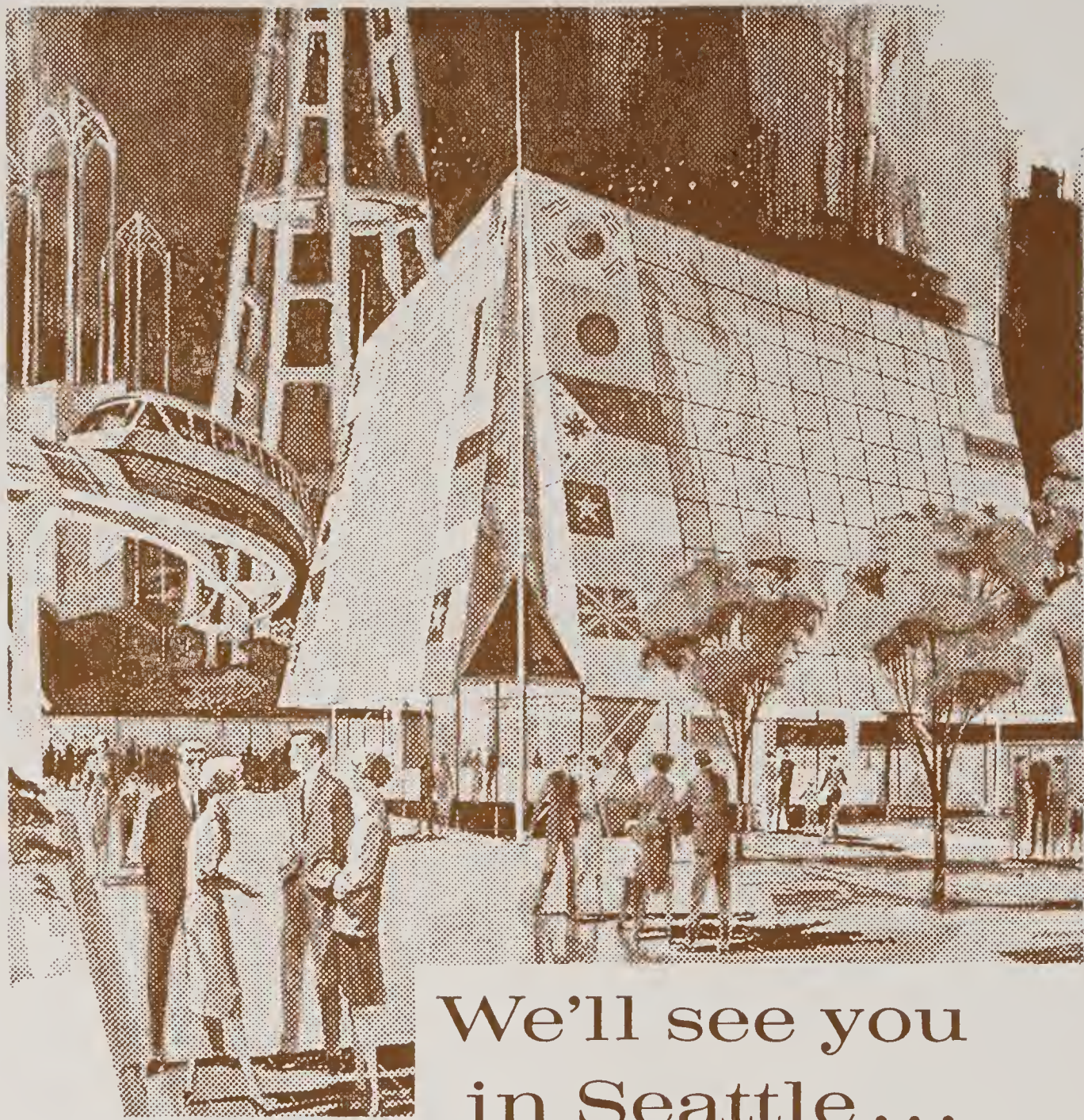




THE UNIVERSITY OF WASHINGTON

Arboretum
bulletin

WINTER
1961



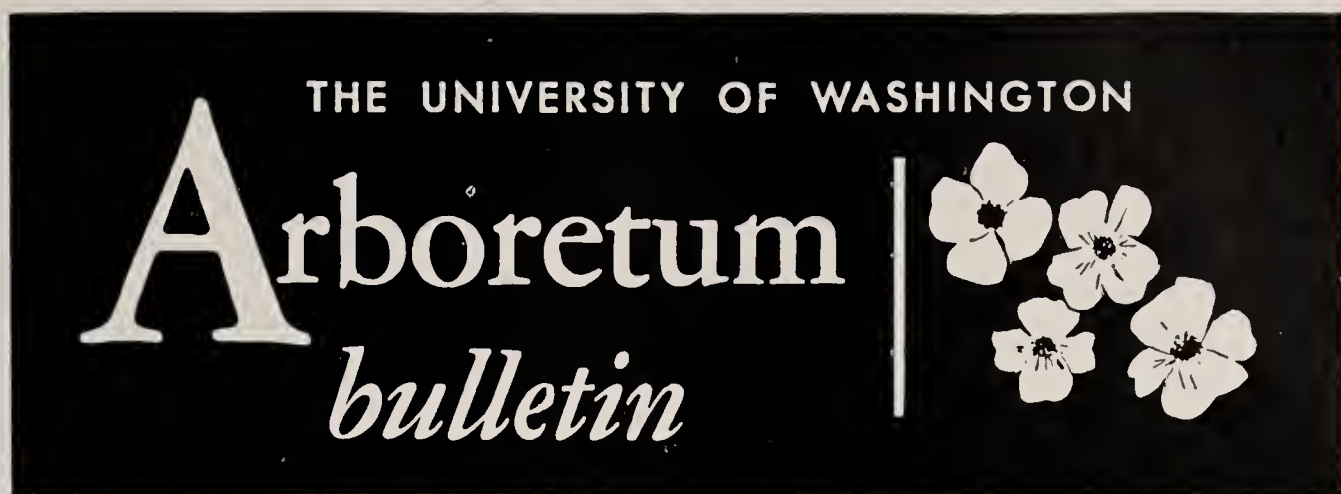
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COVER—*Ilex Pernyi* var. *Veitchii*
 PHOTO BY: WM. ENG

The Arboretum; Summer & Fall, 1961

B. O. MULLIGAN

AS IS USUAL during the months June through September most of the efforts of our small staff were devoted to the maintenance of the grounds,—by weeding, watering and mowing in particular.

An exceptionally wet May, with 3.07 inches of rain instead of the normal 1.61 inches, greatly stimulated growth of both weeds and grass, which were likewise much encouraged by the warm, dry weather of June and July, thereby creating serious problems, especially in weeding, which were not solved until near the end of the growing season.

The northern half of Azalea Way, the upper part of the south bank of Rhododendron Glen and the adjacent camellia garden have all recently been cleaned and the beds mulched with partially decayed leaves.

During August, when the soil was steadily becoming drier, the opportunity was seized to thoroughly overhaul the land drainage system in a wet area between Azalea Way and the Garrett memorial planting, immediately north of Rhododendron Glen. Here some 500 ft. of old drains were dug out, cleaned and relaid, and 600 ft. of new drain tiles laid, covered to the soil surface with washed gravel. Another small area adjacent to the pond at the foot of Rhododendron Glen was treated similarly; we expect a marked improvement in the soil conditions here in the future as a result of this work, for which 66 yards of gravel and 600 drain tiles were required. However, there will undoubtedly be more of the same tasks to be done in nearby locations during the next few years, as the 25 years old drains gradually become choked. Wooden covers to many of the drain sumps were also replaced by heavy steel grids.

Much attention was paid to the Japanese garden, which attained its first anniversary in June and has attracted a very steady stream of visitors all summer and into early autumn.

A number of maple trees (the European *Acer campestre* as well as our native *Acer macrophyllum*) which had evidently died from waterlogging of the soil following disturbance and compaction by the bulldozer in the spring of 1960, with unusually heavy rainfall following from January through May this year (total 23.79 ins., 8.33 ins. above the normal), had to be removed, both from the east side near the gate and at the south end outside the fence.

A mulch of 40 yards of treated Douglas fir bark was spread over most of the cultivated areas at the north end and on the west side; the lake was cleaned of algal growth, cat-tails (*Typha latifolia*) and other weeds in and around it, and silt removed from the stream flowing down from the hill above.

During late September and early October a new gate was installed at the south end of the garden, of similar design to the original, being again constructed by Mr. Sad Ishimitsu, of Seattle. The approaches, supporting fencing for the turnstiles, and landscaping were all designed and constructed by the Physical Plant Department of the University. This gate was opened to the public on October 13th. An attractive stone vase enclosing a drinking fountain has been erected by the original gate; another will be placed near the south entrance, which is much nearer to the principal car park by the Madison St. playfield.

At the north end of Arboretum Drive very useful filling of an old excavation beside the entrance was accomplished, which will both provide more parking space near the club house and also permit some planting on and below the bank at the rear.

The office roof has been rejuvenated by a new covering of composition roofing; the outer walls of this structure, as well as the service building behind it and the center portion of the greenhouse block have all been

repainted a light green tone, while the interiors were done during late October. The signs on the buildings have been replaced by new ones. All this work, by the University's crews from the Physical Plant Department, has much improved our appearance for the visitors expected at the World's Fair in Seattle next spring and summer.

A weed killer was sprayed on all the large grass areas during September, and Azalea Way later treated with a mechanical aerifier to permit better penetration of air and moisture.

Acquisitions

168 items were entered in our records from June 1 through October 31. Of these, 82 were seeds, the remainder either plants or cuttings.

Amongst the seeds were 14 packets of native trees or shrubs from the Municipal Botanic Garden, Buenos Aires, Argentina; 12 of *Rhododendron* species collected in the Himalaya, sent us by Mr. John C. Wister of Swarthmore, Pennsylvania, and 26 packets of woody plants from northern California and southern Oregon, personally collected by Mr. Carl S. English of Seattle.

The plants included 27 conifers purchased for the Japanese garden (9 *Chamaecyparis*, 18 junipers), 12 young Carolina hemlocks, apparently not previously represented here, small plants of *Forsythia* 'Karl Sax' and 'Beatrix Farrand' from the Arnold Arboretum, collected seedlings of *Acer glabrum* var. *Douglasii* and *Larix occidentalis* from the Cascade Mountains in Washington, one plant each of five new *Camellia japonica* clones from Mr. J. A. Buzard of Bellevue, Washington, and bulbs of six kinds each of daffodils and lilies to brighten some of our beds in early spring and midsummer respectively.

Notable amongst cuttings received was a collection of nine species and four hybrids of *Buddleia* from the Central Experimental Farm, Ottawa, Canada. Most of these have now given us some rooted plants, thereby much increasing our collection of these shrubs.

Some books added to the library during this period have been: *Experimental Control*

of Plant Growth, by Dr. Frits W. Went, (Ronald Press, New York, 1957); *A California Flora*, by Dr. P. A. Munz and Dr. D. D. Keck, (University of California Press, Berkeley, 1959); *Handbuch der Laubgehölze*, parts 9 & 10, by Gerd Krussmann, (Paul Parey, Berlin); *Vascular Plants of the Pacific Northwest*, part 3, (Univ. of Washington Press, Seattle, 1961); *Trees, Shrubs & Woody Vines of the Southwest*, by R. A. Vines, (Univ. of Texas Press, Austin, 1960), donated by Dr. and Mrs. David Metheny of Seattle, and *Designing Japanese Gardens*, by Katsuo Saito, (Gihodo Co. Ltd., Tokyo), a gift from Mr. J. Iida of Tokyo, architect of our own Japanese garden.

Plants Distributed

From a list of 57 items of surplus plants sent out to members of the American Association of Botanic Gardens and Arboretums in September, 37 requests were received and filled, so far as possible, during October and November.

Forty-six other lots of seeds, scions and plants have been distributed between June 1st and October 31st. Some of the recipients have been: The Royal Horticultural Society's Gardens, Wisley, Surrey, England; Royal Botanic Gardens, Kew, England; National Botanic Garden, Dublin, Ireland; Director of Parks, Canberra, Australia; Morris Arboretum, Philadelphia, Pa.; University of Minnesota, Dept. of Horticulture, St. Paul, Minn.; Utah State University, Logan, Utah; Strybing Arboretum, San Francisco, California, and the Parks Dept., Victoria, B. C. Such exchange between similar institutions is a fruitful and valuable source of new material and we are glad to be able to play our part in it.

Gifts Received

Arboretum Unit Council,	
for new lath house.....	\$700.00
Arboretum Unit #19,	
for the Sawyer memorial.....	135.00
Arboretum Unit #33, for maintenance.....	50.00
Arboretum Unit #37, for library.....	50.00
Arboretum Unit #39, for maintenance.....	250.00
Arboretum Unit #59, for maintenance.....	31.50
Arboretum Unit #61, for any purpose.....	25.00
Amateur Gardeners,	
for Williams Camellia garden.....	82.77
Evergreen Study Club, for any purpose..	25.00

Mercer Island Garden Club, for the Winter Garden.....	75.00
West Seattle Garden Club, for Woodland Garden.....	150.00
Washington State Conservation Society, for holly grove.....	329.59

Education

A professional course for elementary school teachers was held in the Arboretum club house at weekly intervals from September 19, comprising six lectures of two hours each and a field trip. Subjects studied included elementary botany, native plants, birds, aquatic biology and a survey of the Arboretum and its functions. Mr. Witt, Assistant Director, was responsible for the success of this course in cooperation with Mr. John Putnam of the Seattle Public Schools.

An exhibit of more than eighty different kinds of conifers, many with cones, with a few representatives of the Yew family (*Taxaceae*), was set up in the Arboretum Club House the week end of November 11-12.

Facts & Figures

(a) The Arboretum Budget

This, which is derived from the College of Forestry's budget, totalled \$173,800 for the biennium July 1, 1959 to June 30, 1961. Of this amount \$154,550.00 (89%) was expended on salaries and wages, the balance of \$19,250.00 on all other requirements. These included new equipment, supplies of all kinds, services (lighting, heating, telephone), etc. The balance at the end of the biennium was \$614.77.

For the current biennium we have been allotted \$187,560.00; salaries and wages have been increased by \$11,260.00 to \$165,810.00, all other expenditures by \$2,500.00.

The permanent staff numbers fourteen, of which three are in the office, the remainder outside.

(b) Attendance at the Japanese Garden

June	11,195	July	11,810
August	12,925	September	8,646
October	5,248	Total	49,824

(c) Traffic Count at North Gate

	1961	1960	1959
June	15,316	14,420	14,828
July	13,386	13,725	13,169
August	11,272	9,606	10,722

September	8,771*	9,217	8,512
October	11,219**	9,585	10,230
Totals	59,964	56,553	57,461

(d) Telephone Enquiries for Information

	1961	1960	1959
June	206	286	120
July	183	229	79
August	177	189	109
September	137	175	137
October	133	182	143
Totals	836	1,061	588

2nd Lake Bridge & Interchange

Work on the 2nd Lake Washington bridge is proceeding steadily on the east side of the north end of Foster's Island. The roadway will cross it at this point, from east to west, with a right-of-way 200 feet wide.

Contracts for the Arboretum Interchange are likely to be let before the end of the year. This will occupy most of the land north of Lake Washington Boulevard between Miller and Roanoke Streets, excepting a narrow strip immediately behind the row of Simon poplars.

The collections of quinces, crab apples, rose species and mountain ashes, planted from April 1948 onwards, will consequently be eliminated from this area, although some will be removed to the University Campus and a few to other locations in the Arboretum.

Mr. Glen Hunt has been appointed as landscape architect by the State Highway Department to work out plans for future landscaping within and around this complex of roads.

Miscellaneous

The Director attended the Western Chapter, International Shade Tree Conference at the University of British Columbia, Vancouver, June 20-23, and the Northwest Regional meeting held at Washington State University, Pullman, October 21.

Mr. J. A. Witt, Assistant Director, went to the International Shade Tree Conference at Minneapolis in August, and subsequently

*road closed for one week

**high figure due to five Sundays in month and good Fall color.

(Continued on Page 127)

Hollies in the Arboretum, Revisited

J. A. WITT

NINE years ago Mr. B. O. Mulligan's article, "Hollies in the Arboretum" (ARBORETUM BULLETIN, Winter 1952, p. 17) appeared in this BULLETIN and constituted the first report on the then two and one-half year old holly collection near the south end of Arboretum Drive North. We now take this opportunity to report on new plantings, how the collection has fared through the intervening years, and some further evaluation of the plants.

The collection has grown from twenty species, thirty varieties and five hybrids to twenty-six species, sixty-eight clones and seven hybrids, the main additions being among the *I. Aquifolium* clones. Several other species and varieties now in the lath house or nursery are awaiting planting, including several yellow fruited forms of the American holly, *Ilex opaca* var. *xanthocarpa*, and the Japanese *Ilex Sugeroki*. The new bed reported in the 1952 article is now fully planted and is joined with the area below and west of the main collection where there are a number of plants in the grassy area. These are largely the English holly, *Ilex Aquifolium*, or its hybrids.

The collection has grown well, and despite the very severe winter of 1955 very few plants were killed, although many were cut back to some extent. The November 1955 freeze took three of four *Ilex chinensis*, *Ilex rotunda* from Japan and Korea, *Ilex vomitoria*, Yaupon, from the southeastern U.S.A., and one plant of *Ilex glabra*. Several Chinese hollies, *Ilex cornuta*, were very badly damaged, together with *I. Cassine*, Dahoon, *I. opaca* 'East Palatka,' and several of the *I. altaclarensis* clones.

On the credit side many of the plants have made very notable growth, particularly the *Aquifolium* and *altaclarensis* forms, and several of the other species have grown exceptionally well. Recent height measurements

show this very clearly. At the end of twelve and one-half years some of the plants were very close to twenty feet tall. Below is a selected list of heights demonstrating their growth rate. All of these reported were less than six feet tall when put out in 1949:

<i>Ilex Aquifolium</i> 'Angustifolia'	.....14'
" " 'Bacciflava'	.....16'
" " 'Variegata'	.....11'
" <i>altaclarensis</i> 'Shepherdii'	.....18'
" " 'Camelliaefolia'	.....16'
" <i>chinensis</i>	.....19'
" <i>ciliospinosa</i>	.....16'
" <i>opaca</i> 'Merry Christmas'	.....16'
" " 'Hampton' (planted 1952)	.....13'
" <i>pedunculosa</i>	.....18'
" <i>Pernyi</i>	.....14'

Our records show that the tallest plant in the collection, *I. chinensis*, has grown nine feet since October, 1955—a very respectable rate of eighteen inches a year.

Many of the plants are now reaching a stage where we can pass some judgment as to their ability to perform here. The north bed which was most recently planted has relatively few specimens worthy of mention although a six or seven foot specimen of *Ilex Aquifolium* 'Handsworthensis' planted in 1954 is showing considerable promise. It has relatively small spiny leaves, purple wood and large clusters of bright red, medium sized fruit.

A very interesting pair of hollies is growing at the south end of this bed, *Ilex Pernyi* var. *Veitchii*, planted in 1952 and now about ten feet tall, with a loose habit and small, few-spined, oval leaves arranged flatly along the thin branches. The fruit is large and dark red held tightly to the underside of the leaves. Generally speaking, it is most unlike *I. Pernyi* but was identified for us by Arnold Arboretum.

In the grassy area south and west of the main collection we find a very striking group

of three bold-leaved plants which had their tops cut out by the 1955 freeze but are now about eight feet tall. They have a dull green, broadly ovate leaf with few to many spines, quite obviously veined on the upper surface. We received these as *I. Perado* var. *platyphylla* but feel that they are most likely *I. altaclarensis*, the presumed child of a marriage between *Ilex Aquifolium* and *I. Perado* var. *platyphylla*. To date they have not fruited but have such good foliage that it doesn't really matter.

Some very interesting foliage variations may be found in the bed containing the English holly varieties. At the south end a group of the slender *I. Aquifolium* 'Angustifolia' have reached nearly 15'. These probably have the narrowest habit of any of their type, even the leaves are narrow and long, dark green and few spined. They are female, but produce fruit only rarely. More free fruiting are

the yellow-berried hollies, *I. Aquifolium* 'Bacciflava,' growing to the north. These appear to be the normal type of English holly until the fruits ripen in November, then they take on a golden hue from the large clusters of bright yellow fruits. There are silver and golden variegated forms including the ferociously armed variegated hedgehog holly, 'Ferox Variegata,' of which we also possess the green-leaved form. To the west in this bed the smooth, shining leaved 'Jan van Tol' (or 'J. C. van Tol') has developed into a spreading specimen of open habit beset with handsome dark red fruit.

Directly south we find the bed devoted largely to the *Ilex altaclarensis* group, containing several outstanding varieties. The

Below:

Ilex X Altaclarensis 'Shepherdii'
in fruit.

FIG. 12

PHOTO BY: WM. ENG



tallest is a pair of the clone we are calling 'Shepherdii' although there is some dispute as to its correct name—it might well be 'Hodginsii.' Regardless of nomenclatural difficulties, they are most striking, with large shining green leaves, erect habit and quantities of large bright red fruit (fig. 12). The 'Camelliaefolia' group is not quite as tall but has larger leaves, three to five inches long, armed with a very few spines. The fruit of this cultivar is very large and somewhat darker red than most. With its shapely pyramidal shape and lustrous foliage it must be considered among the most ornamental of its type.

West of this bed is another planted to the oriental hollies, largely species though a few hybrids are included. *Ilex ciliospinosa*, a

Below:

Ilex crenata var. *Mariesii*, fruiting branch.

FIG. 13

PHOTO BY: CAMPUS STUDIOS

western Chinese holly growing here, has small, stiff flattish evergreen leaves set with a few weak spines, and an open semi-pendulous habit. Our plants unfortunately are male so we shall not see the fruit until we find a female companion.

One of the more unusual hollies in our collection is growing nearby. This is *Ilex latifolia*, from Japan, which is developing slowly into a large shrub. The foliage is much like a cherry-laurel, large and thick with a dull green color. It is not fruiting this year but has in the past, when it produced tight clusters of brick-red fruits at the ends of the shoots. Another spineless holly, *Ilex integra*, is also found here and is slowly developing into tree form. Our plants, with shining green leaves, are all male but we have a female in the nursery ready to join them soon.

The bed containing the various clones of

(Continued on Page 126)



Propagation Of Holly

J. HAROLD CLARKE*

AS IS TRUE with most woody plants, hollies can be propagated by seed, layering, cuttings and grafting, although nearly all commercial propagation is by cuttings. The other methods, however, have just enough importance to warrant their inclusion in a general discussion of the subject.

Practically all plants can be grown from seed and hollies are no exception, but the seeds, at least of the tree hollies, are hard coated, and many will take two years to germinate. The seedlings will vary considerably and may be quite unlike the tree from which the seed came. Figures reported for the native eastern holly (*Ilex opaca*) indicate that more than half the seedlings will be male and hence will produce no berries, although it is impossible to tell the sexes apart until the trees are old enough to bloom. It would seem best, therefore, to leave seed propagation to the plant breeders or those who are engaged in some phase of research.

Layering of low-hanging branches is not difficult but the resulting plants will, for a while, lack the symmetry which makes the young holly tree so attractive. This would be a way to obtain a start from a neighbor's tree where no one involved has facilities for, or interest in, the growing of cuttings.

Cuttings provide a relatively easy, rapid way to obtain plants genetically identical with a desirable form or variety, provided a few small twigs may be snipped off, if necessary in an inconspicuous place so the original tree need not be disfigured in any way.

Late fall or early winter is the usual time for making holly cuttings although I suspect a good propagator could find wood which would root during a large part of the year. Our own procedure has been as follows. We take mature tip cuttings, preferably from

fairly vigorous growths at the outer tips of the branches, although shoots inside the tree, or near the ground, may be used if it is important not to mar the appearance of the plant. The cuttings are made about four inches long and all leaves stripped off except two or three at the tip. We then wound the base of the cutting by slicing the bark from one side, extending about an inch from the base. This is done by making a quick scraping stroke with the blade of the pruning shears immediately following their use to shorten the cutting to the desired length. After a little practice, cutting off the unwanted part of the twig and making the wound becomes almost a single operation. Most cuttings would root without the wound but it exposes more cambium tissue and roots tend to come out along the stem rather than just at the base.

The use of a root-inducing hormone, like wounding, is not entirely necessary, but tends to give better and more rapid rooting. We use a home-made preparation containing .8% indole butyric acid in talc, essentially the same as Hormodin No. 3. The base of the cutting is dipped in the powder, the surplus flicked off, and the cutting placed in the rooting medium. Other hormone materials, liquid as well as powder methods of application, have been used successfully by others.

As a rooting medium we have used straight sand and straight peat, as well as a mixture of about half and half sand and peat. Rooting has been reasonably good in each of these media but the sand and peat mixture would probably be the most satisfactory.

It is important to keep both medium and air relatively moist during the rooting period. This is done on a large scale with a mist system, or on a small scale by covering the propagating bench or box with polyethylene sheeting. It is also advisable to use bottom heat, usually an electric heating cable, to maintain

*Of Long Beach, Washington. President, American Rhododendron Society, author and nurseryman.

the temperature of the rooting medium near 70°F., until roots have formed.

For the gardener with a greenhouse growing holly cuttings offers no great challenge. Lacking that equipment a plastic-covered box in the kitchen window or in the basement may be used but it will be more difficult to control moisture and temperature. Hollies are sometimes propagated commercially in cold frames and there is no reason the home gardener cannot do likewise. For a cold frame it would be advisable to take the cuttings as early as possible, August or even early July or as soon as the tip growth has matured beyond the soft, actively growing condition. Prepare the cuttings as previously indicated, insert in the medium, water in well and then put on a tight sash or plastic cover. The frame should be at least partially shaded and of course should have been built in such a way that it is well drained so that it can be wet down thoroughly without danger of waterlogging. Some cuttings will probably root before winter, some the following spring, but all might be left in the frame until the following fall before planting them out in a nursery bed in a reasonably protected place.

Presumably the readers of this article will be most interested in varieties of English holly but the above directions should be satisfactory for any of the evergreen, tree-type hollies. Deciduous types, rare here, would be grown from seed, as a species rather than a clone, or from hardwood cuttings taken in late winter, or softwood cuttings taken in early summer. The shrubby hollies, of which there are a number, may be grown from cuttings taken during mid- or late summer. There are some variegated types which tend to sport back to the solid green leaves. With such plants, one must select the cuttings somewhat carefully to maintain the pattern of leaf variegation desired.

In years gone by desirable varieties were occasionally propagated by grafting or budding on seedling understocks. This is not very difficult, using budding or grafting methods

normally employed for fruit trees, but it is considerably more bother than making cuttings, and there is always the chance of the scion breaking out and the seedling understock taking over.

The one place where grafting would be useful is in changing over a tree already in the landscape, to make a berry-bearing tree out of a male, or possibly to graft in a few male branches in order to provide pollen, more quickly than could be done by planting a male tree. Before grafting in pollinizers it would be well to be sure the tree is a female that blooms but fails to set fruit because there is no male tree in the neighborhood. In many Northwestern residential areas there are already many holly trees with a scattering of males, enough to supply pollen for the entire neighborhood.

One of the reasons I like a holly tree is its lush symmetry which top-grafting will spoil for several years, if not permanently. Therefore I would in most cases seriously consider planting a tree of the desired variety rather than working over one already established.

Where top-working does seem to be desirable the methods are essentially the same as for fruit trees. If the need is for a pollinizer, budding or whip-grafting can be used out near the tips of the branches to insert a few pollen-bearing twigs without materially altering the general conformation of the tree. If the tree is a male and berries are wanted it would be a big job to insert enough such grafts to change over the tree without making it look unsightly, at least for a few years.

A small tree may be changed over completely by cutting off its main trunk and putting in a cleft graft from which a whole new top may be formed. With a larger tree cleft grafts may be set in the larger limbs as well as the main trunk. A few smaller branches may be left to provide leaf surface for a year or two, before they are removed to complete the "changeover."

The cleft graft is usually made in limbs from one to three inches in diameter, sawed

squarely off where the graft is desired. The stub is split with a grafting tool, or a chisel, and the cleft opened with a small wedge. The scions, usually two to a stub, are one-year twigs of the desired variety, about five inches long with a bud and a leaf at the tip. The base of the scion is wedge shaped, a bit thicker on the outside as inserted into the cleft. The scions are usually at a slight angle to insure contact of the cambium layers (lying between the bark and the woody cylinder). A liquid or soft grafting wax should be used to cover the exposed wood of the stub, sealing

well around the inserted scions. When grafting evergreen material such as holly it will help materially to cut down water loss from the scion if a plastic bag is put over the graft and tied tightly to the stub. The bag and ties should be removed as soon as it is evident the graft has "taken." Such top-working will have the best chance for success if carried out during early spring, just before growth starts. The scions should be dormant, even if it means keeping them in a plastic bag in a refrigerator for a few days until time can be found to complete the job.

Holly Propagation for Amateurs

DR. A. G. ZOET*

THIS is the story of a rank amateur who struck it rich. For the amount of time devoted to the propagation of holly, and incidentally many other broadleaved evergreens, we face the same fate as the fabled Sorcerer's Apprentice. Right now the nursery area is full; we need a new lathhouse; we need more time for our hobby (avocation). Our experience goes back about five years, when the holly project was recovering from the 1955 cold snap. Anyone working with plants has vivid memories of that year. Our final losses totalled about 50% of the planting. We felt that the surviving stock would be the best possible source of cuttings for replacement and future expansion. Therefore, we had to learn another skill if our planting was to develop properly.

Our first good bit of advice came from the Arboretum nursery. Among other things, we were introduced to "Plant Propagation Practice" by J. S. Wells.** Certain adaptations were made for our immediate problem, and these may be pertinent to any person who is interested in propagating woody plants from cuttings. Cost was a very definite item. A hothouse arrangement was not feasible at the

time, so we approached the problem as an interesting variation on techniques we had seen in use.

The materials used are very simple and readily available. The frame is a 3 by 6 foot affair, made of 2 by 12 inch cedar. This is sunk into the ground six to eight inches in an area which is quite well drained. The excavation is continued a couple of inches deeper, and the area is filled with a layer of sawdust to the lower edge of the frame. This allows efficient drainage as well as providing insulation for the propagating bed. The heat cable is placed on this surface.

A lid built on a 2-by-2-inch frame fits the structure beneath. Hardware cloth is tacked on with polyethylene sheeting used as a cover. The cloth serves both as a support and as a sort of water distribution system and rain maker when the box is in operation.

We use a 2½ watt heating cable, 40 feet long, as a source of bottom heat. This allows a heating pattern about six inches apart, and is adequate even though the outside temperature drops as low as 10 degrees F.°.

Coarse sand, or a combination of ⅓ part peat moss and ⅔ coarse sand is used as a rooting medium. A couple of handfuls of fritted trace elements are added to the mix-

*Dr. Zoet is a keen and observant amateur holly grower in Bellingham, Washington.

**Macmillan, New York (1955)

ture. Once the medium is in place and levelled, a fairly heavy layer of Captan is dusted on to keep the molds under control.

Since we have no running water, a gas drum has to serve. However, any leaky faucet would be an equally good source of water. (I am not conversant on the effects of chlorine in city water supplies.) A lawn soaker is an ideal distribution system within the box. Water is allowed to run at a fairly fast drip, roughly about 120 drops per minute at first, though 60 proves adequate later. The warm sand gives a good evaporating surface and the hardware cloth plus polyethylene top form a condensing surface so the cuttings are in a miniature climate of warm sand and a steady warm rain. This is the reason we insist on a flat lid rather than a traditional

sloping one. With good drainage, there is no accumulation of water to encourage rotting. In general, this process is kept going for about 2½ months. After this, the water is shut off and the box is soaked via a sprinkling can once or twice a week.

Cuttings are taken mainly during October. Semi-hard growth from rapidly growing trees is ideal. Cuttings are three to five inches in length with all but 2 leaves ripped off and then wounded. As a rooting hormone we have used 2% IBA, though we know Hormodin #3 (0.8% IBA) and Rootone #10 also are effective. The last two are readily available commercially. The past year we used traces of boron, but this didn't make too much difference in the strike. The 3 by 6 foot frame accommodates about 1000 holly cuttings.

(Continued on Page 125)

Holly in Washington

GEORGE W. EADE*

ONE of the most important horticultural specialty crops in western Washington is Christmas Holly. It is estimated that commercial holly growers harvest and ship approximately 400,000 lbs. of holly greens for the Christmas season, produced on approximately 500 acres. However, an additional 250 acres will be in production in about 7 years.** In addition to the commercial plantings some holly is obtained from trees and hedges used ornamentally in home plantings.

The species used for the production of Christmas sprays and wreaths is English holly (*Ilex Aquifolium*). This group includes a number of varieties and some variegated forms. Because of its attractiveness the silver variegated type usually brings a higher price per pound, even though berries are generally fewer than on the green forms.

English holly does well in areas where the

summers are cool, the winters mild and where the humidity is relatively high. Most of our western low valley areas and particularly the Puget Sound region has nearly ideal climatic conditions for the production of English holly.

Sites selected for holly growing should be protected from strong, drying winds; the preferable soil is a deep, fertile, well-drained orchard type for best growth and production. However, holly will grow on a wide range of soil types of high and low fertility. A commercial planting should not be attempted on marginal tree land as growth will be slower and production of quality cut holly will be limited.

Insects injurious to holly are holly bud moth, holly leaf miner, scale insects and aphids. Information about these pests and their control can be obtained from Mimeograph Circular No. 98; Western Washington Experiment Station, Puyallup, Washington. Title of this circular is *Holly Insects and Suggestions for Their Control*, by E. P. Breakey, Associate Entomologist.

*Chief Nursery Inspector, Washington State Dept. of Agriculture

**Data on production and acreage supplied through courtesy of Mr. E. D. Mann, Washington Holly Growers.

Arboreta and Gardens of N. W. Europe; part 4

B. O. MULLIGAN

FROM DUBLIN it is a short overnight journey by steamer to Holyhead, at the extreme northwestern corner of Wales, and thence by an excellent train, bound for Crewe and London, an hour or so to Llandudno Junction, where any lover of gardens will promptly descend and by bus or taxi proceed a few miles up the Conway River valley to Bodnant, the famous and beautiful garden originally laid out in 1875 but much extended and improved by the late Lord Aberconway (the second baron) during the first 40 years of this century. This, since November 1949, has been under control of the National Trust, like many other lovely old houses and gardens in England and Wales, and is open to the public regularly and frequently during the spring and summer months. It should on no account be missed by anyone touring British gardens, since it contains so many elements of the greatest of these—a superb site, most effective landscape treatment, magnificent old trees as background, and a collection of the finest of plant materials carefully distributed in a wide variety of appropriate settings.

One of the principal features is the series of terraces descending down the hillside from the house. Each is treated differently and forms a garden in itself, enriched by skilfully placed trees and shrubs, or by pools or canals of water confined within rectangular stone borders.

An immense *Cedrus atlantica* 'Glauca' hangs over one of these, spreading its branches like a skirt on the surrounding grass. At one end of the canal terrace stands the 18th century stone pin mill, transported and re-erected on this site in 1938, while at the other is a raised outdoor stage, the wings formed by hedges of clipped yews, with an immense Monterey pine squarely behind it and on either side splendid specimens of the upright, green Lawson cypress ('Erecta Viridis') with

clumps of hydrangeas at their bases.

For spring visitors three groups of shrubs (or trees) are most prominent and especially favored, — magnolias and camellias, mainly grouped down the slope west and south of the house and considerably shaded by beeches and other large trees, and rhododendrons, distributed in many areas but perhaps most happily sited on the steep, partially shaded hillside, with the large-leaved species on the cooler and moister floor of the valley.

Here are to be seen and admired the magnificent old conifers, many planted in the 1870's and now 100-300 feet in height, including Douglas firs, giant sequoias, redwoods, western hemlock, grand fir, Colorado fir, and, much less common in cultivation, the Santa Lucia fir of southern California, *Abies venusta*; most of these except the last had trunk diameters of 3-3½ feet. A much younger specimen (about 35 feet tall) of the Chinese hemlock, *Tsuga chinensis*, was bearing cones; two other conifers of more than usual interest were *Taiwania*, from Formosa, planted in 1926 and now about 22 ft. in height, and the more recently introduced *Metasequoia*, the dawn redwood of central China, about 18 ft. One of the loveliest trees in this enchanting valley, however, is a birch, *Betula albo-sinensis* var. *septentrionalis*, native of W. China, possessing, in older specimens, a smooth orange-brown bark as ornamental as any madrona.

Next day, August 17th, I continued by train to London, staying for several days in a South Kensington hotel, a convenient base for visiting the Royal Horticultural Society's offices in Westminster, the British Museum (Natural History), within a few minutes walk, and the Royal Botanic Gardens at Kew, where I spent as much time in the Herbarium examining *Sorbus* and *Acer* specimens as I did in the Gardens.

However, I was able to see a portion of

the astonishing collection of trees and shrubs in the knowledgeable company of Mr. Brown, one of the curators in charge of this department, and to note some very uncommon and potentially valuable plants, some even in flower at this late date, including the small Chinese tree *Poliothyrsis sinensis*, with its pendent white panicles somewhat reminiscent of our native ocean spray, *Holodiscus discolor*; of this rarity I am glad to say that we have several plants of different ages in this Arboretum.

The new heath garden, located near the pagoda at the southwest end of the 300-acre Gardens and planted in October 1958 with some 20,000 heathers of every possible kind, was already showing promise of the carpet of colors it will produce throughout almost the whole year, an excellent investment in high quality plant material which will certainly return bountiful dividends for many years to come.

Kew possesses so much in plant life, both outdoors and in the conservatories and greenhouses, that no one can fail to find some group which will not interest him or her. The chief difficulty is to make the time to appreciate these horticultural riches.

Leaving London August 21st in a small hired car I drove west into Surrey to visit my old friend Graham S. Thomas (author of "Colour in the Winter Garden," "The Old Shrub Roses") and enjoy the rustic pleasures of his country cottage for two or three days before continuing farther west to other objectives. This also acted as most useful headquarters (to which I was able to return later) for the Royal Horticultural Society's Gardens at Wisley, and for several tree and shrub nurseries around Woking and Sunningdale. My debt to Mr. Thomas for his hospitality and kindness is considerable; it would be most pleasant if he could be persuaded to visit the Pacific Northwest and share some of his long and extensive horticultural experience with us.

The 23rd I spent at the Forestry Research Station at Alice Holt Lodge, near Farnham, Surrey, where my guides were Mr. R. F.

Wood, silviculturist, and Mr. A. J. Mitchell, geneticist.

A most extensive collection of poplars has been planted here since 1954, of especial interest to me since we grow some of the species here in Seattle. Considerable attention has been and is being paid to these trees in Europe as a source for quickly grown softwood and pulp, and more hybrids are being raised and tested for growth rate and wood qualities.

I was also shown the extensive seed testing laboratory, which includes drying equipment, large cold storage rooms (two at 36° F. and one at 24° F., used for *Tsuga* and *Abies* species), and many Copenhagen tanks for germination tests.

This was the first place where rain made itself felt, but only in showers; there was more to come later in the week in Cornwall.

A day later I was in the nursery of Mr. C. J. Marchant near Wimborne, one which I had known well in pre-war days when under control of his father, the late Mr. W. J. Marchant. This is small when compared with most tree and shrub nurseries, but very well stocked and producing a constant supply, from an excellent mist propagation house, of plants of high quality for which there is a steady demand.

As examples one might mention the selected clone of *Epigaea repens* named 'Apple Blossom,' propagated here prior to 1937; the closely related but still rare *Orphanidesia gaultherioides*, from woods on the east shore of the Black Sea; *Philesia magellanica*, from southern Chile; the distinctive white fruited *Sorbus cashmiriana*, and *Acer argutum*, an attractive Japanese species still unaccountably scarce in this country though introduced to the Arnold Arboretum in 1889.

Another National Trust garden well worth visiting for its remarkable trees (in more ways than one) is Killerton, a few miles north-east of Exeter, the county city of Devonshire.

The solid red brick house, of late 18th century date, lies in a valley; the gardens extend up the hill to the north and therefore benefit from the southerly aspect. From near the

house the visitor can see in the distance across the lawn an unusually tall pine, which proves to be our western yellow pine (*P. ponderosa*), quite uncommon in English gardens; close to it is a mature 50-60 ft. specimen of the Chilean "roble," *Nothofagus obliqua*, seeding profusely. Halfway up the hill stands a beautiful blue Atlas cedar (*Cedrus atlantica* 'Glaucá') very conspicuous from the house, as is a golden form of Lawson cypress in the same area. Slightly higher are fine examples of both Californian and Chilean incense cedars (*Libocedrus*) the latter about 30 ft. tall; the Japanese umbrella pine, *Sciadopitys*, over 30 ft. and producing cones, as was the Chinese weeping cypress, *Cupressus funebris*, and its Mexican cousin, *C. lusitanica*, about 50 ft. tall.

Across the hill near these conifers is an avenue of splendid European beech trees, with groups of rhododendrons beneath them; down the slope are the most astonishing trees at Killerton, three ancient (about 140 years old) cork oaks (*Quercus suber*), the largest

Below:

Rhododendron sino-grande at Caerhays Castle, Cornwall, England, (20 ft. tall) with Mr. F. J. Williams.

FIG. 14

PHOTO BY: B. O. MULLIGAN



having a d.b.h. of 42 inches. Some of the sweet chestnut trees (*Castanea sativa*) are even larger and older.

Trees and shrubs of many genera seem to flourish in this soil and climate; magnolias are well represented, including *M. Campbellii*; *Embothrium*, the Chilean fire-bush; the Japanese *Stewartia pseudocamellia* is 45 ft. tall after 58 years growth, and the Chusan palm from S. China not only flowers but also bears fruit. This is certainly a garden of much interest and beauty, well worthy of the preservation which is now being given it.

My prime objectives in Cornwall, at the southwestern tip of England, where I spent three full days at the end of this month, were the two remarkable gardens of Caerhays Castle and Trewithen, both fortunately within easy reach of the city of Truro. A third, Lanarth, I was unable to visit because of the illness of the owner, Mr. Michael Williams.

The first, almost on the south coast of the county, exposed to severe gales off the Atlantic ocean, is the product of the late Mr. J. C. Williams' love for plants and skill in growing and arranging them for over fifty years, and especially in raising plants from seeds sent back from W. China and Upper Burma by George Forrest and other collectors.

The climate is generally mild and wet, comparable perhaps to northern California (Mendocino county). Trees and shrubs grow rapidly and to great size. The long driveway is lined with blue hydrangeas, in full bloom at this time. The house is placed on a level portion of the southerly slope, facing the sea. Up the hill behind it grows an astonishing variety of woody plants, now being cared for by Mr. F. Julian Williams, grandson of the garden's founder, and his very capable head gardener.

Many of the specimens are extremely rare in Great Britain, and also, one might guess, in cultivation anywhere else. The evergreen oaks for example, *Quercus laevigata* and *Q. oxyodon*, and *Lithocarpus cleistocarpus* (planted about 1912), Chinese maples, such as *Acer Forrestii* and probably the related *A. taronense*, both with decorative, long acumi-

nate leaves, and *A. Giraldii*, having foliage glaucous beneath, almost as large as our native *Acer macrophyllum*, with several species of hollies (*Ilex*) from the same region, and one which may be the true *I. Perado* or its var. *platyphylla* from the Azores Islands.

Immense trees of magnolias are to be seen, of *M. Campbellii*, and its var. *mollicomata*, hung in August with long, reddish cone-like fruits. *M. Sargentiana* var. *robusta*, first flowered here in April 1931, as did *M. mollicomata*; the evergreen *M. nitida* from the borders of China, Tibet and Burma, and *M. Delavayi* from S.W. China, perhaps 30 ft. tall in the open, about 25 ft. on the wall below the house. The related genera of *Michelia* and *Manglietia*, almost unknown to me in the living state, were equally large and flourishing.

Of shrubs, camellias and rhododendrons are of course pre-eminent, for here originated the *Camellia Williamsii* group of hybrids, of which I saw great plants 15-20 ft. in height on this wooded hillside, and *C. reticulata*, the wild type, of equal size, which first bloomed at Caerhays in March 1932. The best, and earliest, of these has been named 'Mary Williams.' The large leaved rhododendrons of the *Falconeri* and *Grande* series are here seen in their prime; for example, the Himalayan *R. grande* and Chinese *R. sinogrande*, 40 years old, (fig. 14), as well as *R. Griffithianum*, especially fine and happy here, with *R. auriculatum*, members of the *Arboreum* and *Maddenii* series, whilst *R. Williamsianum* itself, named for Mr. J. C. Williams by Rehder and Wilson in 1913, was 6 ft. tall and 8 ft. in diameter! Many plants of the series *Triflorum* had been cut down and were growing up again strongly; Wilson plants of *R. Hanceanum* were 5 ft. high. A number of Wilson's introductions flowered here for the first time, including *R. sutchuenense* and *R. Fargesii* in 1911.

A grove of the Chilean *Podocarpus salignus* (*chilinus*) a genus of the Yew family seldom seen in the Pacific Northwest, 20-25 ft. tall, was producing numerous self-sown seedlings. A most elegant and rare deciduous tree is

Tetracentron sinense, planted in 1913, from Wilson's seeds; this somewhat resembles the Japanese *Cercidiphyllum japonicum*, but the leaves are alternate instead of opposite and the flowers borne on pendulous spikes 4-6 ins. in length (fig. 15).

I spent one whole day here and returned again for several hours two days later to try and get more photos, but the showery weather denied me much of this additional value to be obtained from such a treasure house of woody plants.

To Mr. Williams I am extremely indebted and grateful for all the time given me, and later on for the generous supply of seeds requested for the Arboretum, from which, I am happy to say, we have raised and already distributed some plants of *Acer Giraldii*, and hope to have others later, especially for west coast arboreta.

At Grampond Road, beside the main road a few miles east of Truro, is the estate and garden of Trewithen, standing on a slight hill more or less surrounded by fine beech and other trees, many of them well over 200

Below:

Fruiting branches of Tetracentron sinense, Caerhays Castle, Cornwall, England.

FIG. 15

PHOTO BY: B. O. MULLIGAN



years old, which with groups and hedges of laurels and other evergreen trees and shrubs help to break the wind coming from the sea ten miles away.

Within this screen and invisible from the road is a garden of great interest and attraction, no doubt providing some plants in flower or fruit in every month of the year, most famous perhaps for its camellias, magnolias and rhododendrons, but having also produced a considerable number of daffodils of the highest quality, some of which have received awards in London.

The guiding genius of this remarkable place was the late Mr. George H. Johnstone, who began the work in 1907 and continued it for more than 50 years—an exceptional record in itself, but more than equalled by the head gardener, Jack Skelton, who has been there since 1904 and in whose company and a heavy rain shower I saw part of the garden on the morning of August 28th, the remainder with Miss Johnstone after lunch.

Stretching south from the 18th century house is a lawn some 200 yards long, enclosed

Below:

Schima khasiana flowering at Trewithen,
Cornwall, England.

FIG. 16

PHOTO BY: B. O. MULLIGAN



on each side by mature tree and shrub plantings of great variety and excellent material, amongst them probably the largest cultivated plant (about 27 ft. tall) of the rare *Rehderodendron macrocarpum*, a small tree, native of Mt. Oméi in western China, member of the *Styrax* family, at this season loaded with egg-shaped, reddish tinged fruits.

Full grown trees of many Chinese magnolias are here too, though not so conspicuous now as they would be in March and April, especially *M. mollicomata*, *M. Dawsoniana*, and *M. Sargentiana* var. *robusta*—all depicted so beautifully in Mr. Johnstone's handsome book, *Asiatic Magnolias in Cultivation*, published by the Royal Horticultural Society, London, 1955.

The evergreen *M. Delavayi* was again magnificent in its foliage. There were good specimens also of the large-leaved tree *M. rostrata*, from Upper Burma and S.E. Tibet, and the shrubby *M. globosa* from the eastern Himalaya, unfortunately less hardy than its Chinese relatives *M. Wilsonii* and *M. sinensis*.

A most unusual and striking tree, just opening its first flowers, was the evergreen *Schima khasiana*, a tree of the camellia family, here 35-40 ft. tall, the flowers creamy white, each 3 ins. in diameter (fig.). This would probably be most successful in Golden Gate Park, San Francisco, and in northern California, but too tender around Seattle.

This garden is full of beautiful as well as rare plants,—a maple from Formosa, for instance, which was later identified at Kew as *A. rubescens* and which we have been able to distribute in limited amount from seeds originally received from Mr. Johnstone, as well as another which is probably *A. flabellatum* var. *yunnanense*, from S.W. China, also growing reasonably well in Seattle. *Sorbus Vilmorinii*, loaded with small dark red fruits, is one of the best, perhaps the best, of its genus for small gardens. Here again was that large silver-leaved *Sorbus* species seen at Mt. Usher in Ireland, which proved to be *S. Hedlundii* from Sikkim.

Camellias flourish at Trewithen, but who can judge their variety and quality in August?

(Continued on page 127)

WINTER INJURY

PATRICIA ALLISON*

PETER KALM, visiting this country from Sweden, wrote under date of September 23, 1748:

“It is true that in Pennsylvania and even more so in the lands farther to the north, the winters are often as severe as in Sweden, and therefore much colder than in England and the southern countries of Europe. I found, for instance, that in Pennsylvania, which lies by 20 degrees farther south than some provinces of my fatherland, the thermometer of Celsius fell 24 degrees below freezing. And yet I was assured that the winters which I spent there were not of the coldest, but quite ordinary.”†

Was last winter in the Philadelphia area one of the coldest or “quite ordinary?” For an answer, we can search weather records and we can also look about us for lingering evidence. In Pennsylvania, record lows far colder than 11 degrees below zero (24 degrees below freezing, Celsius) are commonplace—everywhere but in Philadelphia, that is. Here, the record minimum just equals Mr. Kalm’s reading. The low of the winter past was minus four degrees. Suppose we look about us. At the Arboretum, a Deodar, *Cedrus Deodara*, 42 feet tall, 17.5 inches in diameter a foot above the ground, stands on the hill near Gates Hall. There is a wisp of green at the base, another at the top. It may never again be the splendid specimen it was. Not far from the swan pond, an Incense Cedar, *Libocedrus decurrens*, still is a 23 foot pillar of brown. These are plants that had survived many winters. Elsewhere, *Ligustrum lucidum*, *Prunus Laurocerasus*, *Davidia involucrata*, *Buxus* spp., *Magnolia grandiflora*, *Rhododendron* spp. (azaleas), *Chaenomeles* spp., *Callicarpa*

spp., *Pyracantha crenulata*, *Chionanthus retusus*, *Osmanthus ilicifolius*, *Pinus Armandii*, *P. Taeda*, *P. arizonica*, and *P. Pinaster*, have been killed outright or are severely damaged. Was it an ordinary winter? It assuredly was not. So extraordinary was it, in fact, that even the pattern of daily weather at the airport station, where temperatures are often as much as ten degrees different from those in the suburbs, gives us a good picture of just how severe the hardness test was at the Arboretum.

Before considering the record of Weather Bureau measuring instruments and the records provided by botanical instruments, it might be recalled that many of the commonly reported types of “winter kill” are not winter kill at all, but fall or spring kill. Woody plants are much like animals in certain respects. One of these is their ability to withstand certain rigors in their environments if the rigors are presented to them gradually. Mice, for example, are better able to withstand continuous cold if they have been subjected to short periods of lowered temperature prior to the prolonged exposure.

A great many of the mechanisms underlying such preparedness are not yet understood, but the overt results in woody plants are often quite conspicuous. Twigs that, in spring, were delicately pliant, become during summer, increasingly woody. Twig epidermis, once green and tender as that of a young leaf, ensheaths itself in resilient, corky waterproofing. Buds remain sheltered in waterproof scales. The weather-conditioning seems to proceed with astonishing swiftness when deciduous plants lose most of their porous evaporative surfaces, the leaves, in autumn. Similar, though less conspicuous changes occur in evergreens. These profound physical changes come about only because of metabolic changes in the plant. Not all of such metabolic changes are as obvious to us: the lessening of respiratory rate, the slowing of water and

*Dr. Allison is Associate Pathologist at the Morris Arboretum in Philadelphia. We are grateful to her for allowing us to reprint this account of their experiences last winter, which so closely paralleled our own in 1950 and 1955.

†Sauer, Carl O. 1941. The settlement of the humid east. pp. 157-166. In *Climate and Man*. Yearbook of Agriculture, U.S. Government Printing Office, Washington, D. C.

mineral utilization, the invisible modifications in living substance that make it less sensitive to cold.

There are limits imposed by heredity to the degree of winter preparedness that plants can achieve. This results in what we might term "species hardiness." But because the weather in late summer and autumn is not the same year after year, the success of a given plant in attaining its limit of preparedness, or species hardiness, varies from year to year. "Fall winter kill" frequently follows a period of unusually warm, moist weather when winter preparedness is not yet complete. Buds may swell and even elongate into tender shoots. The perfectly normal autumn temperatures following such a period of growth kill the shoots and weaken the plant. No record low was set for the Weather Bureau archives, yet the plant was damaged. Such injury, especially if confined to buds, may become evident only at the beginning of the next growing season. Diagnosis: winter injury.

In the spring the same sort of injury can occur. A few unseasonably warm days inserted in the otherwise gradual transition between winter and spring are sufficient to make some plants relinquish their hold on their winter defenses prematurely. Subsequent normal spring frosts then damage tender tissues that had begun the long series of alterations that culminate in summer's verdure. Thus, the failure of buds to develop, and the desiccation of broad-leaved evergreen foliage are often attributed to "winter kill."

This year, however, we have seen definite evidence of true winter damage, and no wonder. At least 12 low temperature records were equaled or broken. December was bad enough: the second coldest in 89 years, 11 days with maximums of 32°F or below, 29 days with minimums below freezing. A number of the damaged plants could have been injured then; we do not know for certain. We do know that symptoms were visible shortly after the "fatal fifteen" days of January and February. Beginning with January 19, nearly every conceivable plant-damaging feature of winter occurred.

There were 15 *consecutive* days with maximum atmospheric temperatures below freezing. The second lowest temperature ever recorded in Philadelphia by the Weather Bureau, minus 4, occurred twice in two weeks. (At the Arboretum, where temperatures were approximately 10 degrees below Weather Bureau measurements, the number of consecutive days of subfreezing weather probably was 21). During the "fatal fifteen" plants were subjected not only to frigid temperatures, but to drying winds. During the fifteen days there were extended periods of brilliant sun when frozen needles, bark, and twigs could well have reached their thawing temperatures. During the fifteen critical nights, there were frequent starry skies into which the earth's poor warmth fled anew, plunging slender plant parts once again into the frozen state.

Symptoms of winter damage varied not only in severity, but in time of appearance. The leaves of the Deodar began to turn brown during the first week of February. With some Magnolias, however, the flower buds seemed to swell normally when spring came. Only after many flowers had expanded was it realized that a large proportion of swollen buds had died, and that the injury extended down the twigs an inch or two. Although there was extensive leaf, bud, and twig mortality among many trees and shrubs, adventitious buds have begun to develop. This is even occurring among some of the pines that were at first considered lost. Whether or not the trees will survive is still unknown. *Pinus Armandii*, among the most seriously damaged, probably will not. Boxwood suffered extensive damage, but none of the shrubs at the Arboretum was killed. Characteristic symptoms include the bleaching of leaves and the destruction of bark.

There are several indirect effects of a severe winter that should be noted. Rabbits fed extensively on bark above the snow. This sort of injury, of course, is obvious. Less obvious secondary effects may yet occur. Bark can be injured by exposure to the spring and summer sun as a result of the winter thinning of

foliage. Limbs so harmed, or already weakened by cold injury, can fall prey to borers and other insects. Dead twigs and branches that are not removed in good time will become the initial substrates for canker and wood decay fungi.

Although we cannot reverse the weather, we can protect shrubs and trees from further injury by careful pruning, shading, feeding, and timely applications of pesticides. It might be acknowledged also that the total damage would have been much worse had there not been a fine, deep insulating layer of snow that

protected roots and low-growing shrubs. And, in the event our spring seemed excessively cool, inordinately overcast, and unobligingly slow in coming, our Swedish chronicler, Mr. Kalm, has words of comfort. "It is also true, however, that if the winters are at times hard, they do not last usually a great while. One can say properly that in Pennsylvania ordinarily they do not endure more than 2 months, and sometimes not that long. It is unusual if winter holds for as much as 3 months. Further, the summer heat is very

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A Plea for the Scientific Names of Plants

JOHN M. FOGG, JR.*

We are glad to publish this pertinent note from Dr. Fogg on the importance of using Latin names of plants as well as the common names, especially in publications such as our Arboretum Bulletin. The Editor also regrets that the name *Castanopsis chrysophylla* was not inserted in the article mentioned.

IN the issue of this BULLETIN for Fall 1961 there appears an article (pp. 88, 96-97) entitled, "Search for the Chinquapin in the State of Washington." Nowhere in this account is there mentioned the scientific name of the plant concerned.

If THE BULLETIN of the University of Washington Arboretum were read only by inhabitants of the State of Washington, then the subject of the article in question would be completely unambiguous; it could be only the golden Chinquapin, *Castanopsis chrysophylla* (Dougl.) A. DC. No other plant bearing the common name "Chinquapin" is admitted to the indigenous flora of this state.

If, on the other hand, this BULLETIN is distributed (which it is) to other institutions on the Pacific Coast, then an element of confusion may be introduced. Botanists and plant lovers in Oregon and California, who glance at the title, or read the text, of this article might well be pardoned for wondering whether it concerned the golden Chinquapin or the Sierra Chinquapin, *Castanopsis*

sempervirens (Kell.) Dudley. It would require rather careful perusal of the account itself to ascertain that the author is writing about the former.

Let us now suppose that THE BULLETIN is circulated (which it is) among readers in the eastern half of the United States. Here confusion is compounded. Throughout most of the Middle Atlantic States, the term Chinquapin is conferred upon *Castanea pumila* (L.) Mill. However, in the Ozark-Ouachita Plateau and the adjacent Coastal Plain it is used to designate *Castanea ozarkensis* Ashe, while in Florida and the Gulf States it is applied equally to *C. floridana* (Sarg.) Ashe and *C. alnifolia* Nutt.

It may be stretching matters a bit to point out that the Chinquapin Oak is *Quercus prinoides* Willd. and that the Water Chinquapin is *Nelumbo lutea* (Willd.) Pers., although the latter plant is also known as "Yankapin," a word which is perhaps closer to the original Indian usage than any of the others.

The point of all this is that unless we are writing for a very limited audience, which cannot conceivably misinterpret our colloquial names, it behooves all of us who employ vernacular epithets to identify them in such a manner that they may not constitute a source of confusion among readers in other geographic areas.

*Director of the Morris Arboretum, Philadelphia, Pa.

The Arboretum Bulletin

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Special Notice

To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. Active memberships more than three months in arrears will be dropped and THE BULLETIN will be discontinued.

Arboretum Membership Blank

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All memberships are non-assessable.

THE OLIVER B. THORGRIMSON CUP

This beautiful trophy has been given to the Arboretum by the Myrtle Thorgrimson Unit, No. 49, and is to be awarded annually to the Unit which, in the opinion of a committee appointed for the purpose, has done most during the previous calendar year to benefit the Arboretum.

The nature of any project, the work accomplished or funds raised for some particular purpose, as well as the size of the Units concerned, will be taken into consideration in making the award.

The Committee will consist of:

- (A) Three members from the Unit Council
- (B) Two members from Unit No. 49
- (C) The Executive Secretary of the Arboretum Foundation
- (D) The Director of the Arboretum, to act as Chairman.

Any Unit wishing to compete for this cup (fig. 17) must submit details of their achievement for the previous year, by March 1, to the Executive Secretary of the Arboretum Foundation. The Committee will meet and select the winning Unit during the following month. The name and details of the selected Unit's accomplishment will be published in THE ARBORETUM BULLETIN and the trophy presented at the May meeting of the Unit Council.

The Arboretum is most appreciative of this thoughtful and lovely gift, for such an appropriate purpose, from the members of Unit No. 49.

The WASHINGTON STATE FEDERATION OF GARDEN CLUBS announces "*The Landscape Design Study Course 1*, Student Union Building, University of Washington, January 29, 30 and 31, 1962.

Participants will be:

Richard Haag—Assistant Professor in the Department of Landscape Architecture.

Eric W. Hoyt—Assistant to the University Architect.

Norman A. Johnston—Assistant profes-

sor in the Department of Landscape Architecture.

Arthur A. Kruckeberg—Professor in the Department of Botany.

Roberta A. Wightman—Landscape Architect and President of the Pacific N. W. Chapter of the American Society of Landscape Architects.

For further information contact: Mrs. Robert G. Butts, 9733 51st Avenue South, Seattle 18, Washington. (PA 2-0347)

CALENDAR OF COMING EVENTS—1962

January 18—Unit Council Meeting—Arboretum Clubhouse.

February 3—Dr. Donald Wyman of Arnold Arboretum—Lecture on *Ornamental Trees for Smaller Gardens*—Johnson Hall (Room 101) University of Washington Campus.

March 1—Arboretum Foundation Board of Directors Meeting—Women's University Club.

March 22—Unit Council Meeting—Arboretum Clubhouse.

April 11-12—Work & Fund Day—Arboretum.

May 17—Unit Council Meeting—Arboretum Clubhouse.

June 7—Arboretum Foundation Annual Membership Meeting—Women's University Club.

THIS IS YOUR ARBORETUM, KEPT ALIVE BY YOUR SUPPORT

We are pleased to welcome the following new members (September 7 through December 15, 1961). *Sustaining*—Briggs Nursery, Mrs. M. Cutten Brooks, Del Rose Manor Garden Club, Frances Larrabee Garden Club, Mr. and Mrs. W. Forrest Goodfellow, James H. Lawless, Mr. and Mrs. Robert F. Linden, Mrs. Eugene O'Neil, Mrs. Kane Shoji, Mrs. David Stalter, Mrs. Geo. H. Weyerhaeuser; *Annual*—Mrs. E. C. Alvord, Mrs. C. M. Appleberry, Mrs. Chas. W. Armstrong, Mrs. Merl L. Bassett, Mrs. Alan Bluechel, Mrs. Adam A. Bremner, Mrs. Frank C. Brooks, Mrs. Theodore Bucuvalas, Mrs. Harry E. Bush, Mrs. A. W. Byrski, Mrs. Owen E. Chapman, Mrs. G. M. Christensen, Mrs. Arthur W. Clark, Columbia & Okanogan Nursery Co., Mrs. E. M. Cook, Mrs. Wm. W. Cooley, Mrs. C. S. Cunningham, Mrs. Don P. Davis, Mrs. Carl De Chard, Mrs. Harold V. Deering, Mrs. Wm. P. Dodge, Jr., Mrs. Harley A. Dodson, Mrs. Francis W. Franz, Jr., Mrs. H. C. Gilbert, Mrs. H. C. Glein, Mrs. Roy A. Grant, Mrs. Walter E. Griffin, Mrs. James T. Hansen, Mrs. K. L. Hargreaves, Mrs. James Harm, Mrs. M. Hunt Harris, Mrs. Stanley C. Hoffman, Mrs. Akira

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We are also most grateful to the following members who have raised their dues to: *Life*—Mrs. Harry S. Slater; *Sustaining*—Mrs. Heitman Anderson, Mrs. Ainsworth Blogg, Mrs. C. Raymond Bordeaux, Mrs. Patrick J. Cummins, Furney's Hi-Line Nursery, Joseph Gottstein, Mrs. Conner E. Gray, Jr., Mrs. Neil Haig, Mrs. Noble Hoggson, Mrs. George P. Horton, Mrs. M. Chris Johnson, Frederick M. Mann, Jr., Mr. and Mrs. Millard B. Rogers, Mrs. R. L. Rutter, Mrs. Henry Schmitz, Mrs. J. L. Sealey, Kenneth E. Selby, Kenneth W. Sorrells, Mrs. William Wenner, Mrs. Estes J. Williamson.

Below:

The Oliver B. Thorgrimson Cup

FIG. 17

PHOTO BY: WM. ENG



ARBORETUM NOTEBOOK

This section is particularly designed for notes, information and queries concerning beautiful or unusual plants from growers of all types or experience. We solicit your remarks and ideas, but space limitations may sometimes restrict us to publishing those of the widest interest.

ROSEMARY

Undoubtedly the birthplace of Rosemary was in some spot in the Mediterranean region, and it has been cultivated from time immemorial by ancient races throughout Europe. The Romans probably brought it to England, using it for medicines and funeral decorations. It has remained a cherished gift.

Rosemary is not a rose. It is an herb. According to the Oxford dictionary; "An herb is a plant of which the leaves and stems are used for food and medicines, because of their scent and flavour." Rosemary leaves and stems have also been used in the distillation of perfumes. Bees use the blossoms to make a distinctively flavored honey, sought by connoisseurs.

Few plants give as much for the scant care and devotion rosemary generally receives. Even in poor soil it will bloom for Christmas and far into the spring, but in good soil plants produce masses of tiny, lavender-blue blossoms densely clustered on fairly long willowy stems, blooming for long periods. The narrow leaves, lined with white felt, are linear in shape, and hug the stems. Miss Jekyll calls them "dusky-green."

There is a dwarf kind, *Rosmarinus prostratus*, which while useful in many places is not as hardy as *R. officinalis*, the one usually grown in our gardens.

Rosemary's fragrance during the winter months is startling, and when planted near an outside entrance, away from the wind, offers a most charming welcome for a visitor.

I remember a little lady who, during the winter months, always came to church on Sundays with a flowering sprig of rosemary in her hand. On humid days its fragrance spread throughout the little church.

Rosemary has a long and interesting his-

tory. In ancient days it was featured at all funerals, and it was always planted near burial tombs. In all important ceremonies it was carried as an emblem. Queen Elizabeth the first and Queen Anne used rosemary in their gardens. Later when the Pilgrims first came they introduced rosemary to America. It is mentioned frequently in folklore and early writings, but made its place in great literature when Shakespeare's Ophelia said, "There's rosemary, that's for remembrance."

There is something somewhat comforting in these troublous times, to have in our own gardens a plant that for centuries has resisted the vicissitudes of this world and still keeps its charm.

G. T. D.

Some of Our Favorites☆

☆Won't You Send Us Yours?

Nandina domestica

IT is said that the sacred Chinese bamboo is often planted by the doorway of the house in Japan, and if the master of the house has an altercation with his wife he has only to tell his troubles to the Nandina and all is well. This seemed such a fine idea that I planted three near our doorway. However, the master of this house isn't sold on this quaint notion and still prefers the simple direct approach to domestic turbulence, but the Nandina remains. It has earned its space without this beneficent influence. Its slender, unbranched stems are a bit like the canes of bamboo; the fine textured, compound leaves grow in whorls that fan out in a graceful horizontal pattern. The new growth is a

lovely bronze with a ruddy blush that matures to a rather dull light green. Loose clusters of small white flowers appear in late spring or early summer and are followed by shiny scarlet berries in the fall (if you have more than one plant). The foliage turns a soft gold tinged with red in the fall but it is in the winter that it really comes into its own, when it turns a brilliant coral red. It does not color well or set fruit for me unless it is in full sun. Only two of my plants display this brilliant winter coloring, the third remaining a dull green, so it appears that one should select plants for color in the winter.

Its narrow vertical habit and delicate grace make it a valuable plant to use in small areas where it can be seen close up. If I had a modern house with large windows I'd plant a small group where they would be silhouetted against the glass.

MRS. ESTHER BERRY

HAMAMELIS MOLLIS

Shrubs I particularly like during the winter months are Hamamelis, the Witch Hazels. *Hamamelis mollis* from central China, perhaps being the favorite. It is a shrub from 8 to 10 ft. in height and nearly as much in width, with an open fanlike shape. The new growths are soft and furry and the velvety clustered flower buds appear on the branches and upright twigs in late fall along with the nutlike fruit capsules. These capsules burst open to reveal four highly polished black nuts which shoot out a great distance, but take two years to germinate.

From January to March the shrub is in full bloom with flowers which appear on the bare branches. The narrow twisted petals are a bright yellow, forming no definite shape; the calyx is maroon inside, the stamens yellow. The flowers remain for weeks and are not affected by rain or frosts, unless very severe, and the spicy fragrance is there at all times. A branching spray brought inside will scent a whole room.

Hamamelis mollis is most effectively placed

where there is a dark evergreen background when the yellow flowers are thrown into high relief. The gray-green leaves are bold, obovate in shape with a cordate base. In the young shrubs the leaves are quite large and can be mistaken for *Styrax obassia*. In the fall the leaves are a blaze of color, yellow and orange, turning to a rich brown before they drop. There is a form which retains its foliage till the new spring leaves begin to open; this greatly detracts from the flowers in early winter as it is impossible to hand pick the leaves as the shrub grows taller; it is therefore advisable to select when in flower. *Hamamelis mollis* is easily obtained locally. A form "Coombe Wood" has more arching branches and larger nodding flowers of good color and fragrance. *H. mollis* var. *hallida* has pale lemon flowers and var. *brevipetala* has smaller flowers of deep ochre color, both with good foliage and scent. All hamamelis should be planted in a warm sunny position, where the wood can ripen and form buds for a good display the following winter or early spring.

H. M. MULLIGAN

WHAT TO LOOK FOR IN THE ARBORETUM JANUARY — FEBRUARY — MARCH

We are inaugurating this column for the convenience of those who wish to visit the Arboretum to see some special plant or group of plants but may not be sure of their time of blooming nor where exactly to look.

The Winter Garden, southwest of the office, will be the main center of interest during the first two months of the year. Here various forms of the winter heath, *Erica carnea*, make a glowing carpet of white and pink along the service road. The witch-hazels will display their orange and yellow flowers, starting with *Hamamelis mollis* in January and continuing with the various forms of the Japanese, *H. japonica* throughout February and early March. Other flowers to look for here during January and February include the Sarcococcas; Wintersweet, *Chimonanthus praecox*; *Rhododendron mucronulatum*, the Korean Rhododendron (also found near the north end of Azalea Way) and early daffodils and crocus. *Cornus mas*, the cornelian cherry, is often in full flower by mid-February a few yards southwest of the Winter Garden, and there are usually some flowers on the Whitcomb cherries, *Prunus subhirtella* 'Rosea' to the northwest.

BOOK REVIEWS

Alpines for Trouble-Free Gardening, by Alan Bloom. (Chas. T. Branford Co., Newton Center, Mass., 1961), price \$5.00.

MR. Alan Bloom, who has been a grower of alpines for over thirty years and owns one of the largest perennial and alpine wholesale nurseries in Great Britain, writes with the knowledge and thoroughness you would expect from a successful cultivator of alpine plants.

In his first chapter he sets out to achieve the purpose of his book, to dispel the old-fashioned concept that alpines have to be grown and enjoyed in a rock garden or among rocks, and appeals for a wider scope for alpines. He correctly points out that practically all the hundreds of kinds in existence will grow perfectly well without rocks. The words 'Trouble-Free' in the title are not to be taken too literally and, as he indicates, the need for rational planning and cultivation and the careful selection of plants will result in greater rewards for less trouble. The author's approach to the growing of alpines is very interesting and he goes on to develop the ways and means this can best be accomplished.

Succeeding chapters deal with the excellent modern method of raised beds which provide ideal conditions for the growing and displaying of alpine plants, and at the same time are a great saving in expense and labor. He describes the building and maintaining of these very fully, and many variations are adaptable for all gardens.

The essential need for good drainage is not forgotten and various forms of irrigation, including sub-irrigation, are also discussed. The guides to trouble-freedom are sound, and for the beginner or novice many disappointments and troubles will be avoided if he follows the advice given in this chapter.

The list of alpines, which takes up two-thirds of the book, contains over 1,000 easily-grown plants. Although the reviewer does not agree that all these are easy to grow, many will become less troublesome if correctly planted. This is a large selection and the book is well worth obtaining for the list alone. A vast amount of information is given through a system of indicators against each plant, such as growth spread, hardiness, long flowering period, tidiness of appearance, weed smothering properties and the plant's requirement of sun or shade.

In addition, there is much extra information, which is descriptive and to the point, including many hints on propagation and tips on growing. At the end of the book, some useful lists of plants for special purposes will be found helpful to the reader in making his selections.

There are many excellent black and white

illustrations, although a few suffer from being over-exposed. Plate 51 should read *Thuja orientalis* 'Aurea,' not *Chamaecyparis obtusa* 'Nana Aurea.' An attractive color plate shows a raised alpine bed in the author's garden.

This is a book I would strongly recommend to all alpine plant enthusiasts, be they beginners or not, for it is well written in easy-to-understand language, packed with information and sound common sense.

N. DERING MARRETT

"*Trees in Town & City*," Ministry of Housing and Local Government; (H. M. Stationery Office, London, 1958). Price seven shillings & sixpence.

THIS paper-backed book is, in my opinion, an excellent description of the proper use of trees in urban areas. It is divided into four chapters: the use of trees in intimate and in larger scale situations; planning for new trees in existing cities, redevelopment areas, and new developments; the choice and care of trees, including planting and pruning; and finally, a very complete list of trees suitable for urban use, with their characteristics and individual requirements.

The text is well written and gives the clearly expressed reasoning behind the theories of sight, sound and wind screening, association with architecture, accent of boulevards and monuments, softening of harsh building-lined streets, etc. Of necessity, the text is quite theoretical and requires some effort to apply these English examples, some of them centuries old, to our new raw cities of America, especially in our Northwest. However, the abundance of excellent photographs, which illustrate the theories expounded, almost tell the story by themselves and make it easier to apply the reasoning to local conditions.

Perhaps the most valuable part of the book is the chapter on suggested trees. Unlike the language, wherein one runs across unfamiliar words such as bollard, coppice, spinney, verge and wattle, the plant material in England is very similar to that of the Northwest. My only regret is that several of the species mentioned seem most desirable from a hardiness and smoke tolerant standpoint and yet are almost unknown and unobtainable locally. There are many others, of course, which are completely familiar and for which the descriptions and cultural notes are very helpful.

I am sure that a copy of this little book should be in the library of every city planning and park department office as well as that of every tree enthusiast. Too recently we have considered

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trees as removable obstacles in the path of civic development or natural resources on which to capitalize. This book helps us to see the viewpoint of a people whose distant ancestors actually worshipped trees and who now consider trees in their true relation to man in his own modern environment.

NOBLE HOGGSON

The Story of Pollination; B. J. D. Meeuse. (The Ronald Press Company, New York, 1961). Price \$7.50.

THE non-professional is seldom aware of definitive works in the various fields of science. When an author writes for the layman the result may be popular but often it is something less than authoritative.

Dr. Meeuse, Professor of Botany at the University of Washington, has achieved a rarity in the field of literature—a scientifically sound, delightfully written, beautifully illustrated book dealing with a very specialized area of botanical interest, but one which should be among the reference works in every gardener's library. The role of wind, water, fly, moth, bat, beetle, bird, and the much-vaunted bee in the production of fruit makes as fascinating reading as the account of the infinitely diverse methods of enticement found in floral structure.

This is an excellent book for pick-up reading and its myriad enlightening tidbits make every sampling worthwhile.

Dr. Meeuse says, "In the dim, gray past, certain flowers and animals began to march through time together. They became more and more dependent upon each other, and finally some partnerships evolved that today fill us with marvel and admiration. . . . If we feel some modest pride in stating that man is more than monkey, we must live up to our responsibilities—especially at this crucial moment in the history of mankind with the lurking danger of atomic war and radioactive contamination. Let the unselfish study of Nature be a help to us in retaining our sanity and in preventing us from doing the evil things that would break our particular line of evolution forever. In short, let us admire Creation; let us not destroy it."

PAT BALLARD

Holly Propagation for Amateurs

(Continued from Page 111)

The advantages of a home propagating box are many. 1. A more vigorous plant, already acclimated. 2. When plants are small, they stand the shock of transplanting much better. 3. Plants are not root bound. 4. The variety of plants available is infinitely greater than when you depend on commercial sources. 5. Plants are more available and more easily replaced while you are learning their growing habits under local conditions.

Specifically, with hollies, we are interested in: 1. Varieties best adapted to our local

climate and soil conditions. 2. An inexpensive source for expanding our own planting. 3. Keeping our own losses at a minimum. 4. Developing varieties which could be used as potted berried plants at Christmas time, about 20-24 inches tall. 5. A means of propagating plants that have unusual characteristics which may be desirable.

Not the least reward is to become better acquainted with old Mother Nature and her vagaries. This is both a humbling and a delightful experience.

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Winter Injury

(Continued from Page 119)

strong and constant. In Pennsylvania, most of April, all of May, and the following months until October are as warm as June and July in Sweden. Cherries are often ripe in Philadelphia on the 25th of May; and, not infrequently, wheat is harvested in Pennsylvania by the middle of June. All of September and half, if not all of October constitute the pleasantest season in Pennsylvania.”‡

‡It is only fair to note that May 25 of his calendar would now be June 7.

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Hollies in the Arboretum, Revisited

(Continued from Page 107)

Japanese holly, *Ilex crenata*, also has our largest holly tree, *Ilex chinensis*. As mentioned earlier this plant is the sole survivor of the 1955 freeze and may be of sturdier constitution than its fellows. Now about 19 feet tall it has a gracefully erect habit and is well clothed with spineless light green leaves. Since it hasn't flowered we don't know if it is male or female. The lovely long-stalk holly, *Ilex pedunculosa*, is planted nearby where its dark green spineless foliage contrasts well with the lighter green of the *I. chinensis*. This Japanese species should be planted more widely since it is much hardier than the English holly and is most attractive with large red fruit carried on long peduncles.

The many forms of *Ilex crenata* are worthy of study since the Japanese holly appears to be a very plastic species. In its typical form our plants have assumed a thick shrubby habit, but other forms such as the clone 'Glass' appear to be much taller and more open growing. The dwarf clones 'Helleri' and 'Kingsville' reported in the 1952 article are still little mounds of emerald having achieved a mature height of less than 14 inches. In the center of this bed there is one of the more weird plants in the Arboretum. Any book or article on hollies will tell you that *Ilex crenata* 'Mariesii' is a low growing twisted form with round coin-like leaves, ideal for the rock garden. Our plant, donated to the Arboretum by Mr. Donald G. Graham in 1955, has small leaves crowded at the end of the shoots, as it should have, but could under no circumstances be considered as a rock garden subject since it is at least ten feet tall with gaunt twisted branches sparsely arranged on a tall erect trunk. Cuttings from this plant are beautiful little "bonsais," but all show signs of the legginess that makes their parent so distinctive.

The deciduous holly bed is by no means full though there is a fine group of the black alder, *I. verticillata*, whose small orange-red

fruit make such a brilliant contrast to the yellow autumn foliage. Superficially the black alders appear very similar to our plant of *Ilex serrata* var. *argutidens* from Japan, at least in leaf and fruit, but the Japanese plant is much taller—nearly eleven feet as opposed to seven.

Finally there is the grouping of American hollies, *Ilex opaca*, in the bed north of the last. There has been considerable activity in selecting superior forms of this hardy American species among the growers on the Atlantic seaboard and our collection contains some very fine cultivars. The somewhat spreading form and freely produced bright red fruit of 'Emily' make it a favorite of most visitors. 'Merry Christmas' is another clone that has been much admired, more erect than 'Emily,' pyramidal in outline, it has quantities of somewhat dull red fruit. The American holly will probably never supplant the English holly in the Northwest since its foliage is not as lustrous a green nor are the berries so startling a red, but for those climates too rigorous for *I. Aquifolium*, *Ilex opaca* fills a definite need.

The holly collection is now half-way to a quarter century old, and has done well in twelve and one-half years. It would be fun to read a similar report to this in the Winter issue of THE ARBORETUM BULLETIN of 2049 A.D.

Arboreta and Gardens of N.W. Europe; part 4

(Continued from Page 116)

Only their size and vigor, which was very evident. The same can be said of the numerous rhododendrons, both species and hybrids, on which I can make no fair comment, except to say that in the spring they must form a series of pictures of great beauty, delighting the eyes of any fortunate visitors. Spring is indeed the time to see these magnificent Cornish gardens, to appreciate their floral wealth at its zenith, but how difficult it is for most of us here on the west coast to achieve that dream.

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The Arboretum; Summer & Fall, 1961

(Continued from Page 104)

visited the Boerner Botanical Garden at Milwaukee, Wis.

The Arboretum Foundation donated and set up eight new terrazzo type benches along Azalea Way in July, and also had others already existing reset in cement.

The Unit Council erected during August a small (16 x 27 ft.) lath house to the east of their existing propagating house, to provide shelter for young plants.

Twelve tours were conducted up to the end of October, eleven talks to groups given by the Director or Mr. Witt during September and October.

The four months, June through September, were unusually dry, sunny and warm. Rainfall amounted to only 2.22 inches instead of the normal 4.29 inches, though October provided 4 inches (normal, 2.95 inches). Twelve hundred and twenty-two hours of sunshine during these five months seem likely to give us a bountiful flowering next spring.

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1115 North 94th

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