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Robert L. Taylor

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Acer Davidi

The Flowering Dogwood¹

FRANCIS DE VOS²

In an area stretching from the coast of southern Maine, westward to Iowa and Nebraska and southward to Florida and Texas the flowering dogwood, *Cornus florida*, occurs naturally. As a dependable ornamental, its range of usefulness shrinks slightly along its natural northward boundaries in Michigan, Illinois, New York, and Massachusetts, due to occasional low winter temperatures which kill the flower buds.

With equal suitability this small tree is satisfactory in the formal or naturalistic setting; this transition from the gardenesque to the natural setting is a gap too broad for most plants to bridge. Its scope of usefulness also extends from the diminishing large mansion to the small one-storied project home.

Ornamentals with but a single feature of interest—flowers, fruit, or foliage—are all too commonly used in landscape work. This criticism could never be leveled at the flowering dogwood. In the spring the showy white or pink bracts surrounding the inconspicuous flowers lighten our woodlands and gardens. During the summer months it retires to relative obscurity only to put on a double show of brilliant color in the fall. The bright red

fruits, first against the greens and finally against the rich red-orange leaves, are a spectacle of ranking beauty even in the astute company of the maples, hickories, and sweet gums. Even with leaf fall this dependable performer has still another but subtler point of interest. Have you ever noticed the tracery of the bare branches against a winter sky? The graceful, knobbed, upcurving branchlets trace a pattern of promise for another stellar performance to begin with the arrival of sun-warmed spring winds.

Although the single white "flowered" form is undoubtedly the most widely planted there are several variants in cultivation, the best known being *rubra*—the pink "flowered" form. Other lesser known variants are the weeping form *pendula*, the double flowered form *pluribracteata*, and the yellow fruited form *xanthocarpa*. Variation in the leaf is found in the willow-leaved form *salicifolia*, and the variegated leaved form *Welchii*.

Cultural Requirements

Good cultural practices are prerequisite to successful disease and insect control and for the development of healthy, vigorous trees. Where does good culture start then? It starts with the care that is exercised during digging and transplanting. Nursery grown dogwoods, 3-4 feet in height may be transplanted bare rooted in the spring or early autumn; plants taken from the wild should be moved only in the spring and then only after root-pruning 1-2 years prior to moving. It is true that dogwoods *can* be moved when

¹It was the hope—and intention—of the Editor to present at this season a comprehensive review of various aspects of the flowering dogwood that might be of interest to gardeners. A one-man synthesis of this subject seems, in the present state of horticultural specialization, impracticable. Some phases of the dogwood's appeal are currently more compelling than others, for instance the concern felt in the Middle Atlantic States over the appearance of a new disease that is destructive of its bloom. As an up-to-date review of this subject was both timely and available, it was deemed best to present it now, together with some material on related topics such as the place of the dogwood in the garden, vegetative propagation, and spraying without waiting until they could be fully integrated.—Ed.

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in full leaf or that wilding trees *can* be moved without root-pruning first but these practices should, I believe, be used only when it hasn't been possible to use the time-honored methods which have given good results in the past.

The possession of a healthy, vigorous dogwood on the home grounds is not an accident, it is the result of good practices carried out during transplanting and afterwards. Your dogwood deserves this care—it is a true aristocrat of our gardens.

The fungus of the crown canker disease of dogwoods and several species of wood-borers are known to enter the plant through wounds received at the base of the trunk during transplanting. Careful transplanting, then, demands that skinning the bark, particularly near the soil line be avoided. If wounding has resulted, painting immediately with shellac and then with a good tree paint is advisable. The use of Kraft crepe paper around the trunk and larger branches is generally recommended to prevent the entrance of borers through wounds received in planting.

The next step in transplanting is the actual planting of the tree. The hole should be slightly larger than the full root system of the dug tree and the depth of planting should closely approximate its original depth. It is highly important in heavy, poorly drained soils to loosen the soil in the bottom of the hole to a depth of at least 18 inches by spading or when possible with dynamite. Top soil, to which peat has been added, should be used to fill in around the roots and thorough watering after transplanting is necessary to settle the soil around the roots and to eliminate air pockets.

Although we have no precise data on how much and how often dogwoods need to be fertilized, it is a generally accepted practice to fertilize at least every three years and even more often if the tree appears to need additional nutrients. The use of a 10-8-6 fertilizer which leaves an acid residue is recommended at the rate 2-4 pounds for each inch diameter of the tree at breast height; the fertilizer can be applied in early spring or late fall.

Spot Anthracnose And Other Leaf And Petal Spot Of Flowering Dogwood

ANNA E. JENKINS, JULIAN H. MILLER, AND GEORGE H. HEPTING¹

The flowering dogwood has been called by the late Alfred Rehder "one of the most beautiful of American flowering trees." In similar sentiment, Jay Cleveland wrote (*American Forests*, April 1951):

"Harbinger of spring in the north-eastern and central Atlantic states, the spectacular dogwood is considered one of the most beautiful and richly rewarding small flowering trees. Though actually it is a year-round show tree, its gorgeous pink or white displays make a veritable spring fairyland of hallowed Valley Forge Memorial Park, and other public or private gardens throughout the East."

Because of the high esteem in which the flowering dogwood is held throughout its range, the report in 1948 of the discovery of spot anthracnose, an apparently new disfiguring disease of the blooms, caused much public concern. Cleveland's article, which was the outgrowth of the apprehension expressed over this discovery, was one of the first popular accounts of this disease and was presented under the rather ominous title, "Are Dogwoods Doomed by Disease."

Knowledge of the disease has increased considerably in the last two years though still by no means enough to answer all the questions that are being asked about it. The time seems auspicious for a new review of the sub-

ject, especially at this season when the lovely white or pink blooms of the dogwood again ornament the spring landscape. To supplement the account, brief descriptions of four other diseases that cause spotting of the flowers or foliage of dogwoods are included, since they might in certain stages be confused with spot anthracnose.

Spot anthracnose

This disease affects chiefly the white and occasionally the pink flowering dogwood. At Athens, Ga., two other native dogwoods, silky dogwood (*C. amomum*) and stiff dogwood (*C. foemina*), growing near flowering dogwood have remained free of this disease.

On white flowering dogwood, whether planted in urban areas or growing naturally, the disease may be prevalent from year to year on the same trees while others nearby remain unaffected. This does not necessarily imply differences in susceptibility. Not all trees bloom at the same time, and it could be that the healthy blooms opened during a period when inoculum was not present or when environmental conditions were unfavorable for infection.

Charles H. Driver, in reporting on his survey for spot anthracnose in north Atlanta, Ga. (*Plant Disease Reporter*, July 15, 1950), wrote: "Numerous trees were so heavily infected that the symptoms of the disease could be identified from a car while riding down the street. The pink flowering dogwoods were not found infected even though they occurred very close to heavily infected [white] flowering dogwoods."

¹Respectively, Research Specialist, U. S. Office of Foreign Agricultural Relations, Instituto Biologico, São Paulo, Brazil, formerly Mycologist, U. S. Division of Mycology and Disease Survey and Division of Forest Pathology, Plant Industry Station, Beltsville, Md.; Professor of Plant Pathology, University of Georgia, Athens, Ga.; Principal Pathologist, U. S. Division of Forest Pathology, Asheville, N. C.

Later that same season, Dr. R. A. Jehle, of the University of Maryland, inspected diseased flowering dogwoods at Snow Hill, Md., and found leaves and stems of both the white and pink varieties of dogwood affected with spot anthracnose. He inspected these plants the following spring and found that the blooms of the pink variety also showed infection. In May 1952 he found abundant bloom infection on pink dogwoods in a nursery at Gaithersburg, Md. These plants had been brought to the nursery from a different locality. As the twigs were entirely smooth, with no visible trace of spot anthracnose, it was inferred that flower infection had occurred in their new locality.

Names and related diseases

In first reporting the existence of the disease (*Plant Disease Reporter*, June 15, 1948) Dr. Jenkins and Dr. A. A. Bitancourt of the Instituto Biologico, São Paulo, Brazil, referred to it as a spot anthracnose of flowering dogwood. In popular articles this has been referred to as "blossom blight." Blossom spot would be a preferable name for this type of attack as it would avoid confusion with the disease known as *Botrytis* petal spot.

The spot anthracnoses were first discovered and are still best known as affecting horticultural plants such as grape, brambles, citrus, avocado, rose, snowberry and violet. Characteristically they attack new growth, forming small, dead spots, or scabs. Another notable peculiarity of the group is that each disease attacks only plants of one kind or those closely related. Among spot anthracnoses affecting native North American trees, the best known is pecan anthracnose, also called "pecan nursery blight." Others, more recently discovered and less familiar or rare,

affect southern magnolia, cinnamontree, and Hercules club.

Early discoveries and diagnosis

The discovery of dogwood spot anthracnose was quite by chance, and was incidental to a collaborative study of the spot anthracnoses by Jenkins and Bitancourt. Each had been invited to read a paper on some aspect of this research at the Third International Microbiological Congress in New York in 1939. They had just completed a joint report on a spot anthracnose of tea.

While examining tea bushes for spot anthracnose at the U. S. Plant Introduction Gardens at Savannah, Ga., Dr. Bitancourt noticed severely spotted leaves on a flowering dogwood. These symptoms were typical of a spot anthracnose, necrotic type. To substantiate the diagnosis it was desirable to find fruiting structures of the fungus on the lesions. Sometimes even microscopic examination of specimens of spot anthracnose fails to reveal characteristic structures of the fungus. This was true with these specimens. Dr. Bitancourt, therefore, withheld a report of this dogwood disease as a spot anthracnose until additional specimens could be collected. The causal organism itself was not detected until September 1947, with a chance collection of spotted dogwood leaves, by J. A. Stevenson, at Highlands, N. C. When Dr. Jenkins examined these specimens, she found the typical fruiting structures of a fungus of the spot anthracnose group. Thus, the long-sought-for verification of Dr. Bitancourt's original diagnosis of the disease on this native North American tree growing at Savannah, Ga., was made.

In April 1948 the spot anthracnose appeared in a new guise at Atlanta, Ga. The floral bracts of dogwoods planted

along the city streets were observed to be expanding in a conspicuously diseased condition. Specimens were sent to Dr. J. H. Miller, who found in the small spots dotting the bracts another stage typical of spot anthracnose fungi. This stage, together with that found in the specimen from North Carolina and the diseased leaves from Savannah, Ga., confirmed the identity of the disease in the three locations and showed that it was a typical spot anthracnose.

The outbreak of spot anthracnose on dogwood flowers, thus threatening their ornamental value, stimulated the publication of the aforementioned article in the *Plant Disease Reporter* in June 1948. The extent of the disease as then known included only the two localities in Georgia, one in Maryland, one in North Carolina, and one in South Carolina. Just before the article was published, information was received from Dr. Harold T. Cook, formerly of the Virginia Truck Experiment Station, that he had seen the disease several times in the vicinity of Norfolk, but had been unable to determine the cause because the spots always appeared sterile.

Other history and range

In recent years, because of their importance in both natural stands and parks, dogwoods in the Appalachian area of Virginia have been particularly scanned for spot anthracnose. In September 1949, Dr. Cook noticed an abundant foliage attack on dogwoods at Panorama on the Skyline Drive. The following summer, dogwoods along the Blue Ridge Parkway suffered similarly. In this case, Parkway Superintendent Sam P. Weems, sent specimens to Dr. G. H. Hepting, stating that affected trees developed a sparse, brownish appearance in the lower part of the crown, with the upper part suffering less. He

also said that the disease affected about 50 per cent of the trees in the Parkway south of Roanoke, and was extremely severe in Section I-U.

The available records of the disease in the Carolinas are chiefly those resulting from consultations. For North Carolina they show its presence in Asheville, Linville Falls, and Pine Bluff, besides Highlands already mentioned. In South Carolina it has been recorded at Georgetown, Clemson, Columbia, and Greenville. Dr. G. M. Armstrong, of Clemson Agricultural College, wrote that in the spring of 1952 he found the disease apparently making its first appearance in the foothills at Oconee State Park, about 30 miles from Clemson.

At Atlanta, Ga., the blossom spot phase of the disease continued to be prevalent on dogwoods and in 1952 was even more conspicuous than previously, especially in the Druid Hills section. Dr. Miller also found it in several mountain areas near the North Carolina border.

This fragmentary evidence of the occurrence of spot anthracnose in the Appalachians invites speculation as to what may be the real history of the disease in this extensive mountain region. A veteran hunter, who is familiar with the mountain wilderness of Virginia, upon being informed of the disease and the general aspect of affected trees, at once asserted that he had observed it in this range.

In the absence of systematic surveys, the most extensive search for the disease has been that by Dr. Jehle, in collaboration with Dr. Jenkins. Conducted only as circumstances permitted and incidental to other official work, it was begun in 1948, and observations were made mainly on wild, roadside trees. During the first season, which was

particularly favorable to the disease, the ragged aspect especially of bush-size trees usually sufficed to indicate spot-anthracnose attack. The blooming period having passed, spotting on leaves, stems or fruits as available was depended upon for identification. Leaf specimens collected in August showed abundant fruit bodies of the fungus in its perfect stage, and occasionally in its imperfect or vegetative stage. The latter was also conspicuous on spot anthracnose lesions on the berries.

The first season's survey disclosed that the disease was prevalent in southern Maryland on both Eastern and Western Shores. It was found on wild dogwood in a few localities in Accomack County, Va., and at two places in southern Delaware.

Since 1948 field observations on the disease in Maryland have emphasized other matters, such as first seasonal appearance, more than geographic distribution, but it is now evident that the disease is widely distributed in this State. If it exists in western Maryland, where dogwoods are comparatively rare, this was not disclosed under the limited conditions of the survey, nor was an examination made in the four northeastern counties.

In Delaware the disease was recently discovered in a nursery near Lincoln, as reported by Drs. R. S. Cox and J. W. Heuberger (*Plant Disease Reporter*, July 15, 1952).

The first published notice of the disease in Florida was given by Dr. G. E. Weber, of the University of Florida (*Plant Disease Reporter*, July 15, 1952). Here again, the blossom spot directed attention to it. Dr. Weber found dogwood blooms infected as they expanded late in February at Gainesville and, observing the disease in March on widely scattered trees among

the hundreds growing in Gainesville, he concluded that it was general in that area.

The limited extent of the disease, as thus far ascertained, in relation to the range of the host is shown in Fig. 1.

Importance

N. Rex Hunt, in his article entitled "Plant diseases not yet established in the United States" (*Bot. Rev.* 12:593-627, 1946), wrote that any disease that mars the appearance of a plant is to be regarded as destructive. That the dogwood spot anthracnose is a prime example of such a disease is emphasized by the attention given it by the press and garden public. This is, of course, only a natural consequence of the dogwood's popularity as an ornamental and for its inherent aesthetic qualities. To cite only two examples of helpful publicity in this respect, one appeared as an editorial in the *Washington Evening Star*, June 16, 1951. Entitled "Dogwoods in danger" it could have served as an extension plant pathologist's account of the disease as then known. The other example was the display of diseased blooms and leaves as part of a televised program of Station WMAL, by the *Star's* garden correspondent, W. H. Youngman. This was an early if not the first exhibition of a plant disease by this means of communicating visually with the multi-audience.

We have seen that inquiries on spot anthracnose are prompted chiefly because of its damage to the flowers. The fact remains, however, that the disfigurement also includes the foliage, berries, and twigs. (See Plates I and II.) The decorative effect of this small but distinctive tree is impaired to whatever degree the foliage is attacked. Ravage by the disease in the Blue

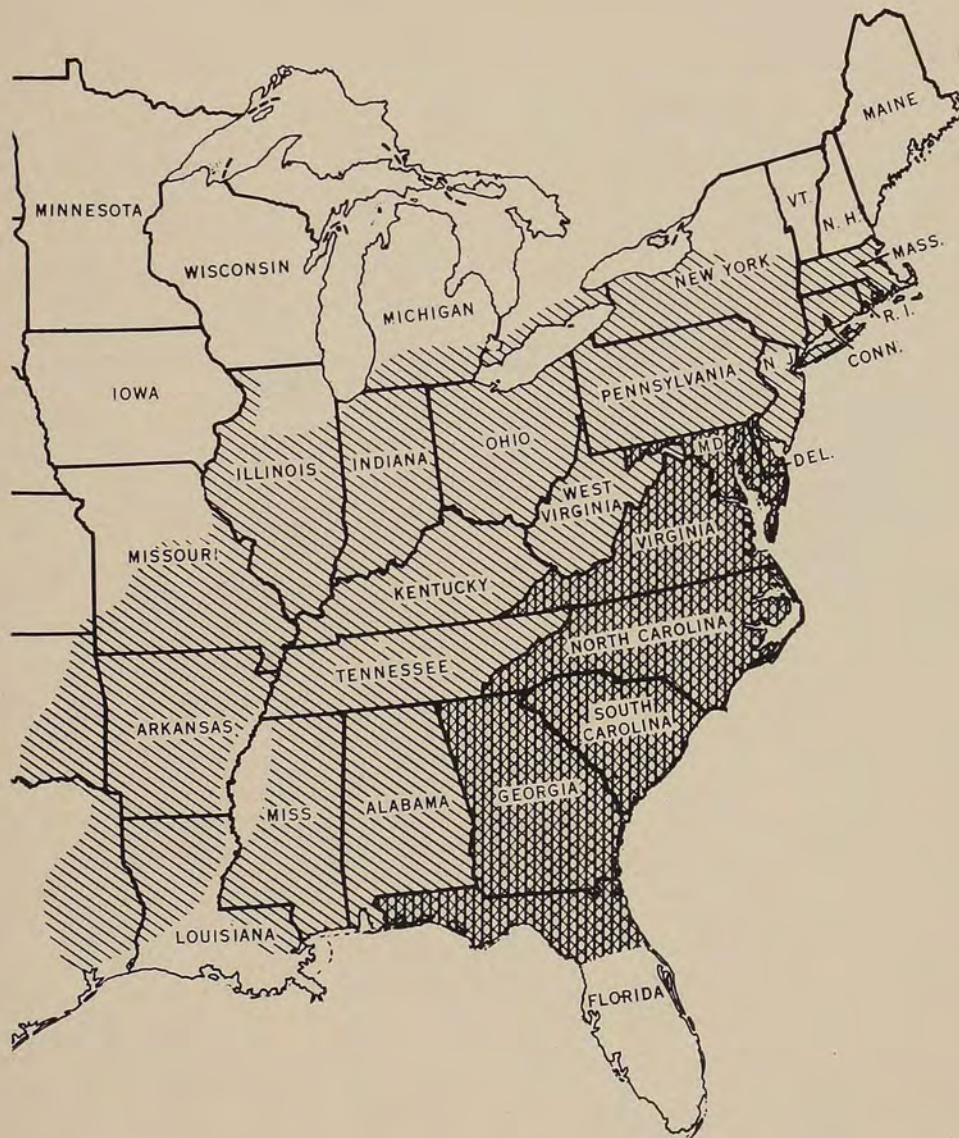


Fig. 1. Comparison of the distribution of spot anthracnose, as now known (dark crosshatching) and the natural range of the flowering dogwood (light crosshatching); the latter after Elbert E. Little, Jr., in *Yearbook of Agriculture*, 1949.

Ridge Parkway in 1950 may well represent the unhealthy aspect of dogwoods in mountain fasts as observed by our Virginia hunter. If these woodland dogwoods could talk, they might tell of serious hindrance to their growth as a result of recurrent attacks by this disease over a period of years. As a nursery disease, the dogwood spot anthracnose might create numerous problems, besides causing direct financial loss.

Symptoms

Dr. Weber (*Plant Disease Reporter*, July 15, 1952) has given the first and only description from field observations of spot anthracnose symptoms as they develop consecutively on the inflorescence and new foliar growth. It is quoted below:

"During the latter part of February, 1952, along the streets in Gainesville, Florida, the buds [involucre] of dogwood trees developed sufficiently to show the white color and attention was attracted to many of them because of their stunted and malformed condition. Closer examination showed many of the bracts (petals) to be characteristically marked with circular to elongate (lengthways of the bract) reddish purple spots up to a millimeter in diameter and frequently surrounded by an irregularly less densely colored area with gradual blending or fading of the color to white. There were from several to as many as 50 spots on a single one of the four bracts. Often one or more of the bracts was so badly stunted as to be barely recognizable. In most instances shedding actually took place on these trees before uninfected trees were at their height of bloom.

"Further examination as soon as the foliage began to appear on these trees showed numerous small circular dark purple spots usually less than a milli-

meter in diameter. The spots were evident on opposite sides of the leaves but were slightly lighter colored on the under side. Transmitted light showed up definite pale halos of variable size, usually more extensive on the younger leaves."

To supplement this description of symptoms on recently expanded leaves, it may be noted that the spots may be scanty or exceedingly numerous, up to a hundred or more on a single blade. They may be scattered over the leaf surface or concentrated on one part, as the tip, margin, or along the midrib. In severe infections the leaf may be reduced in size or the tissue killed outright. Another malformation consists of foreshortening of the leaf because of early midrib infection with consequent wrinkling of the blade on either side.

The spots may be circular, angular, or elongate. Ordinarily they barely reach 1/25 of an inch in diameter, but may be twice this size. By coalescence or close grouping, larger areas may be involved. The dead tissue in the center of the spots often becomes pale yellowish gray and readily drops out. On such open spots the venation may remain more or less intact. In addition to these irregular openings considerable areas, at the tip or along one side may fall away, leaving only a remnant attached to the petiole.

On the petioles, peduncles, fruit clusters and small stems the spots, or cankers, are small, corresponding more or less closely to the blade spot. They are characteristically abundant, especially on stems. (See Plate I, Figs. 3 and 4.) The tissue surrounding individual spots or aggregations of them may be noticeably darkened. The lesions on these organs are circular to elliptical, flat or somewhat elevated. With the proclivity of the disease to

attack one organ or another so long as the growth is new, it is not doubted that dark blemishes sometimes discernible on the exterior of the new involucre also are of the spot anthracnose.

The pathogen

The technical description of the pathogen causing dogwood spot anthracnose as *Elsinoë corni*, by Jenkins et Bitancourt, was published in the *Journal of the Washington Academy of Sciences*, November 5, 1948. Figures 3 and 4 in Plate II are taken from the illustration that accompanied their article. The punctiform ascomata, which are flat stromatic masses measuring 25-100 μ^2 in diameter by 20-60 μ in thickness, are shown. Beneath the dark covering layer (epithecium) the ascoma is practically colorless, as well as crowded with the globular asci, about 16 μ in diameter. The ascospores, normally 8 in number in the ascus, are 3-celled, measuring 12-15 by 15 μ . From analogy with other species of *Elsinoë* that have been studied, no resting period would be required for this stage. Instead, when environmental conditions favored, the ascus would expand and protrude above the stroma, and emit the ascospores. Presumably, under suitable conditions, they would infect such new growth as was available at the time of their discharge.

The conidial or vegetative stage of this fungus termed an "acervulus" belongs to the so-called form genus *Sphaeceloma*. The acervuli are minute spore-bearing structures about 40 μ in diameter by 20 μ in thickness. They are pale or colorless on the blooms but on the fruit spots are colored. They bear

colorless spores, measuring 4.5-6 by 2.5 μ . Search for these structures for scientific study often has been without avail as previously mentioned. From the very nature of the organism, however, we know that this stage may form promptly under appropriate environmental conditions and that conidia may sprout quickly even from hyphae, and immediately germinate. It is doubtless a fact, moreover, that vegetatively, even as remnants of growth the fungus overwinters in lesions on living parts of the tree, or even on last season's fruits remaining *in situ*. This could and probably does function as inoculum by which infection is initiated on the new-formed bracts as they expand in spring. Bract infection would supply inoculum for secondary infections. Whether the perfect stage also has a role in carrying the fungus in a viable condition from season to season is not yet known.

Of the two isolations of the fungus that have been made, the first was by Jenkins from stem cankers collected in Maryland, the second by Weber from spots on new leaves collected at Gainesville, Fla.

Other Blights and Spots

The four dogwood diseases briefly to be considered here are Botrytis petal blight, Ascochyta leaf spot and blight, Septoria leaf spot, and Cercospora leaf spot. In their outward appearance all four are clearly distinguishable from spot anthracnose in both symptoms and the appearance of the associated fungi.

Botrytis petal blight. This disease affects the flowers of many early blooming plants, and often also the foliage and young shoots. It is a disease of cold wet weather, often associated also with frost damage. As a disease of dogwood it is relatively unfamiliar and

²The symbol μ stands for micron, a unit of measurement 1/1000 of a millimeter or 1/25,000 of an inch.



Plate I. Fig. 1. Spot anthracnose on flowering dogwood bloom and fruit. Fig. 2. Same, on leaves and fruit. Fig. 3. On twigs. Figs. 1 to 3 natural size. Fig. 4. Spot anthracnose lesions on twig, enlarged about 3 times.

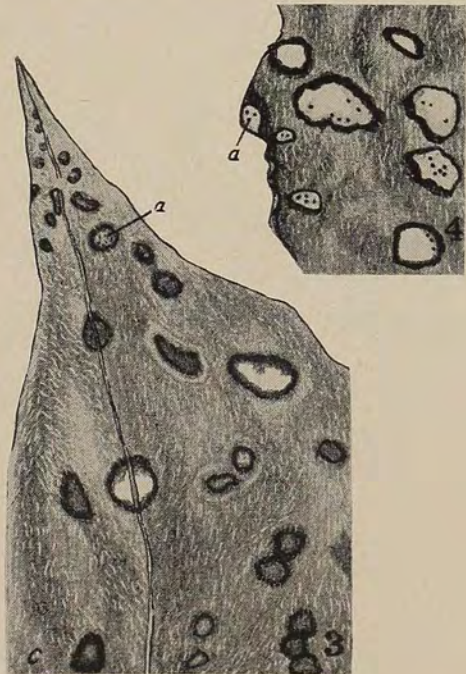
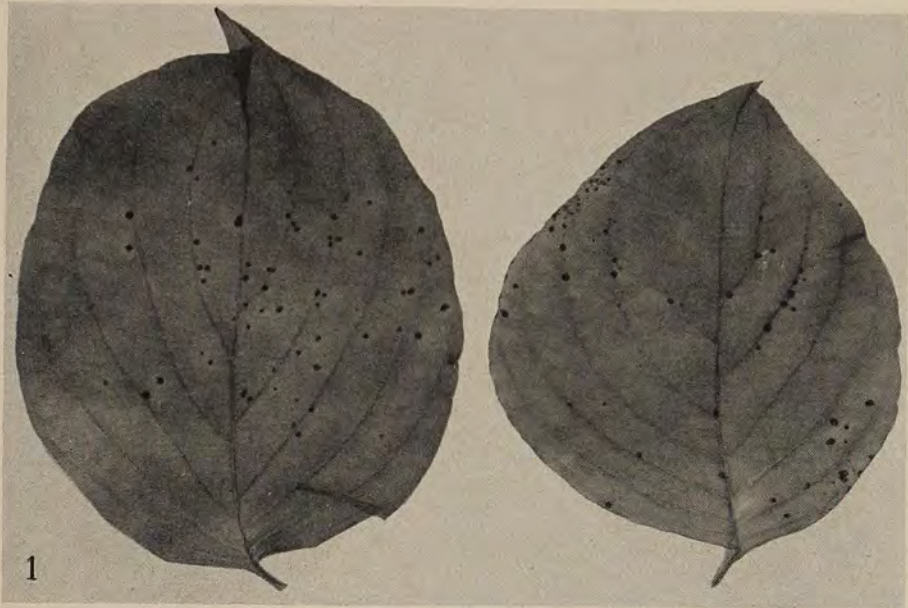


Plate II. Fig. 1. Spot anthracnose on leaves, early stage as in May, natural size. Fig. 2. Same, late stage as in September. Figs. 3 and 4. Drawings of spot anthracnose lesions on leaves, enlarged 13 to 15 times, showing fruit bodies of the pathogen appearing as black specks in the dead tissue.

actual reports of its occurrence are few. It could probably be found to some extent on dogwood flowers and shoots almost any spring when frost injury occurs and is followed by prolonged rainy or damp weather. A few dry sunny days will quickly check it, however, and prevent any spread that would attract particular notice.

In its most typical form *Botrytis* infection appears as brown patches, usually of considerable size, irregular shape, and much wrinkled, on the aging floral bracts ("petals"). When the petals fall and lodge on leaves the latter may become infected too. In humid weather the lesions become covered with a grayish-brown fuzzy mold, bearing tufts of spores which are shed voluminously and blown by wind or splashed by rain. (See Plate III.) Variations from this pattern include indefinite blemishes and discolorations on all floral parts and young leaves and shoots, which may or may not bear the distinguishing gray fuzz and spores of *Botrytis cinerea*, as the fungus is named.

Ascochyta leaf spot and blight. Although earlier instances of this disease have doubtless been seen, and perhaps specimens of it collected, it first came to the attention of the present authors when Hepting observed an outbreak on flowering dogwoods at Biltmore, N. C., in 1942. By mid-summer the foliage of hundreds of trees in this vicinity had blackened and shriveled. Periodically since then the disease has caused severe blighting in the vicinity of Asheville, N. C., and along the Blue Ridge Parkway in western Virginia. With the formation of even a few leaf spots, large areas of the blade may collapse completely. As a result, by mid-June it is not unusual to find most of the foliage of a dogwood, particularly

the shaded and lower leaves, shriveled and blackened.

Leaf spotting begins as early as mid-June. The spots are round or slightly irregular in outline and may range from $1/32$ to $1/4$ of an inch in diameter. The gray to tan necrotic central part has a somewhat prominent border, just outside which the tissue is discolored, brown or reddish (Plate IV, Fig. 1). Tiny, black, punctiform masses that ultimately develop on the light-colored centers of the spots are the pycnidia (spore vesicles) of a fungus which has been identified by some authorities as *Ascochyta cornicola* Sacc., and by others as *Phyllosticta cornicola* (DC.) Rabh., or perhaps *P. globifera* Ell. & Ev. *A. cornicola*, originally described in Europe on *Cornus sanguinea*, has oblong-elliptical, 1-septate spores measuring 7-10 by 3.5 μ . The spores of the fungus in the Carolinas are somewhat smaller than this but the significance of these spore sizes in determining the species has not been established.

The references to *Phyllosticta* may indeed apply to an early stage of the *Ascochyta* before the spores have become 2-celled, or may have to do with different fungi, which may be pathogens themselves or only secondary invaders of damaged tissue. This question of fungus terminology need not be settled here, but the spores observed on the Biltmore specimen were definitely 2-celled, and therefore belong to *Ascochyta*. For the present the fungus is referred to *A. cornicola*.

A commercial experience at Biltmore, not planned as an experiment, indicates that the *Ascochyta* blight can be checked by spraying. On April 15, 1952, a tree service company sprayed some of the affected trees with Copper A, a Dupont fixed-copper fungicide containing 45 percent copper, which

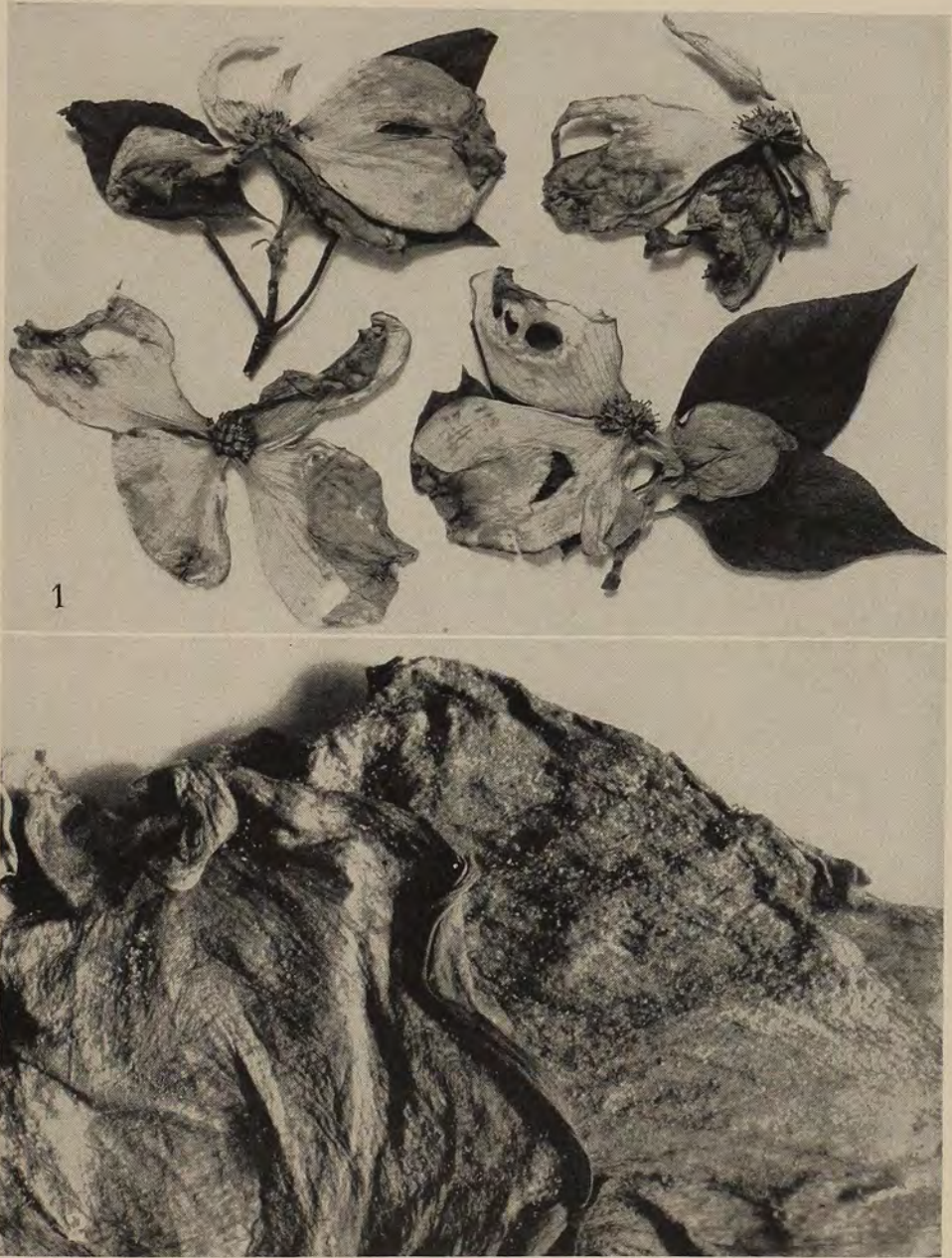


Plate III. *Botrytis* blight of blooms of flowering dogwood, natural size. Fig. 2. Portion of blighted bract, enlarged 6 times, showing gray or buff spore masses of *Botrytis* developing on the surface of the dead tissue.

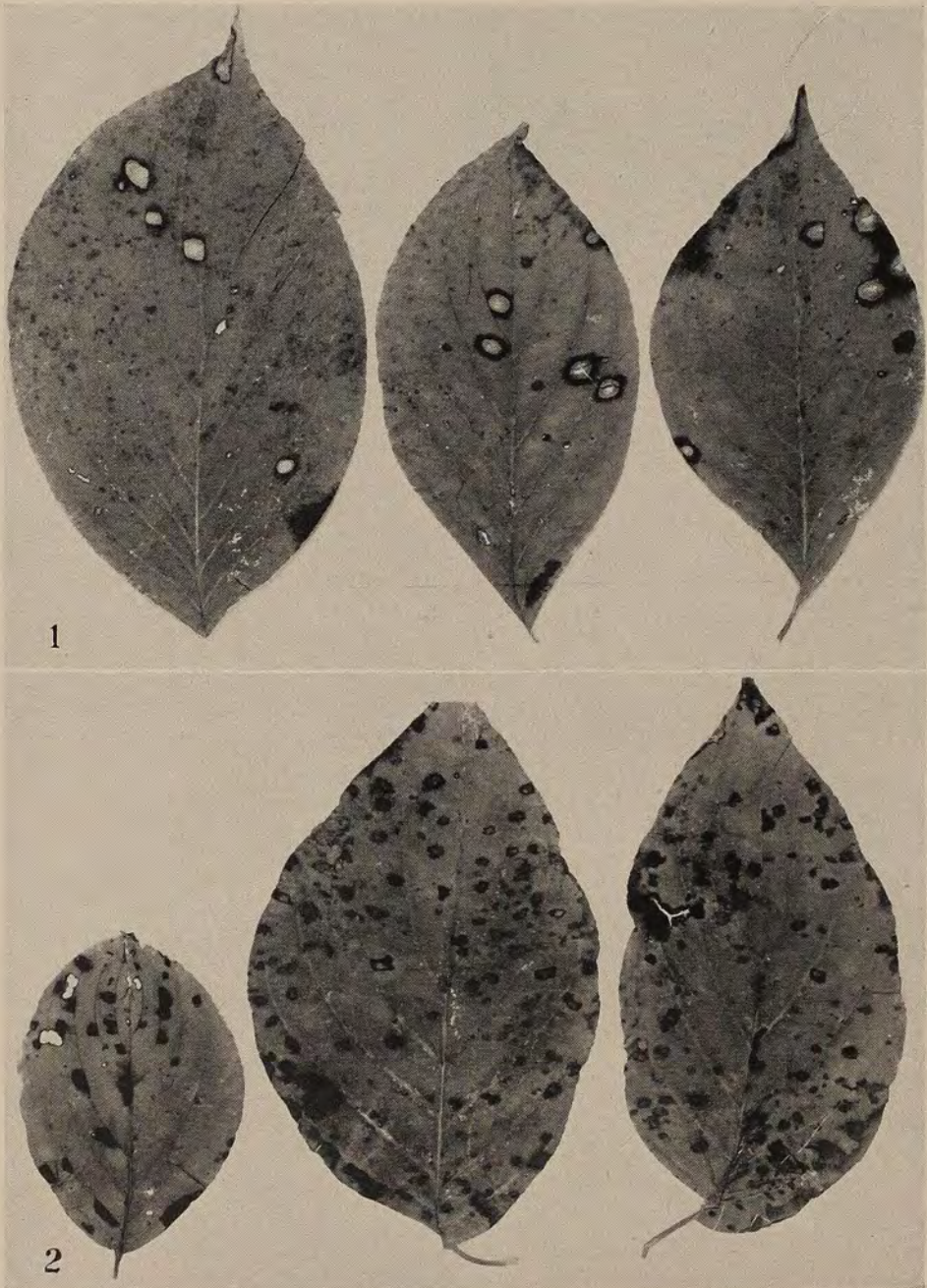


Plate IV. Fig. 1. Characteristic lesions of *Ascochyta* leaf spot of flowering dogwood. Fig. 2. *Septoria* leaf spot. Both figures natural size.

was mixed at the rate of 3 pounds to 100 gallons of water, and three quarters of a pound of Dupont sticker-spreader was added. The application was repeated 5 times at 3-week intervals, with gratifying results. The sprayed trees remained mostly disease-free as compared with surrounding untreated ones, which were generally infected.

Septoria leaf spot and *Cercospora leaf spot*. These two leaf spots seem to have been noticed frequently even before spot anthracnose and *Ascochyta* blight brought the foliage diseases of dogwood into prominence. In Georgia, the first symptoms of the *Septoria* spot appear early in July. Delimited by the veins, the spots are more or less angular in outline. At first they are of uniform color, but later become lighter at the center with a darker border. They range from about 1/10 to 1/4 of an inch in diameter. As the season advances the leaves become heavily spotted and by September most trees show symptoms very markedly. (See Plate IV, Fig. 2.) Small, dark punctiform masses tardily developing on the necrotic centers of the spots are the spore vesicles of a fungus identified as *Septoria floridae* Tehon et Daniels. The spore measurements given for this species are 13-27 by 1.5-3 μ .

The *Septoria* leaf spot appears to be a comparatively harmless leaf spot,

dulling the leaves. Especially when numerous, the spots have the effect of masking the earlier-formed spot anthracnose lesions.

The *Cercospora* leaf spot is said by Felt et Rankin in their "*Insects and Diseases of Ornamental Trees and Shrubs*" often to cause defoliation of flowering dogwoods in southeastern United States. According to Miller's observations in Georgia, the disease appears in late September. The spots are very similar to those of *Septoria* and both are often found on the same leaf. The pathogen is *Cercospora cornicola* Tracy et Earle, originally described on *Cornus florida*. The spore apparatus is a sporodochium—a tuft or cluster of microscopic spore-bearing threads. The pluriseptate spores measure about 50-70 by 2-3 μ .

In the now 20-year old work, cited above, Felt et Rankin state that dogwood leaf diseases have not been studied as to control. They continue: ". . . a general covering spray of bordeaux at two to three week intervals beginning when the leaves are about full grown should be satisfactory." While this might apply to both the *Septoria* and the *Cercospora* leaf spots, the time of application, at least, would be inappropriate for any of the other three dogwood diseases here considered.

Control Of Spot Anthracnose And Septoria Leaf Spot Of Flowering Dogwood

R. S. COX AND J. W. HEUBERGER¹

Several fungicides show considerable promise for the control of the spot anthracnose and Septoria leaf spot. Experimental work under nursery conditions in Delaware in 1952, showed that Puratized Agricultural Spray, Orthocide 406, Manzate, Bordeaux mixture, and Parzate gave effective control of these diseases (see accompanying table for concentrations, times of applications, and control). For overall performance, i.e., disease control and lack of plant injury, Orthocide 406 and Manzate appeared to be particularly outstanding. Bordeaux mixture caused considerable foliage injury, and Puratized Agricultural Spray was objectionable to a certain extent in this respect.

The following tentative fungicide control program is recommended: (a) use either Orthocide 406 (2 lbs. in 100

gals. water) or Manzate (1½ lbs. in 100 gals. water). For smaller quantities of water, use proportionately smaller amounts of the fungicides; (b) make the first application as soon as the flowers begin to open in the spring (about April 15 in Delaware); (c) repeat applications at monthly intervals through the growing season, until flower buds are formed in the fall in order to protect the new growth. If this schedule is followed yearly, the chances are very good for a beautiful display of disease-free blooms.

When applying fungicide sprays, one should bear in mind that complete coverage of all plant surfaces is necessary. In fact, no fungicide program is completely successful unless the four "R's" of spraying are observed:—the use of the *Right Material* in the *Right Amount* at the *Right Time* and in the *Right Way*.

¹Respectively, Associate Pathologist and Plant Pathologist, Delaware Agricultural Experiment Station.

Effect of Various Fungicides on Control of Spot Anthracnose and Septoria Leaf Spot of Flowering Dogwood, Lincoln, Delaware, 1952.

Treatments*	Concentration	Spot Anthracnose Infection		Septoria Infection
		Flower (5/2/52) Percent	Leaf (5/27/52) Percent	Leaf Spot (9/5/52) Percent
Check		55	50	68
Puratized Agricultural Spray	1 pt.-100	8	13	20
Bordeaux Mixture	4-4-100	13	14	7
Orthocide 406	2-100	19	4	9
Manzate	1½-100	25	6	8
Parzate	1½-100	32	20	9
Least significant difference at 5 percent level		No significant difference	20	9

*The listed materials can be purchased under these names at well-stocked garden supply stores.

Growing Flowering Dogwood From Softwood Cuttings

ROGER W. PEASE¹

In growing flowering dogwood from softwood cuttings, two objectives should be achieved: first, a high percentage of rooting; and second, the production of rooted plants able to survive the first winter and develop into vigorous young trees.

Various publications have reported success in inducing softwood cuttings of flowering dogwood to take root. Data from many of these publications have been tabulated in one volume.² However, these tabulations indicate variations in the methods used. In an effort to discover some common factor associated with high percentages of success, these tabulations, for white dogwood only, have been re-arranged in Table 1, according to the season of taking cuttings. Only data from publications listing all of the following three items were included: the season of taking cuttings; the percentage of success; and the auxin treatment, if any. When available the number of days between treatment and recording results was included. The number of days between treatment and recording results was assumed to indicate roughly the number of days between setting the cuttings and the over-all appearance of roots.

The table indicates that in general, percentages of success diminish as the

season of taking cuttings advances, regardless of variations of auxin treatment, which range from no treatment to the use of indole-acetic acid instead of the more standard indole-butyric acid. The table also indicates that the number of days between setting the cuttings and the appearance of roots increases as the season for taking cuttings advances. Apparently treatment with indole-butyric acid increases the percentage of rooting, other factors supposedly being equal. It would appear, then, that best results should be obtained with cuttings taken soon after blooming and treated with indole-butyric acid.

If cuttings are to go into the winter with established root systems and strong dormant buds, a comparatively long period for growth should probably come between the formation of roots and the hardening-off process. Therefore, taking cuttings early in season should aid in obtaining maximum growth and maturity before the first winter.

Materials and Methods

In 1952, an experiment was carried out at the Department of Horticulture, W. Va. University, to see if high rooting percentages could be obtained by taking cutting wood early in the season and treating with indole-butyric acid as indicated in the foregoing literature, and also to see if the resultant plants could be developed sufficiently to overwinter successfully. In addition, the

¹Assistant Horticulturist, West Virginia College of Agriculture, West Virginia University, Morgantown, West Virginia.

²The Use of Auxins in the Rooting of Woody Cuttings. Kenneth V. Thimann and Jane Behnke-Rogers, Maria Moore Cabot Foundation, Peter-sham, Massachusetts.

author was interested in ascertaining if the age of a parent plant had an influence on the percentage of rooting and the vigor of the plants obtained.

On June 11, cuttings were taken from three seedling, white flowering dogwoods five years old, and three seedling, white flowering dogwoods five years old, and three grafted, pink dogwoods at least 18 years old. Only terminal shoot tips were used. They were trimmed to three inches in length, and all but two leaves removed. The stem bases were dipped in a mixture of indole-butyric acid crystals and talc, one part acid crystals to 250 parts talc by weight. This mixture is roughly equivalent to Hormodin B, No. 2. The cuttings were set one and one quarter inches deep in white, washed building sand; and the air was kept saturated with low pressure fog nozzles. Two hundred foot-candles of white fluorescent light were delivered to the sand surface. The air temperature was main-

tained at 65°F. and the soil temperature at 70°F. Free water drainage through the sand was arranged. Both lights and fog nozzles were kept on continuously. All of these environmental conditions may not be necessary or even advantageous.

The cuttings began to form roots in 28 days, but environmental conditions were not altered until August fifth. The cuttings were then removed and placed in a cold frame equipped with low pressure fog nozzles and bottom heat. The growing medium was a well-drained, light soil whose pH had been reduced to approximately 5.0. About half of the sunlight was excluded. From August fifth until the middle of October the minimum soil temperature was maintained at 70°F., and the fog nozzles were opened eight hours each day. The cold frame sashes were lifted for about ten minutes each evening. From October fifteenth to November tenth both soil water and soil temperatures

TABLE I
Published Data* Correlated to the Season of Taking Cuttings
White Dogwood Only

Season of Taking Cuttings	Percent of Rooting	Treatment	Days Before Taking Data
End of Flowering	100%	None	21
Slightly Immature Wood	75%	Indole-butyric Acid in Talc; 1 part to 200	Not listed
Slightly Immature Wood	100%	Indole-butyric Acid in Talc; 1 part to 83	Not listed
June	95%	Indole-butyric Acid in Water; 13 parts per million; Soaked 24 hrs.	34
June	64%	None	34
July	25%	Indole-acetic Acid in Water; 50 and 200 parts per million; Soaked 24 hrs.	37
August	22%	None	45
September	0%	Soaked in Water; 24 hrs.	Not listed
September	15%	Indole-butyric Acid in Water; 50 parts per million; Soaked 24 hrs.	105

*The use of Auxins in the Rooting of Woody Cuttings.

were gradually reduced, until the thermostat was adjusted to 45°F. and water was added only when the soil surface was dry.

On November tenth new growth measurements were made and dormant buds inspected. Well-formed dormant buds had developed and most of the leaves had fallen. During the winter the young plants will be kept under a loose mulch of wheat straw, placed on the cold frame sashes, and a minimum soil temperature of 40° F. will be maintained.

Table II shows rooting percentages and the average length of new growth for both cuttings from young seedlings and from old grafted trees. From this data it was concluded that cuttings from young trees tend to show better growth after rooting than do cuttings from mature trees, but that rooting percentages, under good environmental conditions, are satisfactory in both cases. Because of the preliminary nature of the work, no positive conclusions should be drawn concerning the ability of the rooted cuttings to develop into vigorous young trees.

TABLE II
Comparative Results from Juvenile and Mature Parent Trees

A

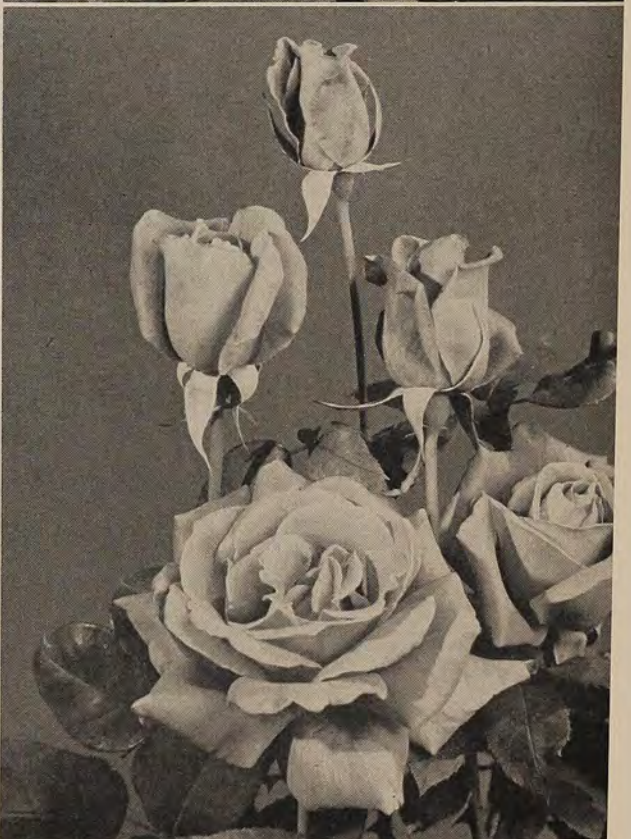
Three Seedling White Dogwoods
Five Years Old

Season of Taking Cuttings	Rooting Percent as of Aug. 5	Treatment	Percent Alive Nov. 10	Ave. Length New Growth
June 11	95.7%	Indole-butyric Acid in Talc; 1 part to 250	95.7%	3.76 in.

B

Three Mature Grafted Pink Dogwood
Parent Trees

Season of Taking Cuttings	Rooting Percent as of Aug. 5	Treatment	Percent Alive Nov. 10	Ave. Length New Growth
June 11	93%	Indole-butyric Acid in Talc; 1 part to 250	78.7%	1.38 in.



Rose Capistrano

(*Germain's Photo.*)

Rose Fred Howard

(*Howard & Smith Photo.*)

Rose Chrysler Imperial

(*Germain's Photo.*)

Rose Charlotte Armstrong

(*Armstrong Photo.*)

All-American Rose Selections

PAUL W. THURSTON

Horticultural World Honors Fifteenth Anniversary

One of the best examples of what intra-industry cooperation will accomplish in a highly competitive field is evidenced in the program being carried on by the American rose industry. What is more interesting, this cooperative effort came into existence not through self-interest, but rather from a public service attitude on the part of the industry itself.

The rose is known as the Queen of Flowers, and is by far the most popular flower grown in America. It is the national flower of England as it is in fact, if not by official designation, of the United States. A recent Gallup poll shows that it is preferred by Americans 18 to 1 over any other flower.

An industry as highly competitive as rose growing was sure to have a history of jealously guarded secrets, intra-trade differences and a public suffering from an acute case of confusion. Up until 1940, new rose introductions were placed on the market on a purely speculative basis. Because of the large amount of time and money necessary to develop a new variety, growers ran the risk of substantial loss if their introductions failed to find public acceptance. And at the same time, with hundreds of varieties from which to pick and choose, the average gardener had little idea of what to expect from any particular one in his own garden. In effect, he became a tester for new and unproved introductions, a position which often cost him considerable time and money.

To bring relief to the public and some semblance of order to the rose market, a group of the nation's leading

growers and experts joined together in 1938 to form All-America Rose Selections, Inc. Their purpose was to establish the highest possible standards for roses in general and to develop new varieties that would produce excellent results anywhere in the country. The year 1953 is significant in the horticultural world because it marks fifteen years of successful progress towards that goal.

Under the guidance of the A.A.R.S. group, specifications governing the all-important characteristics of roses were set up. Following through on this, twenty-one official test gardens were located in various sections of the country where the new varieties were to be tested under a two-year trial plan before introduction to the public. The result of this has been that every rose bearing the green and white A.A.R.S. label has not only won through this two-year trial period, but has been judged on actual performance under the widest possible variation of soil and climate.

Just what this pre-testing means to the average gardener is not readily apparent to most people. Before a grower can even put an entry in the trials, he must develop from 5,000 to 6,000 seedlings of a single variety from which he may get one or two good enough to enter the competition. These plants must then compete for two years in the twenty-one different testing stations against the best developed by other growers.

The All-America testing stations are located at:

Armstrong Nurseries, Ontario, California; University of Florida, Gaines-

ville, Florida; Howard and Smith Company, Montebello, California; Jackson and Perkins Company, Pleasanton, California; Clyde H. Stocking Company, San Jose, California; Texas Rose Research Foundation, Tyler, Texas; Southwestern Louisiana Institute, Lafayette, Louisiana; Howard Rose Company, Hemet, California; Municipal Park, Tulsa, Oklahoma; Bobbink and Atkins, East Rutherford, New Jersey; Woodland Park, Seattle, Washington; International Rose Test Gardens, Washington Park, Portland, Oregon; Jackson and Perkins Company, Newark, New York; Gerard K. Klyn, Mentor, Ohio; Elizabeth Park, Hartford, Connecticut; Cornell University, Ithaca, New York; The Conard-Pyle Company, West Grove, Pennsylvania; Penn State College, State College, Pennsylvania; Ohio State University, Columbus, Ohio; Iowa State College, Ames, Iowa; and Lyndale Park, Minneapolis, Minnesota.

During the test period, the plants are scored by impartial experts under a uniform system covering thirteen characteristics which are essential to a quality rose. Vigor, disease resistance, floriferousness, foliage, bud form, flower form, substance, opening color, finishing color, fragrance, habit, novelty, and stem and neck are all considered by each judge throughout the period.

The twenty-one sets of scores are then sent to the National Rose Jury which tabulates them and makes the annual announcement for that year. When the gardener stops to think that a rose marked with the A.A.R.S. tag is the best literally of hundreds of thousands of seedlings, he understands just how great the value of the system is.

The first announcement of the All-America Rose Selections award was made in 1940, following the first two-

year testing period. To date, only thirty-seven varieties have been given the honor out of the many plants entered into this most rigid of testing systems. Ample evidence that no compromise is ever made with A.A.R.S. standards, is shown by the fact that in 1951, no winners were chosen even though some varieties achieved relatively high scores. It was felt, and rightly so, that since none had come up to the high standards set for the award, the integrity of the A.A.R.S. forbade any compromise with market or public demand.

During the past thirteen years, professional and amateur gardeners alike have learned to rely on All-America Rose Selections as the criteria of quality in new introductions, yet few realize that their splendid flowers are the result of years of patient experiment and research. That new and exciting varieties are introduced year after year is a tribute to the imagination and resourcefulness of the hybridizer, who selects the parents, crosses them and nurses his tiny seedlings into strong, healthy plants.

At the minimum, six years are consumed in the development and testing of a prize-winning rose before it can be even entered in the A.A.R.S. trials. The public gets better roses today than at any time in history because an industry has put aside its individual differences to work toward a common goal of higher standards and better products. The industry in its turn has gained immeasurably because of public confidence and recognition that A.A.R.S. roses are the best.

The pedigree of a top quality rose is so valuable that a patent is issued to protect the years of work which the grower lavished on his plant. A winner of the All-America Rose Selections



Rose Taffeta
(Armstrong Photo.)

Rose Mission Bells
(Germain's Photo.)

Rose Forty-niner
(Armstrong Photo.)

Rose Nocturne
(Armstrong Photo.)

award, the "Oscar" of the horticultural world in the United States, is truly a thoroughbred, pre-tested and ready to grow and flourish in any section of the country.

There are more than 6,000 named varieties of roses in existence today, but gardeners have learned that the simplest and safest way to get the best is to choose A.A.R.S. varieties.

Since the first announcement in 1940,

the National Rose Jury has presented the gardeners of America, a star-studded list of magnificent roses. These spectacularly beautiful flowers which are hardy in all parts of the country, are renowned far and wide for their fragrance, color and all the intrinsic qualities which are characteristic of a thoroughbred rose.

The list of A.A.R.S. champions is indeed impressive:

	1940	
Dickson's Red	Scarlet Red	Hybrid Tea
Flash	Oriental Red	Climbing Hybrid Tea
The Chief	Salmon Red	Hybrid Tea
World's Fair	Deep Red	Floribunda
	1941	
Charlotte Armstrong	Cerise Red	Hybrid Tea
Apricot Queen	Apricot	Hybrid Tea
California	Golden Yellow	Hybrid Tea
	1942	
Heart's Desire	Deep Rose Red	Hybrid Tea
	1943	
Grand Duchesse Charlotte	Wine Red	Hybrid Tea
Mary Margaret McBride	Rose Pink	Hybrid Tea
	1944	
Fred Edmunds*	Apricot	Hybrid Tea
Katherine T. Marshall	Deep Pink	Hybrid Tea
Lowell Thomas	Butter Yellow	Hybrid Tea
Mme. Chiang Kai-Shek	Light Yellow	Hybrid Tea
Mme. Marie Curie	Golden Yellow	Hybrid Tea
	1945	
Floradora	Salmon Rose	Floribunda
Horace McFarland	Buff Pink	Hybrid Tea
Mirandy	Crimson Red	Hybrid Tea
	1946	
Peace	Pale Gold	Hybrid Tea
	1947	
Rubaiyat	Cerise Red	Hybrid Tea
	1948	
Diamond Jubilee	Buff	Hybrid Tea
High Noon*	Yellow	Climbing Hybrid Tea
Nocturne	Dark Red	Hybrid Tea
Pinkie	Light Rose Pink	Polyantha
San Fernando	Currant Red	Hybrid Tea
Taffeta	Carminé	Hybrid Tea

1949

Forty-Niner	Bicolor-Red, Yellow	Hybrid Tea
Tallyho	Two-tone Pink	Hybrid Tea

1950

Fashion	Coral Pink	Floribunda
Mission Bells	Salmon	Hybrid Tea
Capistrano	Pink	Hybrid Tea
Sutter's Gold	Golden Yellow	Hybrid Tea

1952

Fred Howard	Yellow, pencilled pink	Hybrid Tea
Vogue	Cherry-Coral	Floribunda
Helen Traubel	Apricot Pink	Hybrid Tea

1953

Chrysler Imperial	Crimson-Red	Hybrid Tea
Ma Perkins	Coral-Shell Pink	Floribunda

*Derjotes Sectional Recommendation.

Gardening In Scotland

DR. AND MRS. J. M. COWAN

Stonefield Argyll

Garden lovers planning a tour of gardens in Europe are well advised to give Scotland an ample share of their time, for they will surely wish to linger long in some of her world-famed gardens. The great variety of plants and the luxuriance of the growth that they find will, no doubt, astonish them. This will be especially true if they hold the view, like many people living in the south of England, that Scotland, though having beautiful scenery, is, nevertheless, the bleak and barren north. Like them, too, they will doubtless assume that she has an inhospitable climate where only the hardiest of plants and human beings can flourish. This myth about our climate, perpetrated fifteen centuries ago by the Romans, dies hard even today, but a myth it certainly is for it bears no relation to the facts. Indeed, if there is a climatic line dividing the British Isles, it is not, as the

Romans thought, the Emperor Hadrian's Wall which runs east to west mild with a moisture-laden southwest from the Tyne to the Solway, following very nearly the border between England and Scotland. Rather is it a line from north to south separating the western third of the country from the central and eastern two-thirds.

The west is rainy and comparatively mild with a moisture-laden south-westerly wind prevailing and a branch of the warm Gulf Stream lapping the shores from Land's End in Cornwall to Cape Wrath in the north of Scotland. The east has a much larger share of the devastating easterly and northerly winds from the Russian Steppes and the Arctic and no Gulf Stream to mitigate the cold. Moreover, the warm winds from across the Atlantic shed most of their moisture and with it much latent heat on our western shores before travelling very far inland. This

means that the rest of the country is much drier as well as being colder.

The result is that there are many gardens in the west of Scotland, like Logan in the southwest and Inverewe as far north as Ross-shire, which are famed for their wealth of tender and even semi-tropical plants such as Tree Ferns and Palms. Their mild damp climate and cool soil have proved very favourable to the growth and flowering of such shrubs as *Eucryphia cordifolia* and *E. pinnatifolia*, *Embothrium coccineum* and *Tricuspidaria lanceolata*, all from Chile, and the Australian Bottle Brush, *Callistemon coccinea*. These will scarcely survive the winter much further east, even as far south as the Home Counties of England.

One of the most striking of the gardens in the west which I visited recently is Stonefield on the shores of Loch Fyne in Argyllshire. This famous old garden is one mile from the charming little harbour town of Tarbert at the northern end of the peninsula of Kintyre. The mansion house, formerly the home of a branch of the Campbell clan, is now well run as Stonefield Castle Hotel. Staying there, visitors can enjoy, as I did, in comfort and leisure, the beauty of the garden and of its surrounding country.

Fortunately the character of the garden has been preserved, with its magnificent heritage of rare trees and shrubs. Perhaps most precious of all these is its unsurpassed collection of Himalayan Rhododendrons, flourishing as in their native habitat. The natural setting of the garden is superb, surrounded as it is by magnificent Highland scenery. Its wooded slopes run down on the east to the shores of Loch Fyne, a narrow inlet of the sea. To the southwest and northwest the garden is protected by hills from the

violence of the mighty Atlantic gales, that would otherwise play havoc with many of the plants.

The visitor to Stonefield is perhaps first impressed by the remarkable growth and variety of the Conifers, among them many introduced species, such as the Douglas Fir, which the young Perthshire traveller, David Douglas, first discovered on the banks of the Columbia River. There are fine specimens, too, of *Abies nobilis* (now called *Abies procera*) which are well worthy of their name, The Noble Fir, and also of *Abies grandis* (The Giant Fir) a tall tree which thrives particularly well in the west of the British Isles, *Sequoia gigantea* (The Big Tree) and the Western Hemlock (*Tsuga heterophylla*), very decorative with its graceful habit and spire-like crown. Another Conifer which may be seen growing with unusual freedom is the California Nutmeg (*Torreya californica*).

Outstanding too are the tall gum trees, *Eucalyptus coccifera* and other species and a magnificent specimen of the New Zealand shrub, *Griselinia littoralis*, nearly 40 feet high. Other New Zealand shrubs which seem quite at home are *Olearia macrodonta* and *Fuchsia excorticata*, of which there is a particularly large specimen, an unusual plant with pale shaggy branches clad with peeling bark. A plant of *Desfontainea spinosa*, which comes from Chile, is remarkable both for its height and circumference and is a rare sight when in flower, its attractive red and yellow bells contrasting so unexpectedly with the dark green holly-like leaves.

Further proof of the mildness of the climate at Stonefield is provided by the exuberant growth of half hardy trees such as *Pittosporum tenuifolium*, an



Robert M. Adam

Rhododendron grande

evergreen whose small dark brown flowers have an exquisite honey-like fragrance, the black young shoots and the pale green leaves making a strong contrast. In this category comes also the Himalayan *Magnolia Campbellii*—

perhaps the most magnificent of the magnolias—over 25 feet high and *Magnolia denudata* (the Yulan of China) one of the most beautiful and distinctive of all flowering trees. Then, two unusual and tender shrubs which flour-



Robert M. Adam

Rhododendron niveum

ish there are *Mitraria coccinea*, a native of Chile, with brilliant red flowers and neat glossy foliage and *Philesia buxifolia* from the Magellan region, a curious liliaceous shrub with rich red tubular flowers.

But, as I have mentioned, Stonefield's greatest title to fame is undoubtedly her unique collection of Himalayan Rhododendrons, many of them a hundred years old and raised from seed

collected by Sir Joseph Hooker in about 1850. Most of the species figured in Hooker's folio volume on the Rhododendrons of the Sikkim Himalaya are thoroughly at home at Stonefield and have grown to their full stature. In all, some 20 Himalayan species flourish happily there and many sow themselves freely on the mossy lawns. Perhaps the most outstanding of these is a plant of *Rhododendron*

eximium covering a very large area and some years completely smothered in its pinkish-mauve flowers. Its close relation, *R. Falconeri*, with large cream coloured flowers, is represented by specimens up to 25 feet high, as also is *R. grande* with similar flowers and beautiful silvery foliage.

Various forms of *R. arboreum*, with red, pink or white flowers, are veritable trees, some 30 feet high or more, quite as large, I am told, as those which form the Rhododendron forests of the Eastern Himalaya at elevations of 10,000 to 12,000 feet. The closely allied *R. niveum* with compact trusses of rich purple flowers is also represented by an exceptionally fine specimen.

To see these plants in flower, the best time to visit Stonefield is the end

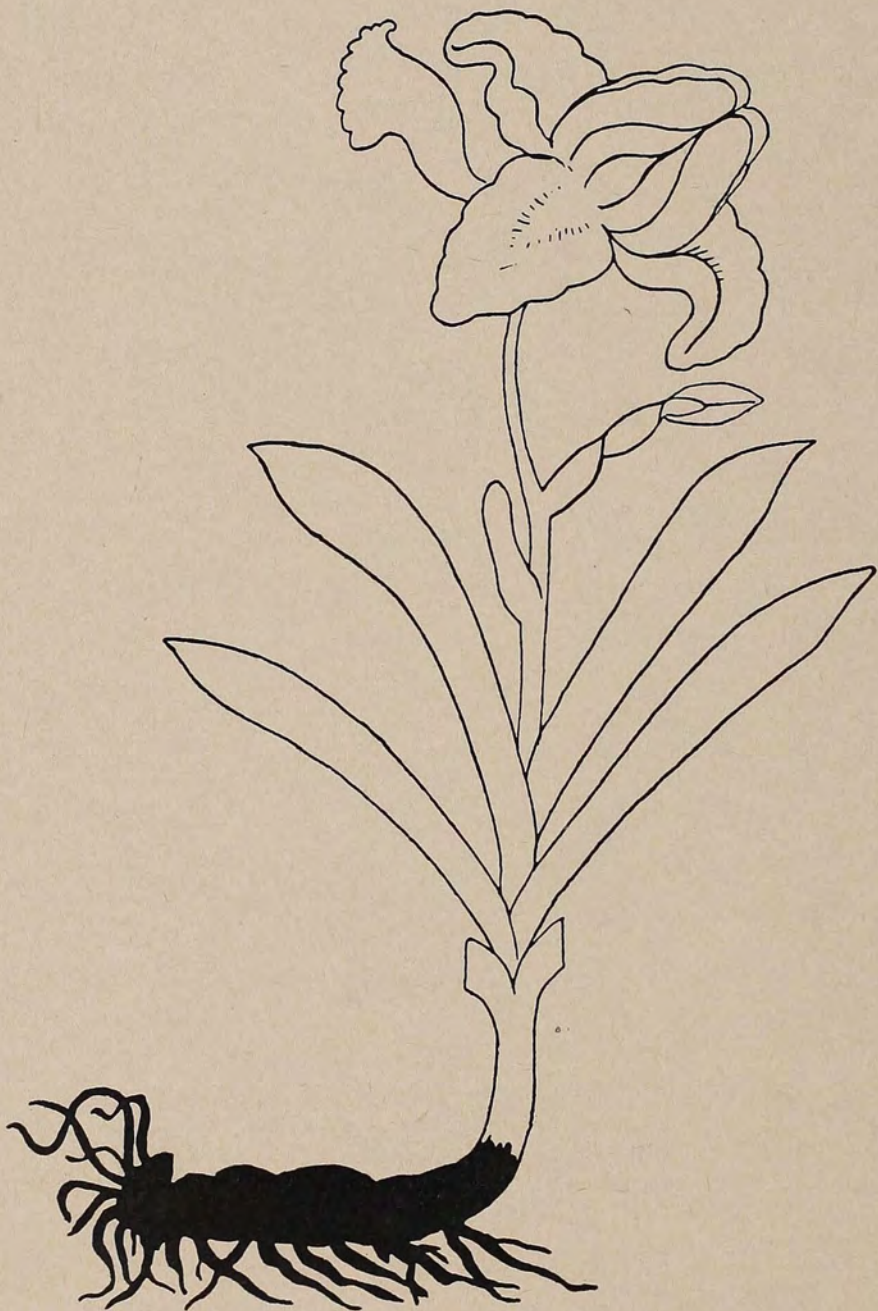
of April or early in May, but the garden is interesting at all seasons and attractive both to the amateur and to the better informed.

Moreover, although it is sixty miles from the nearest railway station, at Arrochar, Stonefield is by no means inaccessible. It can be reached comfortably by boat from Glasgow to Tarbert or by bus direct from Glasgow. The bus travels along the shores of Loch Lomond and through beautiful scenery all the way. But those who are fortunate enough to be going on the Cruise to Scottish Gardens in May this year, arranged by the Gardens Committee of the National Trust for Scotland, will be travelling to Stonefield in perhaps the pleasantest manner possible.

Rhododendron eximium

Robert M. Adam





Iris Germanica or *I. florentina*

Photographed from "The Greek Herbal of Dioscorides"
by Robert T. Gunther, The University Press, Oxford, 1934.

Iris

E. BUCKNER KIRK

Namesake of a goddess; symbol of a Bronze Age religion; heraldic device of the kings of France; "sovereign" remedy for a vast number of ailments from weak eyes to insanity, and including the gynecological; flavor for various beverages, hard and soft; basis for countless perfumes and powders; ornament of our gardens. The Who's Who item for the Iris is a long and distinguished one.

Iris, the Greeks believed, was the messenger of the gods and the personification of the rainbow. Among her duties was that of leading the souls of dead women to the Elysian Fields. And, in token of that faith, the Greeks planted purple Iris on the graves of women.

There is another symbolism that some 19th century authorities claimed for the Iris. It may once have represented the triumph of day over night. This theory has been seriously advanced though it seems a tenuous one. For if the Iris indeed represented the victory of light over darkness, day over night, it must have been in an almost unbelievable antiquity. By a vigorous stretch of the imagination one can grasp that primitive man might feel some anxiety, when flowers withered and leaves fell from trees, that the burgeoning he dimly remembered months ago, might not be repeated. But the modern mind boggles at the savage's apprehensive fear that once the sun has set it will not rise again.

Any such symbolism, if not dismissed as guesswork, is purely deductive, but we do not find the Iris actually appearing visually as a religious symbol in that misty period, the Bronze Age, where history and prehistory meet.

Between 3,000 and 4,000 years ago an artist in Crete was commissioned—more probably commanded—to model in stucco on one of the walls of the great palace at Knossos, a representation of the Priest-King. When he had finished the vigorous figure of a youth in low relief, he painted a background which may have been intended to suggest the local version of the Elysian Fields. For the young Priest-King strides forward, Iris to the right and to the left of him. Of these, the great archaeologist, Sir Arthur Evans has written: "The floral fragments that occurred with the relief . . . may be regarded as highly stylized versions of an Iris type. They are executed with great delicacy and the minute undulations visible on the edges of the petals recall this flower. Elsewhere, too, it appears as a sacred flower." "And," Sir Arthur goes on later, "may indeed well have been suggested by . . . *I. reticulata* which today blooms abundantly over the site of Knossos—the fairest harbinger of the Cretan spring."

Highly stylized art is not born overnight. It is the product of generations of experience with form and technique, besides indicating a specialized approach to the object stylized. The Cretan artist who fashioned the Priest-King was no caveman scratching his first representation of a human being and some flowers on a bit of bone or stone. His work is, indeed, so sophisticated that it suggests centuries of art tradition behind him. And if the Iris appears stylized as a sacred symbol between 1900 and 1500 B.C., its origin as such a symbol is lost in a period beyond any present knowledge.

There are other Irises in Knossos painted under circumstances that make

them peculiarly interesting. Apparently Minoan civilization was not limited, as were most ancient ones, to the noble and kingly classes. Little men, if the surviving examples are any indication, had cultivated taste and the means whereby to gratify it. In the ruins of a small house on a city street which belonged, Sir Arthur believed, to a petty tradesman or merchant, he and his men found fragments of two frescoes from a room in that house. Against a warm terra-cotta-colored background a big blue bird dominates one painting, a blue monkey the other, and patterned around them both are rocks and flowering plants. There we find out Iris again, conventionalized a little, but very little, for the sword-like leaves and crested flowers look so familiar, so natural, that we are driven to wonder about their owners—what sort of man and woman and children enjoyed them as part of home three and a half millenia ago?

A comparatively short time after Iris bloomed on Minoan walls, they appeared sculptured in stone at Karnak in Egypt. Thothmes III (1504-1450 B.C.) celebrated his conquest of a large slice of Asia Minor by having a garden built near one of his palaces to display some of the plants he had brought back from his campaign. A number of these seemed exotic enough to be perpetuated in stone, so he had them carved on a great wall of the temple of Amon and unmistakable among them are some Iris. Even to the lay eye they look like Iris, and W. R. Dykes has identified them as *I. oncocyclus*. But we also have assurance from Thothmes himself of their authenticity. He had an inscription carved near his flowers which reads in part: "Year 25 of the King of Upper and Lower Egype, Living forever. Plants which his Majoesty found

in the country of Syria. . . . His Majesty saith, 'As I live, all these plants exist in very truth; there is not a line of falsehood among them. My Majesty hath wrought this to cause them to be before my father Amon, in this great hall for ever and ever.'" For ever and ever is a long time, but 3,400 years is not so bad either.

The final symbolism of the Iris carries us by a long leap out of antiquity into European history. The fleur-de-lis as conventionalized form long predated its association with the kings of France, but its significance lacked the weight of meaning that accumulated with time around the French national symbol.

There are various legends of how the Iris came to represent the French monarchy but most of them center around one or the other of two historical incidents separated from each other in time by a mere six hundred years.

The first of these concerns Clovis who, in 496 A.D., is said to have abandoned the three toads on his banner in favor of the fleur-de-lis. No bad swap either, as any gardener will admit. His Christian queen, Clothilda, had long sought, so runs the tale, to convert her heathen husband. But Clovis ignored her pleadings and prayers until faced by a formidable army of Huns. In that critical hour he told his wife that if he won the coming battle he would admit the efficacy of her God and be baptised. He did win, of course, and the toads, whose symbolism it might be fun to know, disappeared into limbo.

The second incident is a tradition about Louis VII of France. Shortly before setting out on his ill-fated crusade in 1147, he adopted the purple Iris as his device in obedience to a dream he had had and thus, according

to this version, the fleur-de-lis came to the banner of France.

For close to six hundred years then, if we take the date from the time of Louis, nearer twelve hundred if we take it from Clovis, the Iris was a living symbol of a great nation.

"Now by the lips of those ye love,
fair gentlemen of France,
Charge for the golden lilies!—

Upon them with the lance!"

may be a romantic couplet, but it was, over and over again, grim and bloody earnest. Men charged and fought and died for the land the fleur-de-lis represented. Today, on a piece of junk jewelry, an upholstered chair, wallpaper, dress material, we see a conventionalized ornament. It is hard to realize that for centuries of Frenchmen that symbol held the same emotion with which we first saw the photograph of the six sergeants planting the stars and stripes on Iwo Jima.

So potent was the fleur-de-lis as the device of French kings that the Revolution set out to obliterate it as a symbol of the hated monarchy. It was chipped off buildings and torn from draperies. Men were guillotined for wearing, however, incidently, a fleur-de-lis on their clothes or jewelry. And the Revolution succeeded, for the fleur-de-lis is a symbol now in memory only and passed, as such, into the realm of conventionalized ornament.

Throughout the above section on the fleur-de-lis readers will have noted my acceptance of it as a conventionalized Iris. Yet in the romantic couplet quoted French knights were exhorted to "charge for the golden lilies." Not only has the fleur-de-lis been thought by some to have originated from a lily, but a sword-hilt, a spear-head, and a toad have also been suggested as its origin. "Much learned ink has been

spilled in the endeavor to find out what flower, if any," says H. N. Ellacombe, "was intended to be represented." Abandoning sword-hilts, spear-heads, and toads, most of the writers on the subject that I have read hurl Chaucer, Shakespeare, Spenser, and Ben Jonson at each other:—on the one hand Shakespeare's "lilies of all kinds, the Flower-de-luce being one," with Ben Jonson in rebuttal, "Bring rich Carnations, Flower-de-luces, Lillies," etc., etc. But actually the matter had been settled by the time Shakespeare was four years old, if not authoritatively, at least by popular consent. "From the time of Turner, in 1568, through Gerard and Parkinson to Miller, all botanical writers identify the Iris as the plant named and with this judgment most of our modern writers agree."

I think I may have been able to push the identification of the Iris with the fleur-de-lis back in time a little. All those who saw the magnificent exhibition of French tapestries sent to this country in 1948 will remember the one of the Fying Stag. On this tapestry the stags have the crown and arms of France hung around their necks, both lavishly adorned with fleur-de-lis. Conspicuous in the pattern, and so placed as to suggest a deliberate juxtaposition to the crowns and shields are beautifully executed naturalistic tall bearded Iris. The work is dated 1450-69. If my guess is correct, for five hundred years the fleur-de-lis has been identified with the Iris. It is nearer four hundred from Turner, but even that should be long enough to make the identification stick. Until strong evidence to the contrary is forthcoming it probably will.

A more careful search of old pictures, manuscripts, and textiles may well carry the date even further back

and I would be interested if it were. But I am frankly partisan and hope that any future research continues to favor the Iris.

We can now abandon the Iris as a symbol and go back in time to pick Irises with men who used them hopefully to heal their fellows.

"If one suffer mickle hreak (a great collection of phlegm in the throat), and he may not easily bring it away from him for its thickness, . . . let him take the dust of a root of this wort (*I. germanica*), pounded small, by weight ten pennies, give to drink to the sufferer, fasting, in lithe (soft) beer, four draughts for three days, till that he be healed."

Hreak! Such a beautiful onomatopoeic word! What a pity it did not come down to us—along with less desirable ones—from the Anglo-Saxon. It, together with that naive prescription, delights us. But somehow, too, one's imagination slips away to a woman long ago, pounding orris root, her ears strained for the terrible choking of a child with diphtheria. Just nature, not Iris root in lithe beer, must have pulled through those who did survive the more potent forms of hreak.

The above quotation is from a book that bears the enchanting title *Leechdoms, Wortcunning, and Starcraft*. It is made up of various documents and fragments of documents relating to what then passed for science in England's remote past. The cure for hreak is an English translation of the Anglo-Saxon translation of the Latin translation of the Greek herbal of Dioscorides.

Elsewhere in this same volume we find a cure for dropsy, this time from the herbal of Apuleius, a fourth century Roman: "For water sickness take this wort which is named ———— and by another name gladden (*I. pseu-*

docorus) and next dry it all about; then take the inward part, seethe it in water, when it be warm; mix also thereto honey and vinegar; administer three cups full; very quickly shall the sickness be drawn out by urine." Now whatever may be said about this treatment, it should be pointed out that the term omitted is Greek and literally translated means "the bulb of the squill"—probably *Scilla nutans*. *Scilla nutans* not being handy in 10th century England, the IRIS is blithely substituted.

Iris pseudocorus, the tall yellow flag we grow in our ponds, is native to England, but older than any England we know as it has been found there in fossil form. That it may well have had a place in the early magic-medicine of prehistoric days is suggested in this collection of scientific documents in the Leechbook of one Bald, an Anglo-Saxon practitioner of medicine who flourished about 950 B.C.

"A drink for a fiend sick man (or demoniac), to be drunk out of a church bell, githrife (agrostemma?), cynoglossum, yarrow, lupine, betony, atorlothe, cassock, flower de luce (*I. pseudocorus*), fennel, church lichen, lichen, Christ's mark or cross, lovage; work up the drink off clear ale, sing seven masses over the worts, add garlic and holey water and drip the drink into every drink which he will subsequently drink and let him sing the psalm *Beati immaculati*, and *Expurgat*, and *Salvum me fac. deus*, and then let him drink the drink out of a church bell, and let the mass priest after the drink sing over him *Domine sancte pater omnipotens*."

As a doctor Bald worked under great difficulties. Behind him lay all the ancient native medicinal lore with Christianity more recently superimposed



"Painted Stucco Relief of 'Priest-King': Restored"

Photographed from "The Palace of Minos At Knossos"

by Sir Arthur John Evans, Vol. II, Part II, Macmillan and Co., Ltd., London, 1928.

upon it. Ideas moved so slowly in those days that for all his date, Bald was still very close to the herbal magic that had been the pre-Christian medicinal practice. Christianity had, of course, come to England long before Bald's time, but conversion in the early days worked strictly from the top down. A newly converted king would order his whole army or all his subjects to be baptised, and so they were. Outwardly, at least, most of them conformed. But faced with the grief or anxiety of an illness in the family, it was only human to return to the tried and true practices of fathers and forefathers. Even in Bald's time it is probable that many a Christian muttered over the "worts" he gathered, age-old charms and incantations that predated even Odin and Wotan whom the Angles had brought to England from Germany. The first Archbishop of York (734-766 A.D.) had found it necessary to issue a "Prohibition of"—among other things—"gathering herbs with any incantations except Christian prayers." So Bald was lavish with his Christian trimmings.

The traces of ancient magic that Bald covered up with Christian prayers were not confined to northern Europe. Long before we have any records of mankind in that part of the world, the Mediterranean civilizations had flowered. And still farther back in time, before local communities in Greece could be described as civilized, Iris had had a share in the magic of the healing art. We know this because of the scorn of Theophrastus. Botany, like practically every other branch of science, is popularly supposed to have begun with Aristotle, but actually it was one of his pupils, Theophrastus (370?-287 B.C.), who, following the master's teachings in regard to the

careful observation of nature, became the father of botany. With that beautiful clarity of the Greek mind, disciplined to careful and honest inquiry, Theophrastus was the first to note that fungi, algae, and lichen were plants; to distinguish clearly between annuals, biennials, and perennials; and to recognize many general groups of plants of which more than a hundred genera today bear the names he gave them though they have entered our botanical world through the agency of Linnaeus. Naturally, to so scientifically minded a man, superstitious practises were anathema, so it is to Theophrastus' scorn that we owe our glimpse into the dim past of Greece when the rhizotomists (the root-diggers) were the druggists of the time and possibly even its doctors. "That one should be bidden to pray is not, perhaps, unreasonable, but the additions made to this injunction are absurd; . . . that, when one is cutting Gladwyn (Iris), one should cut it with a two-edged sword, first making a circle around it three times and that the piece first cut must be held up in the air while the rest is being cut." Undoubtedly this difficult gymnastic feat added to the magic of the IRIS so garnered.

Some three hundred years after Theophrastus, the Roman, Pliny, repeated this formula entirely without the Greek's scorn and threw in for good measure the admonition: "It is a point particularly recommended that those who gather it (the Iris) should be in a state of chastity."

Between Theophrastus and Pliny lay a long line of Greek herbalists whose names are known to us through Pliny himself, for he carefully listed all his authorities in his *Natural History*. But the works themselves have disappeared. They probably still live, how-

ever, in the work of Dioscorides, a Greek, who must have derived from his forerunners and to whom we owe the first full length herbal that has come down to us—"the most influential herbal ever written." *de Materia Medica* begins with an article on *I. germanica*.

When Dioscorides led off his great work with *I. germanica* that meant that during all the squalor and violence of the centuries before the Renaissance, when men had neither time nor taste for gardening, the Iris was carefully cherished in the only gardens there were—the physick gardens.

After telling how to dry and treat the root of *I. germanica*, Dioscorides goes on to say that drunk with honey, or wine as the case might be, it was a specific for coughs and colds, for "the torments of the belly . . . & for such as let fall their food, for women's fomentations which doe mollify & open the places, for sciatica, fistulas, & all hollow sores which it fills up with flesh." Laid on as a poultice orris root was good for various kinds of tumors and ulcers, broken bones and headache. Mixed with honey and hellabore it removed freckles and sunburn . . . and finally, summing up the value of the roots, "in a general way they are of very much use."

Those last words settled the matter. With them the Iris, as a valuable drug, entered *materia medica* just about 1900 years ago and, unlike most of the early medicinal herbs, there it has remained until our own day. Not *I. germanica*, however, but our own beautiful *I. versicolor* was in the official U. S. Pharmacopoeia as recently as twenty-five years ago. Mrs. Grieve lists it as "being a useful purgative in disorders of the liver and duodenum, and is an ingredient of many compounds for pur-

ifying the blood. . . Its chief use is for syphilis and some forms of low-grade scrofula and skin affection. It is valuable also in dropsy."

So we end the medical record where we began. For Apuleius' 'bulb of the squill' to cure 'water-sickness,' for which some Anglo-Saxon practitioner substituted *I. pseudocorus*, *I. versicolor* has served us until only yesterday, as it were, for dropsy and scrofula. A long and honorable record.

Iris, so far as I can discover, never got into the kitchen, but it did make its way into beer barrels and wine casks. In Germany orris roots were suspended in beer barrels to keep the beer from getting stale. In France they were hung in wine casks to enrich the bouquet of the wine. In England orris was used to give "the peculiar flavor" to artificial brandies made ther. One feels, somehow, that the adjective describing that flavor was aptly chosen. While in Russia, it flavored a soft drink made of honey and ginger that used to be sold on the streets in Czarist times. Finally, toward the beginning of the 19th century, a French chemist discovered that the seeds of *I. pseudocorus*, freed of their coating and well roasted, produced a drink very like coffee and, he thought, superior to it. When it comes to coffee the French fall far below their own high standard for food and drink, so probably the chemist who enjoyed a brew of *Iris* seed only meant that it was superior to his own chickory-flavored horror.

The Iris came onto the stage of human activities with all the dignity of a religious symbol only to leave it after taking part in what was probably the most frivolous performance ever put on by mankind.

The earliest appearance of the Iris as a perfume, however, could hardly have

been frivolous because the first perfumes were offerings to the gods. Since dried Iris root, flung on a fire, gives forth a pleasant odor, it is more than likely that the Iris figured in some of the sacred burnt offerings of very ancient times. Be that as it may, lovely ladies, very early indeed, saw no reason why the gods should monopolize all sweet scents. In Egypt, Persia, and Greece, perfumes of one sort or another were known and valued from very early periods. Theophrastus mentions Iris among the plants used for perfumes in Athens, and down in Corinth, an Iris water called Irinen, which had the fragrance of violets, was

distilled from the dried rhizomes.

This peculiar property of orris root should be underlined. Its odor, when powdered, steeped, or distilled, is not that of Iris but of violets. Until the synthetic *ionone* was discovered a little more than fifty years ago, all violet powders and perfumes were based on orris root with, in the case of the more expensive perfumes, a little violet leaf extract added.

A second property of orris root is no less important. It has the quality of being able to strengthen the odors of other perfumed substances. In the early 18th century Mr. Charles Lillie, "that Celebrated Perfumer at the

"Blue Monkey In Rocky Landscape: 'Sacral Ivy' To Right"
 Restored drawing by E. Gillieron.
 Photographed from "The Palace of Minos At Knossos."



Corner of Beaufort Buildings in the Strand," described how to make a perfume for hair powder with the scent of a 'well-flavored violet!' Onto a lump of loaf sugar,—he does not say how large a lump—drop 12 drops of rhodium (rose) oil; grind; mix thoroughly with three pounds of orris root. But But "be not induced to add more rhodium oil; for, in that case, a rose perfume will be produced, instead of a violet one; the orris powder itself being a most soft and agreeable perfume, and only requiring to be *raised* by the addition of the above small quantity of the oil." Long before Lillie's time this property of orris root was known, so orris was used not only to make violet perfume, but as a base and fixative for other perfumes.

Pliny lists Iris among the flowering plants used for perfumes in his day and its root was undoubtedly steeped in oil to make the violet-scented unguent that was among those that so infuriated him. For Pliny wrote about "the excesses to which Luxury has run in Unguents" with the venom and fervor of a Carrie Nation denouncing the demon rum. Unguents, he claimed, were introduced to the Romans by the Persians who used them to "counteract the bad odors which are produced by dirt." The Romans, being a cleanly people had no such need for the pleasant odors of perfumed ointments. They just liked them. These, Pliny objected, were scandalously expensive:—"Pearls and jewels, after all, do pass to a man's representative, and garments have some durability; but unguents lose their odor in an instant." He admitted some faint virtue in the fact that "when a female passes by, the odor which proceeds from her may possibly attract the attention of those who even till then are intent upon something else." Since

the odor proceeding from the female might equally distract some conscientious citizen from serious business, it is a wonder that Pliny did not bring that up as one of his objections to the extravagant luxury.

When civilization had staggered to its feet after the fall of Rome and the ensuing dark ages, all through the feudal period, the Renaissance, and up to comparatively modern times (and plumbing) orris root played a major part in helping to make social intercourse bearable. Clothes and even gloves were well soaked in perfume. Orris root itself, as a perfume for linen, is mentioned as early as 1480 in the wardrobe accounts of Edward IV. It is possible, too, that the "swete cloth" famous in Queen Elizabeth's day was achieved by the same method. French peasant women have long used to make their household linen fragrant. Several pieces of dried orris root, strung on a string, would be plunged into boiling water with the clothes. Taken out and dried, the roots could be used again and again. Whether or not this could be managed in a modern washing machine remains to be seen.

"Swete cloth," if so achieved, could only have been linen. However pleasant that might be next one's skin it could hardly have been efficacious in itself. Look at the portraits of the time. There was wool, of course, but if one were a person of any importance at all, one wore silk, satin, or velvet. Dry cleaning was a long, long way in the future. "Swete cloth" underneath and a great deal of perfume on top was the only resort of the fastidious since bathing was considered dangerous.

So for centuries orris root played an important social role. It remained for the 18th century to carry that role to the extreme of absurdity, for, at the

beginning of the century men and women started to powder their hair.

For the first fifty years the new hair-dos were fanciful and elaborate enough, heaven knows, but they grew more and more so until by the seventies and eighties they had reached heights—and literally—that are hardly believable. It was not at all unusual for a lady of fashion to have a coiffure that towered two feet above her forehead, and three was far from unknown!

Orris root was not, in this case, the basic powder used. It may have been in the case of the very rich, but possibly because of its texture, more probably because of expense, it was simply added as a perfume to flour, or "Poland starch" (a kind of flour), and later to a powdered white earth. Before the latter was discovered one of the grievances of the hungry peasants of France was that so much of the flour that they needed for food went to dress the hair of the nobility.

Hair powder was not nearly so simple a commodity as the words "flour" and "starch" suggest. The perfumer, Lillie, warns his customers against buying starches which have "been so adulterated as to be damp and mouldy" or "very bad indeed"—in what way he does not specify, but probably horrendous! Whether they were "light and flying," as he recommends, or "damp and mouldy" the powder was always perfumed by the addition of orris root either for its own scent of violets or as a base for some other fragrance.

Even aside from the olfactory offense of mouldy powder, the need for perfuming these coiffures is crystal clear when one reads a contemporary description of a hair dresser asking a lady—"how long it was since her head had been opened and repaired. She

replied, not above nine weeks; to which he replied that that was as long as a head could well go in summer and that therefore it was proper to deliver it now." The gentleman who gravely reported this conversation to the Cambridge Antiquarian Society adds that—"The description of the said opening of the hair and the disturbance that it occasioned to its numerous inhabitants is best left to the imagination."

There, too, I shall leave it. But possibly my readers will find as much interest as did the Cambridge Antiquarians in learning how the structure was built. "The substratum was composed of wool, tow, pads, and wire, over which was drawn the natural or false hair." Once this was arranged, the main powdering must have followed. Then, artistically arranged on the basic structure, came such trimmings as ribbons, huge plumes, ropes of pearls or beads, artificial flowers. As finishing touch objects of blown glass were often added—insects, birds, ships, animals,—a sow is mentioned in one list. Were, one wonders, the little pigs attached?

In 1777 Hannah More wrote in a letter to a friend:—"The other night we had a great deal of company—eleven damsels, to say nothing of the men. I protest I hardly do them justice when I pronounce that they had, amongst them, on their heads, an acre and a half of shrubbery, besides slopes, grass-plots, tulip-beds, clumps of peonies, kitchen-gardens, green-houses."

The French Revolution, when so many lovely ladies lost not only their head dresses but their heads, brought up abrupt end to the grotesque fashion, not only in France but in England and Europe generally. So as a very minor result of the great world upheaval of a hundred and fifty years ago, orris root

sank back once more to its normal uses in pharmacy and the perfume industries but not for long even there. Modern chemistry, which began in the early 18th century and from which modern medicinal drugs were born, has eliminated all Iris from the pharmacopoeia. With the coming of synthetics the need for Iris in the perfume and cosmetic industries has dwindled to quantities negligible compared to the great days of its usefulness in those fields.

Today the Iris is an ornament of our gardens. Yet over all the years that men have cultivated Iris for practical purposes, however carefully they grew the plants for the sake of the utilitarian roots, they must often have delighted in the beauty of the flowers. Now we, who grow them only for the beauty of the flowers, might take a new look at them. The beauty we enjoy is not lessened by the knowledge that, over at least three and a half millenia, the Iris has served mankind in various ways, grave and gay.

Naegelias

PEGGIE SCHULZ

Some house plants are grown for foliage effect—others strictly for floral beauty. When we find window gardening material, such as the *Naegelias*, that are a happy combination of exquisite foliage and beautiful flowers we are indeed a fortunate lot.

Naegelias were named in honor of Karl von Naegeli who was a professor of botany at Munich. They originally came from Mexico and Central America, belong to the Gesneria family, and comprised of about six species. These plants grow from a scaly rhizome or tuber that is rather like a small pine cone in appearance. When good culture is maintained the rhizomes are firm, white shaded into pink, and many of the threadlike roots are red. Poor culture turns the tuber into a grayish mass and it soon disintegrates.

Dealers usually ship dormant tubers in late spring or early summer and they should be potted immediately in a porous soil such as this: $\frac{1}{3}$ each of peat-moss, leafmold, and good garden loam. However, if you have a mixture that grows African violets or Gloxinias to perfection you may be assured that it will suit *Naegelias* equally well.

Due to the fragile nature of the dormant tubers they often arrive in pieces rather than intact. If this happens to your shipment, don't do as a friend of mine did and throw the pieces away. As is so often the case in certain species of lilies, these scaly portions are potential plant-makers and should be saved and planted. I like to pot three rhizomes to a 6-inch pot and cover them firmly with approximately an inch of potting mixture. If staggered

plantings are arranged for it is possible to have a plant or two in foliage or flower most of the time.

An east or northeast exposure is fine for them. They like the morning sun and enjoy a good, light room. They can be grown in a southern exposure but the foliage will not have the depth of color and you will have to provide protection from the hot midday sun so the leaves will not burn. Watering requirements approximate those of Saint-paulias. The leaves will benefit from a spraying of tepid rain water but it is never advisable to spray them with tap water that contains chlorine. This chemical content leaves unsightly white spots on the dark foliage. Do not set them in the sun after a bath or they will be covered with burned areas.

N. cinnabarina is my favorite and has proven (at least for me) to be the easiest to handle indoors. The first tiny leaves that push through the soil appear to be made of thick, red plush. The stem is sturdy, about the size of an average lead pencil. Leaves are nearly round and neatly crenate. Upon examination of the petioles they are found to be green but good culture produces such a mass of "fur" on them that they give the illusion of being entirely red. Although Naegelias grow into rather large plants in a greenhouse, actually two or more feet, they are kept well within bounds when grown in a window garden. My plants seldom ever grow over fourteen inches in height.

As flowering time nears, an interesting rosettelike bud formation appears on the apex of the plant stems. Naegelias are seldom ungainly and definitely cannot be hurried into flowering in the indoor garden. If the plants are removed to a somewhat cooler spot, 65-68 degrees, flowering will be pro-

longed over a period of six weeks to two months. When grown where temperatures are 70 degrees or over, some provision will have to be made for supplying extra amounts of humidity to them. These are all time-tested humidifiers: set the plants on pebble filled saucers and keep water in saucers just below pot level, place plants in larger moss lined pots and keep moss moist enough to dispense extra amounts of vapor into the air, or set plants on moistened sand.

Flowers on the Naegelias that I have seen are about an inch and a half long. The blossoms on *N. cinnabarina* are scarlet with a creamy lining. Small dots are arranged in the inside center of the flower and continue outward to the petal edges. If you have never seen a Naegelia in bloom you might think that a red-foliaged plant, producing red flowers, would not be attractive. However, Nature has a way of blending colors into a harmonious effect that defies description. Due to the fact that the flowers open wide to expose their creamy throats and garnet flecks, the entire contrast of flowers and foliage is most pleasing.

N. zebrina is perhaps the next ranking in popularity among window gardeners. In fact, some of my friends prefer growing it to *N. cinnabarina*. The leaves on this species are cordate, margins crenate, and their coloring is indeed an exciting feature. Each leaf is dark, furry green, marbled with a rich shade of wine. Growth is the same as described above, and the flowers are red and spotted inside with white.

N. fulgida has rather coarse green foliage. The leaves are serrated and covered with hairs. Flowers are bright red, and the inner portion of the floral tube is spotted with yellow.

N. multiflora has foliage similar to *N. zebrina* but the floral display is not brilliantly colored as on most of the other species. Instead, these flowers are very light, from white to cream colored.

N. achimenooides is listed in Bailey's *Cyclopedia of Horticulture* as a hybrid of *N. zebrina* and *Achimenes* or *Gloxinias*. The flowers on this plant are reported to be large for a *Naegelia*, often two inches long, "talisman" coloring on the outer portion, rose spotted inside.

Bailey also lists *N. hyacinthina* and describes it as of "horticultural origin, probably a hybrid." The white, or rose flowers on this plant grow in a pyramidal, compact form.

There are several hybrids listed among the *Naegelias* and although they usually have to be purchased in mixed assortments, some of them have been named.

Golden King has marbled leaves similar to *N. zebrina* but the blossoms differ by being deep yellow.

Monarch features foliage that is embued with bronze coloring and the flowers are red.

Orange Delight has flowers that are orange inside and yellow outside.

Orange King is perhaps the most widely grown of the hybrids and is the one that is sometimes seen listed separately in catalogues. As the name implies, the flowers are orange.

Propagation of *Naegelias* is a relatively simple matter. Like most members of the *Gesneriaceae* they can be induced to grow stock from leaf or stem cuttings, hand-pollinated seeds, or rhizome division. If you wish to grow them from a leaf be sure to sever some of the parent stem along with the cutting. Pot the cutting in damp

sand and cover with a drinking glass. *Naegelias* do not root as quickly as many other members of the *Gesneria* tribe. Often the leaf dies down before sending up a new plant. Do not discard the material at this point. If you are curious, lift the withered stem and you will perhaps find that it is well rooted and has been growing a tiny rhizome. Never let this small "start" dry out completely; sprinkle with warm water once a week. As soon as leaves poke through the soil it may be treated as an adult plant.

I have a favorite method of propagation. Perhaps I prefer it because I get the most for the least time expended. As the plant shows signs of decline in its seasonal growth I sever the stem at the point where it seems most resilient. This can be determined by bending the plant slightly from the base towards the top. Usually this gives me a cutting of 4-6 inches. This cutting is potted in damp sand and placed in a terrarium where humidity is held at a constant level. In about a month small rhizomes appear in the leaf axils, just as they do in many varieties of *Achimenes*. These rhizomes can be detached when about half an inch long and stored in sand or vermiculite or potted immediately and kept dry until the next growing season appears. The cutting usually strikes root too and produces a sturdy rhizome.

Seeds are fine and are handled in exactly the same fashion that *Gloxinia* or *Saintpaulia* seeds are sown.

Naegelias may be stored in the pots they have grown in or they can be removed and placed in sand and kept dry until their dormancy is over. Like many plants of this nature, their rest period is unpredictable. I have had them rest a month and occasionally they remain dormant for three months.

Naegelias do increase in rhizome count during their growing season and it is not unusual to turn out a pot of dormant tubers and find that you have twice as many as you originally planted. As soon as the new shoots appear above the soil line it is time to gently remove an inch of the old soil, add a freshly fortified mixture, and bring them up to the light.

When growing Naegelias in a greenhouse it is perhaps desirable to store them under benches while they are

"sleeping." If so, be careful to keep water from dripping down on them. Such procedure leads to moldy soil and eventual decay of rhizomes.

If you enjoy the thrill of growing tropical plants add a few Naegelias to your window garden. Place red-foliaged *N. cinnabarina* near a white flowered Gloxinia or Saintpaulia and you will have a setting that will pique the interest of all who view it!

A contribution from the American Gloxinia Society.

Tuberous Begonias

STANLEY SPAULDING, *Editor*

The tuberous begonia was originally discovered growing high in the Andes Mountains of South America in the natural leafmold beneath trees. They received daily rainfall and early morning or late afternoon sun. It is therefore reasonable to assume that the tuberous begonia hybrids like to grow that way, and we should try to copy nature's conditions to the best of our ability.

So, select a location that is sheltered from the wind yet receives good light. Early morning and/or late afternoon sun is good, or a lathed-over area with laths running north to south, so that the sun and shade continually change all day long. If the bed is in full shade there must be good reflected light from buildings or fences.

The soil should be a sandy loam containing large amounts of oak leafmold. One-third mold and two-thirds loam is a good bedding mixture. If your soil is heavy it is best to plant in raised beds containing the above soil mix to a depth of six or more inches.

Soil mix for pots or boxes should be about one-half mold and one-half sandy loam.

We should try to copy nature's way of providing adequate humidity and moisture. The simplest way is by a daily overhead watering with a rain-like spray. The humidity can be increased by spraying the walks and surrounding areas with water at the same time and also at intervals during hot, dry days, depending on the intensity of the heat. It is very important that the rain-like moisture be applied early each day at the same hour. That is done so that the plant has a chance to dry off before the heat of the day; otherwise some moisture will be retained in the base of the flowers and buds, causing rot and bud drop.

Tuberous begonias can be grown in any location where their natural growth habit can be duplicated. That can be done artificially by providing humidity, shelter, and a proper growing medium comparable to that of their native haunts. The plant itself is very easily



Daniel Buckley

Courtesy, American Begonia Society

Camellia—Type Tuberous Begonia

grown under these conditions, being almost pest-free. Little care is required during its growing period except, of course, fortnightly feedings at half-normal strength. I would recommend that the fertilizer used be one derived from fish or a comparable fertilizer that will produce nitrogen slowly for a long period of time. If a ferti-

lizer is used that produces nitrogen rapidly it will cause a luxuriant foliage growth but little or no blooms.

Cleanliness in gardening is the best preventative for disease and pests. Remove the fallen leaves and flowers from beneath the plants each week. If a flower petal falls on a leaf it will usually decay within a few days, so

try to keep the plants clean too.

It is necessary to start dormant tubers properly if we expect to grow specimen plants with many large blooms. Most important, of course, is care in securing fine strains of healthy tubers from a reliable source.

Cover the bottom of a shallow tray with a one-inch layer of dry German peat moss. Place the dormant tubers, crown (concave) side up, on top of the peat. Set the tray in a humid, warm place, over bottom heat if possible, or where a temperature of about 70 degrees may be maintained. If indoors, it will be necessary to *slightly* dampen the moss in order to provide the small amount of moisture they need. Remember they cannot use much water until they have developed a few inches of top growth.

Prepare your rooting trays with a two-inch layer of a mixture of two parts well-decomposed oak leafmold and one part German peat moss, all sifted through a quarter-inch mesh wire screen. When the tubers come to life, plant them five inches apart in the prepared trays. The tops of the tubers should then be covered about one-half inch with the same mixture.

Water very sparingly, keeping the flats damp but not wet. Gradually increase watering as top growth develops. The well-rooted tubers will be ready for planting when there is a top growth of three or four inches.

Today's tuberous begonia is a far cry from the original flower as found in the Andes wilderness. The flowers produced by the original species were small singles and some parents had long, thin, weak stems. Through the years the many hybridizers have crossed and re-crossed the best plants to produce the compact-growing, large, doubled-flowered plant we know today. Soon our foremost hybridizers expect to introduce a plant that will grow naturally low and compact, carrying the giant double flowers erect on thick, sturdy stems which will need no staking. Surely today's most beautiful flower is the giant double ruffled tuberous begonia. (Although lovers of simple things will still find the crisp singles and starry multifloras available.)

GLENN MOTSCHMAN, President-elect, American Begonia Society

A contribution from the American Begonia Society.

Daffodil Section

ROBERTA C. WATROUS, *Editor*

Return to Daffodils.

After giving only intermittent time and attention to my daffodil collection for ten years, the last four of which were spent in the Central American tropics, I was able to make some interesting and provocative comparisons during the daffodil season of 1952. I found it stimulating to see many of the best high-ranking varieties of ten years ago still rating first or second place in the various shows in Washington and Virginia, along with the newer creations of the hybridists. It was a most interesting experience to pick out a flower outstanding in beauty, form, etc., among many other varieties and to find frequently that it was one which I had first seen and selected as notable ten years or more ago. Rodomont, first seen in 1937 or 1938, is still a fine orange and yellow flower with excellent form, good substance, and long stem—one which appears to equal advantage both in the garden and on the show table. The same is true of Dunkeld and Cornish Fire, also in the IIa Division. Among the yellow trumpets Brimstone, Principal, and Moonglow are still outstanding. Among the bicolor trumpets Effective is one of the most unusual and best varieties, followed by Sincerity, Content, and Trousseau. In the white trumpets I still rate Beersheba, Cantatrice, Dunluce, and Cornith as my favorites, and I am particularly impressed by the way in which Cantatrice has withstood neglect and almost naturalizing conditions in my garden for several years. Chastity is excellent as a cut flower although short of stem.

It was heartening to note the greater number of persons who were engaged in hybridizing, especially the increased

interest in developing new miniature varieties, and in planting more of the many beautiful *Narcissus* species. It was particularly pleasing to see a number of the dainty hybrids developed or rescued by Mr. Alec Gray of Cornwall, such as April Tears, Hawera, Tean, Pease-blossom, Raindrop, Rip van Winkle, Pencrebar, and the delightful *Narcissus watieri* from Morocco. I was glad to see the triandrus hybrids, such as Silver Chimes, Rippling Waters, Thalia, and Niveth, in continuing favor, and to know that the distinctive and charming old Engleheart triandrus variety, Dawn, has been rescued from oblivion and is making new friends wherever it appears. Wider interest in cyclamineus hybrids also was noticeable, with such varieties as Beryl, Little Witch, March Sunshine, Pepys, Perconger, and Peeping Tom being seen more frequently and such newer varieties as Jenny, Charity May, and Snipe also appearing.

Among the newer introductions which I saw, the outstanding were Chungking, Chinese White, Rose of Tralee, Foggy Dew, Green Island, Frigid, Binkie, Coral Island, Wild Rose, Red Goblet, Hunter's Moon, and Spitzbergen. I predict that all these varieties will prove very popular as stocks increase. Among the American hybrids I particularly liked were Hoo-sac, Nakota, Nashua, Osage, Powhatan, and Kasota, all productions of Mr. Edwin C. Powell of Maryland.

Pucelle, Dunlewy, and Niphetos are still superb varieties in their classes too seldom seen. Other old favorites deserving greater appreciation are Leprechaun, Evening, Truth, Picador, Distingue, Pinkeen, Brunswick, Tre-

noon, St. Egwin, Tain, Portrush, Master Robert, Mr. Jinks, and Royalist.

It was most delightful to see so many of the cool green-eyed small Leedsii in the shows, such as Dreamlight, Misty Moon, Columbine, and Cushlake, although I have not been able to grow them very satisfactorily in the heavy clay of my garden which dries out and bakes in the hot summers.

Among the old varieties doing well under neglect and naturalizing for almost ten years in my garden are Dawson City, Effective, Cantatrice, and Chastity, trumpets; Aerolite, Carlton, Havelock, Pepper, Yellow Poppy, Alceste, Bernardino, Bodilly, Grayling, Prince Fushimi, Seville, and Silver Star, in Division II; Alight, Alcida, Elspeth, and Mr. Jinks, in Division III; Lune de Miel, double; Dawn, triandrus hybrid; Le Beau, cyclamineus hybrid; and Golden Goblet, large-cupped jonquilla hybrid.

ROBERT C. MONCURE, Alexandria, Virginia

Washington Daffodil Society.

In 1950 three of the larger horticultural organizations in the Washington (D.C.) area, Silver Spring Garden Club, Takoma Horticultural Club, and Woodridge Garden Club, cooperated in sponsoring the First National Capital Narcissus Show. The show was held in two large rooms of the Taft Junior High School and lasted two days. About one hundred exhibitors entered flowers or arrangements in the 69 classes provided by the schedule, which included classes for single specimens, vases of three stems of the same variety, collections by divisions, novelties, seedlings, spring flowers other than *Narcissi*, and arrangements. There were also several commercial displays by daffodil growers or deal-

ers, including some flowers flown from Oregon.

Out of the interest aroused by this show was developed the Washington Daffodil Society, organized a short time later. The objects and purposes of the Society are "to engage in sundry and any projects, efforts, programs, and collective actions to further, advance, and improve the culture, knowledge, enjoyment, use, and education of its members and the public at large in the Daffodil, its botanical relatives, and its natural associates." Unlike most local garden and special plant societies, this one does not attempt to hold monthly or frequent meetings, but centers its attention on such seasonal activities as garden visits during the Daffodil blooming season, planning and holding the annual show, and ordering or exchanging bulbs.

In 1951 eight local garden and horticultural organizations cooperated with the Society in staging the Second National Capital Narcissus Show. One of the features of this show was a small garden showing a planting of about one hundred daffodil bulbs in bloom. This was set up by the Washington Branch of the National Association of Gardeners and attracted much favorable attention. One of the cooperating garden clubs served tea to the Sunday afternoon show visitors.

In 1952 the first Daffodil Institute was held immediately preceding the Third National Capital Narcissus Show, which was again sponsored by the Washington Daffodil Society. The Institute was planned to interest more members of the gardening public in daffodils. A very realistic small garden corner with clumps of daffodils and other spring flowers, built on the stage of the auditorium by the National Association of Gardeners, proved

a revelation to many visitors who "had no idea there were so many kinds." There was also a table display of standard and novelty varieties and of books and clippings relating to daffodils. In addition to two evening sessions of talks on subjects relating to daffodil culture, breeding, exhibiting, and appreciation, there was a class in flower arranging for children one afternoon and a separate daffodil show for novices only the other. At the show for novices experienced exhibitors helped the beginners classify, mark, and set up their flowers. The class in flower arranging for children began with a brief talk and demonstration, after which the children were grouped around tables and provided with flowers and foliage to be arranged in the containers they had brought. After the arrangements were made and judged each child was given a small package of gladiolus bulbs and there were additional awards for the children whose arrangements were judged best.

The 1953 Daffodil Institute and Show will be held on April 17th, 18th, and 19th, in the auditorium of the Woodward & Lothrop Bethesda-Chevy Chase Suburban Store, Western and Wisconsin Avenues, Chevy Chase, Md. The Institute will feature a symposium on topics of interest to advanced daffodil growers. Special at-

tention will be given to species and small varieties in the stage garden. Arrangement classes in the Show are planned to emphasize quality in daffodils. A special committee will assist novice exhibitors.

In connection with the Society's cooperative bulb purchases, a list of varieties recommended for beginners in this area was worked out, and this list has been given considerable publicity. Another educational activity has been the contribution of short articles for the garden page of the local newspapers. Speakers have been provided for garden club meetings.

The Washington Daffodil Society invites communications from other daffodil societies, garden clubs which have daffodil projects, and from individual daffodil enthusiasts, either for publication in this Section of the *National Horticultural Magazine* or for consideration by officers or members of the Society. Reports of successful projects, reports of shows, activities of hybridizers, suggestions, and other comments will be welcomed. Questions, including those concerning sources of supply for uncommon varieties, will be answered as far as possible. Address communications to the Washington Daffodil Society, 5031 Reno Road, N.W., Washington 8, D. C.

Recent Advances In Horticulture

FREEMAN A. WEISS, *Editor*

Systemic Pesticides

Ever since P. A. Millardet, in 1882, publicized the efficacy of a mixture of bluestone (copper sulfate) and lime as a means of protecting grapes from the ravages of downy mildew, and thus initiated spraying with Bordeaux Mixture as a standard practice in the production of various crops, agricultural scientists have been seeking ways of making spray residues longer lasting and less unsightly. It should be recalled that Millardet's discovery of the fungicidal value of this bluestone-lime was only incidental to its use by the vineyardist on the ripening grapes to discourage human pilferers. The presence of this unappetizing coating perhaps had a deterrent effect on small boys that outlasted its value as a fungicide.

Obviously, the ideal pesticide would be one that needs to be applied only once and will be absorbed by the roots or leaves, diffusing throughout the plant and rendering it toxic or repellent to whatever pest or parasite that may attack it. Of course, the toxicant would have to be harmless to domestic animals or to man, and being internal there would be no question of an unsightly coating. By a systemic pesticide is meant one that has these properties in some degree even though it may fall considerably short of the ideal.

Nature seems to have anticipated man in producing plants equipped with built-in toxins, but we can not say whether this is for the purpose of protection against pests of any kind. In many cases the presence of toxic properties in plants seems to be "just one of those things." At any rate, when it was discovered that certain notorious-

ly poisonous plants, the loco weeds, of the Western Plains, owed their toxicity to their capacity for absorbing the chemical element selenium from the soil and storing it in their parts, it was only a step to try selenium compounds as systemic pesticides. This resulted in rather spectacular success in controlling certain pests, chiefly spider mites and aphids, of greenhouse-grown ornamentals, especially carnations and chrysanthemums. Sodium selenate was the compound chiefly used in soil applications, and a product containing this compound known as P-40 is still on the market, but the extreme toxicity of selenium for man and animals, and the long persistence of its compounds in soil after one treatment, have made its use on or even near food crops impossible. Accordingly, selenium pesticides have largely given way to certain phosphorus-containing products which the chemists first began devising as lethal war gases. The now familiar Parathion was the first of the phosphorus compounds that showed prolonged systemic effects. Its high personal hazard, and the facts that some plants did not absorb it readily while some kinds of mites were very resistant to it, stimulated further search for more effective systemic pesticides.

The next step toward this goal was the production of Pestox in England, and Systox in Germany. These materials have as the active ingredient either a compound bearing the horrendous name of octamethyl pyrophosphoramidate or some analogue of it. In a recent article on spider mites, in the U. S. Department of Agriculture Yearbook for 1952 — "*Insects*," Dr. Floyd F. Smith writes, "The materials

resulted in the most satisfactory control of resistant mites in experiments conducted in commercial greenhouses. They are absorbed by the plant and render the sap toxic to feeding mites and aphids for 2 to 4 weeks or longer after they have been applied." Strangely, however, Pestox "has no contact action of value for killing mites or aphids."

The use of these systemic pesticides on plants other than ornamentals is still only in the experimental stage and, in fact, they have not yet been released for commercial sale. Results to date are encouraging straws in the wind that we may in due time have efficient pesticides that require only infrequent application, that work internally by making plants toxic only to such pests as feed on them, and do not detract from their ornamental value.

So much for the materials that are effective against animal pests such as insects, mites, and perhaps some nematodes. What are the plant pathologists doing to develop systemic fungicides and bactericides, since most materials used for controlling animal pests are of no value against organisms of plant affinity? Progress in this direction has thus far been made chiefly in England, where a detailed and comprehensive investigation of systemic fungicides is under way. It has included first a study of known fungicides for systemic properties, and second the examination of substances found to be translocatable in plants for fungicidal effects.

Starting the second phase of this survey with the chlorophenoxyacetic acids and related compounds, which are the basis of the selective and systemic weed-killers such as 2,4-D, the British investigators found several compounds that were appreciably fungicidal but noninjurious to plants. Furthermore, they were absorbed by plants through the roots and to some extent through the leaves; thus either soil or foliage applications could be made.

The possibility of using as systemic fungicides the secretions or excretions of fungi and bacteria themselves, the products that have leapt into prominence under the name antibiotics in human pathology, also is being investigated. Though some antibiotics have proved highly toxic to plants, others are comparatively harmless but have marked fungicidal properties. As there are well nigh infinite possibilities of variation in these materials, together with the wide range of compounds that the chemists can create, the search for usable fungicides among them will be long indeed. It has progressed far enough, however, to show that this is a promising direction for further research. Coupled with the inherent resistance to various diseases and pests that the plant breeders are introducing more and more into cultivated plants, including ornamentals, the prospect seems good for increasing relief, with less effort, from the tribulations that pests impose upon the gardener.

A Book Or Two

Plants of the Bible. Harold N. Moldenke and Alma L. Moldenke. The Chronica Botanica Company, Waltham, Massachusetts. ("A New Series of Plant Science Books," Vol. 28. 1952. 364 pages, illustrated. \$7.50.

Luke 12:27—Consider the lilies how they grow: they toil not, they spin not; and yet I say unto you, that Solomon in all his glory was not arrayed like one of these.

This familiar verse from the Bible is but one of hundreds which carry to us fragments of the plant lore of the Holy Land of two thousand years ago. Plants then as today played an intimate part in the lives of the people and it is little wonder that the Bible is filled with innumerable references to them.

Down through the centuries Bible students have evoked interest in the plants of the Scriptures with the idea of learning the exact identities of those mentioned. This volume by the Moldenkes, a husband and wife team, is the most recent, the most authoritative, and probably the most exhaustive of recent works on Bible plants. It is essentially a book of reference. Dr. Moldenke, until recently Curator of the Herbarium of the New York Botanical Garden, would naturally be interested in this subject for in his family there are more than a handful of clergymen. To such a biblical environment add a career of botanical investigation in which he has shown special aptitude in the minute details of bibliography, a bent quite necessary in collaborating in the preparation of a work of this kind.

The Moldenkes inform us that contributions to the botany of the Bible began with the early Greek philosophers but that the first volume dealing solely with Bible plants was that of Levinus

Lemmens whose book appeared in 1566. Publications on this subject have continued to appear regularly down to the present time. Just how much has been written can be gathered from the fact that the Moldenkes' bibliography lists upwards of 500 references to secular accounts of this type.

The task of correctly identifying Bible plants, often from fragmentary allusions, is not an easy one involving as it does many an inference and many an educated guess. Few botanists would care for instance to identify even tentatively such famed Scriptural plants as the "burning bush," the "manna of the desert," or even the "green bay tree," all of which are discussed in the present work. To add to the difficulty many species common in Biblical times possibly have disappeared due in part to the increased aridity in the Holy Land brought about by poor utilization of the land down through the centuries. Nor have Bible translators always been of help. Mostly untrained in natural science they have more often than not assumed that Bible plants were identical with those passing under the same name in their own countries. Later translations have often been based on earlier ones and not on the original writings and so errors have often been long perpetuated. The Moldenkes point out that even in the old, yet still popular King James Version the identification of plants is far from accurate. For example in this translation aspens are called "mulberries," the almond becomes a "hazel," the juniper is called a "heath," the dill is called "anise," the apricot becomes an "apple," the box is called "ivory," the cypress is called "box," and the plane-tree becomes a "chestnut!"

In the Moldenkes' work some 230 plants, vascular and non-vascular (the latter including such types as bacteria, molds, and lichens) have been discussed. The contents include a short historical sketch and phytogeographical description of modern Palestine, while the bulk of the volume is taken up with individual discussions of each species, arranged alphabetically by its scientific name rather than in phylogenetic order. The more important Scriptural citations, referring to a particular species, head each individual discussion. A chapter of supplementary notes has been added and the authors state that any additional relevant information that comes to their attention will be issued from time to time in "Chronica Botanica." A general index and also one to Bible verses have been included. Many of the illustrations are reproductions of interesting engravings from early Bible literature. They are of the type that one comes to expect in the publications of the Chronica Botanica Company.

This reviewer would like to correct one error in the text. A common misconception is continued in naming *Aloe succotrina* Lam. (page 35) as the source of the drug aloes of Socotra (and of the Bible). In spite of its specific name *Aloe succotrina* is endemic to a limited area around the Cape Peninsula of South Africa. It is not a drug-producing aloe. The aloes of the Bible may have been derived from the drug aloe of Socotra, namely *Aloe Perryi* Baker; but it is equally possible that *Aloe barbadensis* Miller (*A. vera* "L." of many authors), a wider ranging species of the Red Sea and Mediterranean region, was a more common source of true aloes in Biblical times.

W. H. HODGE

The American Camellia Yearbook, 1952. Published for Members of the Society, Box 2398, University Station, Gainesville, Fla. Membership \$5.00 the year. 286 pages, illustrated in color and black and white.

The yearbook is always of interest to the camellia grower and should be of interest to the non-grower whether he is about to become a grower or not. The editors, Messrs. Arthur C. Brown and Austin Griffiths Jr., are to be congratulated on the diversity of texts in this issue that range from the highly technical paper on chromosome counts by Dr. Janaki Ammal to a delightful skit in the New Yorker manner on Camellia Snobs. For the person interested in propagation there are articles on grafting, for the gardener, articles on all phases of garden practice, for the collector reports from here and there listing items to be scorned or coveted and purchased, a new proposal for show classification, all the usual huzzahs about flower arrangements (the judges' comments are printed this time and as usual the minority voice is the interesting one), various historical bits that could not be saved if one had waited much longer perhaps, and the continuation of James Stokes "Early Occidental Camelliana" which is a very nice thing.

The reviewer is a camellia beginner which very decided personal likes and dislikes of which he is fully aware but he has never yet failed to find in the Camellia Yearbooks something of pleasure and something of profit for himself in the garden and for the nurseryman from whom he made purchases. Join the Society by all means and buy the back files, if you must!

The Daffodil and Tulip Yearbook for 1953 No. 18. Edited by P. M. Synge. Published by The Royal Horticultural Society, London, England. 1952. 198 pages, illustrated. \$2.40 post free.

For the American reader who has seen a British Show, each year book comes as a happy reminder of the deliriously wonderful time he once had, and as a cause of wonder that the refinements can continue in the established lines and that new lines can come along as well. He can pass over the notes on the smaller shows and from the far-flung corners of the Empire if he wish, he can sigh that the growing for this country is so unevenly reported and then settle down to digest the reports on the great shows and the garden visits, to consider and reconsider which varieties sound most to his taste and whether or not he can push his budget to buy them this year or next or the year after.

In this volume there are two articles of special interest to the reviewer who doubtless has a biased view, namely "Daffodils in the Wild" by Cyril F. Coleman who tells of his trips hunting them on the Continent in a most delightful fashion and the other, "Some White N. *Bulbocodium* Forms" by D. Blanchard, which tells his amateur experiences in growing all the forms that he would come by with enough details to make it possible for the American grower to interpret them to his own conditions and equipment. There is an intriguing account of the breeding underway which shows that the end is not yet in the narcissus world.

The Seed Industry. Edgar J. Clissold, Bellman Publishing Co., Boston, Mass. (American Industries Monograph No. 3). 1946. 47 pages. \$1.00.

Mr. Clissold analyzes the *Seed Industry* as to the various types of employment offered and the training needed to fit the worker for them. The author is well experienced in the seed trade, particularly that segment dealing with vegetable and flower seeds.

The production of seeds—vegetable and flowers, hybrid corn, and field seeds (grasses and legumes) including the cereals, is a small but highly important industry because upon it depends much of the food production of the Nation. The harvesting, cleaning, packaging and distribution of seeds requires the services of a considerable number of workers—some highly trained technical workers, others semi-skilled and many unskilled. Mr. Clissold has listed them by groups, describing their qualifications and duties. The industry is highly specialized and most of the operations are seasonal, this makes the continuous employment of all but the key workers somewhat of a problem.

The author omitted mention of the plant breeder who has recently come into considerable prominence in the various segments of the seed industry. It is the plant breeder who develops new varieties and maintains the stock seeds. The plant breeder, usually an agricultural college graduate, should have training in genetics as well as in horticulture or agronomy.

The author discusses vegetable seed production as it was prior to 1946. Today it is even more highly centralized in the favorable producing areas of the Far West. To a certain extent imported seeds, such as spinach, are supplanting certain kinds that formerly were produced in the Mount Vernon area in Washington. At the same time domestic production has expanded for other kinds, such as cauliflower, and

there is a growing export trade.

Occasionally the author confuses the reader as he attempts to cover all divisions of the seed industry. For the most part the discussion relates to the vegetable seed division. The field seeds, especially the grasses and legumes are passed over lightly. No mention is made of the hybrid seed corn division, which has assumed great importance in recent years. However, these divisions employ, with the exception of the packeting and cataloging workers, about the same types and skills of workers.

W. H. YOUNGMAN

Decorating with House Plants. Ruth Gannon. The Studio Publications, Inc. In association with the Thomas Y. Crowell Company, New York, 1952. 136 pages, illustrated. \$5.00.

This is a most interesting book in that it starts out with a somewhat different premise than most books that treat of house plants. It clearly shows in the title that it is not a book of instructions on the growing of house plants. As one reads on through the book itself, however, there is much more discussion of how to grow the wretched things than there is on how to keep them in health in the places they are to decorate, there is nothing at all about the place to which many will have to retire periodically for periods of recuperation, not much to tell about the business of heaving them in and out, though doubtless that too is done by the faithful 'Alice' (see page 95).

The fact remains, however, that the illustrations that show house plants as decorations are almost all of them very top flight quality not only as photographs, but as decorations. In addition they are well diversified, though most appear to have been done in what is

so succinctly known in the present day jargon, as the "upper income brackets."

The main business is the discussion of the plants that are suitable for use in houses. This includes a wide range of material classified to make discussion simple, into the usual headings. There is a very nice inclusion of new materials without any neglect of the old faithfuls. The advice in almost every case is of the most sound but there are a few very dubious inclusions for ordinary house decorations, as for example the inclusion in the chapter on Cacti and Succulents of many individuals that need light *from all sides all the time*, and want a drier—or, in some cases—a moister air than the usual house affords. *Lithops bella* and its kin, do not like an ordinary house, and certainly could be used only in a very special type of house 'decoration'. The Mammillarias, Astrophytums, Notocactus and Opuntias all look very odd in no time at all if not suited better than the usual house window.

One has the feeling that the author who undoubtedly has success with house plants and a charming taste in placing them well may have been lured into writing a book that contains chapters with which she may have had less experience than warranted a text. But, if the book had no other claim to distinction, and it has many, there should be a special medal of distinguished service awarded the author for her chapter on Gift Plants which was foreshadowed by the ever more forceful sentence on page 12—I quote—"Most gift plants should be bought to be enjoyed during their relatively short period of bloom, and then be discarded." The sad thing is that most persons who should heed this advice won't embrace it.

There is one illustration, beautiful in itself, that is absolutely unpardonable, namely the lovely color plate that faces page 16. No one should risk potted plants on an inside stairway of such narrow dimensions and carpeted to boot! Unless of course it is done deliberately when some less well-loved relative has come to visit and might happily crash headlong down, bombarded *en passant* with potted plants, a new and lovely death. But jesting aside, stairways are traffic lines in design and nothing should be allowed to interfere with the flow of traffic in the places that are designed for it.

Guide to English Gardens. Alice Chauncy, The Horticultural Society of New York, Inc., New York 19, New York. 1952. 28 pages, illustrated. \$1.00 per copy.

A suggested guide for garden visits to England and Scotland, including fifty private gardens, prepared from Miss Chauncy's own intimate, personal and up-to-the-minute knowledge of the finest English and Scottish homes and gardens.

American Tomato Yearbook. 1952. Dr. John W. Carncross, Editor. Rutgers University, College of Agriculture, New Brunswick, New Jersey. 1952. 36 pages, illustrated. \$2.00 (available from American Tomato Yearbook, Editorial Office, 8 Elm Street, Westfield, N. J.)

The 1952 edition of the *American Tomato Yearbook* is again edited by Dr. Carncross, and contains much interesting and vital information to the tomato grower, the tomato dealer and shipper, the tomato canner, the tomato research specialist and all those with an interest in the tomato industry.

Of special significance is the complete and up-to-date list of recent ref-

erences to tomato culture, tomato diseases, pests and their control. There is also helpful information covering such important subjects as "Tomato Spraying" "Tomato Planting Tips," and "Grade Requirements for Canning and Processing."

The book is illustrated with up-to-date charts and graphs giving a complete picture of the tomato industry. In addition there is much statistical information of vital importance. This includes a tabulation of states giving current data on tomato yield, acreage and production for both processing and fresh market, statistics on tomato juice, tomato pulp, tomato catsup, tomato imports and exports.

Other leading features include a leading article on adequate tomato spray coverage by W. C. Handwerk, Supervisor of Extension, Campbell Soup Company, two pages on tomatoes in Canada, a complete list of state agricultural colleges and experiment stations, a breakdown by states of commercial varieties, a classified directory of business concerns serving the tomato field, a list of leading associations engaged in the tomato industry and information on the composition and food value of the tomato.

The Best Loved Trees of America. Robert S. Lemmon. Doubleday and American Garden Guild, New York 22, N. Y. 254 pages, including numerous superb black and white illustrations. \$3.50.

The author invests his trees with character and also describes many of their characteristics. Not all readers will agree that a black walnut for example has "moods and manners" or that its quiet poise marks it as one of the great gentlemen among American trees. A gentleman with web worms

perhaps! For many the author's subjective characterizations will add interest to his descriptions, but to others the implication that a tree has "self-willed wood" and similar expressions will be hard to take, but any such reader has no privilege to complain if he has read the second paragraph of the introduction.

Mr. Lemmon seems to have followed no logical pattern in arranging the sequence of his chosen species. Thus one must look at the index or the table of contents at the front to find a particular description. Eastern and western, coniferous and broadleaf trees follow one another indiscriminately. However, this disorganization is at most only a small annoyance.

Sixteen species of conifers, 41 of broadleaves, 1 palm and 1 tree lily (*Yucca brevifolia*) are discussed. The species are well chosen from different sections of the United States and Canada. The selections will not satisfy everyone but are representative of familiar forest, shade and ornamental trees. The illustrations of summer and winter habits, flowers, fruits, leaves and bark are excellent. The photograph of the flower of *Magnolia grandiflora* is so lifelike that one can almost feel the texture of the petals and catch its pervasive fragrance. The pictures of mature trees should be helpful in planning tree plantings for home grounds. This is not a book for botanists but rather for amateurs who like to have at hand a ready source of information and inspiration about common trees. The intimate accounts of growing habits, requirements and history make pleasant reading.

Teleological interpretations of tree behavior, which are scattered here and there through the book, sometimes lead the author astray. For example, he

suggests that if western hemlock is started from seeds it might succeed in lowland sites because the seedlings never having known about the habitat of their parents would not be prejudiced against such surroundings. Delightful, but pure poppycock.

In placing restrictions on the sizes of trees that can be transplanted successfully the author apparently had in mind the amateur rather than the professional with proper tree moving equipment. With adequate equipment and proper methods, large trees of most species can be transplanted without undue danger of loss.

In the discussions of some trees additional information would have made a more accurate presentation possible. Sycamore anthracnose, sometimes mistaken for frost injury, causes damage and disfiguration in the spring when the leaves are developing as well as in late summer as suggested by the author. This fungus disease is very difficult to control. The London plane, which is warned against, is very resistant to anthracnose. The statement that the "white pines," meaning *Pinus strobus*, are among the finest evergreens for ornamental plantings except where the blister rust is a problem should be further qualified to advise that the eastern white pine is best in a cool climate and not adapted to the hot lowlands. The chief drawback to more extensive use of the horsechestnut is a fungus disease commonly called leaf blotch. This disease, more than the drought or overcrowding mentioned by the author, is largely responsible for the unsightly appearance of the leaves after midsummer.

The American beech is *Fagus grandifolia*, not *F. sylvatica* as given on page 26.

The Gardener's Pocketbook

Concerning *Oxalis*

Any one who lived and gardened in a place where oxalis can become too invasive a member of the garden community probably will look with suspicion on the rest. The writer never having lived where he could make the beautiful *Oxalis adenophylla* or *O. enneaphylla* happy had always coveted a species that would make for him a similar sward of leaves with flowers studding its surface. That desire plus a natural curiosity led to the purchase of several species from an autumn bulb list which began their lives most unhappily in pots, unhappily only in so far as blooming was concerned, though curiosity was certainly whetted by the sight of *O. hirta* that came up and made leafy stems that could easily have been mistaken for a dwarf cytisus on causal glance. In pots, never a flower or sign of one.

All were moved to the Mississippi garden as dried bulbs in 1952 and only *O. Bowiei* showed any signs of life till autumn when all began to appear. *O. hirta* sent up its stalks again, but this time stiff and erect and toward autumn gave a few flowers, in the usual oxalis style, rose colored with a clear slightly greenish yellow eye. In Sampson Clay's volume for The Present-Day Rock Garden, is the note ". . . usually blooms too late in the year to be a success in the open." Here the late October early November flowers were not caught but stopped as cooler weather came on. The plants have gone through the winter as evergreens with a little autumn tinting on the older leaves. So far it is a tight clump.

O. Bowiei which grew at once and flowered lost all its leaves with the first

real frost, but it is coming again now (January) with decent foliage. This one suspects will be invasive.

O. variabilis and *O. brasiliensis* are spreading but in tight carpets of leaves that lie flat on the ground. *O. variabilis* has flowered, in the typical magenta-rose form and very charming. One wishes that the white form were available. As yet no sign of buds have come on *O. brasiliensis* but its carpet of leaves is almost as fine as that of a true alpine. How much the light sandy soil and the "warm" site have to do with the habit remain to be seen and whether or not the plants will in time spread where they are not wanted can only be proven in time.

Pass Christian, Miss.

Acer Davidi

One cannot help but wonder why certain plants that have long ago been introduced to this country have not received the popularity that they seem to warrant. Is it because they have been found to be difficult to propagate and grow? Yes, this is probably part of the answer, since many nurserymen are not too anxious to carry stock which they cannot turn over rapidly and profitably. What, then, is the answer when a desirable plant which propagates easily from seed and grows well, does not become wide spread in cultivation in those areas where it will grow best? I believe, the answer to this is that no one has really "pushed" it and it is my opinion that *Acer Davidi* is a plant worth "pushing."

Acer Davidi is native to China and is wide spread there, being found in all but the northern and northeastern provinces according to Rehder. This species was introduced to this country



Oxalis fulgida (Crimson Oxalis)
Photographed from the "Botanical Register"
Vol. XIII, Plate 1073, 1827.

in 1879 and again in 1902. It would seem then that there has been ample time for it to become well established in all suitable areas of the United States.

The species of *A. Davidi* belongs to that section of the genus *Acer* known as *Macrantha* which is characterized by having the bark on the branches of the younger parts of the trunk striped white. Undoubtedly the best known member of this section is *A. pennsylvanicum* (Moose Wood), a native of northeastern U. S. and also found along the upland south to Georgia. This maple, however, has never become very popular because: 1) it is too open in habit, and 2) it does not do well at low elevations and in full sun. Its usefulness, therefore, is limited to shaded sites in naturalistic plantings in areas where the summers are not too hot.

Plants of *A. Davidi* have been growing at the U. S. National Arboretum in Washington, D. C. for fifteen years, and were at one time, and may still be, in the collections of the Arnold Arboretum and the Brooklyn Botanic Gardens. It is on the basis of performance at the National Arboretum that I recommend it for areas having a climate similar to that of D. C. The trees are now twelve to fifteen feet in height and Rehder states that the species reaches a height of forty-five in their native habitat. Unlike *A. pennsylvanica* it tolerates full sun and develops into a compact tree ranging from broad oval to broad columnar in outline. There is no record in the literature indicating that a *fastigiata* type of this plant exists, however, there is present in the collection at the arboretum a *fastigiata* form.

Their pendulous racemes of yellow flowers, the clean dark green leaves

during summer, the yellow autumn color of the foliage, and the sparkling white striated bark, during the winter months, are all noteworthy characters of landscape merit. This is a maple well worth trying.

Novelties.

Every gardener with any sort of inquiring mind looks at any plant that is offered as "new" and/or "better." And even when he knows that it is easy to be beguiled by the properly glowing prospect of new descriptions, he feels a sporting urge to see for himself.

Among the plants that are being offered in 1953 by Wayside gardens are several that intrigue the editor no end, and some that he has already seen and liked as for example, *Aster Winston Churchill* which to this eye is most assuredly not red but a delightful burgundy color.

For summer-flowering in regions where it flourishes nothing is better than the old "blue-flowered spirea" which all of us know is no spirea but a mint relative. The gray green leaves, with the powder-blue flower clusters paired down the over-arching branches are a summer delight. If the new sort "Heavenly Blue" is really deep blue, it will be a wonderful addition and if the growth stays low and compact that will also help. But do not overlook the significant words, advice to grow it in a "warm, dry, sunny spot" and the advice about sandy soil and full sun.

The "Yellow Lilac" which is said to be more properly described as cream-colored, is certain to make a hit. Although the introducer suggests, in contrast with lilac, blue and lavender shades, we hope some one with imagination will combine it with the known whites that already run either to green on one hand or have a hint of flesh color.



Robert L. Taylor

Acer Davidi

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