Acer macrophyllum
‘Seattle Sentinel’
PRESIDENT’S MESSAGE

This has been a very busy and eventful Spring for the Foundation. A very successful plant sale was put on by the Unit Council under the guidance of Jeanne Gardiner. One of the most enjoyable aspects about it was how everyone worked together, typified perhaps by the enthusiasm and energy of the Thorlakson family. Pat Thorlakson was responsible for traffic, aided by her husband, Neil; and three younger members of the family, Rick, Beth, and Anne, helped drive the shuttlebuses.

The Symposium was another success. Our four speakers — Dr. Louis Martin, Dr. Leslie Laking, Dr. Francis Ching, and Dr. Francis De Vos — gave excellent talks, perfectly sensing the purpose of the Symposium, and Dr. Roy L. Taylor did an outstanding job in drawing the presentations together. We are indebted to Marge Clausing and her committee for its organization.

Our congratulations to Brian Mulligan on his retirement as Arboretum Director of twenty-six years. Perhaps the thing that stands out most in my mind is not his many accomplishments and honors as a director, but his kindness, helpfulness, and patience with the average dirt gardener like myself. We all appreciate his efforts. Our sincerest, best wishes go with him and his wife, Margaret.

We are saddened by the death of Donald Graham. Everyone using and enjoying the Arboretum today is indebted to his vision and dedication. We extend our sympathies to Mrs. Graham and family and friends.

John A. Putnam

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**COVER PHOTO:** *Acer macrophyllum* 'Seattle Sentinel'

(See p. 13) Photo by: E. F. Marten
Bulbs for Early Rock Gardens and Terraces

ROSEMARY OWEN, F.R.H.S.*

The year of the bulb gardener begins in the autumn when a foundation is laid for new and colorful spring displays. Almost instant results may be achieved by planting several varieties of autumn crocus and *Colchicum* in mid-August. These corms and bulbs are so impatient as to flaunt their blossoms within weeks of planting, standing naked and leafless to cover bare spots left by seasonal cleanup.

*Sternbergia* is a welcome autumn flowering bulb of which *lutea* is the most adaptable form. The flower is brilliant gold arising amid narrow, straplike leaves, somewhat resembling a large crocus but with six, rather than three stamens. The bulb is a black tuniced member of the Amaryllidaceae family and should be planted six inches deep in August. A native of Palestine, it resents excessively wet summers and may require some protection from rain while becoming acclimatised.

*Colchicum autumnale* is familiar in older gardens, blooming in early September, and should be placed where an embarrassment of lush spring foliage will not become a nuisance at die-back. For size and perfection of form the rosy, globelike blooms of *C.* 'The Giant' stand in striking contrast to the purity of *C. speciosus 'Album' and speciosus 'Album Plenum'. These white single and double species require protection from mudsplash by the use of turf or ground cover, as do the dainty rosettes of *C.*

*Rosemary Owen, a practical horticulturist living in British Columbia, has spent years growing bulbs in the Pacific Northwest. Her recently published book THE PACIFIC BULB GARDENER is a delightful contribution to horticulture.
'Water Lily'. The rare chequered, or tesselated, species may be persuaded to adapt to Pacific Northwest conditions but are reluctant to increase even in their native habitat of Greece.

In September, October and November, groups of autumn crocus will clothe bare spots with lavender, blue and white flowers that are charming in fragile grace. Crocus speciosus and C. speciosus albus spread readily by seedling and vegetative reproduction. In a dry year when the jays leave the woods to pillage our gardens these bulbs may mysteriously vanish leaving only broken stems and petals as evidence. October is the month of the larger, less prolific C. 'Oxonian' and C. 'Cassiope'. A spurious spring is brought to the last days of autumn by the neat, purple flowers with bright orange stigmata of C. medius. A handful of the strange, nut-like corms of C. laevigatus var. fontenayi planted in the sunny dress circle of a favourite bed will delight a gardener by appearing at Christmas with soft blue, veined blooms that withstand rain and snow in a continuous festive offering.

Plants of the winter flowering crocus, both species and hybrids, bloom successively over a period of ten to fifteen days, unlike the better known spring crocus which appear in a single blaze of glory, often to be smashed by driving rain. The corms of winter flowering crocus are small and inexpensive, ranging from the clear gold, pointed petals of C. susianus and the smaller slender, vibrant gold blossoms of C. ancyrensis to a medley of varying shades in the C. chrysanthus hybrids, many of which are touched with contrasting feathering on the outer petals. All these crocus varieties bloom in January and February according to the severity of the winter and the position of the plantation. There is a wealth of choice to be found in the catalogues of British and European collectors, any of which travel best by airmail for early planting unless a local source is available. It is possible to build up a collection of 30 or more varieties in a few years as the bulbs are small and may be purchased for not more than a dollar a dozen. Such a collection, judiciously chosen, will create gay cushions of colour extending from September to March in a terrace or rock garden. On a sunny February day the delight of the bees who discover these blossoms is only exceeded by the wonder of the owner.

The C. chrysanthus species originate in Greece and Turkey; the C. sieberi variants grow high in the mountains of Parnassus and Attica. A delightfully diversified range of C. chrysanthus hybrids was developed by the well known British hybridizer and propagator, E. A. Bowles. Dalmatia is the home of the varied C. tomasianianus group which, like C. versicolor var picturatus from Southern France, will proliferate freely by seed as well as division. The tiniest offspring of these bulbs, scattered and scratched into a woodland dell, will produce drifts of purple 'Tommies' shading to gamet, intermingled with the slender, purple-veined flowers of C. versicolor var. picturatus. Crocus require little attention if allowed to naturalize but, being a native of countries with dry, hot summers, will not thrive in beds where constant summer watering is maintained. Careful labeling and lifting is recommended to ensure healthy increase, unless planting pots are used, and stored in a cool, well ventilated shed safely away from the depredations of birds and mice. The dug crop may be stored in silk stockings hung from rafters. On a bleak winter day when the blossoms remain furled, no more acceptable table decoration may be found than a collection of these dainty blossoms nipped off at the stem base and tenderly placed in a moss bowl to open wide to the warmth of the house. Such a gift to an invalid carries with it the very essence of awakening Spring.

In keeping with the miniature form of the species crocus the smaller forms of Galanthus, such as G. nivalis and G. nivalis florus, will be found to be more in proportion than the better known G. elwesii. The blue of the species Crocus sieberi may be complimented by the gentian shade of Scilla var. atrocoerulea sibirica (often known as 'Spring Beauty') which emerges very early. Further shades of blue may be provided by planting Iris reticulata together with the hybrids I. reticulata 'Joyce', 'Cantab' and I. histrioides. These miniature bulb Iris are subject to a disease called 'inkspot' and should only be purchased from a reliable source.

Pots of I. reticulata may be brought into the house at blooming time and will be found to be delightfully perfumed. Immediate return to the garden will avoid any set back as this is not a forcing technique. Unlike other Iris species, the
I. reticulata benefit from a light dressing of lime. It is well worth while to attempt to grow I. reticulata var. vartanii from Palestine. The blossom is an ethereal white on a four inch stem and if brought indoors has a haunting almond fragrance.

Muscari 'Blue Spike' is one of the most attractive plants of the species both in form and pleasing azure shade of the blooms which appear in April. As the bulbs multiply rapidly and are antagonistic to Scillas, they should be strictly controlled. The foliage often appears before Christmas and seems to be quite impervious to frost. Muscari comosum var. plumosum may be used for an unusual feathered lavender effect in late May.

All the bulbs mentioned above prefer a sunny site. But what of the damper, shady side of a rock garden? Here dainty Fritillaria will flourish along with a number of varieties of Erythronium, most of which are native to North America. The bulbs should be planted deeply in a rich leaf mold and left undisturbed. A collection of Cyclamen species will soon spread carpets of charmingly shaped and variegated leaves if conditions are suitable. These bulbs require some moisture and shade, as in a woodland setting, and must be mulched with fine peatmoss, compost or rotted wood to provide a rooting medium for the seed. The flowers appear in great profusion in late winter, spring and autumn, according to variety, in shades of white, pink or brilliant cerise.

The Tulipa species kaufmanniana, fosteriana and greigii and hybrids are useful as brilliant splashes of colour, set in small groups, to bloom in late February and early March. The bulbs should be placed well apart, using only five or six to a clump, as the leaves are large and subject to mildew if overcrowded. To maintain miniature proportions some gardeners prefer the smaller T. species such as T. turkestanica, pulchella, T. aucheriana, T. tarda and T. saxatilis. It is essential that these bulbs be recovered at die-back for proper ripening in accordance with the arid conditions of their countries of origin.

A number of charming miniature Narcissus
species will contribute their grace to the rock garden display from January to May. During a dry spring some watering may be necessary but these tiny bulbs with sparse foliage prefer, in most cases, a sunny, fairly dry position during the summer months.

It is not unusual to discover N. asturiensis (minimus) defying the January storms in close competition with N. bulbocodium var. romieuxii. These will be followed by N. cantabricus var. clusii and var. petunioides from France and northern Spain. N. bulbocodium vulgaris var. conspicuus, obesus and citrinus will also establish and seed freely if undisturbed. The Narcissus nanus cultivars, 'Little Gem' and 'Little Beauty', although dwarf rather than strictly miniature, are a splendid foil to the rich blue of Scilla sibirica 'Spring Beauty'.

N. cyclamineus has an unusual form. The corona is long and tubular, surrounded by recurved perianth segments which meet behind the flower giving it a quaint, belligerent air, amusing in a plant standing only four inches tall. The flowers are rich gold and amazingly long lasting. The bulbs will tolerate semi-shade and require damp, friable soil.

N. triandrus albus and concolor are most attractive with dainty, pendent bells but are inclined to disappear unless provided with a sunny, well drained location. Perhaps the most difficult Narcissus species to establish are N. rupicola and N. watieri which are usually more rewarding grown in pans in an alpine house. An easy and satisfactory miniature Tazetta is N. canaliculatus with surprisingly large, fleshy bulbs and a delightful, fresh fragrance. The white perianth is in perfect balance with the brilliant red cup on a six inch stem. A few plants of N. jonquilla will flood the garden with a heady perfume. The hybrids, 'April Tears' and 'Beryl', although not in the miniature class, are a happy addition to any rock garden collection.

Probably the most frustrating threat to early blooms is the destruction wrought by slugs. Bait in pellet form is dangerous to pets but the bran type, used repeatedly, is effective. Sharp sand scattered around the plants will also discourage these pests. At planting time it is necessary to avoid the overhanging branches of evergreen shrubs as the resin drip will mar the fragile blooms during the spring.

So it will be seen that the smallest suburban garden planted with a judicious selection of autumn, winter and spring flowering bulbs can make each day an adventure in search and delightful discovery.

BOOKS FOR BULB GROWERS

Of interest to all bulb growers is the book THE PACIFIC BULB GARDENER written by Rosemary Owen, F.R.H.S., Victoria, British Columbia and reviewed in the Winter, 1971 BULLETIN, Vol. XXXIV, 4, p. 22. Mrs. Owen’s article "Bulbs for Early Rock Gardens and Terraces” in this current issue will entice one to read further. Another book which concerns itself with species and hybrid tulips, daffodils, crocuses and other hardy bulbs and their place in the garden is Michael Jefferson-Brown’s DAFFODILS, TULIPS, AND OTHER HARDY BULBS, published by John Gifford, Ltd., 1966. Funk and Wagnall’s COMPLETE BOOK OF GARDEN BULBS written by Reynolds and Meachem has much fine information about bulbs for all seasons of the year, but little data on some of the fine species and the hard-to-find treasures that bring color and charm to the garden. One of the most definitive books on bulbs is Patrick Syne’s THE COMPLETE GUIDE TO BULBS published in 1962 by Dutton. This book is truly a handbook to the species and best varieties and to their cultivation. Unfortunately, it is difficult to obtain and hence will have to be a library-enjoyed book. The other three are easily obtainable for your private library.

Doris Butler
Bark Beetles: Serious Pests of the Northwestern Forests

R. I. GARA, EDWARD HOLSTEN, AND ERNEST MANEWAL

Most beetle families found in Northwestern forests do not directly compete with man for wood and fiber; a dramatic exception to the rule is the family Scolytidae, the bark beetles. Several members of this group are capable of destroying thousands of acres of pine and Douglas-fir forests. Last year alone the Douglas-fir beetle (*Dendroctonus pseudotsugae*) killed 7.3 million board feet of timber in Washington and Oregon, and over 425,000 acres of ponderosa pine land was devastated by the mountain pine beetle (*Dendroctonus ponderosae*), Dolph and Hadfield (1971).

Mountain Pine Beetle

All species of bark beetles have similar life histories, the mountain pine beetle is a good case in point. In mid-summer, hordes of males and females emerge in search of new breeding material. Before long, “pioneering females” find a susceptible ponderosa pine, a susceptible host being a tree which is unable to expel the attacking beetles. This occurs when the tree is out of water balance, a situation where more water is being transpired than can be supplied by the root system. As a result, the cells lining

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1 Associate Professor of Forest Entomology, College of Forest Resources, University of Washington, Seattle, Washington.
2 Graduate Student in Forest Entomology, College of Forest Resources, University of Washington, Seattle, Washington.
3 Teaching Assistant in Spanish Department, University of Washington, Seattle, Washington.
the resin ducts lose turgidity, and the pressure these cells apply to the resin is reduced. Subsequently, when the first-attacking females enter the tree and sever the resin ducts, they are not “pitched out.” At that time, an interesting event occurs! The successful females send out a chemical message – an attractant – which provides a signal to the dispersing population that new breeding grounds have been allocated. Males and females within range of this message then are guided to the source, and thousands of beetles quickly accumulate on the tree. For a brief time the tree may resist the onslaught, but soon the mass attack overwhelms the host and it is killed. The tree then becomes the home for thousands of bark beetles and other insects.

As the tree dies, the females mate and bore egg galleries in the fresh, inner bark tissues, and the tree is girdled by these mining insects. While constructing the egg galleries, the female beetles lay eggs along the margins and pack them with boring dust. Soon the eggs hatch and minute larvae begin to bore larval mines at right angles to the main egg galleries. The larvae continue to grow and enlarge their larval mines until winter stops further development; the more advanced larvae form pupal cells and overwinter as pupae. Development continues the following spring, and a new crop of adults beings to emerge and seek new hosts by July.

**Douglas-fir Beetle**

The Douglas-fir beetle basically has the same life style as the mountain pine beetle. It differs mainly in preferring downed trees and logs as its primary breeding site. Like the mountain pine beetle, the main function of the Douglas-fir beetle attractant is to signal to the population the location of scattered and new host material.

However, when the Douglas-fir beetle occurs in epidemic proportions, the insects readily attack and kill vast quantities of standing trees. This all too frequent occurrence takes place after severe wind storms. Unfortunately, Douglas-fir trees are not windfirm, and large amounts of prime Douglas-fir beetle breeding material often become available over substantial areas. Following blowdowns, beetle populations increase tremendously because their favorite food material becomes plentiful. Provided no additional blowdowns occur, food material to sustain greatly increased beetle populations becomes limiting in about two years. At this time, the populations which have increased to epidemic proportions attack standing trees in their search for new brood material. Trees are killed by the concerted attack of large numbers of beetles spurred on by attractants produced by females attempting to overpower the living hosts. Soon large pockets of timber are laid waste.
Control of Bark Beetles

Traditional control of bark beetles involved the felling of infested trees with subsequent insecticide treatment of the broods. This practice has been recommended for years and still is practiced in many areas of the U.S. It can be seen, however, that this control method has been unsuccessful in preventing outbreaks. The main reason why the prescribed control techniques have failed is that man is always a step behind the beetle population. When the trees are "controlled," a major portion of the adult population has already left. In a short time these scattered populations begin new infestation centers.

Sanitation logging or other salvage operations, however, have been successful in preventing the buildup of large Douglas-fir beetle populations. Generally, blowdowns are salvaged quickly before epidemic beetle populations occur.

Overall, the future of efficient bark beetle control is bright. Most of the bark beetle attractants have been isolated and synthesized. There is intensive research, in various parts of the Northwest, on the best way to use these new chemical tools. The time will come when bark beetle populations will be manipulated; populations will be lured away from prime timber areas before damage ensues. Also, when infestations are underway, it is conceivable that emerging bark beetle populations will be caught in baited traps before they can locate and infest new hosts.
Landscaping
With Vines

MARY PALMER*

Vines, simply stated, are plants with stems too weak to support their tops. Over a long period of growth and development, vines have tried in varied ways to overcome this weakness. In doing so, they have possibly made themselves the most versatile plants on earth.

Today's homes and gardens are more compact and functional now than ever before. Vines are well equipped to accommodate precisely these considerations. Deep rooted, strong growing, outdoor hardy vines are delightful nonconformists. Their sinuous stems reach above and beyond the more conservative growth in a landscape and stretch the bonds of constraint with infinite individuality, delicacy and charm. Whether they are used as a screen, a background or as a foil for objectionable construction features, or to weave a decorative tapestry on walls, fences, or trellises, vines will provide a pleasant blending of the practical and the esthetic as well as enhancing other landscape features, making them most welcome to gardens.

Landscape vines are either "twiners", "leaners", "graspers", "clingers", or "creepers". By far, the greatest number of vines are twining types. Vines with twining stems encircle sup-

*Mary Palmer (Mrs. Albert W.), a member of Unit 16, the Sylvia Henry Unit, is Garden Editor of The Seattle Times. We are pleased to have her first-time contribution.

Actinidia chinensis, male plant flowering; flowers 1½ ins. diam. white when newly opened, fragrant, changing to buff with age. Photo by: William Eng.
ports, winding round and round until they obtain a fast hold, twining usually in one direction, either clockwise or counterclockwise. Some vines, like the grape for example, have tendrils that curl first in one direction, then in the other. This reverse “spring” is based on a sound engineering principle which permits the wind to blow the vine until the tendril is nearly straight before it breaks. When the wind ceases the “spring” pulls the plant back to its former position. Vines should be trained to twine in their natural direction. Lonicera or honeysuckle, Polygonum aubertii or silverlace vine, Phaseolus coccineus or scarlet runner bean, Clematis, Vitis or grape, and Wisteria are examples of “twiners”.

“Leaners” are vines which lack a means of support with which to cling, as a climbing rose. “Leaners” need to be tied or trained to supports in order to stand erect or to climb. “Graspers” are vines that bear tendrils or small threadlike stems that twist around near by objects. Some tendrils are petioles; others are a continuation of the leaf or flower spray and some are independent parts. Examples of “graspers” are Passiflora caerulea or passion flower, Parthenocissus quinquefolia or woodbine, Cobaea scandens or cup and saucer vine, Lathyrus odoratus or sweet-pea and Cucurbita or gourds.

Still another vine type, known as the “clingers”, attaches itself to a support and clings to brick, stone or other surfaces. Vines that cling send out rootlets, discs or similar holding-fast parts which fasten to the nearest object. A somewhat different version of the “clinger” is exemplified by Hydrangea petiolaris, the climbing hydrangea. Aerial roots along the main stalk of this vine become attached to the support as do the discs of Parthenocissus tricuspidata or Boston Ivy. Campsis radicans or Trumpet vine, Euonymus obovatus and E. radicans, the clinging members of the euonymus family, Hedera helix or English ivy are other “clingers”.

Clematis armandi, an evergreen clematis. Photo by: Roy Scully, Courtesy of “The Seattle Times”
“Creepers” are characterized by no inventiveness; they neither lean, twine grasp or cling. Creeping, crawling vining plants are indispensable as ground covers. Plants with prostrate, trailing stems as “creepers” will generally never stand erect without support. _Lantana depressa_, a prostrate form and _L. montevidensis_, trailing fuchsias, _Pelargonium peltatum_ or ivy geranium are a few flowering “creepers” that decorate the summer gardens. Evergreen “creepers” include _Arctostaphylos uva-ursi_ or our native bearberry (kinnikinnick), _Vaccinium vitis-idaea minus_ or low blueberries (lingonberry), _Camellia sasanqua_, and _Euonymus fortunei_.

Some vines are luxuriant in the dark, shady areas of the landscape: _Actinidia chinensis_, _Cissus capensis_ or evergreen grape, _Kadsura japonica_, _Polygonum auberti_ or silverlace vine, _Vitis coignetiae_ or glory-vine, and _Fatshedera lizei_. Others are sun worshipping vines: _Clematis armandi_, an evergreen clematis, _Ipomoea purpurea_ or morning glory, _Lathyrus odoratus_ or sweet-pea, _Lonicera_ or honeysuckle, any of the _Rosa_ species and cultivars that are climbers, ramblers or trailers, _Passiflora caerulea_, one of the hardiest and most commonly cultivated of the passion flowers, _Phaseolus coccineus_ or scarlet runner bean, _Pueraria thunbergiana_ or the Kudzu vine, and _Plumbago capensis_, for example.

Vines with decorative berries or fruits are _Celastrus scandens_ or American bittersweet, _Euonymus fortunei_ or winter creeper, _Kadsura japonica_, the _Passiflora_ species, and _Smilax rotundifolia_ or horsebriar.

Vines should be selected for a specific location in the landscape, provided with suitable supports, and maintained with corrective pruning. Near buildings one should avoid planting vines that are so rampant in growth that they tear shingles or penetrate the structural framework. Many are outlaws and require constant restraint. Delicate vines will sulk if not given attention. A planting pocket should be

_Euonymus fortunei Carrierei_, a fruiting branch. Photo by: E. F. Marten
carefully prepared. A light, sandy soil enriched with organic matter such as leaf mold, peat moss, antique manure or compost is beneficial. The vine's growing soil should drain excess water in winter, yet retain moisture during the growing or active season. The planting hole for most vines should be about two feet square. The existing bottom soil should be removed to a depth of at least two feet and a layer of fine gravel or sand two or three inches deep placed in the base of the hole and topped with four or five inches of the prepared soil mixture.

Most vines are planted with their crowns (the point where the roots and the top growth join) an inch or two below the ground level. The fine soil mixture should be carefully worked in around the base of the vine, and the new planting watered deeply. The vine should be fastened to a permanent support to avoid damage to the lower part of the stem. As a final step, the planted vine should be mulched over with a summer mulch two or three inches deep, extending out a foot or two from the base of the plant.

Each spring as new growth surges, a vine's growing soil should be fertilized with a commercial plant food containing approximately 5 per cent nitrogen, 10 per cent phosphorus and 10 percent potash, a cupful of the fertilizer applied in a large circle around the base of the vine and thoroughly watered into the soil after the application. In autumn, an organic type plant food such as blood, bone, or fish meal or composted manure should be applied.

Tender vines should have a light winter mulch protection placed after the first frost. If signs of a severe winter are evident, the less hardy vines can be removed from their supports in the late fall and buried entirely under the soil five or six inches deep. They can be covered further with two or three inches of an insulating mulch such as ground bark, old sawdust, leaves or compost. In the spring when the danger of killing frosts has passed, the winter covering must be removed.

*Hydrangea petiolaris*, thought by many to be one of the most beautiful flowering vines. Photo by: Roy Scully, Courtesy of "The Seattle Times"
On June 30, 1972 Brian O. Mulligan retired after 26 years as Director of the University of Washington Arboretum. Born in Marino, County Down, Ireland, he was a student at the Royal Horticultural Society’s Gardens at Wisley, Surrey, England from 1924 to 1927, obtaining a National Diploma in Horticulture (by examination) in 1933. By appointment of the Ministry of Agriculture, he was a research worker in vegetable diseases at the University of Bristol from 1930 to 1934. In 1935 he became Assistant to the Director of the R. H. S. gardens at Wisley. With the outbreak of the war, he transferred to the Air Ministry as one of seven horticultural advisors whose work consisted of advising on vegetable growing throughout Great Britain. In May 1945 he was appointed Senior Advisor and one year later was released by the Air Ministry to return to his duties at R. H. S. Gardens at Wisley.

His appointment to the University of Washington staff on October 21, 1946 came at a time when the Arboretum was suffering from neglect, due in a large measure to the war. His training and experience at Wisley proved invaluable, his first task being to regroup and rearrange many of the plants in the Arboretum, using the Olmstead plan as a guide, but deviating when conditions required. The Cistus collection is an example of the application of his horticultural knowledge and landscape skills in developing the Arboretum. The illustrations on pages 14 and 15 substantiate the growth of this area and are indicative of comparable growth in all parts of the Arboretum. During his tenure as Director he has either located or hybridized, named, propagated and distributed to the gardening public a number of select specimens of unusual plant material. Among these are Magnolia kobus ‘Wada’s Memory’, Magnolia salicifolia ‘Elsa Frye’, Ceanothus ‘Puget Blue’, Rhododendron ‘Seattle Springtime’ and Acer macrophyllum ‘Seattle Sentinel’ (see cover). The latter he spotted growing above the Arboretum on Capitol Hill. Over the years he has built an extensive photographic slide collection and library at the Arboretum.

He has been a major contributor to both scientific and popular publications. His monograph MAPLES CULTIVATED IN THE UNITED STATES AND CANADA written in 1958 is recognized internationally. He has held many positions including President of the American Association of Botanic Gardens and Arboreta. He served as Editor of the University of Washington Arboretum BULLETIN from 1954 through 1964 and continues presently as a valued member of the Editorial Board.

Mr. Mulligan’s work has been recognized both at home and abroad. On January 14, 1963

(continued on p. 26)
Cistus beds from South by Upper Road, June, 1948.

Cistus area in flower, June, 1952. Photos by: E. F. Marten
Cistus area from Southeast, July, 1960. Photo by: E. F. Marten

Cistus area from Southeast, June, 1972. Photo by: Joe Witt
If the American farmer had to depend on crop plants of the same degree of genetic improvement as our city trees, this nation’s agriculture could not sustain one-half of our present population. Selection and breeding of crop plants over the past 100 years has given us pest-resistant, well-adapted, high-yielding varieties that have, in conjunction with improved cultural practices, enabled us to reduce the acreage devoted to farming.

Of course, trees are not corn plants, and growing a tree takes time. Still, in 1968, there was a total of 231 professional man-years devoted to research and application in the genetic improvement of forest trees (Schreiner, 1969). More than 93% of this manpower has become employed since 1950. The progress has been most gratifying. One southern state (Florida) produced 20 million genetically improved seedlings of one pine species (slash pine) in 1968. Within 10 years, it is likely that more than half a billion genetically superior pine seedlings will be grown annually in the United States.

Of course, shade trees are not forest trees, and there are some important differences in the production and use of nursery stock and other phases of operations in these two areas. These differences, in relation to genetic improvement, have been discussed elsewhere (Santamour, 1968) and need not be rehashed here. But how many professional man-years are currently being invested in the breeding and selection of shade trees? How many trees on our city streets have resulted from a deliberate attempt to combine desirable characteristics, especially pest resistance, from two individuals or two species? The answer to both questions is “Too Few!”

The major biological mystery of our times, in my opinion, is not the possibility of life on other planets, but how trees survive in the environments of our major cities. A great deal of credit must be given to the municipal employees of the parks, streets, utilities, and public works agencies whose job is to care for these trees. The trees they have to work with are certainly a motley group. By and large, the trees in our cities are a genetically variable population of seedling origin from parent trees whose only virtue was seed production. The few clones or cultivars presently being used were primarily selected for crown characteristics and are generally propagated on rootstocks of seedling origin. These rootstocks are likewise variable in their resistance to pests and environmental stresses. Our city trees are not even the best that nature has to offer. These trees have been plucked from the forest and thrust into environmental situations for which their evolutionary development has not prepared them.

Yesterday

In early times, when the environmental differences between urban areas and the countryside were not so marked, the trees did well. What we now consider, with remarkable hindsight, as the mistakes of the past, were not really mistakes. American elm, the queen of shade trees, was a versatile, adaptable species of outstanding beauty. Unfortunately, Dutch elm disease entered the picture. The so-called London plane came to the United States with a solid British reputation for enduring the smoke of London and Birmingham. Who would have guessed that among the seedling progenies of these hybrid trees, an innocuous native disease, sycamore anthracnose, would find such willing hosts? The mighty oaks have endured in our cities for many years, but are now the prey of the damaging obscure scale. These examples are enough, but the list could be longer. These were good trees, but not for today. However, trees

*This article, reprinted from ARBORIST’S March, 1971 issue, is presented here with the permission of the International Shade Tree Conference, Inc. Dr. Santamour, Jr. is Research Geneticist at National Arboretum in Washington, D.C.
do live a long time; and we have inherited yesterday’s trees and their problems.

Today
What do we plant today? We still plant American elm, London planes, and oaks — none of which are improved over the proven liabilities of the past. Apparently, change is difficult to achieve. But there has been a change — because now we have seen the widespread use of selected and vegetatively propagated clones and cultivars of certain tree species that do constitute the beginning of the age of enlightenment. We have seedless and thornless honeylocust, maples in a wide diversity of forms, and purely male ginkgos. Unfortunately, the mimosa webworm finds the foliage of the new honeylocusts absolutely delicious; verticilium wilt, attacking the roots, is not impressed by the marvelous crown shapes in our select maples; and a ginkgo is only a ginkgo, even if it doesn’t smell bad.

The bitter truth is that none of these selected trees have been improved in any characteristic affecting their survival.

Tomorrow
If trees are going to play an important role in humanizing our deteriorating urban environments, tomorrow’s trees must be genetically superior. They must be developed to tolerate or resist the environmental stress factors that cause injury to trees in the city, impair their growth, and make them more likely hosts for damaging insect and disease pests. Such factors as intense reflected heat, inadequate soil aeration, salt in the soil, and chemical air pollutants must be considered in any tree improvement program (Santamour, 1969a).

Fortunately, the inherent variability that causes us so much trouble in tree culture is also the basic requisite for genetic improvement through breeding and selection.

Where are these improved trees going to come from? The persons who grow the trees or who plant the trees in our cities generally cannot afford the long-term expenditure of time, money, and scientific talent necessary for such research. The development of improved shade trees required Federal, State, or university programs which, ideally, will be supported on a continuous basis for at least 30 years.

The research project on “Cytogenetics, Breeding, and Evaluation of Shade Trees” was begun at the U.S. National Arboretum in 1967. This project was the first to be initiated with the goal of developing genetically improved trees in a wide range of genera for use in the cities of tomorrow. We have already made important breeding progress in Ulmus, Platanus, Magnolia, and Liquidambar. Preliminary work on Tilia, Robinia, Liriodendron, and Acer shows considerable potential. Studies on air pollution tolerance (Santamour, 1969b) will be intensified and salt tolerance studies are underway.

Other projects in the United States are concerned with the evaluation of commercial cultivars for specific areas and with the development or selection of American elms resistant to Dutch elm disease. Resistance to mimosa wilt is the objective of one USDA project in Georgia, and a new tree breeding program has recently been initiated at the ARS laboratory in Delaware, Ohio. The signs are encouraging. There is an increasing awareness that trees, aside from their commercial value as lumber, are important to man’s survival and well-being.

When will these improved trees arrive on our city streets? If the broad research projects mentioned above had been started 20 years ago, or if the older, special-purpose programs had been adequately supported, some trees would be on the streets today. In the next few years, we will probably see some disease-resistant American elms released through some of the older projects. Important as they may be, one or two elms may not be enough for our nationwide needs. And elm certainly is not the only kind of tree we need.

Twenty years is a long time; but it will be that long before we can hope to see a substantial and significant number of new and improved trees in our cities.

If we can support the projects in existence today and initiate new projects throughout the country, it will be only a 20-year wait. Let us not, in 1990, have to ask the question, “Where are the improved trees?”

Literature Cited
Santamour, Frank S., Jr. 1968. The forest and the

(continued on p. 26)
It was in an early year of the depression, 1933, when then Mayor Charles Smith appointed a committee to create an arboretum in Washington Park. Donald Graham was named chairman. From that beginning, until his passing this spring, Donald Graham lavished attention, time and money on the Arboretum and its supporting Foundation. As a lawyer and knowledgable horticulturist he led this original group of devoted amateur gardeners through the complex negotiations between city and University that resulted in the building of one of the country’s finest botanic gardens.

After the initial organizational task was completed this original committee became the nucleus of the Foundation. Donald Graham served almost continuously on this Board and in 1941 and 1942 was President. Twenty years later in 1962-1964 he again assumed this leadership. While he had many fervent members of the Foundation to assist him, certainly no one has been closer, more diligent and devoted to our Arboretum through the years since 1933. A frequent and always welcome writer for the Arboretum BULLETIN his contributions include articles on tree peonies, eucryphias, magnolias, especially M. sargentiana var. robusta, rhododendrons and other unusual plants.

Even before development of the Arboretum, Donald Graham was an avid gardener and had started importing the better forms of trees and shrubs for his own garden. Many new and superior types and forms were introduced to the Northwest via his garden, as he was most generous to the Arboretum and to his gardening friends. Much of this fine material “escaped” through numerous benefit plant sales put on by the Foundation and other organizations. The high quality of plant material in Seattle gardens is due, in no small measure, to Donald Graham’s horticultural knowledge and generosity.
Mr. Graham was always in the forefront with things pertaining to horticulture and was one of the earliest members of the American Rhododendron Society. He was directly responsible for organizing the Seattle Chapter. Even prior to this, he put on the first large rhododendron shows in the Arboretum. Later, he always participated in and provided material for Society shows. Donald Graham was one of the very few men to be made an honorary member of the Seattle Garden Club in recognition of his service to the city. Other well-deserved honors included the Bronze Medal, the highest honor a chapter can bestow, awarded to him in 1971 by the Seattle Chapter of the American Rhododendron Society for his efforts on the genus and for the Chapter. This year he had been nominated for the American Horticultural Society’s Amateur Citation award to have been made in September. Unfortunately, honors sometimes come too late.

Donald Graham’s contribution to the Arboretum was beyond calculation; his influence on the horticultural quality of Seattle tremendous. He will be greatly missed but long remembered, with gratitude, for improving the aesthetic life of his city.

Edward B. Dunn, Past President
Arboretum Foundation

AWARDS

In recognition of long service to the American Rhododendron Society, for leadership and active participation as a Director of the Board for A.R.S., as Officer (in all categories including three terms as President) of the local chapter, as Show Chairman innumerable times, as active member of various committees as needed, and for continuous efforts to improve the quality of rhododendrons by growing, selecting, sharing and encouraging others, the American Rhododendron Society at its Annual Meeting for 1972, awarded its Gold Medal to Donald McClure, former Vice-President and steadfast supporter of the Foundation. This is the highest honor that can be given to a member. We congratulate Mr. McClure. We also know that the award was well deserved!

This is your Arboretum, kept alive by your support

We are pleased to welcome the following new members (April 1, 1972 through June 30, 1972):

We are grateful to the following members who have increased their dues to: Contributing — Mrs. William H. Griffith, Jr., Miss Kathleen Donahoe. Sustaining — Mrs. Don G. Abel, Jr., Mrs. S. C. Bacon, Mrs. Philip W. Bailey, Mrs. J. R. Calahan, Mrs. Donnell Fisher, Jr., Benjamin Notkin, Mrs. John Reynolds, Mrs. A. Riehl, Mr. & Mrs. Earl D. Scott, Will Thomas, Mrs. J. A. Walsh.
THE ARBORETUM SYMPOSIUM

The recent symposium on "The Role of the Arboretum in an Urban Society" proved to be a stimulating and rewarding experience for all who attended. Of interest to those unable to attend will be the information that the entire proceedings were taped and will be available presently in printed form. We urge all members to obtain a copy and read how eminent authorities regard this asset in our community.

Dr. Odegaard, President of the University of Washington, speaks at the opening of the symposium. L. to r.: Mr. F. Ching; Dr. L. B. Martin; Dr. Roy Taylor, Moderator; Dr. Odegaard; Robert Behnke, Arboretum Foundation. Photos by: Joy Spurr

Dr. Francis DeVos, Director, Botanic Garden of Chicago Horticultural Society.

Dr. Leslie Laking, Director, Royal Botanical Gardens, Hamilton, Ontario, Canada.

Dr. Louis B. Martin, President, Chicago Horticultural Society.

Dr. Roy L. Taylor, Director, Botanical Garden, University of British Columbia, Vancouver, B. C.

Mr. Francis Ching, Director, Los Angeles State and County Arboretum.
SOME OF OUR FAVORITES
Won't You Send Us Yours?

Western Dogwood (Cornus nuttallii)

BRIAN O. MULLIGAN

This series of notes on plants valued in local gardens has now been running in the BULLETIN since the issue for Winter 1960 (Vol. XXIII, No. 4), during which time some fifty different kinds have been commented on, most of them either shrubs or small trees. I was astonished to find that our beautiful native dogwood tree was not amongst them and am happy to try and rectify this surprising omission.

The last issue of the BULLETIN (Spring 1972) contained a series of illustrations of the flowers of this tree, from buds in late winter to their full development in April or May, at which time there is no more beautiful tree in the Arboretum, where it flourishes and with the
aid of our bird population constantly regenerates itself along and near Arboretum Drive in the well drained, sandy soil which it prefers. This year the spring flowering seemed exceptionally prolific, perhaps due to the large amount of sunshine we received from mid-July until late in September, 1971, in August 10% above our average for that month.

For two to four weeks depending upon weather conditions, especially the daily maximum temperatures, these 30-45 ft. (or sometimes taller) trees are decorated by the lovely white "flowers" each with four to six conspicuous white bracts, held out along and above the branches in a manner which displays their charms to the full. A background of dark green conifers such as the native Douglas fir or western hemlock will considerably enhance their effect.

Prior to their flowering there is a prolonged period of several weeks when we can watch the development of those tight, round green buds which have been carried through the winter at the end of the branchlets with no special protection. Last winter, in January 1972, they endured minimum temperatures on twelve successive nights ranging from 8°F. to 23°F. (8°F. and 9°F. on consecutive nights), but this apparently had no effect upon them. In the location near Lowell in northwestern Idaho where this tree is also native, temperatures must go considerably lower in winter.* It would be of interest to learn just how much cold these buds can endure, but we shall not discover that information in Seattle.

During the summer months the trees stand as columns of green foliage hiding their attractive branching pattern. The leaves are quite similar to those of its eastern cousin, Cornus florida, but usually somewhat longer, wider above instead of below the middle, not as pale (glaucescent) beneath and having a more abruptly acute apex instead of one gradually attenuate to the tip. The twigs of C. florida are frequently covered with a thin white wax, lacing in C. nuttallii.

Certain individual trees have the capacity for flowering in August and early September, and do so regularly, even though they may also have flowered in the same spring. This is a bonus which we welcome even though it may surprise our visitors and bring questions from them. It is a character which should be preserved by vegetative propagation of these specimens.

In September the fruits begin to color in the former flower clusters, but usually only a few mature in each, first changing to orange on the exposed upper portion, then to bright red, but by this time the seed-eating birds, especially the evening grosbeaks, have probably discovered them and made systematic forays on this bounty. The seeds however are fortunately rejected and can be picked up from the ground after the flocks have departed.

Early in October we begin to see signs of fall color appearing in the reddish tints of certain leaves, but it will be several weeks before this develops fully and the trees are entirely bedecked with orange to red foliage, their second season of beauty during the year. When several are grouped together this can be a very striking feature in the landscape and one easily recognized at a distance, as can be seen in the Arboretum each autumn.

During the winter months we enjoy the solid character of this tree — its strong trunk, the bark smooth and gray when young, becoming fissured into small rectangular plates when old, the main stem ascending vertically, the lateral branches arranged more or less horizontally and in tiers around it, especially in the earlier years. Unfortunately, it sometimes produces a pair of main stems or leaders, and if these are both left then decay may set up in the crevice between them, with eventually fatal results. One should be removed at an early stage in its growth.

Finally, when disease or old age overtakes them — and they are generally not very long lived trees — the trunk can be cut into suitably sized logs for the fireplace where it will burn slowly and quietly to the end, thus adding one more to the sum of its beneficial characteristics. Few trees offer us so much from their youth to old age; no wonder we continue to plant and care for them.

*The average Jan. temperature in Kooski, 23 miles west of Lowell, is 28.7°F. In Seattle it is 38.2°F.
ARBORETUM CLASSES
Fall, 1972

The College of Forest Resources administers the education program of the University of Washington Arboretum. For further information, call 543-2730. To register, send check (made payable to the University of Washington) to:

Arboretum Courses
Anderson Hall
University of Washington
Seattle, Washington 98105

BIRDS OF ARBORETUM. Mrs. Zella Schultz, noted ornithologist, will conduct a field course in the Arboretum dealing with bird identification and adaption. Class limited to 20. Students should have binoculars; meet at Arboretum office, Saturdays, Sept. 16, 23, Oct. 7, 21; 9-11 a.m. 4 sessions, $10.

FALL TOURS. Mr. Joseph Witt, Acting Director of the Arboretum, will conduct tours of the arboretum grounds in fall color, including the Oak Section and Woodland Gardens. Class limited to 25. Saturdays, Sept. 30, Oct. 14, 28; 9:30-11:30 a.m. Meet at Arboretum office. 3 sessions, $5.

PRUNING ORNAMENTALS. Mr. Chico Narro, expert nurseryman, will demonstrate techniques of pruning trees and shrubs. Arboretum greenhouse; class limited to 30. Saturdays, Nov. 4 and 18; 10-12 noon. 2 sessions, $5.

BONSAI CULTURE FOR BEGINNERS. Mrs. Horace Raphael, authority on Bonsai culture, will teach a series of 10 workshops for beginners. Students receive two trees suitable for Bonsai, and may add their own selections during the course. Each section limited to 12. 10 sessions, $40.

Section A: Tuesdays, Oct. 3, 10, 17, 24, Feb. 20, 27, March 6, 13, 20, 27; 10:30 a.m. – 12:30 p.m.
Section B: Same dates; 7:30 – 9:30 p.m.

INTERMEDIATE BONSAI CULTURE. Mrs. Raphael will conduct this series of 10 workshops for students with some experience in Bonsai culture. Students supply their own trees. Each section limited to 12. 10 sessions, $40.

Section A: Wednesdays, Oct. 4, 11, 18, 24, Feb. 21, 28, March 7, 14, 21, 28; 7:30 – 9:30 p.m.
Section B: Thursdays, Oct. 5, 12, 19, 26, Feb. 22, March 1, 8, 15, 22, 29; 7:30 – 9:30 p.m.

Book Reviews

THE PRINCIPLES OF POLLINATION ECOLOGY.

The first edition of this well-known book came out in 1966, and obviously fulfilled a demand. Persons interested in the various and manifold aspects of flower pollination (and related subjects) will welcome this new version, which incorporates some fascinating new developments such as the discovery that in the pollination of figs by their natural pollinators — minute female gall wasps — the pollen is not transported passively on the glossy and smooth outside of the insects, but is actively collected and then transferred to special pockets on the underside of the female’s abdomen or in the cephalothorax, from which it is later, mysteriously but conveniently, extruded again during the act of egg-laying. This puts the case of the figs in a class with that of yucca and yucca moth, heretofore always claimed to be one of the most extreme examples of an “improbable” pollination-situation.

Including the epilogue, there are 11 chapters. The extensive bibliography (of about 470 items) is followed by a brief subject index which, in its turn, precedes useful separate indexes for the plant names and animal names mentioned in the book. Especially useful also is chapter 10, “Case histories”, illustrated by about 50 India ink drawings. Pollination in the flowering plants (which most people think of almost exclusively when they hear the word “pollination”) is covered mostly in chapter 5, the bulkiest one. The first four chapters lead up to it in an attractively logical and background-providing way, since they cover — respectively — the history of pollination ecology, the techniques involved in its study, pollination seen as spore dispersal, and the actual dispersal of spores and pollen in lower plants and gymnosperms. The balance of the book is devoted to retrograde developments (chapter 6), the historical development of flowers in relation to mode of pollination (chapter 7), pollination ecology and speciation (chapter 8) and applied pollination ecology (chapter 9).

Clearly, then, this is a scholarly and well-balanced book, which one would like to see on the desk of every biologist and biological amateur worth his (or
he) salt. At the same time we must reluctantly concede that — in spite of its title — this is not really a book for beginners. This is an abundance (perhaps a superabundance?) of scientific terms, and these are not always explained when they are introduced for the first time; on page 2, for instance, the unsuspecting reader is suddenly confronted with the word dichogamy, which at this stage of the game must still have an aura of complete mystery to him. It is furthermore regrettable that so little attention was given to biological clocks, rhythms, and the time-sense of insects and other animals, especially in connection with the opening and closing of flowers, a topic which, undeniably, is of the utmost relevance in a discussion of pollination ecology. The chapter on applied pollination ecology is one of the weakest in the book; what a pity that the elegant work done in this country on the “domestication” of alkali bees and leafcutter bees is not discussed at all!

In general, the somewhat peculiar English in which the book is written adds to its flavor and attractiveness; there are only a few places where it is unacceptable. The reader will also accept smilingly such funny statements as: “No pollinator is exempt from errors; even bumblebees (italics mine, B.J.D.M.) may die from poisonous nectar”. (It seems to follow that bumblebees are some sort of super-animals, who in general are above such “mistakes”. Where was the authors’ well-developed sense of humor, when they wrote this down?!) On the other hand, we are sadly puzzled by some mistakes in the names of authors and organisms; e.g., the American biologist Thien might well object to being referred to as “Thieu” (or vice versa), and the Spaniard Sols might find “Stols” much too Dutch to suit his taste. The number of printer’s errors — for which the publisher should take the blame — is far too large to be acceptable in a book of this price.

In spite of these few shortcomings, which can easily be corrected in a later edition, we recommend the book most emphatically to flower lovers and biologists of some slight sophistication.

B. J. D. MEEUSE, Ph.D.
Professor of Botany
University of Washington


His father, Nils Ingemarsson, as was the custom for the firstborn, chose a surname of his own when enrolling at the university. And so, what turned out to be the greatest name in botany, LINNAEUS, was fittingly derived from a plant, namely a large, venerable linden tree growing on the family property (Swedish lind; lin in the Smaland dialect). Plants seemed to have played a significant role in the value system of his father who, a country clergyman, was an enthusiastic horticulturist in his own right. Thus, what unquestionably must have been an unusual genetic endowment was further reinforced by the garden-oriented life in the rectory at Stenbrohult.

This biography is an enticing way to get acquainted with the botanist’s life. Illustrations and color plates alone deserve high praise and reflect the author’s credentials as curator of the Watts gallery at Compton, England. The text vividly portrays Linnaeus’ early struggle for an appropriate education; his singular collection trip to Lapland; the scientifically significant journey to Holland and its precipitate, the historic Systema Naturae; the apex of his career as professor in Uppsala; and many of his human traits, his ambition, vanity and high self-esteem. Besides, the author succeeds in conveying an historical perspective of 18th century Sweden and removing some of the glorified lustre frequently projected into days past.

The book is concluded by an authoritative appendix, compiled by Dr. William T. Stearn, describing Linnaeus’ classification system, nomenclature and method (botanical and zoological); listing the Linnaean collections and major publications; as well as giving sources of further information.

To the layman, this is a gourmet pièce de résistance, to the botanist, an appetizing antipasto.

REINHARD F. STETTLER, Ph.D.
Assoc. Prof. of Forest Resources
University of Washington

PACIFIC NORTHWEST FERNS AND THEIR ALLIES, University of Toronto Press, 1970, T.M.C. Taylor. 97 species with line-sketches and maps showing occurrences of each species. 247 pages, $15.00

This work fills a gap in Northwest fern flora, since no comprehensive treatment of pteridophyte flora covering the area from Oregon to Alaska has been published.

Dr. Taylor writes with authority, based on many years of interest and study on ferns and their allies. He has spent a great amount of time in the field, as well as checking herbarium material throughout the world. The author is now Professor Emeritus, having retired as Head of the Botany Department of the University of British Columbia in 1968.

He describes ninety-seven species in detail; each description is supplemented with a line drawing, showing distinctive features, and a map covering the distribution of each species. The author provides information on habitat, range, and rarity and advises the gardener on species adaptable to garden culture. The subject matter is arranged in alphabetical order by family, genus, and species.

This volume is highly readable, and will provide a useful reference for professional botanists, naturalists, horticulturists, and all individuals that have a special interest in temperate ferns or their allies.

Appendix I, covering chromosome counts, will be of special interest to professional botanists, and Appendix II covering distribution patterns will be valuable to all fern enthusiasts. The glossary of fern terms is quite extensive and should enhance the value of the text.

NEILL D. HALL

In the Spring issue of the BULLETIN the author and publication data in a book review were inadvertently left out in the printing process. The full data is as follows: SECRETS OF PLANT LIFE by Marcel Sire. Viking Press, New York, 1969. $19.50
Recent Additions To Our Book Shelf

Is there room on your gardening shelf for a new book? Are you interested in some arm-chair gardening? The Foundation Book Committee announces recent contacts which make the following books printed in England readily accessible for Foundation readers:

Addressed mainly to the beginner, this book contains much information about the history of camellias, describes species and hybrids, includes lists of popular varieties in England and America and gives cultivation notes for the district, site and soil in which they are to be grown.

Bagust, Harold. MINIATURE GERANIUMS. John Gifford, Ltd., 1968. 99 pp. $3.75
This book presents an interesting discussion of horticultural requirements of 2” - 8” or 9” geraniums, propagating techniques, soils, fertilizing, pests and diseases, delightful line drawings and color illustrations as well as lists of varieties and suppliers.

This book contains interesting descriptive and cultural data of some of the well-known climbing plants as well as some rare and unusual material. Fourteen line drawings and thirty-four excellent black and white illustrations add interest.

Sub-titled "Hardy Perennials in Their Natural Environment", this book details growing a variety of hardy plants that flourish in moist soil, with an emphasis on sufficient moisture as distinct from water or bog gardening. Based on the author’s experiences in his own garden, the book also contains a comprehensive and descriptive list of plant material for shade and moisture requirements.

Fogg, H. T. Whitham. SEE HOW THEY GROW. Charles T. Branford Co., 1964. 100 pp. $4.50
"Every seed is an adventure and an act of faith in the future," says the author in relating in word and picture how to get some familiar as well as unusual plants to germinate and grow. Emphasis is on window-sill and living room gardening, including a short discussion of bottle gardening, hence the book will have special interest to apartment dwellers or those whose gardening is confined to indoors.

Genders, Roy. THE POLYANTHUS, ITS HISTORY AND CULTURE. Faber - Branford, 1963, 231 pp. $7.25
Development, culture, hybridizing and exhibiting are described in detail in this book devoted entirely to Polyanthus. It is well illustrated with 45 black and white photographs and 1 color overplate.

Hecker, W. R. AURICULAS AND PRIMROSES. Charles T. Branford Co. 216 pp. $9.95
A comprehensive survey of Auriculas and Primroses with historical data, full information about cultivation, exhibiting, propagation, pest control and treatment of disease, this book will be a reference for novice and specialist alike. It is beautifully illustrated with over fifty photographs, twelve of them in color.

This is a practical and comprehensive book on requirements and cultivation of hardy bulbs written by a leading English bulb grower. It contains 33 illustrations, mostly black and white. It includes much information about species bulbs as well as hybrid varieties.

Enjoying Your Garden. John Gifford, Ltd., 1970. 190 pp. $4.25
The importance of varied types of foliage, bark and form, of choosing good plants all are charmingly discussed as the author shares his personal gardening experiences, his joy of birds in the garden, and his favorite gardening literature.

Originally published in 1957, this revised edition again makes available a book concerning itself with color in bloom, berry, foliage and form of trees, shrubs, plants and bulbs for enjoyment in a winter garden. Eight full-page water color prints and 52 black and white line drawings delightfully illustrate the book.

Welch, H. J. DWARF CONIFERS. Charles T. Branford Co., 1966. 334 pp. $15.00
Superbly illustrated by more than 300 photographs and written from personal knowledge of the author, this book will be a valuable aid to identification and cultivation of most forms of commercially available dwarf conifers.

Yashiroda, Kan. BONSAI, JAPANESE MINIATURE TREES, THEIR STYLE, CULTIVATION AND TRAINING. Faber-Branford, 1960. 166 pp. plus special section of 100 plus photographs. $6.25
Written by a Japanese expert who has demonstrated at Brooklyn Botanic, this book covers growing bonsai from seeds, cuttings, grafts or collected plants in all traditional styles.

Other books may soon be available. If you are interested, contact any of the members of the Book Committee or call EA 5-1625.

Doris Butler

Notice

The American Horticultural Society is having its 50th anniversary meeting in Seattle at the Olympic Hotel on September 5th to the 10th. Displays will be at the Pacific Science Center.

A Bonsai Show will be held at the Art Museum Pavilion in the Center, September 7th thru the 10th. Museum hours — open Friday evening. Preview at 3:30 on Wednesday, September 6th. Regular admission $1.00, students 50c.
Trees
(continued from p. 16)

street: A comparison of tree improvement in forestry and horticulture. Sixth Central States Forest Tree Improvement Conference, Proceedings, P. 1-5.


Mulligan Retirement
(continued from p. 13)

he was given a Gold Medal by the Massachusetts Horticultural Society. In 1971 he was given the prestigious Veitch Memorial Gold Medal by the Royal Horticultural Society for service to horticulture generally. Also in 1971 the Seattle Chapter of the American Rhododendron Society awarded him their Bronze Medal—the highest award given by a chapter.

As he begins his retirement he will continue to work on a checklist of plants in the Arboretum. We wish him well in future activities.

GORDON D. MARCKWORTH

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FOUNDATION OFFICERS
1972-1973
L. to r.: M. Chris Johnson, Vice-President; Mrs. Allan D. Moses, Vice-President; Dr. Giacomo Pirzio-Biroli, Vice-President; John A. Putnam, President; Mrs. Moritz Milburn, Vice-President; Mrs. John S. Robinson, Secretary; and Donald C. Davis, Treasurer. Photo by: Joy Spurr
That Flower Thing in the Spring, the twenty-fifth annual Foundation Plant Sale, was successful beyond all expectations! The combination of months of planning, hundreds of dedicated workers, perfect weather, fine plant material and cooperative buyers resulted in profits nearing $16,000.00. The Arboretum will benefit greatly this coming year!

The response to last year's fall bulb sale indicated that Foundation members were eager for hard-to-get unusual bulbs. The 1972 bulb list, mailed recently to all members, includes the most popular of the bulbs from last year's list plus more species crocus, special colors in anemones, more species narcissus and tulips and a section on bulbs for forcing. Mark your list and send in your order early! If you did not receive a list and wish to have one, please call EA 5-4510.

Jeanne Gardiner

Curious about your own back yard?

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