constitutional law and political science in several universities. He had much to do with legal aspects of the drafting of the Plant Patent Bill which became law in 1930. He provided advice and counsel on the bill for establishment of the United States National Arboretum. He served as special counsel to the Secretary of Agriculture (1933), and as Chairman of the Advisory Council of the National Arboretum from 1946 until his death. Focusing upon a combination of his legal, horticultural and scientific skills, this last responsibility won Fred a quality of esteem and of respect throughout the Department of Agriculture and the government that will be seldom, if ever, duplicated.

Besides serving as Trustee of Hamilton College and the Washington Center for Metropolitan Studies, he was an officer of numerous civic and community groups, being a double recipient of the Washington Star Cup for outstanding civic activities. Among many such citations and awards were, in the field of horticulture, the Gold Medal of the American Horticultural Society, the Gold Medal of the American Rhododendron Society, and the Distinguished Service Award of the Horticultural Society of New York.

He is survived by his wife, Marion Armstrong Lee, by two sons, a daughter, and seventeen grandchildren. His brother, George S. Lee, Jr., is a past president of the American Daffodil Society and was editor of the American Horticultural Society's *Daffodil Handbook* on which they worked together.

Respect and affection for Fred Lee will remain with the scores of persons within and outside of our Society who knew him and worked with him.

For the President and Board of
Directors of the Society,



HENRY T. SKINNER
Director
U. S. National Arboretum
Former President
American Horticultural Society

October 1968

1968 Awards— American Horticultural Society

The Society's annual awards for excellence in advancing horticultural progress were made at the Awards Dinner, a highlight of the 23rd American Horticultural Congress at San Francisco, California, on September 19, 1968.

In recognizing the outstanding work of these distinguished leaders in the horticultural field, the Society emphasizes standards of excellence for all horticulture.

1968 Awards and Citations Committee

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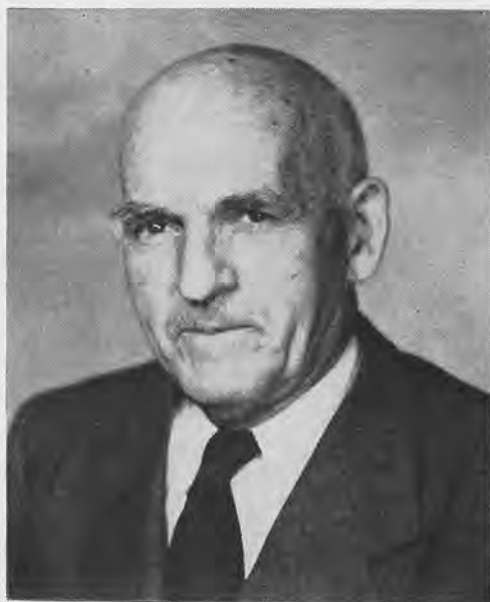
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The Liberty Hyde Bailey Medal Awarded to Dr. George McMillan Darrow



For his broad scientific contributions to horticulture, especially in the fields of strawberry and blueberry breeding.

Resident of Glenn Dale, Maryland. Graduate of Middlebury College, and Cornell University and with a Doctorate from Johns Hopkins University. For forty-five years associated with the United States Department of Agriculture principally as a fruitbreeder. From 1946 to his retirement in 1957 he was in charge of the USDA's Small Fruit Division.

From his breeding research with strawberries and blueberries have come some of the most outstanding varieties of the past twenty-five years. His contributions went beyond the production of superior new varieties. The guide lines for both contemporary and future breeders of strawberries and blueberries were established through his research and writings on breeding behavior, polyploidy and physiology. He was instrumental in establishing the Small Fruit Research Unit in the USDA, in organizing a strawberry virus free program, and a number of strawberry conferences.

A prolific writer, he kept the scientific community and the general public informed of his findings through nearly 300 articles published in the leading

scientific journals, farmers' bulletins, and trade magazines. He is the author of the book *The Strawberry—History, Breeding and Physiology*. He was co-editor of the "Daylily Handbook" which was published in 1968 by the American Horticultural Society and the American Hemerocallis Society.

He is a past president of the American

Society for Horticultural Science, The Washington Botanical Society and has served on the Editorial Board of the American Genetic Association since 1923. In 1954 he received the Distinguished Service Award of the USDA. In retirement he has applied his talents as a plant breeder to developing new day-lilies.

**Citation in Horticultural Journalism
Awarded to
C. Gordon Milne**

For many years of responsible editing and garden writing. His insistence on truth in horticultural advertising won him the admiration of fellow garden writers and the appreciation of the public.

Resident of Indianapolis, Indiana. He received his horticultural training at Ohio State University and taught horticulture at Purdue University and floriculture at Texas A & M College. He is a member of the Garden Writers Association of America, the American Rose Society and Sigma Xi, a national scientific fraternity.

He has been garden editor of the Indianapolis Star since 1952. He is known and respected across the nation as an outstanding garden writer. His informative and accurate garden writing has provided his readers with the knowledge and guidance necessary for successful gardening and for an understanding of the horticultural problems of our times. His insistence on truth in horticultural advertising has won him the admiration of fellow garden writers and the appreciation of the public.

**Citation in Plant Breeding
Awarded to
Charles L. Weddle**

For his pioneering efforts in developing the all-double petunia. His F₁ hybrid petunias, snapdragons and zinnias set new standards of excellence.

Resident of Paonia, Colorado. He received his academic training at Texas

Tech and Michigan State and taught in the Floriculture Department at Cornell University.

He was the first American to solve the problem of breeding all-double petunias. As founder and president of the Pan American Seed Company, he introduced thirty varieties of F₁ hybrid petunias, many of which became All American Selection winners. To many flower growers he is known as "Mr. Petunia." His Rocket snapdragon series has also received wide acclaim.

In 1967 he formed the Weddle Plant Research Laboratories at Palisade, Colorado. He is now directing his talents and major efforts toward the improvement of the zinnia.

**Citation in Amateur Horticulture
Awarded to
Grace P. Wilson**

For contributions as a specialist in African violets, as a judge of Amateur flower shows, as a lecturer and especially for her outstanding work as an amateur in guiding the American Horticultural Society through many years.

Resident of Bladensburg, Maryland. An avid lifetime gardener with interests encompassing many facets of gardening. As a specialist in African violets she gave freely of her time as a lecturer, organizer of shows, and as a judge.

In her constant desire to be more knowledgeable in horticulture she attended horticultural lectures in a wide variety of subjects. She is an accredited Flower Show Judge and has willingly shared her horticultural knowledge with new garden clubs as a lecturer and provided guidance in organizing, staging

and judging a wide range of flower shows.

For more than a decade she gave unstintingly of her time to the American Horticultural Society. Her six years of volunteer service is one of the most significant contributions ever made to the Society.

**Citation in Commercial Production
Awarded to
Monrovia Nursery**

For outstanding contributions to the art of growing a wide range of high quality ornamental plants in containers.

They accurately predicted the trend of the times and developed to a high degree the art of producing and merchandising, on a nation wide basis, a wide range of high quality container grown ornamental plants. They have made significant contributions towards adapting and modifying standard methods of propagation, container culture, and shipping to meet the demands of a business that catalogues over 400 plants to commercial nurserymen throughout the country. In addition to supplying high quality standard nursery stock they have through diligent search and production methods made available to gardeners, horticulturalists, and landscape architects many outstanding new or little known species and varieties.

**Citation in Teaching
Awarded to
Frances M. Miner**

For contributions to popular education to horticulture and botany that have helped persons of all ages understand and appreciate the plant world.

Resident of New York city. She is a graduate of Smith College and received her master's degree from New York University. She joined the staff of the Brooklyn Botanic Garden in 1930 and is currently the Chairman of the Department of Education and Deputy Director of the Garden.

Over a period of thirty-five years she developed programs in popular education in horticulture, botany and gardening that have enriched the lives of both young and old. The programs of popular instruction that she supervises are attended by 20,000 children and 2,000 adults each year. Many of her ideas of popular education have helped others to understand and appreciate the plant world. They are now a part of the educational programs of other botanical gardens.

In 1964 she was honored with the Sophia Smith award from Smith College for her contribution to keeping alive an awareness of nature's beauty and mystery.

Ten New Ornamental Viburnums From the U.S. National Arboretum

DONALD R. EGOLF

As *Viburnum* is one of the nursery staples, particularly in northern regions, the addition of select cultivars provides stimulus for expanded production and landscape use.

The new cultivars, *Viburnum* \times *rhytidophylloides* Sur. 'Alleghany', *V. dilatatum* Thunb. 'Catskill', *V. \times carlcephalum* Burkwood ex Pike 'Cayu-

ga', *V. dilatatum* Thunb. 'Iroquois', *V. \times burkwoodii* Burkwood & Skipwith 'Mohawk', *V. lantana* L. 'Mohican', *V. dilatatum* \times *lobophyllum* 'Oneida', *V. sargentii* Koehne 'Onondaga', *V. sieboldii* Miq. 'Seneca', and *V. sargentii* Koehne 'Susquehanna', are the result of research initiated at Cornell University where the seedlings were grown until 1958 when they were transferred to the U.S. National Arboretum. These are a sturdy group of cultivars which are outstanding in flower, fruit, foliage, and

Cytogeneticist, U. S. National Arboretum, Crops Research Division, Agricultural Research Service, U. S. Department of Agriculture, Washington, D. C. 20250.



Fig. 1, flower and fruit. *Viburnum* \times *rhytidophylloides* 'Alleghany' (N.A. 28865, P.I. 316675) was selected from an F_2 *V. rhytidophyllum* \times *V. lantana* 'Mohican' seedling population. 'Alleghany' has very dark green, coriaceous leaves; abundant inflorescences; resistance to bacterial leaf spot; hardiness; and vigorous, globose

growth habit. The rugose, coriaceous foliage, which tends to be semi-persistent, is intermediate between the parental species. For several weeks in September and October the plant displays brilliant red fruit as ripening stages advance to black. 'Alleghany' has attained a height of 10 feet and has developed into a dense, globose shrub as wide as high.

growth habit.

Viburnum species and cultivars frequently are grown from seed by nurserymen. Such commercially grown seedlings are the result of open-pollinated seed that does not maintain the species, but evolves a new race of hybrids that will include many inferior seedlings unworthy of cultivation. It is not to be concluded, however, that certain species cannot be grown from seed with a resultant population of moderate uniformity in the characteristics of growth, flower, and fruit. Clonal propagation demands greater emphasis so that all plants propagated consistently produce outstanding ornamentals. The common statement that several seedlings need to be planted together to insure fruiting is not valid as

many species and cultivars are self-fertile. The sparse fruiting species possibly do require a higher degree of cross pollination, but rather than rely on a heterogeneous seedling population with many inferior plants, the planting of several select cultivars in close proximity will produce heavy fruiting. Any of these 10 new cultivars vegetatively propagated will provide select and reliable ornamentals.

The cultivar names, 'Alleghany', 'Catskill', 'Cayuga', 'Iroquois', 'Mohawk', 'Mohican', 'Oneida', 'Onondaga', 'Seneca', and 'Susquehanna', have been registered with the U.S. National Arboretum, the international registration authority for *Viburnum* cultivar names, in accordance with the *International Code of*

Fig. 2, growth habit. *Viburnum dilatatum* 'Catskill' (N.A. 28866, P.I. 316677) is a selection from a seedling population from seed obtained from Province of Matsu, Honshu, Japan. 'Catskill' has compact growth habit, smaller and rounder leaves, and good

autumn coloration. The smaller, dull, dark green leaves assume good yellow, orange, and red autumn coloration. The dark red fruit clusters are dispersed over the plant and provide a display until mid-winter. The original plant is 5 feet high and 8 feet wide.



Nomenclature for Cultivated Plants, 1961. Detailed botanical descriptions of each of these cultivars can be found in the following references: Egolf, 1966a, and 1966b.

With the exception of 'Seneca', which has a chromosome complement of $2n = 16$, all of these cultivars have a chromosome complement of $2n = 18$. 'Alle-

ghany', 'Cayuga', 'Iroquois', 'Mohawk', 'Oneida', and 'Seneca', which resulted from hybridization, have the same chromosome counts as the parental species previously reported (Egolf, 1962a) and produce abundant seed, thus indicating that no irregularities occur in the meiotic divisions.

All 10 cultivars have proven hardy

Fig. 3, flower. *Viburnum* \times *carlcephalum* 'Cayuga' (N.A. 28180, P.I. 315888) resulted from a cross of *V. carlesii* \times *V. carlcephalum* (*V. carlesii* \times *V. macrocephalum*). 'Cayuga' has abundant inflorescences of pink buds that open to white flowers in late April, compact growth habit, and medium-textured foliage, with tolerance to bacterial leaf spot and powdery mildew. The leaves are small-

er, glossy, and have better color than those of *V. carlcephalum* which tend to become coarse in texture. Nearly all inflorescences have pink buds accenting the waxy, white flowers. Although the inflorescences are smaller than those of *V. carlcephalum*, their greater numbers present a mass effect and a more ornamental plant. 'Cayuga' is a compact, deciduous shrub to 5 feet high with spreading branches.





Fig. 4, fruit and foliage. *Viburnum dilatatum* 'Iroquois' (N.A. 28867, P.I. 316678) resulted from a cross of two superior *dilatatum* selections. 'Iroquois' has large, heavy-textured, dark green leaves, abundant inflorescences of creamy-white flowers, large, glossy, dark scarlet fruits, and dense, globose growth habit. The foliage is

ornamental at all seasons, glossy green in summer, and orange-red to maroon in autumn. The glossy, red fruit—borne in wide-spreading clusters—are at least a third larger than those of the typical *V. dilatatum*. A mature specimen will reach up to 8 feet high and 10 feet wide.



Fig. 5, fruit. *Viburnum lantana* 'Mohican' (N.A. 28868 P.I. 316679) occurred as a superior plant among a seedling population raised from seed obtained from Poland. 'Mohican' has dense growth habit, thick, dark green leaves, fruit that turns orange-red and maintains an effective display for 4 weeks or more, and resistance to bacterial leaf spot. In early July the fruits begin to ripen orange-red and remain effective for 4 weeks or more, whereas fruit on other *V. lantana* plants pass rapidly from orange to black. The thick, dark green foliage is borne in abundance to produce a mature, dense, globose specimen up to 6 feet high and 8 feet wide.

in Zone 5b¹. 'Mohican' also is hardy in Zone 4, while 'Onondaga' and 'Susquehanna' are hardy in Zone 5. All are adaptable for cultivation under diverse soil conditions but will do best in heavy loam soils with a pH of 6.0-6.5. 'Mohican' will thrive in full sun, dry situations, and limestone or loam soils with a pH of 6.0-7.0. Additional infor-

mation on *Viburnum* species and cultivars was published in the *American Horticultural Magazine*, Egolf, 1962b, 1962c, and 1963.

The Crops Research Division of the Agricultural Research Service, U.S. Department of Agriculture, released 'Cayuga' and 'Mohawk' in 1966 and 'Alleghany', 'Catskill', 'Iroquois', 'Mohican', 'Oneida', 'Onondaga', 'Seneca', and 'Susquehanna' in 1967, but has none of these plants for sale. It will be several years before sufficient stocks have been commercially propagated to enable the home gardener to purchase plants through normal retail outlets.

¹Hardiness zones refer to the Plant Hardiness Zone Map, U. S. Dept. Agr. Misc. Publ. 814. The suffix b with the hardiness zone indicates that the plant is hardy only in the warmer parts of the zone. The Map is available without charge from the American Horticultural Society.



Fig. 6, fruit. *Viburnum dilatatum* × *lobophyllum* 'Oneida' (N.A. 28869, P.I. 316676) resulted from a cross of *V. dilatatum* × *V. lobophyllum*. 'Oneida' has flowers which are abundant in May and sporadic throughout the summer, glossy, dark red fruit that persists until late winter, fine-

textured foliage that assumes pale yellow and orange-red autumn hues, and upright growth habit with wide spreading branches. Because of continuous flowering, a 10-foot specimen may have mature fruit, immature fruit, and flowers evident on the plant at the same time.



(Above)
Fig. 7, foliage. *Viburnum sargentii*
'Onondaga' (N.A. 28870, P.I. 316680)
resulted from a self-pollination of *V.*
sargentii. 'Onondaga' has velvety, fine-
textured, dark maroon young foliage,

that maintains a maroon tinge when
mature. The plant will produce a
greater foliage display if pruned to
induce dense branching. The smaller
stature, up to 6 feet high, is less than
most *V. sargentii* plants.



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6. ———. 1966 b. Eight New *Viburnum* Cultivars. *Ibid.* 14(3):106-122. September. (Described are 'Alleghany', 'Catskill', 'Iroquois', 'Mohican', 'Oneida', 'Onondaga', 'Seneca', and 'Susquehanna').



(Left)

Fig. 8, plant in fruit. *Viburnum sieboldii* 'Seneca' (N.A. 28871, P.I. 316682) resulted from a self-pollination of *V. sieboldii*. 'Seneca' has abundant, pendulant inflorescences of firm fruit on red pedicels that ripen red and persist on the plant up to 3 months before becoming black and falling. Birds normally eat the fruit of *V. sieboldii* before it has matured, but the fruit of 'Seneca' is very firm and is not devoured by birds even when fully ripe. The pendulant, multiple-colored clusters of orange-red fruit are spectacularly displayed above the coriaceous, green foliage. Although 'Seneca' is tree-like and may attain a height of 30 feet, the plant can be grown with several branches from the base and kept as a large shrub of 15 feet.

(Above)

Fig. 9, flower and foliage. *Viburnum sargentii* 'Susquehanna' (N.A. 28872, P.I. 316681) was selected from a seedling population raised from seed obtained from Province of Matsu, Honshu, Japan. 'Susquehanna' is a select *V. sargentii* plant with heavy-branched, corky trunk, coriaceous, dark green leaves, abundant flowers and fruits, and upright growth habit. Since *V. sargentii*, as commercially grown, usually is either not the true species or an inferior plant, this superior seedling was selected for cultivar introduction. A mature specimen, up to 10 feet high, is a large upright plant that is ideal for park planting but not suited to the small home garden.

Conifers— Promising Source of New Drugs for Cancer

AHS supports the search for plants of value in anti-cancer research, and welcomes the opportunity for horticulturists to cooperate in a humanitarian program of worldwide importance (Ed.).

The conifers are proving a fertile area in a search for anti-cancer drugs. This finding is one of the most significant returns from an intensive screening of our plant resources.

Our rewarding experience in screening about one-third of the world's species of conifers, representing about half the genera, dictates an expanded effort to include as broad a representation of these plants as possible.

This note is intended to bring this interest to the attention of horticulturists and to enlist their aid in our procurement of additional genera and species.

Since 1960, Agricultural Research Service botanists have supplied more than 17,000 plant samples, representing about 10,000 species, for anti-cancer screening. This program, conducted in cooperation with the Cancer Chemotherapy National Service Center of the National Cancer Institute, has demonstrated significant anti-cancer activity for about 800 species in 133 plant families.

Plants with cancer inhibiting capacity are scattered more or less at random throughout the plant kingdom. But, there is a tendency for them to be concentrated in a few families, such as dogbane (Apocynaceae), spurge (Euphorbi-

aceae), pulse (Leguminosae), and lily (Liliaceae) families.

The greatest concentration of plants with this capacity is among the conifers. To date, we have tested 146 species in 28 genera. Sixty conifers in 16 genera have shown sufficient activity against cancer in laboratory animals to justify intensive chemical fractionation to isolate and identify active chemical constituents.

Many conifers are now under fractionation in four chemical laboratories. Active constituents, isolated from 17 species, include podophyllotoxin and similar lignans, tannins, beta-sitosterol, diterpenes, alkaloids, and a compound of unknown nature.

The anti-cancer activity of podophyllotoxin and similar compounds is now well known. They are not acceptable for development as new drugs because they are active only against *in vitro* systems (cancer cells cultured in artificial media). Clinical work to date has shown little promise.

Tannins have proved unacceptable because their therapeutic index (range between minimum effective dose and maximum tolerated dose) is not great enough for clinical safety. In addition, they are not chemically stable.

Beta-sitosterol is not suitable for further development because it is not sufficiently soluble in any acceptable biological solvent. Soluble derivatives prepared to date have only marginal activity.

The diterpenes are a new class of compounds among those known to display anti-cancer activity and little is now known of their potential drug value. They are currently under consideration for further evaluation.

The most promising compounds isolated from conifers are alkaloids. Two

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alkaloids have been isolated from species in two genera. An example is taxol from the bark of *Taxus brevifolia*, a native of the Pacific Northwest. Both alkaloids show significant activity against mouse and rat tumors that are useful in detecting compounds likely to be of value in treating human patients.

A chemical substance isolated from a species of *Pinus* is very promising. Its chemical structure is yet to be determined but it is not one of the types mentioned above.

Further screening of conifers is urgent. The probability that other valuable compounds will be detected is high. We want to test as broad an array of conifers as possible. Our objective is to bring before a selected screen of animal-cancer systems the complete spectrum of chemical compounds produced by these plants. We wish to include other gymnosperms as well, especially the cycads. The latter are well known for their toxicity. Screening will detect those with selective toxicity against living cancer cells.

Although we have screened a large number of conifers, our sampling is very incomplete. There is good reason to include additional species of genera that are fairly well represented in our collections. Experience gained since this program began has demonstrated that screening procedures now in use are much more likely to detect activity than those used during the early stages. Thus, it now appears that further screening of species previously included in the program will be advisable.

In order to increase the probability of detecting compounds of potential value in treating cancer in man, samples of gymnosperms will be subjected to a special screening spectrum, more intensive than that normally employed. Crude extracts will be tested against two forms of leukemia in mice that have good clinical predictability for anti-cancer activity in man.

They will also be screened against KB Cell Culture (derived from a carcinoma of the nasopharynx), a very sensitive *in vitro* test system that often detects activity missed by other systems. KB detects

the activity of some compounds present in extremely minute amounts. These compounds, when concentrated, often show activity against animal tumor systems with good clinical predictability.

All extracts will be tested for alkaloids. When an extract is negative against KB and the animal test systems but shows a positive alkaloid test, an alkaloid fraction will be retested against the tumor screen to the extent that supplies of plant material are adequate.

Some of the cancer-active plant constituents with which we have had experience occur in all parts of the source plant. An example is "camptothecin," an alkaloid from *Camptotheca acuminata* (Nyssaceae). Others are concentrated in a single organ. An example is taxol, from the bark of *Taxus brevifolia*. We will therefore want to test separate samples of each plant part to the extent this is practical. Trees and shrubs can yield separate samples of roots, bark, bark-free wood (or wood with bark attached when stems are small), twigs, leaves, and fruit. Nursery stock is a good source of roots, stems, and leaves.

We are making a very intensive effort to procure samples of as many conifers, cycads, and other gymnosperms as possible. Many will come from plants growing in their native environment. Samples from ornamental or botanic garden specimens are welcome. We will purchase nursery stock from which samples can be prepared.

Many species are rare and will be difficult to locate. We are especially interested in obtaining samples of the conifer genera *Acropyle*, *Actinostrobus*, *Agathis*, *Amentotaxus*, *Arceuthos* (*Juniperus drupacea*), *Athrotaxus*, *Austrotaxus*, *Diselma*, *Fitzroya*, *Fokienia*, *Microcachrys*, *Neocallitropsis*, *Nothotaxus* (*Pseudotaxus*), *Pherosphaera*, *Pilgerodendron*, *Saxegothaea*, *Sciadopitys*, *Tetraclinis*, and *Widdringtonia*. We also wish to obtain samples of *Gnetum* (Gnetaceae) and all available cycads.

Appropriate information will be appreciated and may be forwarded to me at the following address: New Crops Research Branch, Plant Industry Station, Beltsville, Maryland 20705.

Useful California Natives for Gardens

PART I

MARJORIE G. SCHMIDT

Many western American native plants are familiar garden subjects and have been cultivated through the years, some to the point where their wild origin has almost been forgotten. In my native state of California countless wild species still remain unknown in gardens, and far too little progress is being made to discover their possible values in the horticultural scheme.

Few have seen the stately matilija poppy, *Romneya coulteri*, in its natural setting of dry canyon walls. It would hardly seem a likely candidate for the cultivated garden but once established it is apt to take over garden borders. The versatile hollyleaf cherry, *Prunus ilicifolia*, is widely used for both hedge and specimen, although few recognize its dark green outline among other foothill shrubs. There are many cultivars of the famous Lawson cypress, *Chamaecyparis lawsoniana*, but few gardeners know the tree as it grows in the lush coastal forests.

The rare endemic *Carpenteria californica* has long been a popular ornamental shrub, but not many have visited its restricted natural habitat where it has all the charm of a highly cultivated subject; its flat white flowers resemble single camellias. Other natives of wider distribution are more easily recognized and none is more popular than the Christmas berry, or toyon, *Photinia arbutifolia*. One of the first to be accepted as a garden plant, it is now used along freeways, where its evergreen leaves are always presentable, and its immense clusters of bright red berries enliven the roadsides all winter. Because of these examples and my own few successful adventures in growing wild plants, I hope that many more will find their

place in the horticultural scheme and achieve the popularity which I believe is their destiny.

Carpenteria

Among California's evergreen, flowering shrubs, *Carpenteria californica*, the bush-anemone, stands out as one of the most handsome, with the added intrigue of being a rare endemic. Next to the genus *Fremontia* it is considered to be Gen. Fremont's finest discovery among western native plants. Following its initial discovery nothing was heard of *Carpenteria* for thirty years. It was rediscovered in 1875, and subsequently quantities of seed were collected and widely distributed among horticulturists. Being an adaptable, free flowering shrub, it is greatly admired by all who grow it. Bush-anemone is native to only a few localities of the Sierra Nevada foothills of Fresno County, southeast of central California. Here it grows in brushy, chaparral-like places, and few except botanists have visited its natural habitat.

Bush-anemone has smooth, oblong dark green and glabrous leaves above, and whitened beneath with a fine pubescence, two to four inches in length, opposite and quite closely spaced to give an overall dense, leafy effect to the plant. Flowers occur in open terminal clusters. The single pure white blossoms are provided with a ring of bright yellow stamens, with the fragrance of mock-orange. Plants are outstanding in full flower which generally occurs in May, although in gardens plants may bloom at other times of the year. Bush-anemone is generally recommended as an accent shrub to be used where its generous flower display can be fully appreciated. As a foothill shrub of elevations up to 4,000 feet it is tolerant of some cold, although it has not been thoroughly

tested as a garden subject for mountain areas. Seed is contained in a conical, leathery capsule. In *Cultivated Trees and Shrubs*, by Alfred Rehder, it is listed as being hardy in zone seven, which is a narrow, curving belt extending from the mild sections of the Pacific States through the south, and to Virginia on the Atlantic Coast.

Although a chaparral plant the bush-anemone tolerates light shade, and moderate amounts of water as long as the soil is well drained. In my garden it grew to the rear of a wide border where it received some shelter from nearby trees, and was backed by a living wall composed of Mexican mock-orange and *Cornus glabrata*, one of California's creek dogwoods. These two rampant, semi-climbers quickly covered the fence, and required severe pruning to prevent them from invading the background trees and shrubs. In this setting my *Carpenteria* grew to about nine feet in as many years with a spread of four feet, and branched from the base to form a compact shrub. Wild plants may be from three to seven feet, but in gardens the ultimate height varies according to situation. In a friend's garden a specimen plant grew in semi-espalier fashion against a west facing wall, attaining about fifteen feet in height. It was lightly pruned, and a few branches removed to form an open framework. In another garden bush-anemone grew in the filtered light of evergreen oaks which made a perfect, shadowy setting for the lovely white flowers.

Propagation of bush-anemone is by seed, cuttings of young wood, or from the freely produced suckers. Because the seedlings have a tendency to damp-off, seed is scattered on sphagnum or peat moss which tops the soil mixture. Care must also be taken not to over-water the seedlings as this may also induce damping-off. Seedlings should be transplanted while still small into a gritty soil mixture. A tendency to aphid attack which causes leaf curl sometimes mars the beauty of *Carpenteria*, and if this occurs plants must be sprayed immediately. If done promptly further attacks

can usually be prevented. Cut flowers last very well in water and a few sprays make an elegant bouquet, or are equally fetching in an arrangement of mixed flowers.

Calochortus

The varied types of plants within the lily family are other remarkable features of western native flora. From the giant yucca with its massive spikes of creamy bells to the diminutive *Fritillaria pudica*, practically all sizes in several genera are represented. The genus *Calochortus* is one of these lilaceous types, and includes three categories of plants—the tall mariposa, the intermediate fairy lantern, and the most diminutive, kitten's ears and star-tulips. Of these I will describe my experiences with several in the latter two groups.

Calochortus albus, the white globe-tulip, is a prime favorite, a plant of unusual grace and refinement. Its pearly globes enliven the tangle of ferns and



Fig. 1. *Carpenteria californica*—a close-up of the flowers.

PHOTOS BY AUTHOR

shrubs among which it grows in shady woodlands. This elegant plant has several common names aside from globe-tulip, including also fairy lantern, satin bells, Indian bells, alabaster-tulip, and snow-drop. The globe-tulip is native to the Coast Ranges from central California southward, and in central Sierra Nevada foothills. Generally it is a woodland plant inhabiting tree dotted hills and canyon walls, but it may also venture out onto north or east facing slopes among a scattering of shrubs. I have frequently visited a shady oak dell where it grows among a select company including *Fritillaria lanceolata*, *Iris fernaldii*, *Pedicularis densiflora*, *Cynoglossum grande*, with *Ceanothus thyrsiflorus* making a bower of blue flowers overhead.

The globe-tulip is generally a robust plant growing from a small coated bulb. Very early in spring it produces a solitary, glossy, deep green basal leaf a foot or two in height. A branched flower stalk of almost equal height soon follows bearing cauline leaves and pointed, leaf-like bracts. Each branch bears several subglobose flowers, lovely nodding

satiny bells which swing out in lantern fashion. Three arched petals meet at the tips to form this flower of most pleasing design. Short sepals conform to the flower curve, and often bear a tint of pale purple, or deep rose. The inner gland is easily detected as it has a blister-like appearance on the outside of the flower, and is a distinguishing mark of the globe-tulips. Plants bloom in May, although depending upon exposure, they are apt to flower any time from mid-April until June. Many angular black seeds are produced in three sectioned, nodding capsules, and these are ripe in late summer.

Southward from San Francisco the flowers of *Calochortus albus* often become deeply rose-tinged, and these are considered to be var. *rubellus*. The flower color is vibrant and in a shady setting they glow like jewels. A small patch of this variety persisted in my garden for many years under the outer branches of a Monterey pine. Several gradations of tinting occur between this variety and the species, and even where pure white flowers prevail, some will have a wash of rose or pale wine concen-



Fig. 2.
Carpenteria californica—habit of the plant in flower.

trated at the base of the flower and on the sepals.

Authorities on the cultivation of native plants generally agree that the globe-tulip is one of the easiest to grow. The term is relative as few wild bulbs are completely amenable to garden conditions. However, with well drained soil containing some humus and in partial or broken shade, they are apt to persist. A colony flourished in my garden for many years, growing under the high shade of an old live oak, *Quercus agrifolia*. Here they were companioned by *Iris innominata*, amid the dainty, lacy foliage of *Vancouveria hexandra*. Although the globe-tulip will grow in deep shade, and often does so in the wild, flower production is better where plants get sun for at least half a day. I was gratified to discover that the globe-tulip grows and flowers with its accustomed vigor in my mountain garden, not dismayed by occasional near-freezing temperatures.

Seed of *Calochortus albus* germinates readily without any special treatment. Planting may be done in autumn or early spring and seedlings generally ap-

pear within a few weeks. By the end of the first year the developing corn is somewhat less than rice-grain size, and the leaf is a bright green spear. I have two methods for planting seed. If the quantity is small, I plant the seed in a wide shallow pot, using finely screened leafmold with sand and loam. For large amounts I plant the seed in an outdoor bed which is boarded on the sides, and with screen below to keep out gophers and moles. Over this bed I place a light frame to which one-half inch screen is tacked to prevent animals and birds from scratching in the soil. This covering is easily removed for purposes of weeding and cultivation. Grown thus the plants remain intact until a mature bulb is formed, which takes at least three years. When grown in pots I sometimes transplant the young seedlings to individual pots, doing this at about their tenth month, to a year or more of growth. This transplanting must be done quickly into prepared soil, and well scrubbed pots. All members of the lily family are susceptible to fungi, and cleanliness is essential. Along with its amenability, the globe-tulip seems more disease resistant than most species.

Fig. 3.
Calochortus
albus
—close-up of the
fully opened
flowers.



Many words of praise have been written about the lovely globe-tulip, and one admirer was the late and knowledgeable Louise Beebe Wilder. In her "Adventures with Hardy Bulbs" she gives lucid directions for growing the globe tulip as well as other western wild bulbs. Several writers have quoted John Muir's opinion that the globe-tulip is the most beautiful of all wild lilies.

Growing species of *Calochortus* away from their western haunts is tricky, but generally successful if given full sun, well-drained soil, and a dormant period in late summer. It is most important to plant the bulbs in late autumn to prevent top growth which may be damaged by frost or snow, and thus kill or weaken the corm. The conditions most conducive to longevity are to be found in a rock garden, natural rocky slope, or a raised bed.

The late B. Y. Morrison, whose familiarity with many plants is well known, gave his formula for growing *Calochortus* in the *National Horticultural Magazine*, for October 1955, in "Notes on *Calochortus*." He suggested that the corms be planted in coarse soil with no fertilizer but to which small amounts of leaf soil might be added. His planting site in Maryland was in front of a hedge where greedy shrub roots would be certain to use any excess moisture. Bulbs are planted about three inches deep and rather close together for a good show of flowers.

So deeply do I admire the small species of *Calochortus* that restraint is almost impossible when I describe their individual charms. The spritely Sierra star-tulip (*Calochortus monophyllus*, also known as *C. benthamii*), has an attractiveness far beyond that of its small stature. It is native to the west slopes of the Sierra Nevada Mountains in the central portion. I have frequently encountered it in pine-oak woodlands, where the beautiful *Ceanothus integrifolius* is often present. In a few places this star-tulip is companioned by the rare *Iris tenuissima*, but more commonly it grows with a spreading clump of *Apopcynum*.

Following abundant rains Sierra star-tulip appears in great quantities and their glowing yellow flowers enliven open forested regions. In wet years plants are robust and as much as a foot tall, although six to eight inches is more normal. With less moisture only scattered colonies will be found. The flowering stem is exceeded by several inches of the wide, glossy basal leaf. Flowers tilt upward so that the observer may fully enjoy the face-like interiors heightened by red-brown spots at the base of each petal. Wide, lemon-yellow petals are fringed and densely bearded. Pointed, green-yellow sepals appear between each petal to form the unique star pattern of the flower. The Sierra star-tulip blooms in April or May, and by late summer the nodding capsules are ripe and bear a good quantity of angular, dark brown seed. One writer has called this the "gold edition" of star-tulip since it is abundant in areas where gold was mined in the early days.

For many years I had a colony of Sierra star-tulip in my dry border where it grew with other small native bulbs, and was backed by a spreading *Arctostaphylos densiflora* 'James West.' The diminutive and widely distributed *Calochortus tolmiei* was one of its companions and was generally in flower at the same time. Although the flowers of this pussy ears were of subdued colors, white with tints of lilac or lavender, they had the same quaint, face-like appearance from bearding on the inner surfaces. Some of the low statured brodiaeas and alliums make excellent companions for the star tulips and fairy lanterns.

Elphin is the word for these plants with their open-campanulate or globe-shaped flowers, and dainty appearance. All should have a garden situation where they do not have to compete with aggressive plants, and where intensive cultivation is not practiced. I have found them to be enduring when proper conditions of soil, moisture, and exposure were provided. Under these circumstances their modest size and delicately tinted flower-cups can be fully enjoyed.

Some Pollination Problems of Apples¹

DARRELL T. SULLIVAN, GERALD M. BURKE,
AND FRED B. WIDMOYER²

Many fruits require cross pollination for production. Fruit set is sporadic when the flowers are self-pollinated. In general, apricots and peaches set well with their own pollen, but most varieties of almonds, plums, pears, cherries, and apples will not set fruit with their own pollen.

'Delicious', the most widely planted apple cultivar, serves as a good example. Although the trees grow well, low yields may occur. Several factors are responsible. 'Delicious' is self-unfruitful and must be cross-pollinated with other cultivars. A genetic factor is present that reduces fruit set. This cultivar is more susceptible to low temperature damage just before and during bloom than most commercial cultivars. Because of these problems, sufficient pollinizers must be provided for good fruit set and high yields.

Most orchards lack enough pollinizer cultivars. In many orchards, solid blocks of 'Delicious' have been planted. Single trees respond similarly. Satisfactory crops have been produced some years. Fluctuating production from year to year makes it difficult to establish apple packing facilities and develop markets. Improved pollination would help stabilize the annual yield.

Apple fruit set was examined in the Hondo and Espanola areas of New Mexico. One orchard, consisting of four acres, was planted entirely with 'Delicious' trees. In 1965, although bees were used extensively, a commercial set was not obtained. Several trees, which were hand pollinated, had a good fruit set. Pollination was the problem. The fol-

lowing year, no trees were hand pollinated and only those near an adjacent orchard of mixed cultivars set a commercial crop.

An effort was made to correct inadequate pollination in an 18 acre block of 'Delicious'. Several 'Delicious' trees were partially topworked with 'Golden Delicious' in 1963. 'Golden Delicious' were planted where original trees died. A light fruit set was obtained in 1965 and 1966; however, the fruit set was heavier on the topworked trees and on those near the 'Golden Delicious' trees.

In another orchard, one part consisted entirely of 'Delicious'. Every third row was a pollinizing cultivar in the remaining acreage. An excellent commercial set of fruit occurred in the pollinizer block of the orchard in both years, although a very light set resulted in the solid 'Delicious' block.

A lack of pollinizers was found in a 23 acre orchard of 'Delicious' which contained only 15 'Golden Delicious' pollinizer trees. In 1965, bouquets of 'Golden Delicious' were placed in the lower branches of several trees. A heavy fruit set resulted on the 'Delicious' trees near the 'Golden Delicious' pollinizers and on trees where bouquets were used. The overall fruit set was heavier in 1966, probably because in addition to using bees, pollen was applied with an orchard sprayer.

In a 25 acre 'Delicious' orchard where every third row was planted to a pollinizing cultivar, there was an excellent fruit set in both years even though the trees lacked vigor.

Since 'Delicious' is self-unfruitful, thorough cross-pollination is required for adequate fruit set. If the orchard consists of more than a few trees, two planting plans are suggested. Under Plan A every third row is planted to the pollinizer cultivar. This usually insures

¹Journal Article 300, Agricultural Experiment Station, New Mexico State University, Las Cruces, New Mexico, 88001.

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adequate pollination when bees are present in sufficient numbers and weather conditions are favorable. Under Plan B every third tree in every third row is a pollinizer. This plan results in more trees of 'Delicious' than Plan A, but spraying and harvesting may be complicated by the interplanted rows. With sufficient bees, pollination is usually adequate using this system. A 'Delicious' tree should never be farther than one tree space from its pollinizer.

Few apple cultivars are self-fruitful, although some, such as 'Grimes Golden', 'Yellow Transparent', and 'Rome Beauty', may set satisfactory crops when planted in solid blocks. The "five in one" apple tree planted in the back yard should not have pollination problems. The increased use of dwarf trees permits planting of several trees in the space required for one standard tree. Cross-pollination may be obtained by proper selection of cultivars. All apple cultivars benefit from cross-pollination. A list of apple cultivars grouped as to self-unfruitfulness and bloom season and their value as pollinators is presented in table 1. Cultivars listed as self-unfruitful do not set commercial crops unless cross-pollinated. Pollinizers must bloom in the same season as the main cultivar to be effective.

In solid block orchards of 'Delicious', or orchards with too few pollinizers, topwork some of the trees to a polliniz-

ing cultivar. Graft or bud pollinizers according to Plan A or B. Topworking may be accomplished during several years. Under Plan B a single branch on every third tree of every third row is grafted to the pollinizer. Later the entire tree should be grafted to the pollinizer. Topworking trees is a permanent solution for inadequate pollination, but several years will be required for the new cultivar to develop. In the meantime, place pollinizer bouquets in the orchard. Cut large branches with both open and unopened flowers. Place them in water immediately and if possible put them in the tree rather than on the ground. Each tree should have its own bouquet. Replace the flowers when they wilt.

Bees are the only important insects which pollinate apple trees. At least one strong hive of bees should be placed in or near the orchard for each acre of trees. The hives may be placed in groups of eight to ten. Wild bees aid in pollination, but additional hives of honey bees are required in the orchard during the blossoming season.

Extremely weak trees and vigorous, young trees usually produce few flowers with light fruit set. Spurs on healthy, vigorous branches set more fruit. Correct pruning will admit light and stimulate spur development. Generally, early spring applications of nitrogen fertilizers are considered beneficial to fruit setting.

TABLE 1. Apple Cultivars Classed According to Self-Fruitfulness, Blooming Sequence, and Value as Cross-Pollinizers.

USUALLY SELF-FRUITFUL	PARTIALLY SELF-UNFRUITFUL	SELF-UNFRUITFUL
	<i>Early Blooming</i>	
Yellow Transparent (E)*	Ben Davis (E), Black Ben Gano	Arkansas (P) McIntosh (E), Blackmack, Red McIntosh
	<i>Midseason Blooming</i>	
Grimes Golden (E) Wealthy (E), Wealthy Double Red	Golden Delicious (E) Jonathan (E), Blackjon, Jonared	Arkansas Black (S) Delicious (E) (all strains) Stayman Winesap (P), Blaxtaya- man, Scarlet Staymared, Stay- mared Winesap (P) (all strains)
	<i>Late Blooming</i>	
Rome Beauty (E), Red Rome, Rome Beauty Double Red, Seeando Red Rome		Northern Spy (E), Red Spy

* Effectiveness as a cross-pollinator: (E) = excellent (S) = satisfactory (P) = poor

Detroit, The Beautiful

ALICE WESSELS BURLINGAME
AND FRANKLIN J. BLANCHARD

Detroit is a midwestern gem of beauty with its location on the Detroit River. It is unique because the center of the city is on the river's edge, opposite Windsor, Canada, which occupies the other bank. The streets fan out from downtown like the spokes of a wheel. As early as 1648 the site was visited by Frenchmen and its location on the bank of the Detroit River made it a trading center for Indians.

The history of the city records pestilence, famine, and fire. After each disaster, the town has been rebuilt resulting in a tradition among its citizens for growth with the times—from changing cultures to partnership with today's dynamic automobile industry.

The Detroit Institute of Arts, Wayne State University with its modern, large campus in the center of town, the world-famous Detroit Zoological Park, the Detroit Symphony Orchestra, the many walkways for leisurely viewing the river traffic from all over the world, and Belle Isle, a 1,000-acre island park in the Detroit River, ten minutes from downtown, all are factors in Detroit's tradition of culture. These attributes account in large measure for the name by which the city is known worldwide: Dynamic Detroit.

City beauty requires civic watchdogs and the Department of Parks and Recreation plus the Central Business District Association are constantly renewing and rebuilding streets and areas of beauty to guarantee continually attractive displays in tune with the seasons.

Alice Wessels Burlingame, garden consultant, 3891 Oakhills Road, Birmingham, Michigan 48010.

Franklin J. Blanchard, Floriculture Supervisor, Detroit Department of Parks and Recreation, City County Building, Detroit, Michigan 48226.

Picnic tables are placed along the waterfront to encourage "people watching", as well as launching facilities so that small boats may meet guests or the occupants may tie up and go shopping. Through the years a number of old buildings have been removed to provide for wide streets. Many parklets have been allowed in the master plan which gives air space and small areas filled with beauty.

Readers who are aligned with city planning and ornamental horticulture will be interested in the following comments which reflect the practical experience of maintaining plant material in a busy city with the usual gas exhaust and a compact population.

There are many constructed containers for trees and flowers. Experience has shown that a 36 inch container which will accommodate a 24 inch ball of earth will maintain a tall hedge, shrub-like tree, buckthorn (*Rhamnus* sp.) through the cold winter weather. Buckthorn and Chinese elm (*Ulmus parvifolia*) provide good tub accents. If tulips are planted 20 inches from the edge of a large street planter they will flower satisfactorily.

For flowers the Detroit Department of Parks and Recreation uses fiber glass containers and in the bottom of them places bricks for ventilation. The plants themselves are planted in standard metal washtubs. This is done for the following reasons: planting in a second container provides ventilation; they are easy to secure and the handles on the tubs make them easy to move. They can be planted in the late winter when the employees have more time. At the proper date, the tubs are moved to the streets of Detroit for their beautification.

These flower containers are watered from a 1,000 pound tank pump, like an

**Fig. 1. Park-
let at the rear
of the
Guardian
Building
before refur-
bishing.**



**Fig. 2. The parklet after redesigning with a foun-
tain and benches to encourage "people watchers."**

oil tank, and once a month Rapid-Gro is in the watering mixture.

Mayor Jerome Cavanaugh is an admirer of the beautification program, and on a visit to Copenhagen he was inspired by the Tivoli gardens. It was his suggestion that Detroit use the Danish idea of metal tripods each with three hanging baskets for street displays. The "baskets" are 24 inch washtubs, painted inside with creosote and outside with tar. These are made up indoors in the late winter and secure their ventilation from strips of board placed a measured distance apart and attached to an angle iron which hangs from the top rim of the tub. They are painted gay colors.

The many benches around the downtown area are made by debarking logs and making 4 inch x 4 inch strips which are attached to a concrete form. The Department makes these during an off season.

With the rebuilding and modernization of the City of Detroit, the Parks and Recreation Department have found that there is more ventilation for a wider selection of plants. As a result the geraniums are flourishing where they did not do so in the past.

Grand Circus Park is a landmark to



Fig. 3. A typical planter. The wooden slats provide ventilation during warm weather. The plant material is buckthorn (*Rhamnus* sp.).



Fig. 4. Woodward Avenue, a main thoroughfare, has many small "safety" islands with planters. Tulips can be wintered over in these planters (2 x 12 x 15 feet) if they are planted 20 inches from the outside edge.

Fig. 5. Harmonie Park had long been a "pass through" area to parking lots and small business.



those who know Detroit. More parking space was needed so a large facility was constructed under the park.

Today when you visit the park you admire the large trees, shrubs, benches and walkways. Behind this grandeur there is a story. The trees are planted in boxes 4 feet under the surface. These boxes are 6 feet x 8 feet x 10 feet. Their walls are 8 inches to 10 inches thick. They have weeping arrangements for drainage. Soil and slag are in the bottom of the boxes. The total depth of soil in the park is between 24 inches and 36 inches. Roses are not used because they stay green too late due to the heat from the garage below and winterkill.

Experience Shared

- Encourage private business to develop "beauty spots" or parklets on their land.
- Rose-moss (*Portulaca grandiflora*) makes a good bedding plant because it re-seeds itself year after year.
- Perennials are not used to any extent because they call for hand labor in maintenance which becomes expensive at \$3.50 per hour.
- Where air pollution is present in confined areas, smooth-leaf plants, such as wax begonias and cannas are selected because soot slips off their surface.
- Vocational training is not provided within the Department of Parks and Recreation because of the good training facilities available at the Community Colleges and Michigan State University.
- The pigeons have now become commuters to the parks in the center of Detroit. They have discovered the braces under the beams of the expressways, which make a more affluent home, and they commute to the parks for their hand-outs of food. They go home when their day is over.
- If you have soapbox orators who interfere with traffic and control of pedestrian flow, build a podium at a place of your choice where the police can politely direct those who wish to practice free speech. Detroit has one on the old County Building steps.
- "People watchers" make the best security guards for city beautification so the emphasis on money investment should be where there is a constant flow of pedestrian and car traffic.
- Making a city beautiful and maintaining that beauty calls for skill and civic spirit. Detroit, The Beautiful, is the product of the loyalty of its dynamic industry and the pioneering spirit of its people. This metropolis has a city population of 1,620,000 and a suburban population of 4,214,000.



Fig. 6. Today, Harmonie Park is a "pocket of beauty" designed for outdoor shows, with a fountain, artistic plantings, and benches inviting a rest in the sun.



Figure 7. Harmonie Park today has attracted many art studios and businesses with cultural goals.

What Really is a Garden?

GERTRUDE B. FIERTZ

Why ask when everybody "knows" a garden! Yet thinking it over, I have an idea there are as many private definitions of a garden as there are people. The definition even varies from country to country, and weaves its way far back in time, as the Garden of Eden and the almost equally famous Hanging Gardens of Babylon indicate.

The word garden suggests a place for flowers and fruits, for herbs and vegetables, a place of greenery, we might say, and a place almost always adjoining a dwelling. But a garden is more. It holds a warmth and pleasure and attachment to people which are lacking in related words like field, orchard, park, or plot of ground. This is the reason, no doubt, why "garden" has split off from its older English, workaday equivalent "yard." The word "garden," in short, carries an "image," to use a contemporary term, with overtones that indicate it is a place to enjoy, to relax, to regain perspective. "I come out here when I'm perturbed," a gardener told me, "and I go back into the house knowing better what I think and should do."

A garden may be of many kinds. Like our own Primate species, a garden is not basically specialized. Its strength, like ours, lies in its adaptability to an almost infinite variety of purposes, tastes, conditions and settings. It may be planned for a season, for instance, as a spring garden with flowering bulbs; a summer garden with lovely perennial borders and bright annuals; a fall garden of asters and glowing chrysanthemums; or even, under special conditions, a winter garden of evergreens, lingering bright berries, the red and golden stems of certain dogwoods.

A garden may also take its character from its location and climate. It may be an Alpine or rock garden—popular, one may wryly add, not where it would be most suited, as around the cool, rocky edge of the upper Great Lakes, but much cultivated on the flattish, sandy "outwash plain" of Long Island. It may be a seaside garden, even with the severe limitations of poor soil, salt spray, and an overworking hot sun. It may be a cactus garden in an even hotter, arid land. We may, moreover, experience a mild but pleasant shock before a bog garden's unusual specialties. A very modern development has brought about the big city roof-garden, which must cope more than any other with our growing air pollution, and contributes its bit, along with inadequate park land, to form the "lungs" of a city. It is matched in the suburbs with the patio garden, both of which are limited largely to pots, window boxes and planters.

Still another factor in location may determine the character of a garden: the nature and tradition of the people of its country. Almost any one traveling in England, for instance, will notice the greater value attached to privacy—more walls, more hedges, for example, in contrast to American "openness"—as well as a love for gardening that cuts right across all classes, as almost nothing else does, from Lord to charwoman it seems. In Central Europe fruit trees, either standing alone or espaliered against sunny walls, are a part of every garden. In Switzerland, too, the brightness of flowers is so loved—perhaps just as in Canada, a delight springing from the long winters—that not only every house but every window in every house, not to mention the windows of banks and shops and even street lights and piers,

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are aflame with geraniums, petunias, carnations and the rest. Not only are they planted but they are kept picked and watered and trimmed and replaced so that a box, any box it seems, is always at the height of its bloom.

As for Japanese gardens, here are the most distinctively national of all, but so much are they *sui generis* that we mention only one feature: the Japanese love of rocks—texture, color, surface, shape—their unique and perhaps best contribution of all, it seems to this writer.

Size does not matter. A garden may stretch over acres as on the great estates of England, or the formal gardens of Italy and France where, as some one has said, "not a leaf dares to sprout without an order." On the other hand a garden may shrink almost to handkerchief size. Here I think with special fondness of certain lumber towns on the precipitous slopes of British Columbia along the Riviera of the Inland Passage. Here even the streets are long bridges, and the houses are propped up on stilts. The tiny area of garden space on the land side overflows, as it were, into ample, thickly planted, bright-flowered, window boxes. Then with this remembrance, memory jumps a continent-width to New York's "Village" and to a cobbler whose south-facing window holds flourishing small lemon and orange trees. Under these with the warmth of May he will set out half a dozen pots of lower-growing basil. I see again the pride on his face as we compliment him on shining leaves and healthy fruits just forming from the blossoms. Surely his plants, too, form a garden.

Special interests may direct the choice of plants in a garden. It may be, for instance, a "Heavenly" garden with heavenly blue morning glories, moonflowers, starflowers, and others. It may be a jewel garden that presents persian jewels, the jewel of tibet, or the pearl-bush. Once, years ago, I planned for my children an animal garden where we set out tiger lilies, catnip, horseradish, turtleheads. There are also Bible and Shakespeare gardens, but I have long waited to find a garden reproducing the

herbs and vegetables that Charlemagne ordered, early in the ninth century, always to be planted in the imperial gardens.

That sort of garden where herbs, the few vegetables known and used at the time, along with certain old-fashioned flowers, and the whole often enclosed with walls that held espaliered fruit trees, was grown for centuries in Medieval Europe, crossed the ocean in Colonial days, declined in the 19th century, and recently has enjoyed a modest revival. The purpose of these gardens was to provide for human use: variety and good taste in cooking, fragrance among clothes and linens, household remedies in its poultices, infusions and tisanes—with sometimes a few love charms and aphrodisiacs for good measure! No botanical or horticultural distinction separated herbs and vegetables and flowers at that time—though many a household mistress and physician and "wise woman" knew their plants well. These were gardens "for herbs and good smell" as Gervase Markham wrote in 1616.

A distinction in style did exist, however, between front and back gardens. The front garden was, of course, the more formal, at least in Colonial days, with geometric flower beds, often outlined with box, and sometimes ornamented with topiary horrors (at least to modern taste). The back garden, utilitarian in purpose, was far more charming, varied, and individual, depending on the knowledge, skill, taste and resources of the mistress. Several delightful reconstructions can be seen today as at Pennsbury Manor, the 17th century home of William Penn, on the Delaware River, at Williamsburg, Virginia, and at Sturbridge, Massachusetts, to name a few.

Equally utilitarian but totally different in plan and appearance are the aboriginal gardens of Guatemala, Mexico, and elsewhere in the Caribbean. Here the family garden is often difficult to distinguish from the surrounding woodland, for "clean cultivation" is

learned, if at all, from the white man. A variety of plants grow together, seemingly without plan, and yet observation shows that something is almost always reaching maturity and ready for use, and the fact that the soil itself is little exposed, may yet hold a lesson for us in temperate lands.

These examples by no means exhaust

the kinds and types of gardens. Like Cleopatra, age cannot wither nor custom stale their infinite variety. And like our tastes in houses and pictures and music, our preference in gardens reflects our own personality, and brings just as wide an opportunity for our own creative gifts.

Who can say what really is a garden?

CORRECTION

Volume 47, No. 3, page 291 of the Summer 1968 issue of *The American Horticultural Magazine*, first paragraph, line 3:

Ilex platyphylla var. *iberica*
Loesener should read *Ilex*
perado d. var. *iberica* Loesener.

Also, page 311, column 2, paragraph 2, line 9:

The word Carins should, of course, be Cairns.

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.

Photoperiodism After 50 Years

STERLING B. HENDRICKS*

(From the *Journal of the Washington Academy of Sciences* 58: 69-74, 1968.)

"The time was midsummer of 1918—the place then was the Arlington Experimental Farm of the U.S. Department of Agriculture near where the Pentagon building now stands. H. A. Allard and W. W. Garner were starting an experiment on 'Maryland Mammoth' tobacco to see if its flowering really depended on the length of day as their preliminary observations suggested. Their results, showing the anticipated dependence, were soon followed by similar findings on a soybean variety and many other

plant species. Through the ensuing years, photoperiodism has been intensively studied and many unexpected ramifications have been found. To mark the 50th anniversary, a symposium on current findings was held by the Agricultural Research Service at Plant Industry Station, Beltsville, Md., on Jan. 26 and 27, 1968.

"Three main channels of discovery are now recognized in photoperiodism. The first is the ubiquity of the phenomenon in plants and animals. The other two are light and time dependencies implied respectively by 'photo-' and 'periodism.'

"The symposium dealt mostly with light control of plant development. At-



Fig. 1. 'Dorothy Gish' azaleas. Left: Natural day plus 4 hours of light. Right: Short (8-hour) day.

tention centered around the action of the blue chromoprotein phytochrome, which was recognized from physiological work in 1952 as determining the light control. Flowering and growth responses of many plants to short light breaks of normal dark periods show the controlling function of phytochrome.

"Agronomic use of photoperiodism depends chiefly on breeding of varieties for limited latitudes. Wheat, maize, sorghum, and soybean varieties have been selected with respect to latitude against photoperiodism as a leading background factor. In the ornamentals industry, chrysanthemum production depends fully upon control of day length, both in reducing long days by darkening of plants to promote flowering and by light breaks during the long night to maintain vegetative conditions." The familiar year-round flowering of chrysanthemums is a consequence. Poinsettias are even more sensitive than chrysanthemums to the effects of photoperiod and fail to bloom if exposed to low intensities of artificial light during short days.

Other familiar ornamentals, carnations and petunias, for example, are prompted to grow and flower by extending the day length. Azaleas, on the other hand, produce longer shoots on long days but develop buds and flower sooner when exposed to short days (Fig. 1). Recently we learned that fluorescent or incandescent light, as a supplement to natural days, will cause Easter lily plants that are growing from incompletely vernalized bulbs to flower sooner than similar unlighted plants. Thus, the light in effect substituted for low temperature treatment of the bulbs.

We are looking for similar interactions of photoperiod with other factors of the environment now that, "advances in knowledge of photoperiodism during the last 50 years . . . have brought the more basic questions to a point of reasonable study."

*Soil and Water Conservation
Research Division
Agricultural Research Service
U.S. Department of Agriculture.*

Principles of Hardiness and Survival as They Relate to Newly Propagated Plants

CONRAD J. WEISER*

(From Proceedings of the Instructional Plant Propagators Society, Annual Meeting 1965. p. 113-121.)

"Plant survival at low temperatures has been a vexing problem since man first gathered the fruits of the fields to provide sustenance for himself. Today a nurseryman in the Great Plains or an orange grower in Florida would both agree that low temperature injury is a most serious problem. In fact, on much of the earth's surface low temperature is the single most limiting factor to plant growth and survival."

Working with red-osier dogwood, Dr. Weiser and his colleagues found that cold acclimation occurred in two stages in the autumn. The first stage of hardening (to about 0°F.) occurred before any frosts in the fall. The second and more dramatic stage occurred immediately after the first fall frosts and reached an undetermined level somewhere below -120°F.

In trials to artificially cold acclimate dogwood plants in controlled environment chambers, Dr. Weiser found it necessary to first expose them to short days and then freezing temperatures. "The short day treatment induced rest period and in some way preconditioned the plants so they were capable of acclimating rapidly when exposed to freezing. Frost was necessary for maximum acclimation. For example, 35°F., following short days did not induce any cold resistance. Also short days or freezing temperatures alone did not induce any acclimation, nor did a simultaneous short day and freezing treatment. It would be very useful to understand the nature of the short day induction response and the triggering mechanism of freezing temperature." Apparently many plants have the inherent capacity to acclimate to cold but possess the wrong biological clocks. In such cases, prolonged growth in the fall is undesirable. On the other hand, short days applied prior to frost set the sequence of reac-

tions in motion that permit the inherently hardy but unhardened plant to escape freezing injury. Plants to be overwintered outdoors need short days in autumn. "While hardening may be inhibited by long days, we want the plants to accumulate sugars through photosynthesis. This means that bright light during the short days is desirable. The common practice of shading newly rooted cuttings to harden them off after mist propagation, limits their already depleted carbohydrate reserves and probably reduces their capacity to acclimate to cold. Shading during autumn should be kept to an absolute minimum."

"Water is often discussed in relation to hardiness. It is doubtful that withholding water is beneficial in hardening most plants and may actually interfere with natural hardening. Probable exceptions to this are plants which do not go into rest in the fall and need unfavorable conditions to stop their growth.

"The production of maximum growth by high levels of nitrogen and phosphorus fertility are sometimes not compatible with maximum cold hardening. High levels of potassium are generally beneficial. In tender species which have a tendency to grow late in the autumn, it would be advisable to withhold nitrogen and possibly phosphorus late in the growing season to slow down growth and promote the accumulation of sugars. Although our discussion has centered

around high feasibility levels, it is generally recognized that unthrifty plants suffering from low fertility are also subject to winter damage. Cultural practices such as heavy, late shearing or pruning which induce late fall growth in some plants have the same undesirable effects as high nitrogen fertilization."

For Improved Cold Hardiness and Better Survival

1. Maintain good fertility as indicated by a thrifty appearance of the plant.
2. Supplement the rainfall if needed to keep the plants in good condition.
3. Prune or shape the plants as needed after flowering.
4. Try short day treatments, about 9 hours daily for a minimum of 15 days, to induce the onset of the rest period before the first frosts.

Avoid

1. Late applications of fertilizer, especially those containing nitrogen and phosphorus.
2. Allowing the plants to suffer from drought.
3. Pruning or shearing late in the growing season.
4. Extending the daylength with artificial light late in the summer.

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The Gardeners' Notebook

POSSIBILITIES WITH POSSUM-HAW (*Ilex decidua*)

J. BON HARTLINE AND
EDWARD P. HUME

One of the most fruitful fields for woody ornamental plant selection and breeding lies within populations of *Ilex decidua*. Commonly known as possum-haw, this plant grows as far west as Texas and north into Virginia, Kansas, central Missouri, and southern Indiana. Its range in cultivation is considerably wider, reaching the Chicago area, and New England. The plant is variable in size and shape, extent of fruitfulness, size and color of berries, and particularly in the persistence of the fruit in an attractive state during the winter.

The possum-haw resembles the winterberry, *Ilex verticillata*, another deciduous holly whose principal range is farther north but whose southern limits go deep into the range of *Ilex decidua*. The winterberry seeds are smooth, while those of the possum-haw are slightly ridged or ribbed. There are usually more fruits in the possum-haw cluster (three to six), while winterberries have one to three fruits in the average cluster.

In recent years the possibilities of securing plants combining large possum-haw fruit in dense masses capable of remaining a bright shining red throughout the winter has led the senior author and several others, especially Professor J. C. McDaniel of the University of Illinois, to search the countryside for superior native plants. Cuttings of some eighteen outstanding plants are being grown and compared at Anna, Illinois. Here in the general area of the mid-Mississippi Valley, this species is most prolific, and is the most useful of all the deciduous hollies.

J. Bon Hartline, past president, Great Rivers Chapter, Holly Society of America.

Edward P. Hume, Horticulturist, Southern Illinois University, Edwardsville, Illinois.

Possum-haw shrubs are among the most adaptable of all *Ilex* species. They can be found not only in lowlands, but also on side slopes and even on top of high ridges. The brilliant, red-berried masses are visible from a distance of half a mile. Early March is an excellent time for scouting, as only the most durable forms will be found still showing good color.

Individual plants range in fruit color from deep red to bright red and orange to washed-out shades of orange. The Byers Nursery in Huntsville, Alabama, has a clear, light yellow form. A small black spot on the tip of each berry makes a pleasing contrast with the yellow fruit color. Berries of some of the strains under test stay plump and shiny for more than two months when cut off and placed among the evergreen branches of a male American holly for winter decoration.

The fruits may vary from five to as much as ten millimeters (about $\frac{3}{8}$ in.) in diameter in some of the clones under test. Fruits are actually produced singly, but appear to be in clusters of three to six, since they develop very close together on very short spurs in the axils of earlier leaves. The distance between spurs depends on the rate of growth of the branch when it was formed. New growth, particularly at the tips of primary branches, may be a foot or more per year with several inches between each leaf. But side branches grow considerably slower with about an inch between nodes. The spurs developing from these grow so slowly that the leaf scars from successive seasons' growth are practically continuous.

While old growth can be very slow, occasional "water sprouts" or base branches can make as much as five feet of growth in a single season. If plants are severely pruned annually for cutting wood, they produce several feet of vigorous growth each year as a result.

Inside the nearly spherical fruit are

usually four seeds (pyrenes) arranged and shaped like segments of an orange five to six millimeters long and two to three millimeters wide and thick. A substance in the pulp or in these straw-colored seeds inhibits their consumption by birds in the fall and early winter. Mockingbirds, cedar waxwings, and occasionally other species do eat the fruit in the winter after stripping *Pyracantha* and some other *Ilex* species. However, possums, mice, ground squirrels, or other animals also apparently consume them, as piles of seeds are found fairly frequently near the base of these shrubs. A very old country name for this plant is turkeyberry, indicating one possible consumer.

If the possum-haw is not a preferred source of food for birds, the dense twiggy branches supply good protection for low-nesting species. A few rather upright plants have been found, but when space is available, most of the population have a spreading or an arching form that is as wide or wider than it is high when the plants are mature. Most plants reach sixteen to eighteen feet, although larger plants have been reported. Since the wood is rather weak and brittle, the branches break fairly easily.

The possum-haw tolerates a wide range of soil conditions from strongly acid to near neutral reaction. Many wild plants have been observed growing in pockets between limestone outcrops. Occasional flooding in cold weather will not kill the plant. Once established it may even survive on dry hillsides. It is well adapted to cultivation and can make an outstanding contribution to the winter landscape, but it should be given enough space for full development. It is not adapted to hedging as pruning merely encourages rapid growth. Consequently, no attempt should be made to "tame it," but it should be permitted to grow naturally. No other holly species effectively serve as pollinators. Therefore, at least one male plant of this kind should be located in the general vicinity of any planting.

Another character which plant scouts look for is a light bark color. Plants have been found with interesting silver-gray

bark.

Fertilization promotes rapid growth, so that new plants can develop, fruit, and become a significant part of the landscape within three years. Vigorous plants will supply cuttings that root easily for those who want to produce new plants.

The flowers of both male and female plants are not sufficiently conspicuous to attract attention. Flowers appear in April in southern Illinois but not until late May near the northern end of its range. Leaves vary somewhat, with the smallest leafed specimens scarcely one and one-half inches long, while others may be over three inches long. Some plants have entirely smooth leaf margins, but most plants exhibit slightly serrate leaves, particularly toward the tip. The color of the leaf depends on the available nutrients. Normally, leaves are a medium dull green. The foliage is not usually bothered by insects or diseases and serves well as a background for



Branch of possum-haw (*Ilex decidua*) in the U. S. National Arboretum, Washington, D. C.

PHOTO GENE EISENBEISS

flowers or low shrubs. In the autumn leaves turn greenish yellow and drop rather quickly, leaving the mass of fruit and light gray bark for winter interest.

Cuttings, taken when new growth begins to harden in the spring, may root in six to ten weeks if wounded and dipped in hormone and placed under mist with bottom heat. Rooted cuttings potted in peat pots can be moved as soon as roots penetrate the walls. Pruning the root tips allows a mass of fibrous roots to develop that insure good survival when "canned." Plants in one-gallon containers can be "over-wintered" in the lath house or other protected areas. Container-grown stock transplant better than balled and burlapped plants.

Possum-haw flowers well in full sun or in partial shade. A rather dense shade will reduce fruit production only when the plant has extreme competition from other plants. This characteristic increases its landscape opportunities.

Little is known of the hybridizing potential of *Ilex decidua*. There are a number of known or putative F_1 hybrids, but few if any of them have yet proved fruitful. A hybrid swarm (*I. decidua* \times *I. vomitoria*) is rumored to exist in Jasper County, Texas. Mr. Robert Simpson of Vincennes, Indiana, has some seedling plants that apparently resulted from a chance cross of an isolated *I. decidua* with American holly, *I. opaca*. Mr. W. F. Kosar, at the U.S. National Arboretum, produced a hybrid of *I. decidua* \times *I. latifolia*. Professor McDaniel investigated the possibility of hybridizing possum-haw with other deciduous species, and has produced fruits developing from reciprocal crosses with the rare southern *I. amelanchier*. He has been unable, so far, to get fruit set on *I. verticillata*, using *I. decidua* or other foreign pollens.

While several nurseries are propagating clonal selections of *I. decidua*, few have been named 'Fraser's Improved', named for a Birmingham, Alabama nurseryman, may still be available in Alabama. 'Warren's Red' is a cultivar recently distributed by Warren & Son Nursery in Oklahoma City. It was selected for its long-lasting, large, red fruit.

Seed propagation is not advised. This method takes longer to produce pistillate plants that may well have sparse or small fruits less colorful than in vegetatively propagated selections. Fruits of clonal selections should also last longer into the winter.

The authors appreciate the assistance of Professor McDaniel in the preparation of this article.

THE MARTHA WASHINGTON YEW

Surely the English yew (*Taxus baccata*) shown in the accompanying photographs must be among the oldest exotic trees in the United States. It is on Six Chimney Lot on the south side of Francis Street in Williamsburg, Virginia. The lot gets its name from the six chimneys that were once there after the houses burned.

"This lot was formerly owned by Colonel John Custis, who died in 1749, leaving it to his son, Daniel Parke Custis. George Washington married the latter's widow, Martha Dandridge [in 1759] . . . and when visiting Williamsburg, would stay at the Custis residence. All that remains . . . is a brick kitchen [known as the Martha Washington kitchen] and a large yew tree, said to have been planted with Mrs. Washington's own hands."¹

¹Tyler, Lyon G. 1907. *Williamsburg, The Old Colonial Capital*, Richmond, Virginia, p. 248.



Fig. 1—Martha Washington yew and kitchen. We have grown seedlings from the tree.

According to tradition this tree was planted by Martha while she was still the wife of Daniel Parke Custis.²

E. G. Swem writes: "On this lot Custis built a brick house, and as early as 1717 was developing a garden, because in that year he wrote to the Perry firm in London, ordering some handsome striped hollys and yew trees; this is the first mention of his garden. . . . Of all that Custis planted, there remains today a yew tree in all its glory of two hundred and twenty years growth."

In a number of letters to Peter Collinson, published by Doctor Swem, mention is made by Custis that he has trimmed and clipped his yews; one surmises that he made topiary pieces of his specimens, for in a letter dated 1742 he comments on "very fine yews balls and pyramids which were established for more than 20 years" and which suffered from the severe winter.³

It may well be that the tree is rightfully referred to as the Martha Washington yew.

²Lodewick, J. Elton, and Mrs. Lynwood R. Holmes. 1931. *Notable Trees of Virginia*. Bull. Virginia Polytechnic Institute, Blacksburg, Virginia, p. 21.

³Swem, E. G. 1948. *Brothers of the Spade*. Proceedings of the American Antiquarian Society, pp. 160-161. From a 1949 reprint.



Fig. 2—Base of Martha Washington yew showing surgery. This work was done prior to the photograph published by Lodewick and Holmes in 1931.

PHOTOS BY THOMAS L. WILLIAMS

On August 10, 1968 this old tree had the following measurements: At ground level the trunk had a circumference of 14 feet, and the spread of the tree was just under 40 feet. Interestingly, the 1931 publication on "notable trees" gave measurements of 14 and 35 feet, respectively.

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WILD-GINGERS FOR SHADY PLACES

The wild-gingers (*Asarum*) are excellent ground covers for shade. Several can offer evergreen foliage of great beauty, and although the dull reddish flowers are hidden under the leaves, it is always a pleasure to part the green cover for a peek at them. One of the pleasures of poking through the leaves of wild-ginger for a look at the curious flowers, or to see if any seedlings are lurking under the parent's wing, is the gingery fragrance that arises from the slight bruising of leaves or rootstocks.

The wild-ginger of the northeastern states (*A. canadense*) is, of course, deciduous, but nevertheless is useful in the wild garden on shady slopes, or wherever a low mass of thick foliage is wanted. It produces new leaves early in the spring, making the most of the early sun. It will spend the rest of the summer quite happily under the low canopy of plants that are slower to send up their new growth, such as Solomon's seal (*Polygonatum*), Solomon's plume (*Smilacina*) and *Cimicifuga*, guarding against annual weeds. The leaves, broadly heart-shaped, are about five inches across. The plants spread into masses one or two feet or more across.

Of our several southern evergreen gingers, Shuttleworth-ginger (*A. shuttleworthii*) is the one commonly offered for sale. The leaves, a little smaller than those of the Canada ginger, differ from plant to plant, not only in size and proportion, but in markings. Some plants are all green, others are handsomely mottled with silver gray. In win-

Evergreen wild-ginger (*Asarum shuttleworthii*). Plant from Callaway Gardens, Pine Mountain, Georgia where it is used as a ground cover on account of the rhizomatous habit. Native of West Virginia to Georgia.

PHOTO: FREDERICK G. MEYER



ter the foliage is tinged with bronze. When I was poking through the shuttleworth ginger in my garden last spring, I was amazed to see how many flowers one clump could produce. They were packed tightly together, close to the ground, and quite worth a look. The flowers are larger than those of the other wild-gingers, almost two inches long and an inch across. Inside, they are mottled strongly with dull red-purple and dull yellow-green, and outside, finely speckled with red-purple. The texture is quite leathery. I can imagine someone skilled at making corsages producing an unusual one with these odd flowers.

From the Pacific Northwest and California come the evergreen *A. caudatum* and *A. hartwegii*. The flowers of *A. caudatum* are responsible for the specific epithet, for the calyx lobes are elongated into slender tails. The lobes of the flowers of *A. hartwegii* are much less tailed, but end in slender points. To me, it is the handsomest of the five species we grow, with its deep green, gracefully shaped leaves beautifully marbled with silver.

European wild-ginger (*A. europaeum*) also has leaves evergreen and shining. It is a dependable garden plant

that grows into substantial clumps.

All of the wild-gingers like good soil that does not dry out, and good drainage. Those that are evergreen deserve positions where their fine foliage can be admired throughout the year. In our garden near Philadelphia, the evergreen species perform well except for *A. caudatum*, which usually loses its leaves before spring, although it is otherwise hardy. During the prolonged cold and dry late winter of 1968, the European and Hartweg gingers lost their foliage, too, but the shining new growth appeared early in the spring. The Shuttleworth wild-ginger endured the adverse weather without leaf loss.

Clumps of wild-ginger enlarge rather slowly. They are not, after all, in the class of pachysandra, nor do we want them to be. However, they do produce seedlings, sometimes quite freely. Since seeds do not always germinate in the spots we would choose for them, I keep a close watch around our plants. Seedlings are dug from paths, and also carefully removed from spots too close to their parents. They transplant easily, and even those seedlings that have come up in an intertangled mass can be gently separated and given a fresh start where they have room to develop properly.

The wild-gingers are, of course, not related to the true ginger (*Zingiber* of the Zingiberaceae) which supplies the wherewithal for gingerbread.

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POTENTILLA RUPESTRIS— A GOOD COMPANION PLANT

Some plants are destined to be the stars of the garden, others to play supporting roles. *Potentilla rupestris* is one of the latter, a herbaceous plant with certain sterling qualities that make it suitable for a modest part in the garden picture.

In general aspect, *Potentilla rupestris* immediately brings to mind the strawberry, but in important ways it differs. Its white flowers, so like strawberry blossoms, are borne in loose clusters on branching stems about two feet high.

The bloom covers a period of about a month, longer than that of most perennials; near Philadelphia the month is May.

They rise a well-proportioned distance over the mound of foliage, which is also reminiscent of the strawberry. The leaves are divided into leaflets, up to as many as eleven, but usually five to seven. They are toothed and strongly veined, and the three top leaflets are especially prominent, while the next pair under them are apt to be very small. It is the trio of top leaflets that resemble the strawberry.

The foliage mound can be two feet across and approaches a foot in height. All through the season it stays neat, green and attractive, a pleasant foil for whatever other plants are in flower.

Seedlings appear in reasonable numbers. They transplant easily, and grow quickly to form good plants. Even in midsummer, young plants can be moved to positions where unexpected gaps need attention. A little water, shade for a day or two, and they start to put forth new leaves.

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THE DOUBLE BLOODROOT

The double bloodroot, *Sanguinaria canadensis* 'Plena' is a very choice plant that is rarely seen in gardens. It is as easy to grow as the single form, has no pronounced soil preferences, and in my twenty years experience it has not been troubled by diseases or insects. I grow it in a clay loam soil with a pH of 7.0 or more, in full sun or partial shade, and mulched with sawdust. The plants are fertilized each spring with 10-10-10 or similar fertilizer and later, because of the sawdust mulch, an application of ammonium nitrate is made and washed in with a sprinkler.

The fully double flowers are pure white, very lovely, and bloom a few days later than the native single flowered bloodroot. No seeds are produced.

Propagation is by division of the roots. For rapid increase the roots may

The double bloodroot (*Sanguinaria canadensis* 'Plena')

PHOTO PARIS TRAIL



be broken into one-bud pieces every two or three years. The leaves stay green until September and when they die down the plants may be divided. The fleshy roots dry out very quickly and should be replanted immediately, or stored in a polyethylene sack in a cool place.

I have not been able to determine the origin of this clone. There is almost no mention of double bloodroots in the horticultural publications that I have searched. I would like to know whether there is more than one clone in cultivation and where and when they were discovered.

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THE HIGAN CHERRY

Most widely grown of the cultivars of the Higan cherry (*Prunus subhirtella*) is the weeping form known to the Japanese as Shidare-higan, listed by nurseries as *P. subhirtella* 'Pendula.' Mature trees are picturesque in form and charming in flower, like waterfalls of palest pink. The bloom is quite fleeting, however, and a storm at flowering time may demolish it practically as soon as it appears.

'Jugatsu', the autumn cherry, is another cultivar of *P. subhirtella* usually

listed in catalogs as *P. subhirtella* 'Autumnalis'. While it lacks the appealing weeping habit, it scores heavily in a longer blooming season. The flower buds do not reach maturity all at once but over a long period. Some will open during mild spells in autumn and even during the winter, often enough to give a delightful foretaste of spring.

However, the amount of bloom produced during these times does not detract from the spring show. Bloom starts before that of the weeping cherries, and lasts several days longer. Since the flowers open in succession instead of all at once, storms are less damaging. The autumn cherry is upright in growth and reaches a height and spread of about 20 feet.

Another lovely cultivar of *Prunus subhirtella* is 'Momi-jigare'. It is slower growing than the autumn cherry, and remains a smaller tree. Color in the semi-double flowers is deeper than that of the other Higan cultivars, strong rose in bud, opening to a good clear pink.

It is not difficult to locate sources for the autumn cherry, but 'Momi-jigare' requires a hunt.

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THE LENTEN-ROSE *Helleborus orientalis*

The Lenten-rose, *Helleborus orientalis*, native of Asia Minor, is a hardy herbaceous perennial belonging to the buttercup family (Ranunculaceae). Several other species of *Helleborus* are also found in the same region and in southeastern Europe. Those who have written about hellebores consider *H. orientalis* to be the best species as a garden plant. The named clones of European gardens are of this species. My experience with them is limited to eight named clones and about 160 seedlings raised from them.

The clones 'Ariadne', 'Delicatissima', 'Albert Dugourd', 'Mons. Prosper Perthus', 'Miranda', 'Marco Polo', 'Atorubens', and 'Mildred Luedy' were planted in 1957 and in two years they

flowered but not heavily. The flowers were distinct and attractive.

A year or two later the flowers of the different clones were cross-pollinated and a seed crop was produced. It was hardly necessary to do this by hand as the bees were very active during the period when pollen was being shed.

The seeds require after-ripening, or chilling, before they germinate. This is done by planting the seeds in a flat soon after they are ripe in early July and leaving the flat outdoors over winter in a cold frame. If the seeds are spaced about an inch apart, the seedlings need not be pricked out and can remain in the seed flat until the following spring. The seeds germinate late in April. If the seeds are not harvested many self-sown seedlings will come up close to the old plants the next spring.

Seedlings are transplanted from the seedflat in spring with a spacing of at least a foot each way. That may look like a lot of space for the tiny plants, but when they are four years old some of the plants will be at least two feet across. If the weather is hot and dry, the plants should be shaded and watered frequently until they are well established.

The seedlings have no special soil requirements and grow vigorously in a silty clay loam soil with a pH of 7.0 or higher. Weeds are controlled by mulching with sawdust or rotten leaves. The mulch also conserves moisture in dry weather. It is an advantage to have the mulch around the plants to protect the flowers from being splashed with mud by heavy rains. A liberal application of 10-10-10 fertilizer or a similar formula is applied in March before growth starts.

The large leathery leaves remain green well into the winter, but should be removed in March before the new flower stems spring up. If this is done early the old leaves may be cut off with hedge shears and raked up with a hay rake. If one waits until the new flowering stems are up two or three inches the old leaves must be cut off one by one with hand pruning shears, a time consuming and tedious job if there are more than a few plants.



My seedlings were an interesting lot. The colors ranged from greenish white with lilac spots to dark maroon without spots. The pure white of *H. niger* was missing. A number had unattractive greenish-red flowers and these were discarded. Some were also discarded for lack of vigor and flowers. About 20 percent of the seedlings were attractive and worth being retained indefinitely.

The most interesting information that came out of this batch of seedlings was that they were far superior to the named clones in vigor and flowering. A number were as attractive as the parents and a few were better. The named clones failed to flower in 1966, and bore only a few flowers in 1967. They will be discarded in favor of their vigorous and floriferous offspring.

At present I can only speculate as to the reason for the superior vigor of the seedlings. From what we know about viruses in other plants, the first guess is that the named clones are infected with a latent virus that reduces plant vigor without a definite mosaic pattern in the leaves. One plant of 'Atrorubens' has definite foliage symptoms and is weak. Another plant of the same clone is without symptoms and is vigorous and free

flowering. Two or three seedlings developed typical mosaic mottling which a plant pathologist guessed might be caused by the cucurbit mosaic virus, a very common virus found in many weeds, garden flowers, and vegetables. No other diseases or insect troubles have been seen yet.

The Lenten-roses are worth growing for several reasons. They bloom in late March, and early April with Dutch crocus when there are very few flowers in the garden, and continue for several weeks. They are very different from other spring flowers. The leaves remain green until well into winter. The plants are apparently somewhat tolerant of shade and they also do well in full sun. In very hot weather the leaves wilt and watering is necessary. The flowers are not injured by hard frosts.

The flowers are not suitable for cutting as they wilt badly. One writer suggests floating them in water near eye level. The colors are not brilliant but after a year or two one discovers that they are nice garden plants.

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Book Reviews

The Language of Gardening

George F. Hull. The World Publishing Company, Cleveland, Ohio 44102. 1967. 192 pages. \$4.95 (Library).

Botanical nomenclature and the value and use of plant names have often been a verbal stumbling block to home gardeners. An additional problem has been the correct pronunciation of these unfamiliar and often Latinized words. If given the opportunity to enroll in botany and horticultural courses or the time to search through numerous textbooks and references, the gardener can find the definition of these verbal and grammatical gardening tools. In this book, the author has done the searching study for him. The brief, yet informative, discussion of plant names, both scientific and common, and the definition of frequently used botanical terms will be of great interest and value to the novice as well as to the experienced gardener. A pronunciation guide for unfamiliar words is also provided.

George Hull is a practical gardener and a talented, experienced writer. As a garden editor for nearly twenty years, he has given practical solutions to many thousands of questions addressed to him by home gardeners. This practical approach, plus a lifetime of personal experience in gardening, has enabled him to write a book that is informative, useful, and interesting.

FRED C. GALLE

Miniature Trees in the Japanese Style

Gillian E. Severn. Taplinger Publishing Company, Inc., 29 E. Tenth Street, New York, New York 10003. 1967. 112 pages. \$4.50 (Library).

This book on the training and growing of woody plants in the Japanese manner is done in a direct and practical way. After first describing "What is Bonsai?" the author discusses the several types or styles of training plants and lists suitable subjects with comments for each type. This list includes both deciduous and evergreen plants. The following chapters are devoted to the care, training and culture of trained plants.

Omitted from this book is the romance and oriental significance of plants of special kinds and types. This omission will increase this book's appeal to many readers who wish to train and grow plants in this manner but who feel mystified by those books which dwell excessively on the history and development of bonsai in the Japanese tradition and techniques.

CONRAD B. LINK

B-P-H / Botanico-Periodicum-Huntianum

George H. M. Lawrence, A. F. Ginther Buchheim, Gilbert S. Daniels, Helmut Dolezal. Hunt Botanical Library, Pittsburgh, Pennsylvania 15213. 1968. 1,063 pages. \$30.00

The Botanico-Periodicum-Huntianum is the first reference work of its kind in the world's periodical literature in the plant sciences. In scope, B-P-H lists some 12,000 titles and is devoted to botany and related fields. Full coverage extends to agriculture, agronomy, bacteriology, biology, ecology, floriculture, forestry, fruit growing, genetics and plant breeding, geography, horticulture, hydrobiology and limnology, microbiology and microscopy, paleontology, pharmacology and pharmacognosy, plant pathology, and vegetable crops. Not included are certain technical government publications, reports and extension circulars and bulletins of state and federal agencies, and proceedings of congresses and symposia. Also excluded are horticultural and related periodicals concerned exclusively with cultural information, or with marketing, or with plant products, or with uses of plants in other preparations or compounds.

Briefly, the object of B-P-H is to provide an internationally acceptable, non-ambiguous code of abbreviations for the world's periodical literature in the plant sciences. These abbreviations are regularly used for literature reference citations. In addition to the accepted abbreviations, about 12,000 other abbreviations are included as synonyms and these are cross referenced to the adopted abbreviations. For example, the first entry lists the former A. H. S. Gard. Forum as a synonym for *Amer. Hort. Soc. Gard. Forum* as the accepted abbreviation for the American horticultural society gardeners forum. The abbreviation and full citation for the Society's magazine in *Amer. Hort. Mag.* American horticultural magazine. Washington, D. C. 1960 [Preceded by *Natl. Hort. Mag.*] 1-237-2. The last series of numbers refer to the location of the entry in the Union List of Serials.

There have been earlier, mostly regional works, covering periodical literature in the plant sciences, but the B-P-H seems to be the first with a unified world coverage. And for this reason the book is important. The key to using the B-P-H is found in the ten page introduction where the organization is provided in great detail. Matters related to abbreviations, titles, places of publication, volumation, the *Union List of Serials* and synonymous abbreviations are fully explained with examples to illustrate main points. The careful attention given to the area of linguistics will remain one of the strong points of B-P-H. Abbreviations provided for

transliterations of oriental ideograms, for example, appear to be one of the unique features of the book, and there are others. The selected references will also be most useful.

Two appendices cover words or abbreviations of words used in B-P-H abbreviations and there is a useful list of countries that, through the course of time, have changed from one name to another. Names of periodicals may, and often do, change as a result of a name change of the country.

The monumental task of producing B-P-H was guided by George H. M. Lawrence, as senior editor, and his staff at the Hunt Library. Standardization of reference abbreviations to the world's periodical literature in the plant sciences was an outgrowth of basic importance to an even more prodigious work now in preparation at the Hunt Library, the *Bibliographia huntiana*, which will attempt to provide detailed bibliographic references of all printed books in botany and allied fields, including horticulture, published in the period 1730-1840. Without a peer, B-P-H thus becomes the standard reference work of its kind.

The book shows what is possible via the computer, when by any other manual process the monumental task of data sorting would have been less accurate and much more laborious. B-P-H was produced by offset printing from an earlier computer-produced print-out. The entries are numbered and double-spacing separates the references, thus minimizing confusion between titles.

It is assumed that supplements to the B-P-H will be forthcoming from time to time to account for change and additions to the periodical literature, such as *Amer. Hort. Soc. News & Views* which, as of the spring issue 1968, superseded the *Amer. Hort. Soc. gardeners forum*.

FREDERICK G. MEYER

The Lily Yearbook of the North American Lily Society Number 20. 1967.

George L. Slate, Editor. Published by the Society, Geneva, New York 05473. 177 pages. \$5.00 (Library).

This yearbook fulfills its title of reporting on Lilies for 1967. As with previous issues, it contains many articles on the development of new hybrids and the species and cultivars that were involved. Such reports are essential for any who are involved in lily breeding.

Cultural articles are also included dealing with winter hardiness, soils, fertilizers, mulches, herbicides and general culture.

As with many plant societies, the persons who are active in the development of new kinds, and who are the authorities on them also make interesting stories. Several such experts are included here, among them Carl Purdy and Mrs. J. Norman Henry.

CONRAD B. LINK

Flora van Kamer—en Kasplanten (Plants for indoors and greenhouses)

B. K. Boom, H. Veenman & Zonen N. V., Wageningen, The Netherlands. 1967. 368 pages, illustrated b/w. f 34.50 (\$7.94)

This Dutch work by one of the leading European authorities on cultivated plants is brought to the attention of American horticulturists, because of the scarcity of books of this kind in the modern horticultural literature.

The present work is the latest in a series of reference books by the same author covering the cultivated plants of The Netherlands. The work on woody plants, for example, is now in the fifth edition. A book covering the cultivated herbaceous plants was published in 1950. The present volume covers the tropical and warm climate plants grown indoors in Holland. The book has been written expressly for nurserymen, and for this reason it will be useful for the ordinary serious gardener as well. Even for the non-linguist, the book is not difficult to use. In the first place, the text is in telescopic format, and the similarities of Dutch and English, aided by a Dutch-English dictionary, bring the book within relatively easy reach of average readers.

The book is arranged in systematic order by plant families according to the standard Englerian sequence. First there are keys to the families, followed by keys to the genera and then to the species. The leading cultivars are also included, because in a book about cultivated plants this is an absolute necessity.

The wealth of exotic horticultural material cultivated indoors in Holland is truly amazing, as is evident in walking down almost any Dutch village street where windows are customarily curtainless and house plants fill the window sills in full view.

The book is provided with a liberal supply of line drawings, mostly of leaves which are useful for identification. In the back of the book are 250 black and white photographs of plants, many of cacti and other succulents.

This is one of the most carefully prepared books on the subject available today and is a book that ought to be known to all serious gardeners and horticulturists.

FREDERICK G. MEYER

Rock Gardening—A Guide to Growing Alpines and Other Wildflowers in the American Garden

H. Lincoln Foster. Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts 02107. 1968. 466 pages, illustrated. \$7.00 (Library).

Rock gardens are a less common form of gardening but when they are properly built they are most effective. A rock garden may provide an effective way of developing the landscape as well

as offering an opportunity for the culture and display of many kinds of plants. First factor to be considered is the construction of a rock garden. Explanations are given for the several styles or forms of gardens suitable for different locations, such as a wall garden, an outcrop or ledge, a rocky pasture, a moraine, or a wooded or bog area. This is followed by the general culture of rock or alpine plants, their planting, propagation, soils and maintenance.

The major portion of the book is the section, "Descriptive Catalogue of Plants", where over 400 genera of plants are briefly described with cultural notes. Included in this section are herbaceous perennials, ferns, bulbs, and dwarfed trees and shrubs. The author has selected those species and forms that are most suitable for this type of gardening. Even without a rock garden, the gardener will find in this descriptive listing many plants that are also useful in more conventional forms of planting, the flowering border or for the small restricted areas often found in the home landscape.

CONRAD B. LINK

American Rose Annual 1968

O. Keister Evans, Jr. Editor, American Rose Society, 4048 Roselea Place, Columbus, Ohio 43214. 1968. 246 pages, Illustrated. \$5.00 (Library).

Yearly annuals of the plant societies serve to keep the reader abreast of current matters and they frequently look into the future as well. This 1968 Edition of the American Rose Annual, the 53rd in the series, does just this. In this issue the reader has a chance to learn about new cultivars, their breeding and development and classification, as well as the listing of the New Roses of the World and Proof of the Pudding—the evaluation of new and recent cultivars based on test garden observations and experiences.

Cultural topics include a Checksheet for Rose Growing, Soil and Nutrients for Roses, and Why Organics?, as well as Growing For Shows, Rose Understocks, and Aluminium Foil Thrip Repellent.

There are articles in this Annual of interest to the rosarian, amateur or professional or to the gardener interested in plants and their culture.

CONRAD B. LINK

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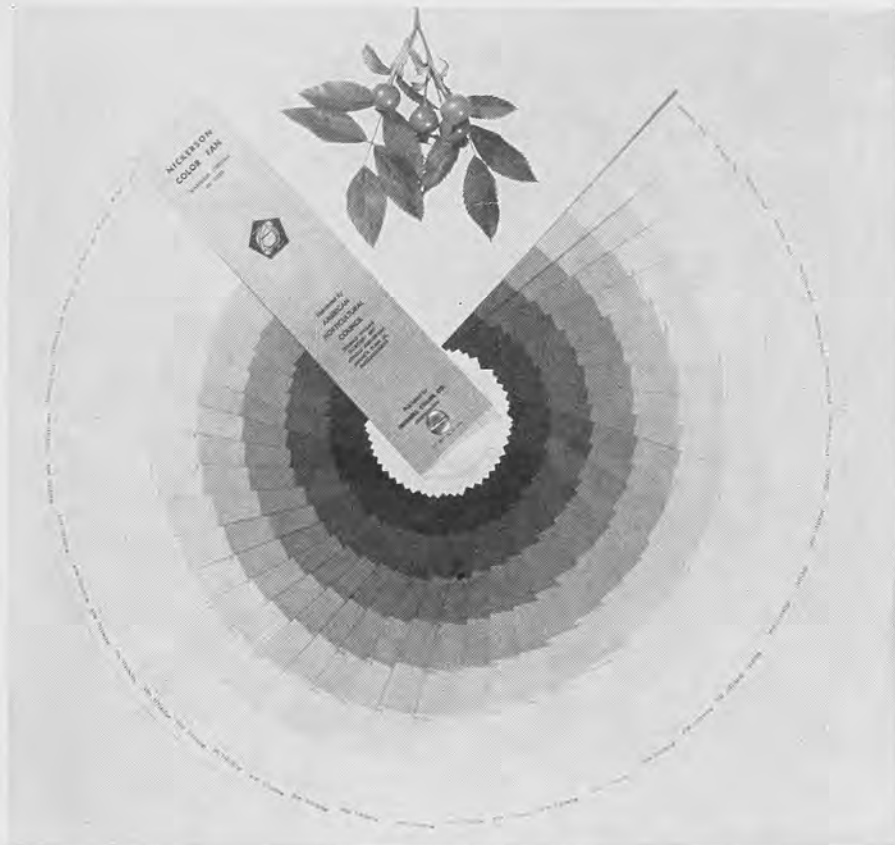
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